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GOVERNMENT POLICY AND TUITION IN HIGHER EDUCATION

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ABSTRACT

Tuition and fees for higher education have increased at a rate much higher than inflation over the past 40 years. Although the amount students pay has risen much less than listed tuition, net price also continues to increase faster than inflation. Taxpayer-funded subsidies to higher education have also increased substantially during this period. The Bennett hypothesis states that tuition will increase in response to subsidies. We review the variety of government programs subsidizing higher education and summarize the existing evidence on the Bennett hypothesis. The evidence on the Bennett hypothesis remains mixed, providing some evidence that the effectiveness of the subsidies in increasing college enrollment is diminished to the degree that taxpayer moneys are diverted to the institutions of higher education.

JEL codes: H52, H75, I22, I23

Keywords: higher education, tuition, Bennett hypothesis, subsidy, Pell Grant, federal loan program, college costs

I. INTRODUCTION

Listed tuition—essentially the sticker price—for US colleges has increased significantly, even after adjusting for inflation. For all institutions of higher education, that increase averages 71 percent since 1990 and 36 percent since 2000.[1] Tuition has increased faster in public, four-year institutions, where the increase has averaged 126 percent since 1990 and 62 percent since 2000, but listed tuition has increased in all categories—public and private, for-profit and not-for-profit, two-year and four-year. Private schools' prices started in 1990 at much higher absolute levels, so although their increases since then have generally been lower in terms of percentage, they were often higher in terms of dollar amount.

In the 2013 State of the Union address, President Obama stated that "taxpayers cannot continue to subsidize the soaring cost of higher education. Colleges must do their part to keep costs down, and it's our job to make sure they do." In the same speech, the president argued that policies such as tax credits, grants, and subsidized loans have been important policy tools to "make college more affordable." In 2007 President George W. Bush signed into law a bill that increased the maximum Pell Grant award—in order, he said, to "help millions of low-income Americans earn a college degree."[2] Both presidents failed to mention that the policies they supported could themselves have been responsible for some of the increase in tuition. Considering two effects of the subsidies—direct price reduction and higher sticker prices—at the same time is important for understanding the intended and unintended consequences of higher education subsidies.

Academic research highlights a variety of explanations for rising tuition. These explanations center on three main factors: the rising costs of providing higher education, the increased demand for higher education, and certain changes in government

1. Authors' calculations from Thomas D. Snyder and S. A. Dillow, Digest of Education Statistics 2011 (NCES 2012-001, National Center for Education Statistics, Washington, DC, 2012), table 349.
2. Associated Press, "Bush Signs Tuition-Aid Bill He Had Opposed," NBC News.com, September 27, 2007, http://www.nbcnews.com/id/21014582/ns/politics/t/bush-signs-tuition-aid-bill-he-had-opposed/; George W. Bush, "Remarks on Signing the College Cost Reduction and Access Act," September 27, 2007, published in *Public Papers of the Presidents of the United States*: George W. Bush (2007, book 2) 1244–46, http://www.gpo.gov/fdsys/pkg/PPP-2007-book2/html/PPP-2007-book2-doc-pg1244.htm.

policy. Unfortunately, all of these are aggravated by the concern typically referred to as Bowen's law—that universities will spend any revenues available to them "only indirectly and distantly [determined] by considerations of need, technology, efficiency, and market wages and prices."[3]

In what follows, we focus on the role that government subsidies play in how universities set tuition. We first document rising college tuition. We then describe common government subsidies for higher education, such as Pell Grants and federal subsidized loans, as well as state-funded institutions and state scholarship programs. We review the existing literature on the effects of government subsidies on tuition, and then provide a summary of our findings.

II. OVERVIEW OF TRENDS IN TUITION PRICING

Since 1971/72, the average list price for college has risen across all types of institutions. Sandy Baum and Jennifer Ma, economists and policy analysts at the College Board, document this increase among three primary institution types: private, nonprofit, four-year institutions; public, four-year institutions; and public, two-year institutions.[4] We reproduce these data in figure 1 to illustrate the rise in tuition that has attracted so much concern. All dollar amounts are adjusted for inflation to 2012 dollars; tuition includes all required fees.[5] Among private, nonprofit, four-year institutions, average tuition increased from $10,245 in 1971/72 to $29,056 in 2012/13, which is an average annual increase of 4 percent over the rate of inflation. Tuition increases were largest in the 1980s, and the rate of increase has fallen during the 1990s and the first decade of the 2000s. Public, four-year institutions post lower tuitions than their private counterparts, but they have increased tuition more rapidly. List price for public, four-year institutions averaged $2,117 in 1971/72 and rose to $8,655 in 2012/13: a 309 percent increase. Tuition increases averaged 7 percent per year, with increases accelerating over the past 40 years. Annual increases averaged 1.9 percent in the 1970s, 3.1 percent in the 1980s, 4 percent in the 1990s, and 5 percent in the first decade of the 2000s. Even with these large increases, tuition at public, four-year institutions on average remains less than a third of tuition at private, nonprofit, four-year institutions. Public, two-year institutions list even lower

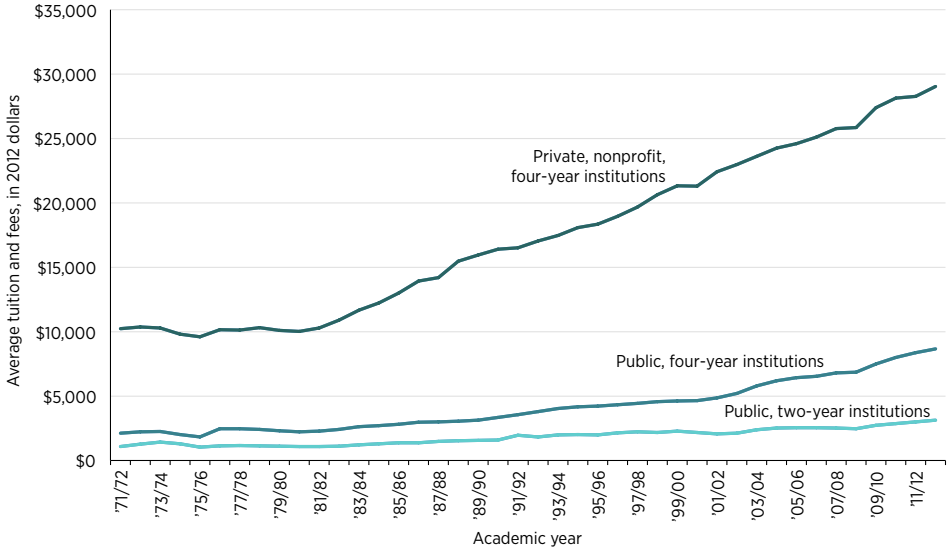
3. Howard Bowen, *The Costs of Higher Education: How Much Do Colleges and Universities Spend per Student and How Much Should They Spend?* (San Francisco: Jossey-Bass Publishers, 1980), 19.

4. Sandy Baum and Jennifer Ma, *Trends in College Pricing, 2012* (New York: College Board, 2012), http://trends.collegeboard.org/college-pricing.

5. Data, including room, board, tuition, and fees, from Baum and Ma's study suggest slightly slower increases. List price at private, four-year institutions including room and board averaged $16,420 in 1971/72 and rose to $39,518 in 2012/13: a 141 percent increase. At public four-year institutions, tuition, fees, room, and board rose from $7,639 in 1971/72 to $17,860 in 2012/13: a 134 percent increase. These charges, in real terms, declined slightly in the 1970s and consistently increased faster than inflation in the 1980s, 1990s, and the first decade of the 2000s. Baum and Ma, *Trends in College Pricing*.

tuition prices. In 1971/72, list price averaged $1,081. In 2012/13, list price at a public, two-year institution averaged $3,131—a 190 percent increase. Listed tuition and fees have consistently increased faster than inflation for all institution types over the past 40 years.

FIGURE 1. AVERAGE LIST PRICE BY INSTITUTION TYPE, ADJUSTED FOR INFLATION, 1971–2013



Source: Sandy Baum and Jennifer Ma, Trends in College Pricing, 2012 *(New York: College Board, 2012), table 2, http://trends.collegeboard.org/college-pricing.*

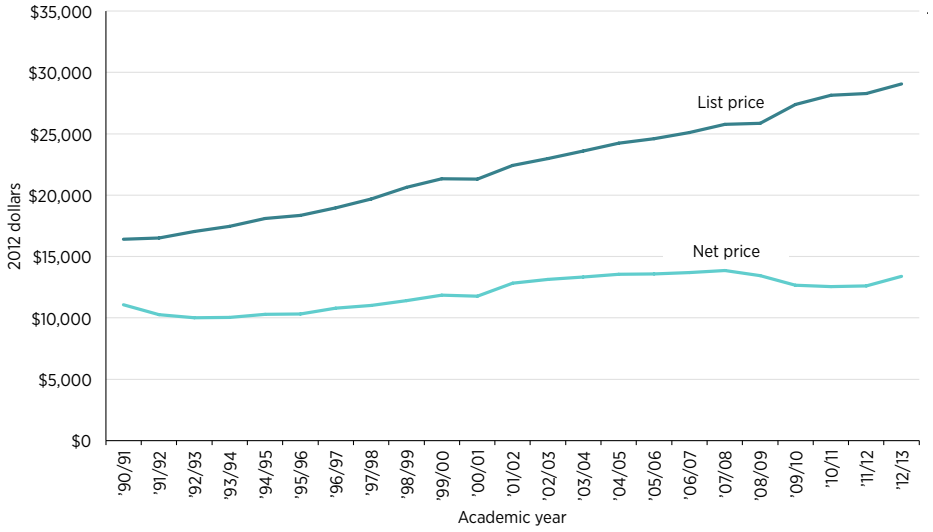
Most students, however, do not pay the listed tuition and fees. A wide variety of government grants and tax credits as well as institutional grants and scholarships offset some of the tuition. We are therefore primarily concerned with the net price to students, the actual price paid for higher education. The gap between list price and net price reflects the size of any government subsidies as well as the fact that institutions charge different students different prices. Colleges and universities may engage in price discrimination—the more formal term for charging different students different prices—in several different ways. They may charge higher prices to students in some degree programs or students who take particular classes; they may also charge lower prices to students who have better academic records. Finally, since most students submit financial-aid applications with detailed information on their ability to pay, the university can use this information to charge higher prices to students who have an ability to pay higher prices.[6] Baum and Ma document that, in

6. For example, suppose a university posts tuition and required fees of $20,000 per year and enrolls 100 students. One student pays $20,000 per year and the remaining 99 students pay $10,000. Average paid price is $10,100, well below the listed tuition.

2009/10, federal and state grant aid made up 78 percent of tuition revenue at public, two-year schools, 37–42 percent at public bachelor's and master's institutions, 18 percent at public PhD institutions, 9–11 percent at private bachelor's and master's institutions, and 4 percent at private PhD institutions.[7] Further, most institutions provide institutional grant aid to some students. This aid discounts the list price for those students, typically in the form of a scholarship or grant from the college. In 2009/10, these institutional discounts on average reduced the price to students at two-year institutions by 7 percent, at public institutions by 10–18 percent, and at private institutions by 27–36 percent.[8]

Baum and Ma calculate net tuition and fees by subtracting grant aid from all sources, both governmental and institutional, as well as tax credits.[9] Federal loan programs also subsidize paid tuition through deferred interest, loan-forgiveness programs, and subsidized interest rates. These loan subsidies are not included in the net tuition figures provided below.[10] In figures 2 through 4, we graph the list price

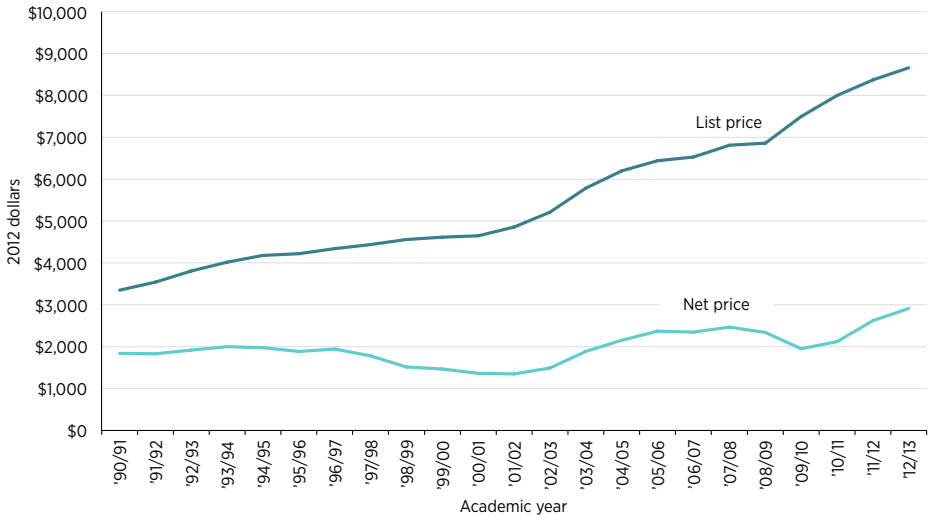
FIGURE 2. LIST PRICE AND NET PRICE FOR PRIVATE, NONPROFIT, FOUR-YEAR INSTITUTIONS, ADJUSTED FOR INFLATION, 1990–2013



Source: Sandy Baum and Jennifer Ma, Trends in College Pricing, 2012 *(New York: College Board, 2012), table 7, http://trends.collegeboard.org/college-pricing.*

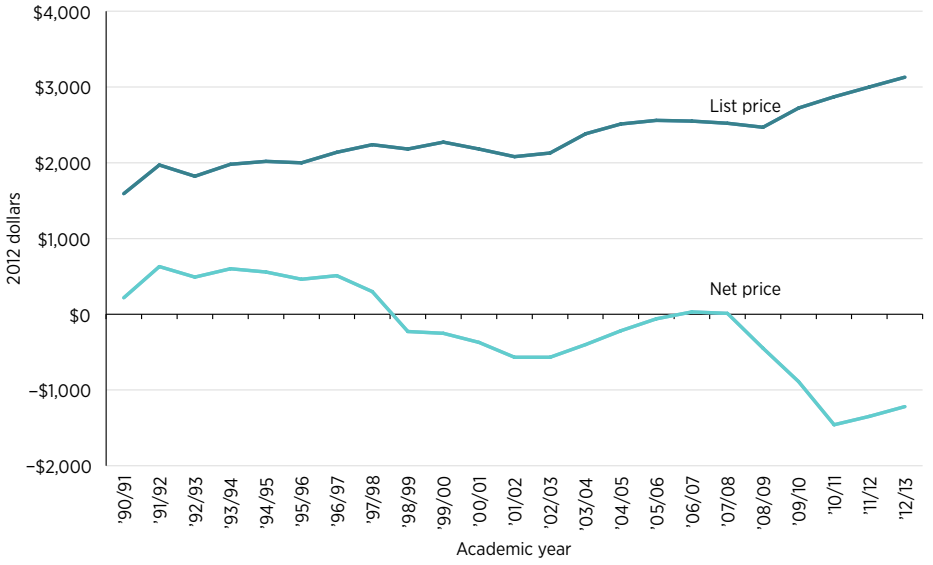
7. Baum and Ma, *Trends in College Pricing*, 21.
8. Ibid.
9. Ibid.
10. Although institutions can track tuition funds paid via federal loan programs, it would be difficult to determine the extent to which an individual student was subsidized through the program before observing his or her default record on the loans. As such, institutions cannot report these calculations via typical data sources such as IPEDS. In some studies, such as Nicholas Turner's recent paper, individual-level data are used to estimate the effect of subsidies on tuition; these data do not allow us to make institution-specific inferences about paid tuition. See Nicholas Turner, "Who Benefits from Student Aid? The Economic Incidence of Tax-Based Federal Student Aid," *Economics of Education Review* 31, no. 4 (2012): 463–81.

FIGURE 3. LIST PRICE AND NET PRICE FOR IN-STATE, PUBLIC, FOUR-YEAR INSTITUTIONS, ADJUSTED FOR INFLATION, 1990–2013



Source: Sandy Baum and Jennifer Ma, Trends in College Pricing, 2012 *(New York: College Board, 2012), table 7, http://trends.collegeboard.org/college-pricing.*

FIGURE 4. LIST PRICE AND NET PRICE FOR IN-STATE, PUBLIC, TWO-YEAR INSTITUTIONS, ADJUSTED FOR INFLATION, 1990–2013



Source: Sandy Baum and Jennifer Ma, Trends in College Pricing, 2012 *(New York: College Board, 2012), table 7, http://trends.collegeboard.org/college-pricing.*

and net price in 2012 dollars for the three main types of institutions from 1990/91 to 2012/13.[11] Some general patterns emerge. Many students pay significantly less than published prices, and the gap between the listed and paid prices has grown over the years. Tuition paid by students has increased more slowly than is suggested by the dramatically increasing published prices.

In figure 2 we graph list and paid prices for private, nonprofit, four-year institutions. Although published tuition and fees were $16,410 in 1990/91, on average students paid about 67 percent of this, or $11,060, after grant aid and tax benefits. By 2012/13, students were paying only 46 percent of the published tuition and fees, or $13,380 of the $29,030 published price. The average price paid by students has risen much more slowly than the published price: the published price increased 77 percent between 1990/91 and 2012/13, while the price students pay for college rose only 21 percent, or less than 1 percent per year. (This increase is still larger than the rise in median income.)[12]

Figure 3 documents published and net prices for public, four-year institutions, using in-state tuition prices. Published tuition and fees rose 159 percent between 1990/91 and 2012/13, from $3,350 to $8,660. Net tuition and fees rose a much smaller 58 percent, from $1,840 to $2,910. The experience with public, two-year institutions differs, as shown in figure 4. Despite a 97 percent increase in published tuition and fees, student net price *fell* 655 percent at public, two-year institutions—from $220 to −$1,220—meaning that students received money (or tax credits) to pay for room and board or other expenses while attending these institutions.

Given the differing trends for list price and paid price, it is important to distinguish what students actually pay from what institutions list as their price. Government subsidies of higher education, in particular, may affect listed tuition and paid tuition differently. We discuss the available evidence on this question below.

III. EXPLANATIONS FOR RISING COLLEGE TUITION

The academic literature's explanations of rising college tuition fall into three main categories: colleges' higher costs of operation, increased enrollment in higher education, and government subsidies of higher education. As our focus is on the role of government subsidies, we only briefly review the former two explanations.

An increase in the cost of providing higher education likely leads to a rise in tuition. One source of rising costs of providing higher education is termed Baumol's cost disease.[13] The labor-intensive nature of higher education's production method

11. These data are from table 7 of Baum and Ma, *Trends in College Pricing*.
12. Tamar Lewin, "College May Become Unaffordable for Most in the US," *New York Times*, December 3, 2008, http://www.nytimes.com/2008/12/03/education/03college.html.
13. William J. Baumol and William G. Bowen, *Performing Arts: The Economic Dilemma* (New York: The Twentieth Century Fund, 1966); William J. Baumol, *The Cost Disease: Why Computers Get Cheaper and Health Care Doesn't* (New Haven: Yale University Press, 2012).

leads costs to increase more rapidly than they tend to do in capital-intensive industries where improving technology may keep costs down. Robert Archibald and David Feldman, economics professors at the University of William and Mary, argue that cost increases in higher education parallel those of labor-intensive service industries, implying that Baumol's theory explains most, if not all, of the rise in colleges' per-pupil expenditures.[14] Other sources of rising costs include more expansive and intensive student support services as larger proportions of the population attend college.[15] Malcolm Getz and John Siegfried, economics professors at Vanderbilt University, list additional sources of cost increases, such as a transition toward more students in expensive disciplines, a shortage in some inputs that are particular to higher education, poor management, and higher expenditures associated with growing governmental requirements.[16]

Another source of rising prices may be the increasing demand for higher education. Since the early 1970s, the enrollment rate of 18–24-year-old high school completers in US colleges and universities has increased nearly every year. By 2007, enrollment rates reached 41.2 percent of people in that age group and almost 50 percent of high school completers.[17] Figure 5 illustrates this rising enrollment rate among high school completers aged 18–24. The same figure shows that enrollment among minorities rose more rapidly than among whites, and this increase is particularly notable among minority high school completers. The increase in college enrollment extends beyond young people.[18] Some of the increase is due to demographic changes as the echo baby boom—the largest generation since the baby boomers, born approximately between the early 1980s and the mid-1990s—aged

14. Robert B. Archibald and David H. Feldman, "Explaining Increases in Higher Education Costs," *Journal of Higher Education* 79, no. 3 (2008): 268–95. Note, however, that per-pupil expenditures (the cost of providing education) do not equal either list tuition or paid tuition. For example, in 1995/96, per-pupil expenditures averaged $16,365 while listed tuition (including fees, room, and board) averaged $12,879. See Thomas D. Snyder and Charlene M. Hoffman, Digest of Education Statistics, 2000 (NCES 2001-034, National Center for Education Statistics, Washington, DC, 2001), table 339 adjusted to 2012 dollars; and Thomas D. Snyder and S. A. Dillow, Digest of Education Statistics 2010 (NCES 2011-015, National Center for Education Statistics, Washington, DC, 2011), table 349, adjusted to 2012 dollars. Averaging paid tuition by the fraction enrolled by sector and each sector's paid price produces an average paid tuition of $3,070 (calculations from figure 19 and tables 7 and 9 from Baum and Ma, *Trends in College Pricing*).

15. Ronald G. Ehrenberg and Susan H. Murphy, "What Price Diversity? The Death of Need-Based Financial Aid at Selective Private Colleges and Universities," *Change* 25, no. 4 (1993): 64–73; Dinah Sparks and Nat Malkus, "First-Year Undergraduate Remedial Coursetaking: 1999–2000, 2003–2004, 2007–2008," *Statistics in Brief*, National Center for Education Statistics, January 2013, http://nces.ed.gov/pubs2013/2013013.pdf.

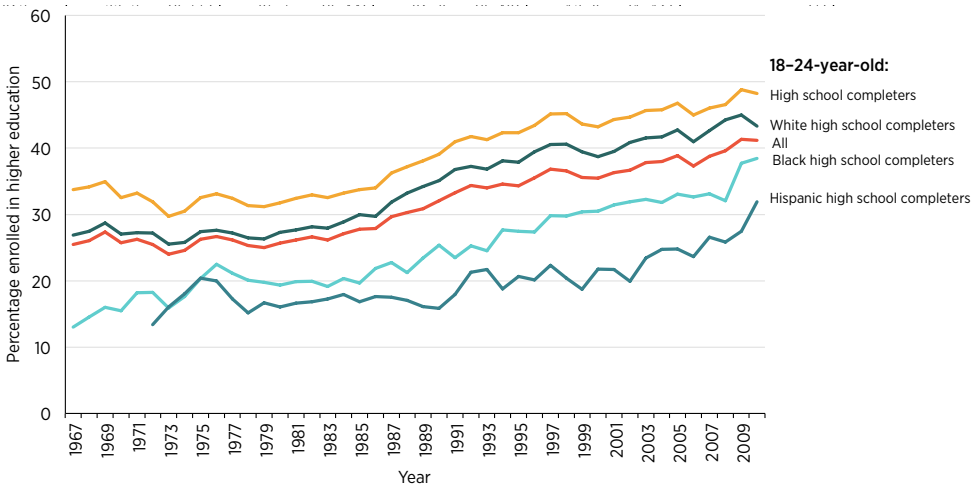
16. Malcolm Getz and John J. Siegfried, "Cost Inflation," in *Economic Challenges in Higher Education* (a National Bureau of Economic Research Monograph), by Charles T. Clotfelter et al. (Chicago: University of Chicago Press, 1991).

17. Thomas D. Snyder and S. A. Dillow, Digest of Education Statistics 2011 (NCES 2012-001, National Center for Education Statistics, Washington, DC, 2012), table 213.

18. Ibid., table 206.

into the college years. However, the increase begins before the echo baby boom and continues after it, and the percentage of enrollees among echo baby boomers is higher than it is among earlier groups.

FIGURE 5. ENROLLMENT RATES OF 18–24-YEAR-OLDS



Source: Thomas D. Snyder and S. A. Dillow, Digest of Education Statistics 2011 (NCES 2012-001, National Center for Education Statistics, Washington, DC, 2012), table 213.

Further, the returns from college attendance have increased.[19] Expecting a greater return on their investment in education, more young adults are willing to pay for college, and such an increase in demand is expected to increase price. Since 2007, the youth unemployment rate has been increasing.[20] This high unemployment rate lowers the opportunity cost of seeking additional schooling and increases the demand for higher education.[21]

19. For example, Jeff Grogger and Eric Eide document the rising return to college in the 1980s. Jeff Grogger and Eric Eide, "Changes in College Skills and the Rise in the College Wage Premium," *Journal of Human Resources* 30, no. 2 (1995): 280–310. Christopher Taber attributes much of this to an increase in the return to unobserved ability. Christopher R. Taber, "The Rising College Premium in the Eighties: Return to College or Return to Unobserved Ability?," *Review of Economic Studies* 68, no. 3 (2001): 665–91. Nicole Fortin shows that the college–high school wage gap continued to grow, albeit more slowly in the 1990s. Nicole Fortin, "Higher Education Policies and the College Wage Premium: Cross-State Evidence from the 1990s," *American Economic Review* 96, no. 4 (2006): 959–87.

20. Bureau of Labor Statistics, "Summer Youth Labor Force News Release," August 21, 2012, http://www.bls.gov/news.release/archives/youth_08212012.htm.

21. Julian Betts and Laurel L. McFarland, "Safe Port in a Storm: The Impact of Labor Market Conditions on Community College Enrollments," *Journal of Human Resources* 30, no. 4 (1995): 741–65. Note that, for increased demand to lead to higher prices, the supply curve must slope upwards. An upwards-sloping supply curve implies that the cost of educating an additional student increases with enrollment. Although

Increased demand due to the expanding population and the rising returns to college likely increases the need for colleges to employ administrators, whose salaries are the fastest-growing portion of higher-education spending.[22] As the number of students increases, the costs of providing services to these students might increase, because it is more likely that the needs of the students will no longer be as well aligned with the institution. In addition, the reporting demands of the government and accreditation agencies have increased.[23]

Increased nationwide competition among colleges and universities likely also affected the variation in tuition. In a monopolistically competitive industry, sellers of higher-quality services may raise prices to capture the less-price-sensitive consumers, or those who demand high quality. If the sellers are able to price discriminate, this strategy is even more successful. Stanford University economics professor Caroline Hoxby highlights how increased competition among colleges resulting from reduced transportation and communication costs leads to divergent quality and prices.[24] Preliminary work by one of this report's authors, Angela Dills, and her

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economists often model the long-run supply curve in higher education as being perfectly elastic, we believe that the long-run supply curve for higher education can be considered to be upward sloping. For examples of the assumption of perfect elasticity, see Archibald and Feldman, "Explaining Increases," who follow Sandy Baum, *A Primer on Economics for Financial Aid Professionals* (Washington, DC: National Association of Student Financial Aid Administrators, 1996); Charles T. Clotfelter, "Demand for Undergraduate Education," in *Economic Challenges in Higher Education*, ed. Charles Clotfelter et al. (Chicago: University of Chicago Press, 1991); Donald E. Heller, "The Effects of Tuition and State Financial Aid on Public College Enrollment," *Review of Higher Education* 23, no. 1, (1999): 65–89; and Michael Rothschild and Lawrence White, "The Analytics of Pricing in Higher Education and Other Services in Which Customers Are Inputs," *Journal of Political Economy* 103, no. 3 (1995): 573–86. For an upward-sloping curve, see Arthur M. Hauptman, *Public Policies, Prices, and Productivity in American Higher Education* (Washington, DC: American Enterprise Institute, 2013), http://www.aei.org/files/2013/04/11/-public-policies-prices-and-productivity-in-american-higher-education_082108551799.pdf; Donald E. Heller, "Trends in the Affordability of Public Colleges and Universities: The Contradiction of Increasing Prices and Increasing Enrollment," in *The States and Public Higher Education Policy: Affordability, Access, and Accountability*, ed. Donald E. Heller, 13–36 (Baltimore, MD: Johns Hopkins University Press, 2001); and Donald E. Heller, *Does Federal Financial Aid Drive Up College Prices?* (Washington, DC: American Council on Education, 2013.)

As colleges and universities expand, their increasing demand for inputs might raise their costs through higher prices in their input markets, particularly faculty. In addition, new entrants into the industry might face higher costs than existing firms. Even if the supply curve for higher education is perfectly elastic in the long run, our explanation still holds for an upward-sloping short-run supply curve. We could also model higher education as a monopolistically competitive market, as does Michael Paulsen, and in such a market, a subsidy can lead to an increase in the price. Michael B. Paulsen, "Economic Perspectives in Rising College Tuition," in *The Finance of Higher Education: Theory, Research, Policy, and Practice*, ed. Michael B. Paulsen and John C. Smart (New York: Agathon, 2001).

22. Jay P. Greene, "Administrative Bloat at American Universities: The Real Reason for High Costs in Higher Education," *Policy Report*, Goldwater Institute, no. 239, August 17, 2010, http://goldwaterinstitute.org/sites/default/files/Administrative%20Bloat.pdf.

23. Dan Berrett, "The Fall of the Faculty," *Inside Higher Ed*, July 14, 2011, http://www.insidehighered.com/news/2011/07/14/new_book_argues_bloated_administration_is_what_ails_higher_education.

24. Caroline M. Hoxby, "The Changing Selectivity of American Colleges," *Journal of Economic Perspectives* 23, no. 4 (2009): 95–118.

coauthor, economist Kurt Rotthoff, lends support to the idea that increased competition from the expansion of for-profit colleges may lead higher-quality schools to increase listed tuition and practice more extensive price discrimination.[25]

This paper focuses on the third type of explanation for rising tuition: government subsidies. William Bennett, education secretary under President Reagan, proposed what has been termed the Bennett hypothesis. He stated in a *New York Times* op-ed in 1987 that "increases in financial aid in recent years have enabled colleges and universities blithely to raise their tuitions, confident that Federal loan subsidies would help cushion the increase."[26] In other words, he believed that when government support to students attending colleges increased, the colleges were able to capture the majority of the subsidy by raising the price by as much as, or almost as much as, the amount of the subsidy. Larry Singell and Joe Stone, economics professors at the University of Indiana and the University of Oregon, propose two additional explanations.[27] One is that if a subsidy is combined with a market where the sellers are not perfectly competitive, the sellers may be able to increase the price of the good by the full amount of the subsidy; the other is that in a market where competition is imperfect, some universities may be able to extract more than the full amount of the subsidy through price discrimination. Because list price and paid price are not the same, universities may increase the list price, allowing them to charge a wider variety of prices to matriculating students. This price discrimination leads some applicants to pay less tuition to the college after the subsidy while others pay the same amount to the college as before the subsidy. In other words, the paid price for some consumers lowers by the entire amount of the subsidy, while with others the university is able to absorb the full amount and the consumers' paid price does not change, holding other factors, such as college quality, constant. This second argument is supported by University of Iowa professor of education Michael Paulsen, who argues that one particular imperfectly competitive market, the monopolistically competitive model, better describes higher education.[28]

One additional explanation for the price increase, outside the scope of this paper, is that the increase in tuition may reflect an increase in the quality of education provided. However, Richard Arum and Josipa Roksa, sociology professors at New York University and the University of Virginia, present evidence that today's college students learn little and that the quality of learning in colleges is decreasing over time.[29]

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25. Angela Dills and Kurt Rotthoff, "Price Increasing Competition: Evidence from Higher Education" (working paper, Providence College, 2013).
26. William J. Bennett, "Our Greedy Colleges," *New York Times*, February 18, 1987, http://www.nytimes.com/1987/02/18/opinion/our-greedy-colleges.html.
27. Larry D. Singell and Joe A. Stone, "For Whom the Pell Tolls: The Response of University Tuition to Federal Grants-in-Aid," *Economics of Education Review* 26 (2007): 285–95.
28. Paulsen, "Economic Perspectives."
29. Richard Arum and Josipa Roksa, *Academically Adrift: Limited Learning on College Campuses* (Chicago: University of Chicago Press, 2010).

The late Philip Babcock, an economics professor at the University of California, Santa Barbara, and Mindy Marks, an economics professor at the University of California, Riverside, document that the amount of time invested in a college credit has fallen in the period from 1961 to 2003.[30] They conclude that either education production functions have improved or the amount of human capital accumulation associated with a four-year degree may have diminished as the use of time as an input has decreased.

The real problem for evaluating this possible explanation is that there is no good measure of the outputs that college delivers. College provides an opportunity for increasing one's skills as well as a signal of the graduate's intrinsic ability and, particularly in the case of four-year institutions, an opportunity to socialize with a selective peer group. University of Michigan professors Brian Jacob, Brian McCall, and Kevin Stange argue that, not only has demand increased in terms of the quantity of students attending colleges and universities, but students' desire for the amenities that are to be provided by these institutions has also increased.[31] As a result, the ratio of amenity to academic spending is a significant predictor of enrollment increases. Federal subsidies may increase college quality in ways that students, but not taxpayers, value. Bowen's law, for example, suggests that the absence of a profit-seeking constraint may encourage spending that adds little to no value, a concern restated by Centre College economics professor Robert Martin and by Richard Vedder, director of the Center for College Affordability & Productivity.[32]

Higher education in the United States is subsidized highly by state and federal governments. In 2009, the average institute of higher education received 35 percent of its operating revenues from government sources.[33] We review the literature on federal and state subsidies and discuss work that has estimated the impact of these subsidies on tuition, focusing on attempts to test the Bennett hypothesis.

IV. FEDERAL SUBSIDIES OF HIGHER EDUCATION

The federal government subsidizes higher education in a variety of ways, including grants, subsidized loans, and tax credits.[34] Figure 6 displays the growth

30. Philip Babcock and Mindy Marks, "The Falling Time Cost of College: Evidence from Half a Century of Time Use Data," *Review of Economics and Statistics* 93, no. 2 (2011): 468–78.
31. Brian Jacob, Brian McCall, and Kevin M. Stange, "College as Country Club: Do Colleges Cater to Students' Preferences for Consumption?" (NBER Working Paper No. 18745, National Bureau of Economic Research, 2013).
32. Robert E. Martin, *The Revenue-to-Cost Spiral in Higher Education* (Raleigh, NC: The John William Pope Center for Higher Education Policy, 2009); Richard Vedder, *Going Broke by Degree: Why College Costs Too Much* (Washington, DC: AEI Press, 2004).
33. Authors' calculations using the Delta Cost Project's IPEDS database.
34. The federal government also subsidizes colleges and universities through research funding from agencies such as the National Science Foundation and the Department of Defense. In real 2012 dollars, such funding rose from $5.8 billion in 1963 to $21 billion in 2005 to $43.5 billion in 2010/11. See "Guide

in federal support for higher education since 1965.[35] In 1965, federal support of higher education totaled $8.925 billion (in 2012 dollars). The Higher Education Act of 1965 expanded the role of the federal government in higher education. Title IV of the act, in particular, covers federal financial-aid programs for college students. In real terms, subsidies more than quadrupled over 10 years, reaching $36.75 billion in 1975. Support rose steadily in the 1970s and 1980s and then more quickly in the 1990s and again in the first decade of the 2000s. By 2010, federal support reached $164.85 billion, a real increase of 347 percent since 1975, and 1,757 percent since 1965. Federal spending in 2010 was concentrated in three major programs: the William D. Ford Federal Direct Loan Program ($118.32 billion in 2012 dollars), Pell Grants ($34.741 billion in 2012 dollars), and Federal Work Study ($1.07 billion in 2012 dollars).[36] Other programs include veterans' educational and training benefits ($11 billion in 2012 dollars) and campus-based programs such as Federal Supplemental Educational Opportunity Grants (FSEOG) ($798 million in 2012 dollars).

Federal involvement in student-loan programs began with the 1958 National Defense Education Act.[37] Over the years, federal loan programs comprised subsidized and unsubsidized Stafford loans, the Federal Family Education Loan (FFEL) Program (formerly known as the Guaranteed Student Loan Program), Supplemental

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to R&D Funding Data—R&D at Colleges and Universities," American Association for the Advancement of Science, last modified August 22, 2008, http://www.aaas.org/spp/rd/guiuniv.html; and Ronda Britt, "Universities Report Highest-Ever R&D Spending of $65 Billion in FY 2011," *InfoBrief*, National Center for Science and Engineering Studies, November 2012, http://www.nsf.gov/statistics/infbrief/nsf13305/nsf13305.pdf.

Federal grants to colleges and universities comprise a large fraction of federal subsidies to higher education. We are not aware of academic literature analyzing the role of the research grants on tuition, particularly for undergraduate students. These grants may increase tuition by raising the quality of research institutions, which increases students' willingness to pay for that education. On the other hand, these grants may lower tuition by providing institutions with an additional revenue stream and allowing institutions to lower tuition to students. Note that these research grants likely disproportionately affect four-year colleges and universities.

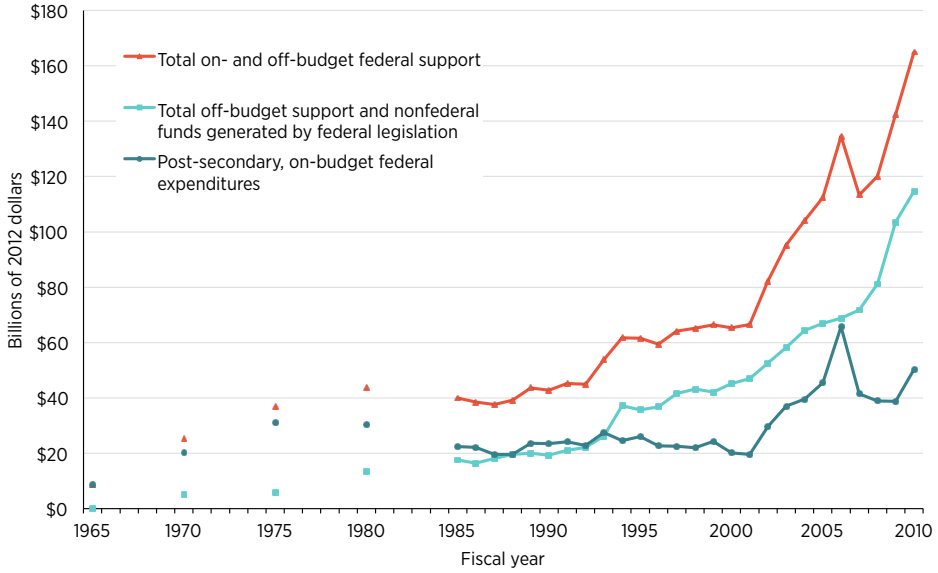
Michael McPherson and Morton Schapiro find that federal grants and contracts lower gross tuition and fees at private, four-year institutions and raise them at public, two-year schools. Further, federal grants increase institutional aid at private, four-year institutions and public, two-year and four-year schools. Michael S. McPherson and Morton Owen Schapiro, *Keeping College Affordable: Government and Educational Opportunity* (Washington, DC: The Brookings Institution, 1991).

35. Note that these figures include nonfederal support generated by federal legislation. This typically comprises "non-Federal (generally State or local) funds provided to obtain Federal matching funds and capital provided by private lenders for education loans." US Senate Committee on the Budget, "Education, International Affairs and Social Security Task Forces . . ." (US Senate, 1998), 97, http://trove.nla.gov.au/work/6821455?selectedversion=NBD41998630.

36. The Federal Work Study program was authorized by the Higher Education Act of 1965. Richard W. Riley, "Biennial Evaluation Report: Fiscal Years 1993–1994" (US Government Printing Office, 1995), http://www2.ed.gov/pubs/Biennial/505.html.

37. US Department of Education, "Overview: The Federal Role in Education," last modified February 13, 2012, http://www2.ed.gov/about/overview/fed/role.html.

FIGURE 6. FEDERAL SUPPORT FOR EDUCATION, ADJUSTED FOR INFLATION



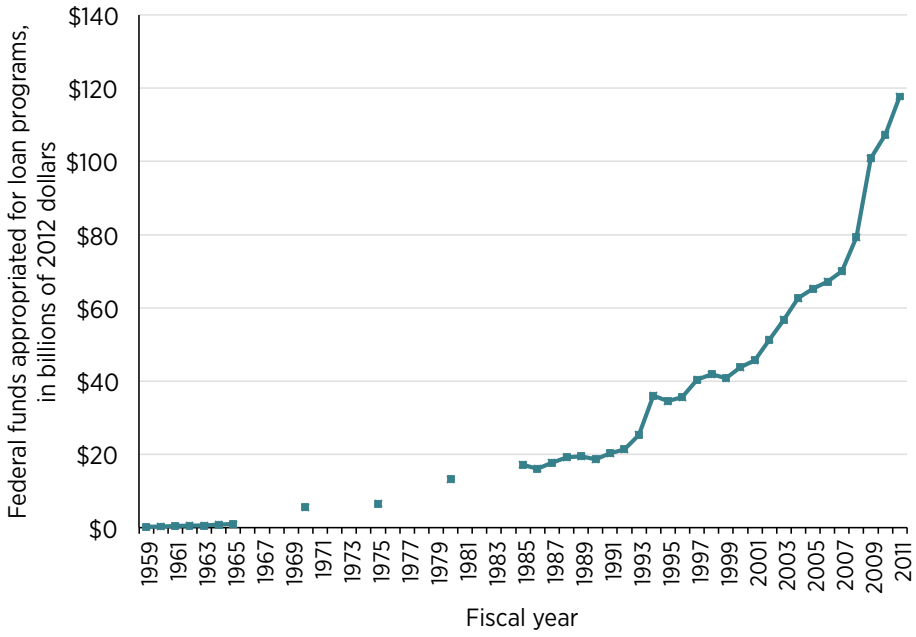
Note: Off-budget support includes loan programs, work-study aid, and supplemental educational opportunity grants. On-budget programs include Pell Grants.

Source: Thomas D. Snyder and S. A. Dillow, Digest of Education Statistics 2010 (NCES 2011-015, National Center for Education Statistics, Washington, DC, 2011), table 380.

Loans for Students (SLS), and Parent Loan for Undergraduate Student (PLUS) loans. These programs exist in their current states under the Direct Loan Program. Expenditures on these programs measure the subsidy to college students and consist of the costs of the federal government's subsidizing the interest and assuming the risk of default.[38] Figure 7 illustrates the rise in spending on federal subsidized loans for higher education. After a slow, steady rise between 1959 and 1993, the introduction of the Direct Loan Program in 1994 expanded federal loan subsidies more rapidly.[39] The sharp expansion begun in 2008 reflects lowered interest rates charged on student loans in the Direct Loan program,[40] expanded loan limits,[41] and an increase in college attendance due to the recession.[42]

38. Under "subsidized Stafford Loans," the subsidy refers to the federal government paying the interest accrued on these loans while the debtor is in school. Loan expenditures include the subsidy referred to in the program name as well as interest-rate subsidies and assumption of the risk of default.
39. The Higher Education Amendments of 1992 began a pilot version of the William D. Ford Direct Loan Program. The Direct Loan Program was phased in beginning in 1994/95 as authorized by the Student Loan Reform Act of 1993. "A History of Direct Loans," Information for Financial Aid Professionals, last modified July 1, 1996, http://ifap.ed.gov/dlfsheets/doc0006_bodyoftext.htm.
40. College Cost Reduction and Access Act of 2007.
41. Ensuring Student Access to Student Loans Act of 2008.
42. Lisa Barrow and Jonathan Davis, "The Upside of Down: Postsecondary Enrollment in the Great Recession," *Economic Perspectives*, Federal Reserve Bank of Chicago, 36, Fourth Quarter (2012): 117–29. Recently, Congress passed legislation pegging interest rates for college students to the 10-year Treasury

FIGURE 7. TOTAL FEDERAL FUNDS APPROPRIATED FOR FEDERAL LOAN PROGRAMS, ADJUSTED FOR INFLATION



Note: Gaps in data are due to incomplete information on the Federal Family Education Loan Program during certain years. Funds for the Federal Insured Student Loan Program (1968–84) and the Supplemental Loan for Students Program (1981–94) are not included; however, a relatively small number of loans were issued from these two programs.

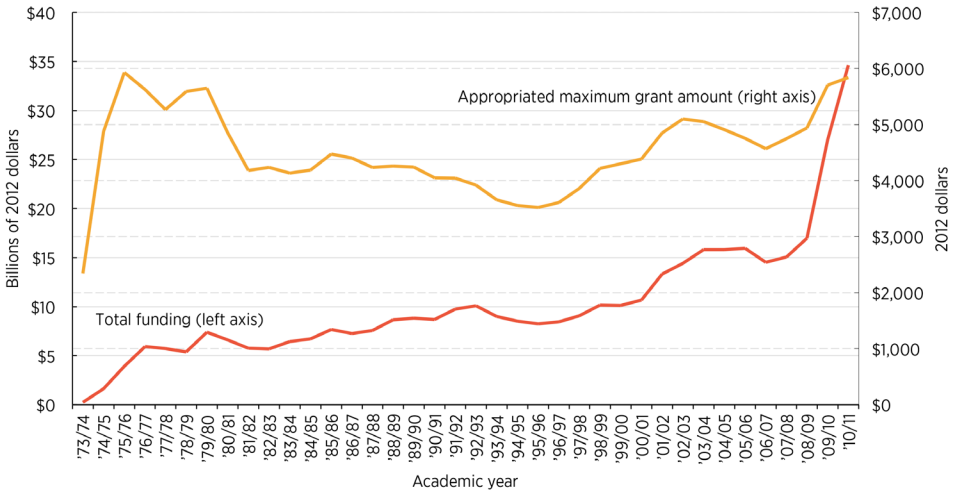
Sources: For Perkins Loan data see "Federal Campus-Based Programs Data Book 2012," Department of Education, last modified July 3, 2012, http://www2.ed.gov/finaid/prof/resources/data/databook2012/databook2012.html; for Direct Loan Program and Federal Family Education Loan Program data see Thomas D. Snyder and S. A. Dillow, Digest of Education Statistics 2011 (NCES 2012-001, National Center for Education Statistics, Washington, DC, 2012), table 384; for Income Contingent Loan data see "Income Contingent Loan Demonstration Program," Archived Information, CFDA No. 84.226, Department of Education, accessed December 4, 2013, http://www2.ed.gov/pubs/Biennial/506.html.

The Pell Grant program began with a 1972 amendment to the Higher Education Act of 1965. Pell Grant awards are intended for undergraduates from lower-income families. The maximum Pell Grant award changes every few years. The authorizing statute sets the authorized maximum Pell Grant for each year, but it has rarely been the appropriated maximum grant. Annual appropriations legislation for the Department of Education funds the Pell Grant program and sets the appropriated maximum Pell Grant. Figure 8 shows the rise in Pell Grant expenditures since 1973/74 as well as the appropriated maximum award per student (in real 2012 dollars).[43] Total Pell Grant expenditures rose quickly in the mid-1970s, then more

note plus 2.05 percentage points. Elvina Nawaguna (Reuters), "U.S. Congress Finally Votes to Cut Student Loan Interest Rates," *DailyFinance*, July 31, 2013, http://www.dailyfinance.com/2013/07/31/congress-votes-cut-student-loan-interest-rates/.

43. The appropriated maximum and authorized maximum have only been equal in FY 1975, FY 1976, and FY 1979. The appropriated funds are determined in advance of the year that the Pell Grants will be issued which leads to some difficulty in determining the proper amount of funds to appropriate. Charmaine

FIGURE 8. PELL GRANT FUNDING AND GRANT SIZE



Source: "Pell Grant Historical Figures," FinAid, accessed December 4, 2013, http://www.finaid.org/educators/pellgrant.phtml.

steadily through the 1980s and 1990s. Expenditures slightly accelerated early in the first decade of the 2000s, dipping in the 2006/07 and 2007/08 school years before more than doubling between 2008/09 and 2010/11. The maximum award tracks some of the trend in total expenditures. In the mid-1970s, the maximum award steeply increased, mostly as appropriations caught up to the authorized amount. The maximum declined between the mid-1970s and the mid-1990s, then rose in the 15 years since.

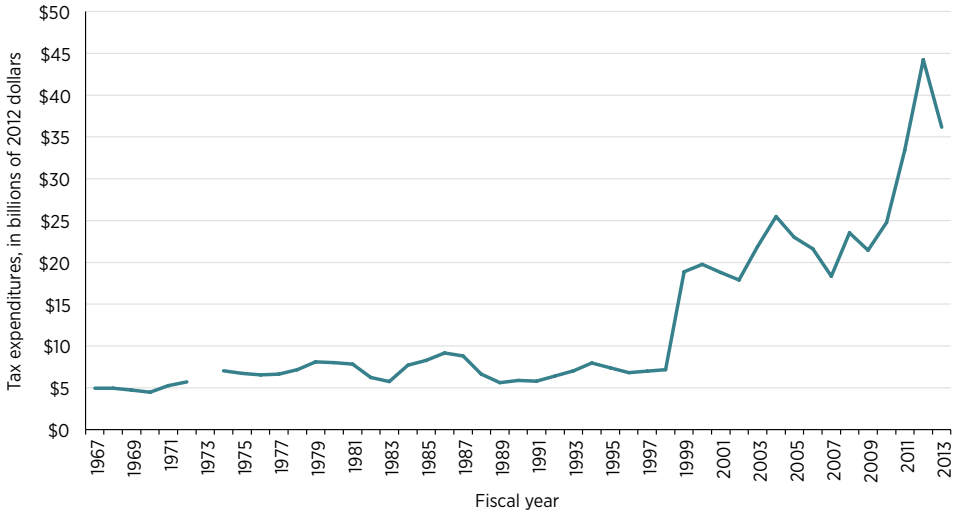
These figures exclude tax expenditures, the tax revenue given up through the granting of tax credits and deductions.[44] Education-related tax expenditures rose from just under $5 billion in 1967 to $44 billion in 2012. Figure 9 illustrates the slight rise in education-related tax expenditures between 1967 and 1998. These tax expenditures include deductions for employment-related education expenses, exclusions of scholarship and fellowship income and veterans' education benefits, parental personal exemptions for students aged 19–24, interest exclusions on qualified US savings bonds, and the exclusion for employer-provided educational assistance.[45]

Mercer, *Federal Pell Grant Program of the Higher Education Act: Background and Reauthorization* (Congressional Research Service 7-5700, January 30, 2008), 4–12, http://www.leahy.senate.gov/imo/media/doc/CRSFederalPellGrant.pdf. "Maximum award" refers to the appropriated maximum award in the text below.

44. For background on tax expenditures in the federal tax code, see Jeremy Horpedahl and Brandon M. Pizzola, "A Trillion Little Subsidies: The Economic Impact of Tax Expenditures in the Federal Income Tax Code" (Mercatus Research, Mercatus Center at George Mason University, Arlington, VA, October 25, 2012), http://mercatus.org/sites/default/files/TaxExpenditures_Horpedahl_v1-0.pdf.

45. Julie-Anne Cronin, "The Economic Effects and Beneficiaries of the Administration's Proposed Higher Education Tax Subsidies," *National Tax Journal* 50 (September 1997): 520–21.

FIGURE 9. TAX EXPENDITURES FOR EDUCATION



Note: The data gap is due to missing tax expenditures for the year 1973.

Sources: Joint Committee on Taxation, table 1, "Estimates of Federal Tax Expenditures Prepared for Committee on Ways and Means and Committee on Finance," various years (for example: https://www.jct.gov/publications.html?func=startdown&id=4446); Analytical Perspectives, Budget of the United States Government, various years (for example: http://www.gpo.gov/fdsys/pkg/BUDGET-2008-PER/pdf/BUDGET-2008-PER.pdf).

The HOPE tax credit and the Lifetime Learning Credit began with the passage of the Taxpayer Relief Act of 1997. Tax expenditures increased in 1998 and 1999 reflecting these tax credits. Another steep increase occurred in 2011 following the passage of the American Opportunity Tax Credit as part of the American Recovery and Reinvestment Act of 2009.

Previous economic research considers how these subsidies affect college tuition, with mixed conclusions. In a report commissioned by Congress, Institute for Higher Education director of research Alisa Cunningham and her colleagues find no relationship between changes in an institution's tuition and the fraction of its students receiving any aid; the percentages receiving federal grants, state grants, or student loans; or the average amount of federal grant, state grant, or student loan received. These authors qualify their results by stating that it is difficult to prove a connection because, unlike other markets, higher education can access nontuition sources of revenue.[46] In contrast, policy consultants Arthur Hauptman and Cathy Krop argue that federal loans ameliorated tuition increases in higher education, although the relatively smaller federal grant programs had little impact.[47] However, Spencer

46. Alisa F. Cunningham et al., *Study of College Costs and Prices*, 1988–89 to 1997–98, vol. 1 (Washington, DC: National Center for Education Statistics, 2002), ix.

47. Arthur M. Hauptman and Cathy S. Krop, *Federal Student Aid and Tuition Growth: Examining the Relationship* (New York: Council for Aid to Education, 1998).

Foundation president Michael McPherson and Northwestern University president Morton Schapiro find that increased federal financial aid leads to higher tuitions at public, four-year colleges and universities but not private, four-year institutions.[48] Economist Michael J. Rizzo and Ronald Ehrenberg, director of the Cornell Higher Education Research Institute, find that in-state tuition at public institutions increases in response to more generous federal aid, although out-of-state tuition at public institutions is not responsive.[49] George Washington University public policy and economics professor Stephanie Riegg Cellini and Harvard University economics professor Claudia Goldin estimate that among for-profit schools in five states, institutions eligible for Title IV spending charge 75 percent higher tuition than institutions not eligible for federal financial-aid programs.[50] At four-year colleges, Nicholas Turner finds that tax-based federal student aid substitutes for institutional aid dollar-for-dollar; that is, the institutions spend less when subsidies are greater.[51]

Looking specifically at Pell Grants, McPherson, Schapiro, and Gordon Winston, director of the Williams Project on the Economics of Higher Education at Williams College, suggest that tuition is unlikely to respond, especially at elite private institutions, as "federal student aid is an unimportant revenue source."[52] In 2010/11, public, two-year schools enrolled 36.5 percent of Pell Grant recipients; public, four-year institutions 27 percent; nonprofit, four-year institutions 12 percent; and for-profit institutions about 25 percent.[53] There are two relevant comparisons. First, public, two-year colleges enrolled 40 percent of all undergraduate students; public, four-year institutions 36 percent; nonprofit, four-year institutions 14.5 percent; and for-profit institutions 9.5 percent.[54] Second, the maximum appropriated Pell Grant in 2010/11 of $5,550 constitutes 20 percent of listed tuition and fees at private, four-year institutions, 69 percent at public, four-year institutions, and 193 percent at public, two-year institutions. Pell Grants remain less important for elite colleges and universities than for less selective ones.[55]

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48. Michael S. McPherson and Morton Owen Schapiro, *Keeping College Affordable: Government and Educational Opportunity* (Washington, DC: The Brookings Institution, 1991).
49. M. J. Rizzo and Ronald G. Ehrenberg, "Resident and Nonresident Tuition and Enrollment at Flagship State Universities" (NBER Working Paper No. 9516, National Bureau of Economic Research, February 2003).
50. Stephanie Riegg Cellini and Claudia Goldin, "Does Federal Student Aid Raise Tuition? New Evidence on For-Profit Colleges" (NBER Working Paper No. 17827, National Bureau of Economic Research, 2012).
51. Nicholas Turner, "Who Benefits from Student Aid? The Economic Incidence of Tax-Based Federal Student Aid," *Economics of Education Review* 31, no. 4 (2012): 463–81.
52. Michael S. McPherson, Morton Owen Schapiro, and Gordon C. Winston, "Recent Trends in US Higher Education Costs and Prices: The Role of Government Funding," *American Economic Review* 79, no. 2 (1989): 255.
53. David S. Baime and Christopher M. Mullin, *Promoting Educational Opportunity: The Pell Grant Program at Community Colleges* (AACC Policy Brief 2011-03PBL, American Association of Community Colleges, Washington, DC, 2011).
54. Authors' calculations for undergraduates using Baum and Ma, *Trends in College Pricing*, figure 19.
55. Baum and Ma, *Trends in College Pricing*.

Research examining more recent periods finds mixed evidence about how Pell Grants affect tuition. Institutions may reduce the institutional aid provided to students in response to increased subsidies. The subsidy would then have no effect on the list price or the paid price. Jon Oberg, a former researcher for the US Department of Education, observes that total institutional-aid spending increases with accepted aid from other federal-aid programs but substitutes for accepted Pell Grant revenues.[56] Archibald and Feldman suggest that the maximum Pell Grant had no effect on public institutions' listed tuition and led to declines in average listed tuition at private institutions as the grants offset rising costs.[57] Singell and Stone examine how list and net prices responded to increases in the average Pell Grant awarded per recipient. They find that in-state tuition at public colleges and universities is unresponsive to changes in the awarded Pell Grant. However, at private universities and for out-of-state tuition at public universities, Singell and Stone find a dollar-for-dollar increase in tuition with the average Pell Grant awarded.[58] University of Maryland economist Lesley Turner estimates that tuition increases 15 cents for every dollar of Pell Grant aid averaged across all types of institutions. When Turner focuses on the selective, nonprofit institutions as in Singell and Stone, she finds they reduce institutional aid by two-thirds of the amount of the Pell Grant.[59]

These empirical tests of the Bennett hypothesis show that for students attending private colleges and universities, federal student aid results in comparatively small declines in the price paid by students. Overall, these studies find mixed evidence that the Bennett hypothesis holds, though to varying rates among different types of institutions: highest in for-profit institutions, then among selective, nonprofit institutions and for out-of-state tuition at public institutions, and lowest for in-state tuition at public institutions. Using Lesley Turner's estimate of the effect of Pell Grants on private institutions' paid price, the $3,250 increase in the maximum Pell Grant between 1990 and 2010 would imply a $1,083 decline in students' paid price. Singell and Stone's estimate, however, suggests an increase in listed tuition of the full $3,250, so that students would pay the same prices as without the Pell Grant.

V. STATE SUBSIDIES OF HIGHER EDUCATION

The previous section describes the relationship between federal aid and tuition, but the findings on federal funding may not necessarily translate to state funding.

56. Jon H. Oberg, "Testing Federal Student-Aid Fungibility in Two Competing Versions of Federalism," *Publius: The Journal of Federalism* 27, no. 1 (1997): 115–34.
57. Robert B. Archibald and David H. Feldman, *Why Does College Cost So Much?* (Oxford: Oxford University Press, 2010).
58. Singell and Stone, "For Whom the Pell Tolls."
59. Lesley J. Turner, "The Road to Pell Is Paved with Good Intentions: The Economic Incidence of Federal Student Grant Aid" (working paper, University of Maryland, Baltimore, MD, March 20, 2013), http://econweb.umd.edu/~turner/Turner_FedAidIncidence.pdf.

This section surveys the research of two main sources of state aid to colleges and universities: direct appropriations and merit-based aid.

State support of institutions of higher education barely existed before the 19th century, except for occasional grants of land or start-up funds, with the notable exception of the University of Virginia. This changed with the passage of the Morrill Act of 1862, which granted states federal land for the creation of a state college, while requiring the states to fully fund the construction. State governments' participation increased in the 20th century, largely through the passage of federal laws which required matching funds from the states. Over time, state aid evolved into unrestricted aid to each institution, often tied to student enrollment; this pattern allowed for the percentage of the funding of public institutions that came from the states to remain relatively stable from the post-war era through the late 1970s.[60] From then on, states began to distribute more money to institutions that met performance goals such as graduation rates and reductions in per-student costs,[61] but this trend has reversed so that few states now allocate spending this way, and those that do only allocate a small percentage. Rizzo and Ehrenberg explain that "during the 1979 to 2000 period, the average state appropriation at the flagship public research institutions, as a share of total current fund revenues at the institution, fell from 42 percent to 31 percent."[62] Most recently, student aid has evolved away from need-based grants to non-need-based grants, such as merit-based scholarships.

Overall, the amount of funding per student granted through direct appropriations has recently been decreasing, and in many states total funding has decreased even while population increases, after increasing for decades and peaking late in the first decade of the 2000s. According to McPherson, Schapiro, and Wilson, "Much of the increase in tuition during the 1980s and early 1990s was due to state legislatures' tendency to lower appropriations to public institutions, not an extraordinary rise in the expenses of those institutions."[63] Over the last five years, state spending in higher education decreased 10.8 percent nationally in real terms, and decreased in all but 10 states,[64] though previous to those years, spending had been steadily increasing and reached a high point in some states.

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60. Elchanan Cohn and Larry L. Leslie, "The Development and Finance of Higher Education in Perspective," in *Subsidies to Higher Education*, ed. Howard P. Tuckman and Edward Whalen (New York: Praeger, 1980).
61. Arthur M. Hauptman, "Reforming the Ways States Finance Higher Education," in *The States and Higher Education Policy*, ed. Donald E. Heller (Baltimore: Johns Hopkins University Press, 2001).
62. Rizzo and Ehrenberg, "Flagship State Universities," 304.
63. Michael S. McPherson, Morton Owen Schapiro, and Gordon C. Winston, "The Effect of Government Financing on the Behavior of Colleges and Universities," in *Paying the Piper: Productivity, Incentives, and Financing in U.S. Higher Education*, ed. Michael S. McPherson, Morton Owen Schapiro, and Gordon C. Winston (Ann Arbor, MI: University of Michigan Press, 1993), 72.
64. "One-Year (FY12–FY13), Two-Year (FY11–FY13), and Five-Year (FY08–FY13) Percent Changes in State Fiscal Support for Higher Education," *Grapevine*, 2012, http://grapevine.illinoisstate.edu/tables/FY13/Table2_FY13.pdf.

University of Chicago economics professor Sam Peltzman argues that direct appropriations and the associated subsidy to residents through lower tuition might actually lower the overall quality, quantity, or expenditures of higher education, so the decrease in these appropriations may actually be socially beneficial. He notes that the predicted impact of an in-kind subsidy—such as the lower tuition rate granted to in-state attendance at public institutions—"leaves the student in a situation with a more limited range of choices than he would have with an equivalent money subsidy."[65] By offering the discount through diminished tuition conditional on attending a particular public, in-state institution, instead of funding the education separately from the provision, the state is limiting the student's higher education choices. Further, Peltzman argues that increasing subsidies through direct appropriations can actually decrease the quantity or quality of the education the student purchases: students choose the government-provided source rather than a private one that, if the students were granted a subsidy that was not conditional on where they attended, would require a higher level of expenditures.

Between 2001 and 2010, the typical state increased and then decreased its spending in higher education, with most states ending at a lower level of real spending than where they began. Since both the direct appropriations and tuition are determined by the state government, changes in one respond to changes in the other. Public institutions have responded to declines in direct appropriations by increasing tuition; these institutions have large fixed costs and the increased tuition makes up the lost appropriations.[66] Most public institutions must seek permission from state officials to increase tuition. These state boards or state legislatures may not allow large increases in tuition unless direct appropriations significantly decrease. Even if the appropriations are unchanged, because these are a fixed amount and not a per-student transfer, an institution's revenue-maximizing tuition may be unaffected by the direct appropriations. Instead, that tuition is determined by students' willingness to pay and the costs of production as distorted by subsidies. Overall, the sum of state spending plus tuition revenues (in real 2012 dollars) has increased. Figure 10 reproduces the information from the State Higher Education Executive Officers Association finance report on fiscal year 2012, and graphs state appropriations and tuition paid to state institutions.[67] The percentage of the total amount covered by tuition steadily increased from 25 percent in 1990 to almost 50 percent in 2012; the percentage covered by tuition rose even in periods where the total expenditure fell, such as since 2008.

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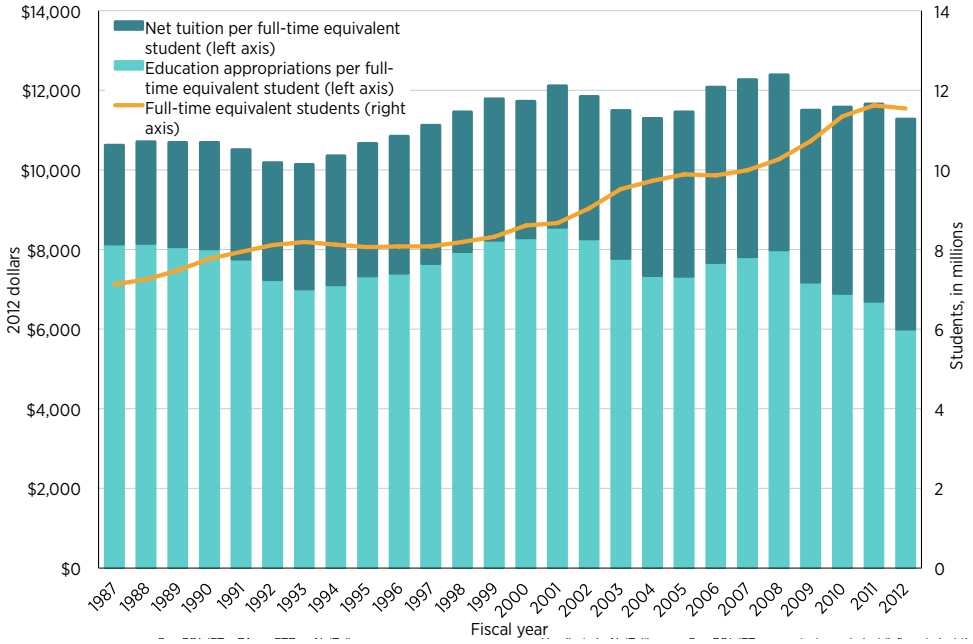
65. Sam Peltzman, "The Effect of Government Subsidies-in-Kind on Private Expenditures: The Case of Higher Education," *Journal of Political Economy* 81, no. 1 (1973): 4.

66. Catherine Rampell, "Why Tuition Has Skyrocketed at State Schools," Economix, *New York Times,* March 2, 2012, http://economix.blogs.nytimes.com/2012/03/02/why-tuition-has-skyrocketed-at-state-schools/.

67. "State Higher Education Finance FY12," State Higher Education Executive Officers Association (Boulder, CO: SHEOF, 2013), http://www.sheeo.org/node/631.

FIGURE 10. APPROPRIATIONS AND TUITION PER FULL-TIME EQUIVALENT STUDENT



Note: Net tuition revenue used for capital debt service is included in the above figures. All amounts are in constant 2012 dollars. A full-time undergraduate is defined as being enrolled in at least 12 credit hours.

Source: "State Higher Education Finance FY12," State Higher Education Executive Officers Association (Boulder, CO: SHEOF, 2013), http://www.sheeo.org/node/631.

Since tuition is typically set by state governments, Union College economics professors Allison Frederick, Stephen Schmidt, and Lewis Davis ask whether these governments change tuition at community colleges when funding from the federal government increases.[68] They find some evidence of the Bennett hypothesis: a 4-cent increase in tuition for every dollar increase in aid. This finding is not far from that of the literature summarized by David Longanecker and Cheryl D. Blanco of the Western Interstate Commission for Higher Education and Bridget Terry Long, a professor at the Harvard Graduate School of Higher Education. This literature shows states to be for the most part unresponsive to federal policy.[69] State's relative unresponsiveness to federal policy might explain why support for the Bennett hypothesis is weakest among public institutions.

68. Allison Frederick, Stephen Schmidt, and Lewis Davis, "Federal Policies, State Responses, and Community College Outcomes: A Test of an Augmented Bennett Hypothesis" (working paper, Social Science Research Network, 2011), http://ssrn.com/abstract=1864204.

69. David A. Longanecker, Cheryl D. Blanco, and Bridget Terry Long, *The Impact of Federal Financial Aid Policies on the Funding, Design, Operation, and Marketing of State and Institutional Financial Aid Policies and Practices: A Review of the Literature* (Boston: The Education Resources Institute report, July 2004), http://174.133.199.34/pdf/research-studies/ReseachReport_Longanecker.pdf.

Another way that public institutions can respond to diminished appropriations is by increasing the percentage of their student body that is out-of-state or the tuition charged to these out-of-state students.[70] These students, not being residents of the same state as the college, are expected to pay the much higher out-of-state tuition. If a university increases the percentage of students who are out-of-state, holding direct appropriations constant, it will increase its revenues. In fact, in the period between 2001 and 2011, for every 1 percent decrease in direct appropriations, enrollment by out-of-state students in public institutions increased by 0.76 percent.[71] As a response, in some states the legislatures constrain the percentage of students attending from out of state.

Part of the decrease in states' direct funding to higher education can be explained by increases in unfunded mandates in other fields by the federal government. When the federal government increases state spending requirements in other areas such as health, the amount that is directed toward education decreases, and tuition compensates.[72] Increases in federal subsidies also may create incentives for state governments to decrease their direct contributions. An increase in Pell Grants or other forms of federal aid to schools might allow state governments to lower their appropriations while continuing to have the same level of spending on higher education, much as highway grants have been shown to crowd out state spending on roads.[73] The loss of state revenue associated with the most recent recession and resulting decline in state spending in higher education fits into this pattern. States decreased their allocations, but the American Recovery and Reinvestment Act (ARRA) provided additional funding for the states to be able to continue to fund higher education, among other things. This funding was set to expire, so many colleges still responded with tuition increases. In the post-ARRA world, state appropriations are 28 percent lower per student (2013 compared to 2008), while tuition is 27 percent higher, even when adjusting for inflation.[74]

States have attempted to lower the cost of college attendance to students by increasingly offering merit-based aid. This kind of aid, unlike need-based aid, is given to college students who meet a specified academic-performance standard. Typically, for freshmen this is some combination of high school GPA and standardized test

70. Rizzo and Ehrenberg, "Flagship State Universities."

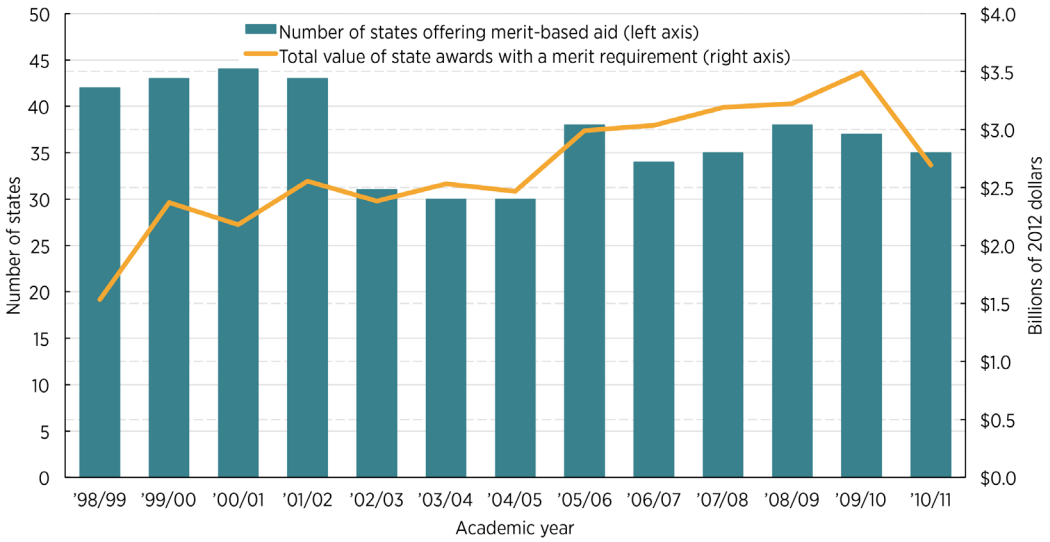
71. Ozan Jaquette and Bradley R. Curs, "The Effect of Financial Support on Non-resident Enrollments for Public Universities" (working paper presented at the Association for Education Finance and Policy annual meetings, March 2013), https://aefpweb.org/sites/default/files/webform/non-res-enroll-text-tables-oj-bc-3-9-2013.pdf.

72. Thomas J. Kane, *The Price of Admission* (Washington, DC: Brookings Institution Press, 1999).

73. Brian Knight, "Endogenous Federal Grants and Crowd-Out of State Government Spending: Theory and Evidence from the Federal Highway Aid Program," *American Economic Review* 92, no. 1 (2002): 71–92.

74. Phil Oliff et al., "Recent Deep State Higher Education Cuts May Harm Students and the Economy for Years to Come" (Washington, DC: Center on Budget and Policy Priorities, March 19, 2013), http://www.cbpp.org/cms/index.cfm?fa=view&id=3927.

FIGURE 11. NUMBER OF STATES OFFERING MERIT-BASED AID AND TOTAL VALUE



Source: "Annual Surveys" (various years), National Association of State Student Grant & Aid Programs, accessed through Repository—Annual Surveys, April 5, 2012, http://www.nassgap.org/viewrepository.aspx?categoryID=3#collapse_346.

scores, while sophomores, juniors, and seniors are required to maintain a minimum college GPA. These scholarships are meant to encourage more of the better students to attend college, particularly to attend college within the state.

Figure 11 graphs data from the National Association of State Student Grant & Aid Programs Annual Surveys on the total spending on merit-based scholarships and the number of states where these are used as a way to fund higher education. Spending on these programs rose through the 1990s and the first decade of the 2000s, hitting a peak in 2009/10, but has decreased since then. The number of states offering some version of these scholarships decreased from 44 in 1999/00 to 35 in 2009/10. By reducing the direct appropriations and increasing these merit-based scholarships, state leaders expected an increase in the state's highly skilled population, an increase in overall enrollment, and an improvement in student performance; in addition, these conditional payments reward those who "provide tangible evidence they are using the money well" by making their tuition lower.[75] Colleges that have a larger proportion of students receiving the scholarship may respond with greater increases in tuition, reducing the value of the merit-based scholarship to the students. Institutions that do not draw as many of these students, however, may not be as able to raise tuition as much. Because the state can also limit the rate of tuition increases, if the tuition increase is smaller than the amount of the aid, then some of the benefit goes to students.

75. William R. Doyle, "Adoption of Merit-Based Student Grant Programs: An Event History Analysis," *Educational Evaluation and Policy Analysis* 28, no. 3 (2006): 259–85.

Merit-based scholarships, because they are typically only available to in-state residents, have been shown to increase the probability of in-state enrollment, and to increase enrollment overall. Christopher Cornwell, David B. Mustard, and Deepa J. Sridhar expand the work by Susan Dynarski and show that Georgia's HOPE merit-based scholarship increased enrollment by 5.9 percent when compared to enrollment in other southeastern states.[76] This result is driven by increased enrollment in four-year institutions and a reduction in the number of students who leave the state for college. The HOPE scholarship in Georgia has also been shown to increase access to Pell Grants as students leverage HOPE scholarships "into greater federal Pell assistance." Neither did the merit-based scholarship students crowd out Pell-receiving students from the most selective institutions.[77]

Beyond the enrollment effects, merit-based scholarships are likely to have tuition effects as well. Institutions that have many merit-based scholarship recipients would likely want to absorb some of the benefit of the subsidy by increasing their posted tuition. Long shows that four-year colleges in Georgia respond to the scholarship by increasing the rates they charge students to the point that they absorb 30 percent of the amount of the scholarship.[78] Long also points out that although the scholarship made both universities and recipients better off, the real losers are the nonrecipient students. These students now face a higher tuition but no subsidy, lowering their chance of enrollment and persistence. Other studies examine the impacts of merit-based scholarships in other states and find similar results.[79]

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76. Christopher Cornwell, David B. Mustard, and Deepa J. Sridhar, "The Enrollment Effects of Merit-Based Financial Aid: Evidence from Georgia's HOPE Program," *Journal of Labor Economics* 24, no. 4 (2006): 761–86; Susan M. Dynarski, "Hope for Whom? Financial Aid for the Middle Class and Its Impact on College Attendance," National Tax Journal 53, no. 2 (2000): 629–61.

77. Larry D. Singell, Glen R. Waddell, and Bradley R. Curs, "Hope for the Pell? The Impact of Merit-Aid on Needy Students," *Southern Economic Journal* 73 (2006): 79.

78. Bridget Terry Long, "How do Financial Aid Policies Affect Colleges? The Institutional Impact of the Georgia HOPE Scholarship," *Journal of Human Resources* 39, no. 3, (2004): 1045–66.

79. Donald E. Heller, "State Merit Scholarship Programs: An Overview," in *State Merit Scholarship Programs and Racial Inequity*, ed. Donald Heller, 13–22 (Cambridge, MA: Civil Rights Project, Harvard University, 2004); Melissa Binder and Philip T. Ganderton, "The New Mexico Lottery Scholarship: Does It Help Minority and Low-Income Students?," in *State Merit Scholarship Programs and Racial Inequity*, ed. Donald Heller and Patricia Marin (Cambridge, MA: Civil Rights Project, Harvard University, 2004); Doyle, "Adoption of Merit-Based Student Grant Programs"; Donald E. Heller, "Merit Aid and College Access" (paper presented at the Symposium on the Consequences of Merit-Based Student Aid, Madison, WI, March 2006), http://edwp.educ.msu.edu/dean/wp-content/uploads/2012/03/WISCAPE_2006_paper.pdf; Patricia L. Farrell and Gregory S. Kienzl, "Are State Non-need, Merit-Based Scholarship Programs Impacting College Enrollment?," Education Finance and Policy 4, no. 2 (2009): 150–74; Rey Hernández-Julián, "Merit Based Scholarships and Student Effort," *Education Finance and Policy* 5, no. 1 (2010): 14–35; Maria D. Fitzpatrick and Damon Jones, "Higher Education, Merit-Based Scholarships, and Post-baccalaureate Migration" (NBER Working Paper No. 18530, National Bureau of Economic Research, 2012).

VII. ON THE OTHER HAND

The presentation above ignores certain factors that may justify the existence of a subsidy even when initially it misallocates resources. In the case of higher education, certain obstacles to accessing higher education may limit students' ability to pay even when their investment in the schooling would be socially beneficial.[80] For example, when individuals are young and returns to education are highest, they rarely have access to enough wealth or credit to pay for their own schooling. Young workers also have lower potential incomes and, as a result, a lower opportunity cost of schooling. Because schooling is hard to collateralize and credit markets are imperfect, subsidies may generate social benefits even though the standard model predicts social losses. This benefit becomes larger if education generates benefits to society, not just to the student.[81] Although the implications of the model on pricing hold, it could be the case that a society would be willing to accept what seems like a short-run inefficiency in its spending on schooling if, in the long run, it leads to a better allocation of resources. These short-run inefficiencies increase, however, as tuition approaches zero.[82] Furthermore, the existing evidence on college quality is thin, but suggests low and declining transmission of human capital.[83] If, instead of generating benefits for society by increasing productivity, higher education merely provides a signal that separates productive workers from less productive ones, subsidizing education only discourages the development of a more efficient method of identifying worker ability.[84]

The social benefit of government subsidies relies on their effectiveness. Subsidies for higher education aim to increase access to higher education. For instance, title IV of the Higher Education Act begins, "It is the purpose of this part, to assist in making available the benefits of postsecondary education to eligible students." Economic theory and empirical research, however, suggest that a substantial fraction of these subsidies may not increase access, consistent with the mixed evidence in the literature on the role of financial aid on college enrollment. Williams College economist Sara LaLumia, for example, finds no evidence that education tax credits and tuition tax deductions increase enrollment for most adults.[85] Harvard University professor

80. Although, of course, the ultimate aim is not just to increase the access to higher education but to increase the productivity of workers by giving them more human capital. This study does not address whether the quality of schooling has diminished over time.
81. Thomas Dee, "Are There Civic Returns to Education?," *Journal of Public Economics* 88, no. 9 (2004): 1697–720.
82. Armen Alchian, "Economic and Social Impact of Free Tuition," *New Individualist Review* 5, no. 1 (1968): 42–52.
83. Arum and Roksa, *Academically Adrift*.
84. Andrew Weiss, "Human Capital vs. Signaling Explanations of Wages," *Journal of Economic Perspectives* 9, no. 4 (1995): 133–54.
85. Sara LaLumia, "Tax Preferences for Higher Education and Adult College Enrollment," *National Tax Journal* 65, no. 1 (2012): 59–90.

Thomas Kane shows that the introduction of the Pell Grant program did not induce lower-income students to enroll in college.[86] Economist Stephanie Cellini, however, finds that increases in maximum awards for the Pell Grant and a California-specific grant, the Cal-Grant, led to entry for for-profit colleges as well as expanded enrollment in community colleges.[87] Economists Neil Seftor and Sarah Turner analyze the introduction of the Pell Grant and show "sizeable effects" on older students' enrollment.[88] Eric Bettinger, an associate professor of education at Stanford University, considers small discontinuities in the Pell Grant formula to estimate its effect on college persistence rates. Although his results are somewhat fragile, his estimates "suggest strongly that a Pell Grant reduces dropout rates."[89]

Recent research supports the conclusion that the complexity of the financial-aid process likely reduces the effectiveness of financial aid in increasing enrollment. Lower listed tuition clearly results in increased college enrollment.[90] Aiding parents in filling out FAFSA forms increases college attendance of their children.[91] Reforms that clearly and directly affected specific student populations are shown to affect enrollment,[92] as seen with Supplemental Security Income benefits previously provided to college students with deceased parents,[93] or making drug offenders ineligible for federal financial aid.[94]

Such financial-aid programs, although frequently targeting individuals from a lower socioeconomic stratum, likely benefit individuals with higher expected future income. These programs subsidize those matriculating into college as compared to

86. Thomas J. Kane, "Rising Public College Tuition and College Entry: How Well Do Public Subsidies Promote Access to College?" (NBER Working Paper No. 5164, National Bureau of Economic Research, 1995).

87. Stephanie Riegg Cellini, "Financial Aid and For-Profit Colleges: Does Aid Encourage Entry?," *Journal of Policy Analysis and Management* 29, no. 3 (2010): 526–32.

88. Neil S. Seftor and Sarah E. Turner, "Back to School: Federal Student Aid Policy and Adult College Enrollment," *Journal of Human Resources* 37, no. 2 (2002): 336–52.

89. Eric Bettinger, "How Financial Aid Affects Persistence," chapter 5 in *College Choices: The Economics of Where to Go, When to Go, and How to Pay for It,* ed. Caroline M. Hoxby, for the National Bureau of Economic Research (Chicago: University of Chicago Press, 2004), 230.

90. Larry L. Leslie and Paul T. Brinkman, "Student Price Response in Higher Education: The Student Demand Studies," *Journal of Higher Education* 58, no. 2 (1988): 181–204; Donald E. Heller, "Student Price Response in Higher Education: An Update to Leslie and Brinkman," *Journal of Higher Education* 68, no. 6 (1997): 624–59.

91. Eric P. Bettinger et al., "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 (August 2012): 1205–42.

92. David Deming and Susan M. Dynarski, "The Lengthening of Childhood," *Journal of Economic Perspectives* 22, no. 3 (2008): 71–92.

93. Susan M. Dynarski, "Does Aid Matter? Measuring the Effect of Student Aid on College Attendance and Completion," *American Economic Review* 93, no. 1 (2003), 279–88.

94. Michael Lovenheim and Emily Owens, "Does Federal Financial Aid Affect College Enrollment? Evidence from Drug Offenders and the Higher Education Act of 1998" (NBER Working Paper No. 18749, National Bureau of Economic Research, February 2013).

non–college goers. Within the lower-income group, the subsidies transfer money to those with better long-term outcomes. Further, tax credits require the recipient to bear a tax burden before benefitting from the credit. As a result, only those individuals with high enough income to pay income taxes benefit from the credit. Direct appropriations may also be regressive because students from lower incomes have lower persistence and completion rates, thus receiving less of the public subsidy.[95] Direct appropriations, however, may be less regressive than tax credits. The experiment conducted by Caroline Hoxby and Sarah Turner suggests that highly qualified low-income students are unlikely to attend a highly selective institution, primarily due to a lack of information about the difference between paid price and list price.[96] The subsidies result in small decreases in average paid price, if any, and also affect a wide variety of behaviors not discussed here. Parents respond to the incentives in the financial-aid system by adjusting their savings and investments to better benefit from the programs.[97] Aysegül Sahin finds that students reduce their effort when they are more subsidized by parents (and, one presumes, by the government as well).[98]

VII. FINAL THOUGHTS

Evidence about whether state and federal subsidies of higher education raise listed tuition prices is mixed. There are several reasons for the mixed evidence, including the complexity of the federal-aid programs and the fact that the institutions that benefit most from raising tuition enroll relatively few beneficiaries of some programs. The main tools used by the social sciences to identify a causal relationship are also of little help. There are few colleges that are unaffected by the policies that can be examined to see what would happen to tuition if not for aid, and to the extent that those colleges do exist, they are not directly comparable. Institutions in other countries do not help, as they are not a good comparison group.[99] Most studies also focus on shorter time spans that rarely capture multiple business cycles.

Further, the subsidies distort the behavior of parents, students, and institutions of higher education. Concerns for equitable access to college drive much of the desire for these subsidies. Although the federal government and state governments

95. Kane, *The Price of Admission*, 36.
96. Caroline M. Hoxby and Sarah Turner, "Expanding College Opportunities for High-Achieving, Low Income Students" (SIEPR Discussion Paper No. 12-014, Stanford Institute for Economic Policy Research, Stanford University, 2012), http://siepr.stanford.edu/publicationsprofile/2555.
97. Bettinger et al., "The Role of Simplification."
98. Aysegül Sahin, "The Incentive Effects of Higher Education Subsidies on Student Effort" (Federal Reserve Bank of New York Staff Report No. 192, August 2004), http://www.newyorkfed.org/research/staff_reports/sr192.pdf.
99. Bridget Terry Long, "College Tuition Pricing and Federal Financial Aid: Is There a Connection?" (Testimony Before the US Senate Committee on Finance Hearing, "Report Card on Tax Exemptions and Incentives for Higher Education: Pass, Fail, or Need Improvement?," December 5, 2006).

could fund higher education through different mechanisms—such as direct appropriations—those would also create problems and inefficiencies. Other approaches, including improving access to credit markets and aiding lower-income households in their understanding of the financing of higher education and the requisite application forms, may more effectively improve access to higher education.