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Overview of the Relationship between Federal Student Aid and Increases in College Prices

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Summary

College affordability is an issue that has received considerable attention from federal policy makers in recent years as concerns have arisen that a college education may be out of reach for an increasing number of students and families. While there is little disagreement that escalating college prices pose a problem, there is not a consensus about the precise causes for these increases.

Among the possible explanations for price increases, one that has surfaced with some frequency in recent years is the notion that the availability of or increases in federal student aid may help to fuel price increases, as institutions seek to capture additional aid rather than stabilize or lower prices. This hypothesized relationship has received a good deal of attention and raised some concerns about the efficacy of federal student aid policies that aim to enhance access and affordability.

This report has been undertaken in response to numerous congressional requests to explain what is actually known about the relationship between student aid and prices. In this report, this task is approached first through analysis of trends in prices, examining different measures and concepts of price. This is followed by a brief examination of trends in student aid, and an examination of many of the competing explanations for why prices are increasing. Finally, the report explores what is known about the possible causal relationship between student aid and price increases, principally through a survey of primary studies that attempt to isolate the effects of student aid on college prices. Some of the themes highlighted in the report are as follows:

- While colleges publish list prices, they also engage in fairly extensive price discounting, effectively reducing prices. Additionally, other subsidies such as governmental grants further defray the price students are asked to pay. Trends in college prices can be measured in terms of published prices, effective prices (prices net of institutional discounts), or net prices (prices net of governmental grant aid and institutional discounts). By any measure, in more recent years for which more comprehensive data are available, prices consistently increased at rates exceeding inflation.
- Overall, student aid per full time equivalent student has also increased in recent years although the trends in aid exhibit more volatility across years (than do the trends in price), sometimes escalating by large increments and sometimes declining or eroding from year to year.
- A plethora of potential explanations for escalating college prices exist. These include declining state appropriations on a per student basis and fluctuating endowments, which may lead to greater college reliance on tuition revenue from students. Similarly, the escalating cost of items upon which colleges are highly reliant, such as high-skill labor and technology, are identified as factors that increase the cost of providing education and potentially contribute to higher prices. Other explanations suggest that colleges have multiple institutional missions, have ineffective centralized control of costs, suffer from various types of productivity issues, and have institutional orientations and incentives targeted toward raising and spending considerable amounts to enhance students' experiences as opposed to orientations toward using resources efficiently. In addition, it is often suggested that durable, or relatively inelastic, demand for

postsecondary education may endow colleges as credentialing institutions with considerable pricing power (i.e., the ability to raise prices without destabilizing demand). There are a substantial number of seemingly plausible explanations for why prices are increasing. This makes it challenging to isolate the effects of any single factor.

- Through CRS's review of research nine empirical studies have been identified, which over the last decade or so have attempted to isolate the effects of changes in aid on prices. Collectively, the studies focus on price responses associated with several different types of student aid, but the effects of grant aid on prices is the most heavily studied relationship. The relationship between prices and loans or tax assistance—the types of student aid that are most widely available and are available to students and families across higher income categories—is not the focus of much of this research.
- Concerns that colleges may "capture" some portion of the aid that is provided to students to lower their net price are generally not directly addressed in the studies. The studies are primarily focused on broad institutional price responses. That is, they do not typically address effects on prices for subgroups of students within institutions, and distinctions are not made between those students who are and are not receiving the student aid hypothesized to be affecting prices. Hence, questions about the extent to which aid policies aiming to lower the net price for targeted students actually do so are generally not directly addressed.
- The studies vary across many dimensions, including the main research questions explored, theorized mechanisms of causation (i.e., how they theorize aid would be captured by institutions), the analytical/methodological approaches employed to examine causality (e.g., natural or quasi experimental versus regression based approaches), selection and use of data, construction and use of proxy measures for aid and price, model specification, and universe of colleges and universities studied. This expansive set of differences makes it especially hard to compare and contrast the studies.
- There is not a high degree of consensus in the findings generated across the studies. Findings across studies are not consistent in terms of direction and magnitude of effects, and even within studies, changes in model specification or controls lead to vastly different results, often without strong rationales for the superiority of specifications generating more robust findings.
- Beyond the various differences in these studies and methodological challenges encountered across this research agenda, not having the outcome measure of primary interest available—a good measure of net price—is ultimately a substantial limiting factor in understanding the relationship between aid and price. Rather, the studies rely heavily on measuring change in list price or change in proxies for net price. This raises the fundamental question of whether, across the studies, the outcome variables actually measure change in the outcome of interest and suggests the need to develop more precise data on net price at institutions to further the understanding of the relationship between federal aid and college prices.

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About This Report

Amidst concerns about college affordability, and suggestions that increases in student aid may help to fuel college price increases, numerous congressional requesters have asked for a product that examines what is actually known about the relationship between student aid and college prices. This report has been undertaken in response to those requests. The report approaches this topic by examining trends in college prices and student aid, examining explanations for why college prices are increasing, and then focusing on one particular explanation—the notion that increases in student aid may lead to increases in the prices charged by colleges and universities.

The layout of the report is as follows. The first section provides an introduction to concepts related to college costs and prices. The next section presents data on the extent to which prices have increased at colleges and universities in the past decade, considering multiple measures of price, and comparing those increases to rates of inflation. This is followed by an examination of trends in student aid. The next section of the report presents an overview of many possible explanations for price increases. After the overview of these competing explanations, one explanation is focused on—the possibility that increases in student aid may lead to college price increases. This is examined through a review of primary studies undertaken in the last decade that attempt to isolate the effects of increases in student aid on prices.

Introduction to Concepts Related to Price and Cost

Few domestic social policy issues have received as much attention in recent years as rising college prices. Scarcely a month goes by without a major publication raising concerns about the sustainability of price increases or about potential consequences that may result from the debt being assumed by students to pay for college. College affordability in light of increasing prices has been the focus of many legislative proposals, congressional hearings, and recent presidential initiatives.[1]

Ensuring access to affordable higher education is a priority for many federal policy makers. In part this stems from a desire to ensure the economic wellbeing of individuals, but beyond the benefits that education provides to individuals, education is valued for its contributions to the vitality of the labor force overall, and as such, is often viewed as an important component of economic policy.

[1] Recent hearings include House Committee on Education and the Workforce, Subcommittee on Higher Education and Training, *Keeping College Within Reach: Enhancing Transparency for Students, Families and Taxpayers*, April 24, 2013; Senate Committee on Health Education Labor and Pensions, *College Affordability*, April 16, 2013; Senate Committee on Health Education Labor and Pensions, *Making College Affordability a Priority: Promising Practices and Strategies,* July 19, 2012; Senate Committee on Health Education Labor and Pensions, *Innovations in College Affordability*, February 2, 2012; House Committee on Education and the Workforce, Subcommittee on Higher Education and Training, *Keeping College Within Reach: Exploring State Efforts to Curb Costs*, July 18, 2012; House Committee on Education and the Workforce, Subcommittee on Higher Education and Training, *Keeping College Within Reach: Discussing Ways Institutions Can Streamline Costs and Reduce Tuitions*, November 30, 2011. For presidential remarks on the importance of addressing college affordability, see *Address Before a Joint Session of Congress on the State of the Union*, February 12, 2013, Administration of Barack Obama, Government Printing Office, p. 6. For information on recent White House proposals and initiatives in this area, see http://www.whitehouse.gov/issues/education/higher-education or see http://www.ed.gov/college.

In addition to having an interest in college affordability for the aforementioned reasons, federal policy makers tend to be attentive to the issue as stewards of a large investment in programs designed to promote postsecondary attendance. The federal government plays the primary role in supporting direct aid to postsecondary students, supporting roughly $170 billion, or 71% of such aid, in the most recent academic year for which data are available.[2] Given that federal policy makers oversee a large investment in this area, they have a natural interest in understanding the efficacy of the federal aid programs that collectively aim to promote postsecondary access, attainment, and affordability. The efficacy of the federal financial aid effort has been called into question by some lately as suggestions have surfaced that federal aid may be helping to fuel college prices.[3]

In considering some of these issues, a starting place is examining changes in college prices. The first challenge with regard to examining college pricing, however, is determining the appropriate measure of price to track.

Defining Cost and Price

In considering how much it costs for students to attend college, it is important to understand the difference between college costs from the institution's perspective and prices for the student. In literature on college costs and prices the term *cost* generally refers to what institutions spend to provide education and educational-related services to students. College costs are supported through a mix of government appropriations, endowment revenue, payments from students, and in some instances through other revenue sources. An important consideration when examining college costs and prices is that only a portion of college costs are covered through student payments, the remainder is thought of as a subsidy.[4]

College *prices* commonly refer to what students or families are asked to pay for higher education. The primary focus of this report is changes in college prices—although college costs are discussed frequently, particularly in relation to the role they may play in affecting how colleges determine prices.

Colleges publish prices known as *list prices* delineating the applicable charges to students paying full price for items such as tuition and fees, and room and board. While colleges post list prices they also engage in fairly extensive discounting of those prices on the basis of factors such as students' financial need or merit. Because colleges publish a list price, but in actuality do not ask all students to pay a common price, and because many governmental subsidies are available to help defray the actual price that students pay, a variety of terms are used to distinguish between published prices and the prices that are actually paid by students net of certain types of subsidies and discounts.

[2] College Board, *Trends in Student Aid 2013*, p.10. Figures are from academic year 2012-2013 and include federal student loans, grants, work study, veterans and military education benefits, and education tax benefits.

[3] See, for example, "Rising College Costs Pose Test for Obama on Education Policies," *New York Times*, October 18, 2012; "What They've Done: President Obama and Mitt Romney," *Washington Post*, October 11, 2012; "Is Financial Aid Really Making College More Expensive?", *The Atlantic*, February 16, 2012.

[4] At both public and private nonprofit institutions, only a portion of what an institution spends in operating funds to educate each student is received from student tuition and fees. This difference is usually referred to as a subsidy, and the source of the subsidy varies.

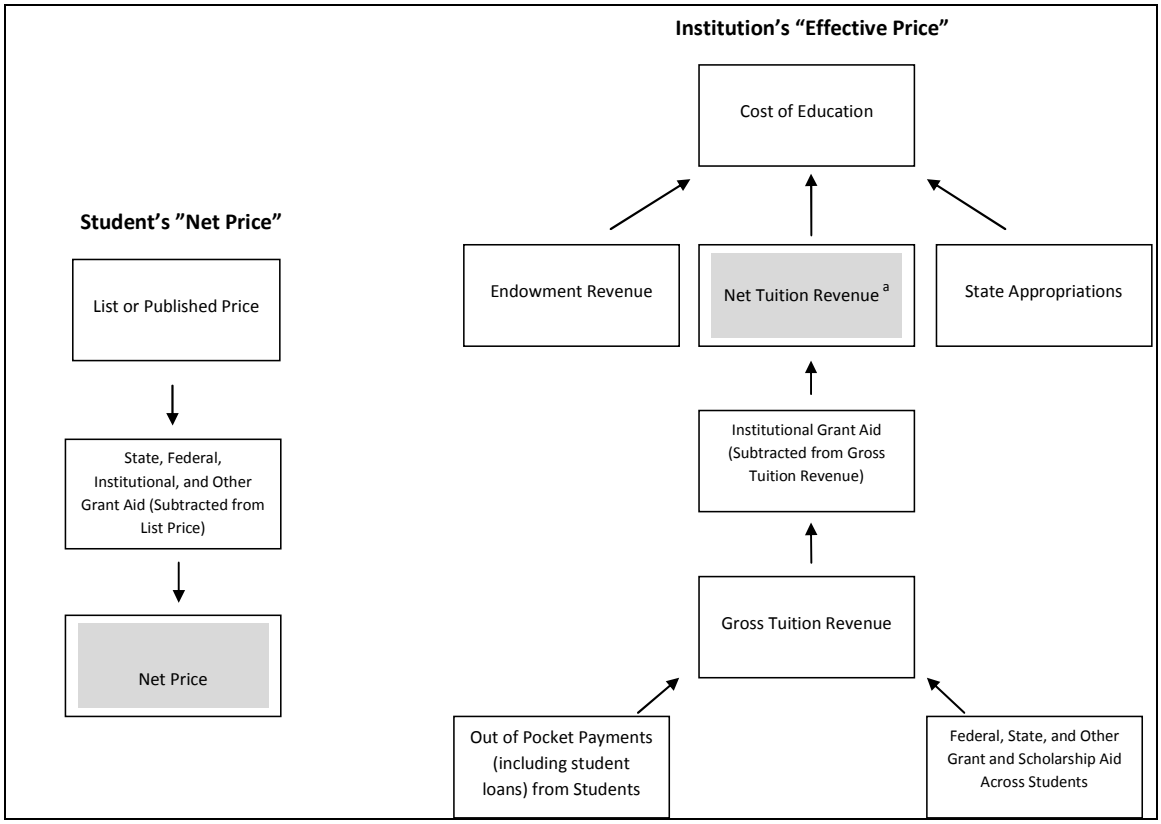
Perhaps the most commonly used term to depict actual prices students are paying is *net price*, which generally refers to the amount a student pays net of grant and scholarship aid. When considering affordability from the perspective of the student, for instance, many would argue that it is more helpful to track changes in net price as opposed to the published price. A complication, however, is that annual data on list prices are readily available, while comprehensive historical data on net price are not, making it harder to systematically track net price trends.

Prices can also be examined from the perspective of the institution. If, for instance, the actual prices institutions set for students are the focal point of an examination, measures of the *effective price* being charged after institutional discounting is accounted for may be reported. A commonly reported figure depicting this is *net tuition revenue*, which reflects the average tuition revenue per full time equivalent (FTE) student received by institutions after institutional discounts are subtracted.[5]

Adding to the complexity of the topic, when college prices are discussed, still other distinctions are commonly made. For example, another distinction can be made between the price charged for only tuition and required fees and the other components that make up a student's total *cost of attendance*. A student's total cost of attendance may include charges for tuition and fees, and also charges for other components such as room and board, transportation expenses, books, supplies, and other expenses. It is often viewed as important when presenting trends for prospective students to display the price associated with the total cost of attendance for academic years, in addition to the price associated exclusively with tuition and fees. Moreover, eligibility for federal student aid programs is typically determined based, in part, on a student's total cost of attendance. Therefore, any measure of college price could include other expenses associated with the student's cost of attendance during the year. Measures of net price are usually based upon the students' full cost of attendance, whereas measures of net tuition are usually based upon the charges associated with tuition and fees. **Figure 1** depicts net price for students and net tuition revenue per FTE student for institutions of higher education (IHEs), which in addition to list price tend to be commonly reported measures of price.

[5] In this report the terms institutional grants, institutional discounts, and institutional aid are used interchangeably.

Figure 1. Measures of Student Net Price and Institution's Net Tuition Revenue per FTE Student



Source: CRS analysis.

a. Institutional net tuition revenue weighted for attendance is reported as net tuition revenue per FTE student.

Institutional Considerations

A Focus on Public and Private Nonprofit Institutions

This report primarily focuses on four-year public and private nonprofit institutions of higher education. Together they serve roughly half of the student population enrolled in degree-granting institutions.[6]

The decision to focus on these institutions is a pragmatic one. Much of the report examines research and literature seeking to explain college price increases, and that work typically concentrates on this set of institutions. Price increases at this set of institutions also tend to be the focus of much of the affordability debate.

Broad Differences in Reliance on Tuition Revenue and in Pricing Practices at Public and Private Nonprofit Institutions

Four-year public and private nonprofit institutions typically receive a lot of the attention in the policy discourse on college price increases. While there are substantial variations within each of these institutional sectors in the roles different institutions play and in the ways prices are established, some fundamental differences exist across the sectors that bear highlighting.

Public colleges and universities are state subsidized institutions that have historically aimed to provide affordable higher education options for state residents in particular. State tuition levels are established by legislatures, statewide coordinating/governing agencies, and/or by coordinating/governing boards for individual state systems. Although certain entities have primary tuition-setting authority in many states, tuition setting processes are described as consultative multi-step processes including input from the governor, legislature, colleges, and coordinating/governing boards. While many factors are taken into consideration when setting tuition levels, the share of the expense associated with providing education that is to be assumed by the students versus the broader base of taxpayers is often a central consideration in these deliberations.[7]

Where private nonprofit colleges and universities are concerned, tuition revenue typically plays the primary role in covering costs. As such prices are heavily relied upon to ensure revenues are sufficient to cover educational expenses. Private institutions are reported to typically consider a variety of factors such as revenue needs and prices at peer institutions when setting list prices, and as needed they use "tuition discounting" as a strategy to help make sure they meet enrollment and revenue needs. Tuition discounting has been characterized as the "art and science of

[6] Four-year public institutions enroll 9.6 million students comprising 34% of postsecondary students, and four-year private, nonprofit institutions enroll 4.7 million students comprising 16 % of students. Whereas public, two-year institutions enroll 10.9 million, or 38%, of students and for profit institutions enroll 3.2 million, or 12%, of students in degree granting institutions. U.S. Department of Education, *Digest of Education Statistics, 2012*, Table 256.

[7] For more information on tuition setting authority in states and factors considered when setting tuition (which reportedly include state appropriations, prior year's tuition, institutional mission, cost of instruction, and inflation indices among other factors) see Andrew Carlson, *State Tuition, Fees, and Financial Aid Policies for 2012-2013*, State Higher Education Executive Officers Association. See also American Association of State Colleges and Universities, *Tuition-Setting Authority and Deregulation at State Colleges and Universities*, Policy Matters, May 2010.

establishing the net price of attendance for students at amounts that will maximize tuition revenue while achieving certain enrollment goals."[8]

In effect, through discounting private colleges and universities employ a pricing practice that economists call "price discrimination," which means charging different consumers a different price for the same product. Prices are set on the basis of the consumers' ability or willingness to pay more for a product, or based on factors such as how valued a certain type of customer or business is.[9]

Tuition discounting at private nonprofit colleges and universities is a long-standing and prevalent practice. These price discounts can be used to fill seats that would otherwise go unoccupied, to enhance the academic profile of an institution, to make it possible for lower income students to attend an institution, or to compete for financially desirable students who may be weighing other options.[10] Roughly three out of five students at private nonprofit four-year colleges and universities receive a discount.[11] From an institutional perspective, this can be examined in terms of "discount rates." Discount rates are a measure of the institution-wide percentage reduction in tuition revenue stemming from the award of institutional grant aid. At private nonprofit four year institutions discount rates range from 27% to 36%, depending on the type of institution.[12]

At public institutions, list prices are more indicative of the effective prices colleges and universities are asking students to pay. Nonetheless, public colleges and universities also engage in tuition discounting for many of the same reasons that private institutions do.[13] While not as prevalent at public institutions, price discounting is still a fairly widespread practice, benefitting roughly one out of five students.[14] At public four-year institutions, discount rates range from 12% to 18%, depending on the type of institution.[15]

In addition to this mode of price differentiation, at public institutions prices are differentiated in another way as well. This is through the separate tuition levels that are established for in-state and out-of-state students. Out-of-state tuition can be set at higher levels to generate more tuition revenue for institutions, and within limitations associated with their roles as state supported

[8] See Jerry Sheehan Davis, *Unintended Consequences of Tuition Discounting*, Lumina Foundation for Education, Volume 5, Number 1, May 2003, p.4.

[9] Price discrimination or differentiation is commonly employed when setting prices for airline or train tickets, movie theater and amusement park admission, and goods such as automobiles.

[10] For more information on tuition discounting and how it is used at public and private colleges and universities, see Sandy Baum, Lucie Lapovsky, Jennifer Ma, *Tuition Discounting at Public and Private Colleges and Universities, 2000-01 to 2008-09*, College Board, September 2010.

[11] CRS analysis of NPSAS 11-12 data using *Powerstats*.

[12] In 2010, discount rates were 30% at private research institutions, 27% at private master's institutions, and 36% at private bachelor's institutions. See Rita Kirshtein and Steven Hurlburt, *Revenues: Where Does the Money Come From?*, Delta Cost Project, American Institutes of Research, 2012, Figure 3. Discount rates are estimated by examining institutional grant aid as a proportion of gross tuition revenues.

[13] Baum, Lapovsky, and Ma estimate that 17% of institutional aid is awarded as tuition waivers, 15% for athletics, and the remainder is almost evenly split between need and merit based aid. Waivers are often required by states and may be awarded to support seniors, students with disabilities, foster children, active duty servicemembers, etc.

[14] CRS analysis of NPSAS 11-12 data using *Powerstats*.

[15] In 2010, tuition discount rates were 18% at public research institutions, 12% at public master's institutions, and 15% at public bachelor's institutions. See Rita Kirshtein and Steven Hurlburt, *Revenues: Where Does the Money Come From?*, Delta Cost Project, American Institutes of Research, 2012, Figure 3.

institutions, some institutions may also have the latitude to boost their shares of nonresident students to enhance tuition revenues by expanding the number of students paying higher prices.[16]

Hence at both public and private nonprofit institutions myriad factors affect how prices are established, and in both sectors there is price differentiation across students. It is not possible to describe the pricing practices employed within varied types of schools in each sector in fine detail, but in broad terms it is possible to identify basic characteristics of these approaches and some basic differences in pricing practices across institutional sectors. As the report segues into an examination of trends in price, examining multiple measures of price, it may be useful to keep in mind some of these fundamental ways in which public and private nonprofit institutions may differ.

Examining Recent Trends in Prices and Student Aid

Recent Trends in College Prices

List or Published Prices

It is commonly reported that in recent decades college prices have consistently increased at rates that have outpaced inflation.[17] In truth, examining price increases is not a totally straightforward exercise. A complication in assessing price increases stems from variations in the ways a diverse set of colleges and universities establish prices for different students. One way to examine price increases is to look at the *list prices* established by institutions. While list price may not be the most informative measure of price it is probably the most ubiquitous measure reported, particularly with regard to price trends.

As discussed earlier, the list or published price is the amount listed by institutions that a student will be charged before taking into account any grant aid. However, in academic year 2011-2012, approximately 59.1% of all undergraduates received some form of grant aid,[18] effectively reducing the list price.[19] That said, high list prices grab headlines and often receive substantial attention from prospective students and at times are the focus of policy debates.

One way to examine trends in list prices is to look at whether price increases for postsecondary education are outpacing some measure of inflation. That is, do annual percentage increases in list prices exceed annual percentage increases in inflation? Any such increase that exceeds the inflation rate can be viewed as an increase that "outpaces" inflation. One common measure of

[16] An estimated 11% of students in public, nonprofit institutions are out of jurisdiction students. Due to state reciprocity agreements some portion of these students may not pay out-of-state tuition. CRS analysis of NPSAS 11-12 data using *Powerstats*.

[17] For example, see http://www.nytimes.com/2012/10/24/education/report-says-college-prices-once-stable-are-up-again.html?_r=0. See also College Board, *Trends in Pricing 2012*.

[18] Grant aid includes grants, scholarships, or tuition waivers from federal, state, institutional, or private sources, including employers.

[19] National Center for Education Statistics, *2011–12 National Postsecondary Student Aid Study (NPSAS:12), First Look Tables*, Table 1. http://nces.ed.gov/pubs2013/2013165.pdf.

inflation is the Consumer Price Index for All Urban Consumers (CPI-U).[20] Although alternative measures of inflation have been developed to account for the inflationary factors that may uniquely affect college expenditures,[21] some economists believe these measures are inherently flawed.[22]

Figure 2 illustrates how changes in the list price for tuition, fees, and room and board (i.e., cost of attendance) have outpaced inflation over the last decade. Because prices at IHEs vary by sector (e.g., four-year public, four-year private, nonprofit) due to different operating and financial structures,[23] **Figure 2** shows a trend line for both four-year public and four-year private, nonprofit IHEs. Moreover, **Figure 2** depicts changes in the list price for cost of attendance (COA) for undergraduate students who enroll full-time and choose to room and board on campus. Specifically, **Figure 2** shows the following:

- From academic years 2000-2001 to 2011-2012, increases in the average COA at both types of IHEs outpaced inflation in each year. The average annual increase above inflation at four-year public IHEs was 3.5%; whereas, the average annual increase above inflation at four-year private, nonprofit IHEs was 2.4%.
- In academic year 2003-2004, the average COA at four-year public IHEs outpaced inflation by 6.8%, the largest increase during the time period measured for both types of IHEs.
- Despite a small decline in the CPI-U during academic year 2009-2010, the average COA increased by 5.3% at four-year public IHEs and 3.7% at four-year private IHEs.
- Annual changes in the COA at four-year private, nonprofit IHEs appear to be less volatile than those at four-year public IHEs. One possible reason for this is that four-year private, nonprofit IHEs are not dependent on state appropriations to help pay for costs and may, in part, determine prices based on enrollment and endowment spend-out targets.[24]

[20] The Consumer Price Index (CPI) is a measure of the average change over time in the prices paid by urban consumers for a market basket of consumer goods and services.

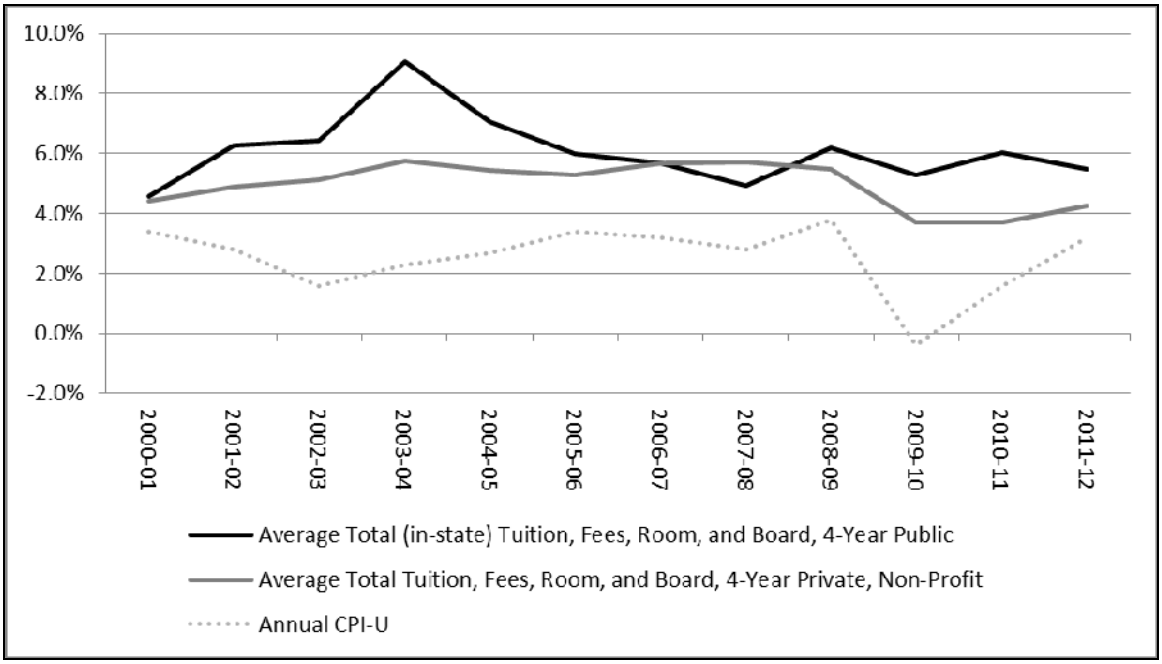
[21] For example, the Higher Education Price Index (HEPI) is an inflation index designed specifically to track the main cost drivers in higher education and is issued annually by Commonfund Institute. It measures the average relative level of prices in a fixed basket of goods and services purchased by colleges and universities each year through current fund educational and general expenditures, excluding research.

[22] For example, economists have noted that the HEPI is self-referential in the sense that it relies upon labor costs (faculty, administrative, and clerical salaries) that colleges can directly influence from year to year.

[23] In academic year 2011-2012, the average tuition, fees, and room and board for a four-year public IHE totaled $16,789; for a four-year private nonprofit IHE, the total was $37,906.

[24] It is not uncommon for IHEs to use a percent (e.g., 5%) of three-year rolling averages of total endowment market value as a spending target to guard against large year to year fluctuations in endowment spending. See Perry Mehrling, Paul Goldstein, and Verne Sedlacek, Appendix: *Endowment Spending: Goals, Rates and Rules*, Educause Forum on Higher Education Finance, 2006.

Figure 2. Annual Percentage Change in the Average Full-Time Tuition, Fees, and Room and Board (List Price) Charged at Four-Year Degree-Granting Institutions Compared to Annual Percentage Change in the CPI-U, 2000-2001 to 2011-2012



Source: CRS calculations using information published in the *Digest of Education Statistics*, *Advance Release of Selected 2012 Digest Tables,* National Center for Education Statistics (NCES).

Notes: Tuition and fees were weighted by NCES based on the number of full time equivalent undergraduates, but were not adjusted to reflect student residency. Room and board were based on full-time enrollment. The annual percentage change in the CPI-U was calculated by CRS using the average CPI-U for each year (as compared to a specific month), as listed in the Bureau of Labor Statistics (BLS) historic data for the CPI-U.

Net Price

Institutions engage in varied types of price discounting through the award of institutional grants and scholarships. Typically this takes the form of merit (e.g., academic, athletic, artistic) or need based aid. In the 2011-2012 academic year, the most recent year for which nationally representative data on student aid packages are available, approximately 20% of all undergraduates spanning all institution types received institutional grants averaging $6,400.[25] In addition to the discounting done by institutions themselves, federal, state, and outside grants and scholarships help to lower the out-of-pocket costs for students. Thus when considering changes in college prices over time, if affordability is the central concern it is useful to consider changes in *net price* as well. As discussed earlier and shown in **Figure 1**, net price is the price IHEs charge students after all grant and scholarship assistance is taken into account, or subtracted out. In essence, net price represents the actual price students and their families need to pay out of their own pockets (including loans) to attend college.

[25] National Center for Education Statistics, *2011–12 National Postsecondary Student Aid Study (NPSAS:12), First Look Tables,* Tables 3 and 4. http://nces.ed.gov/pubs2013/2013165.pdf.

One source for identifying trends in net price is the National Postsecondary Student Aid Study (NPSAS),[26] although new data from NPSAS are available only in four-year intervals. The latest year for which NPSAS data are available is academic year 2011-2012. NPSAS provides detailed information on many aspects of a student's budget and aid package, and net price can be constructed by looking at the out-of-pocket price a student pays after grant and scholarship aid is subtracted from the total student budget. Although veteran's benefits and federal tax benefits[27] also reduce the price a student ultimately pays,[28] the most consistent cross-year definition of net price available in NPSAS does not subtract these benefits from a student's budget. Therefore, the NPSAS definition used below to examine changes in net prices subtracts only grant aid[29] from a student's budget to arrive at a net price.

Using data in NPSAS, **Table 1** shows the average net price in 2011 constant dollars at four-year public and four-year private, nonprofit IHEs for AY1999-2000, AY2003-2004, AY2007-2008, and AY2011-2012. Some key points from **Table 1** include the following:

- Across the 12-year time period between AY1999-2000 and AY2011-2012, the average net price at four-year public IHEs exceeded inflation by 23.7% and at four-year private, non-profit IHEs by 23.9%.
- The largest increase in the average net price at four-year public IHEs, 7.60%, occurred during the recent four-year time period between AY2007-2008 and AY2011-2012. At four-year private, nonprofit IHEs, the largest increase was 10.61%, between AY2003-2004 and AY2007-2008.
- Given that net price data are only available at four-year intervals, it is difficult to generate possible explanations for why net prices increased at a higher rate in either sector during any particular interval.

Table 1. Average Net Price by Institution Sector, in 2011 Constant Dollars

Academic Years 1999-2000, 2003-2004, 2007-2008, and 2011-2012

NPSAS Year	Four-Year Public	Four-Year Private, Nonprofit
1999-2000	$11,559	$18,570
2003-2004	$12,383	$19,934
2007-2008	$13,285	$22,050
2011-2012	$14,296	$23,001
12-Year Change	23.68%	23.86%

[26] The National Postsecondary Student Aid Study (NPSAS) is a large, nationally representative sample of institutions and students conducted by the National Center for Education Statistics. NPSAS is the primary source of information used by the federal government (and others, such as researchers and higher education associations) to analyze student financial aid and to inform public policy on federal student aid programs. Since 1987, NPSAS has been conducted every three to four years, with the latest year available being 2011-2012.

[27] Federal tax benefits refer to the estimated reduction in federal taxes provided by the federal education tax credits (e.g., Hope and Lifetime Learning) or the federal tuition and fees tax deduction.

[28] Student loan aid, while key to financing a postsecondary education in recent years, does not reduce the price a student pays.

[29] Grant aid includes federal and state grants, institutional grants, other grants such as tuition reimbursements, employer tuition reimbursements, and grants from private sources.

Source: CRS calculations from the National Postsecondary Student Aid Study (NPSAS) using *Powerstats*.

Notes: For all years, net price is defined as the attendance-adjusted student's budget (i.e., cost of attendance) minus all grant aid. Grant aid includes federal and state grants, institutional grants, other grants such as tuition reimbursements, employer tuition reimbursements, and grants from private sources. All net price estimates include undergraduate students who attended only one institution. 2011 constant dollar amounts for AY1999-2000, AY2003-2004, and AY2007-2008 were calculated by CRS using changes in the consumer price index (CPI) as provided in online data published by the Bureau of Labor Statistics (BLS).

Another source for net price information that is worthy of mention is the Integrated Postsecondary Education Data System (IPEDS). As part of the Higher Education Opportunity Act of 2008 (P.L. 110-315; HEOA), the U.S. Department of Education (ED) is required to make publicly available on its College Navigator website information about the average net price of each postsecondary institution that participates in Title IV federal student aid programs.[30] ED calculates average net price from data provided in an institution's annual submission to IPEDS and is generated by subtracting the average amount of federal, state/local government, or institutional grant and scholarship aid from the total cost of attendance. ED populates the online College Affordability and Transparency Center[31] with average net price by institution each year to meet the requirements established in the HEOA. While the net price amounts provided in the online College Affordability and Transparency Center are informative, the average net price is only calculated for full-time, first-time degree/certificate-seeking undergraduates who were awarded grant or scholarship aid from the federal government, state/local government, or the institution.[32] As a result, net price information is excluded for a significant number of postsecondary students when calculating the average net price listed in the College Affordability and Transparency Center. Moreover, the omission of students who were not awarded some type of grant aid may lead to misleading averages.

Net Tuition Revenue

Another way of looking at net college prices and the role of institutional grant aid in discounting prices is to evaluate certain components of tuition revenue[33] received by institutions net of institutional discounts. Examining net price through this lens is a shift from viewing net price from an individual student's perspective. It places the focus on the net amount received by the institution per FTE student, in effect making the institution the unit of analysis. Using available data this approach also focuses on revenue received for charges related to tuition and fees only, as other revenue generated from charges for room, board, and other operations that provide services to students (and may be considered part of a student's cost of attendance) are reported in a separate revenue category as part of the annual IPEDS reporting requirements for institutions.

The National Center for Education Statistics (NCES) recently released a database called *IPEDS Analytics: Delta Cost Project Database 1987-2010*[34] that provides researchers with several multi-

[30] The HEOA also included a requirement that every Title IV participating institution have a net price calculator on its website.

[31] See http://collegecost.ed.gov/.

[32] For more information on how the net price is calculated using data in IPEDS, see http://nces.ed.gov/ipeds/resource/institutional_net_price.asp.

[33] Institutions receive revenue from a variety of resources, including tuition, grants, contracts, and auxiliary services such as bookstores, dining halls, and hospitals.

[34] For more information on the Delta Cost Project Database, see http://nces.ed.gov/ipeds/deltacostproject/download/DCP_History_Documentation.pdf.

year panel datasets of matched institutions that meet certain panel requirements, allowing for a more stable comparison of institutional characteristics across multiple years.[35] Using this dataset, it is possible to compare changes in average net tuition revenue at the same institutions on a FTE student basis.[36] As discussed earlier, *net tuition revenue* is the total revenue received at an institution from tuition and fees that is received in the form of federal and state grant and loan aid *and* direct payments by students. Net tuition revenue would not include institutional grant aid. Put simply, it reflects the average tuition revenue per FTE student received by institutions after institutional discounts are subtracted.

Using data calculated by CRS from the *IPEDS Analytics: Delta Cost Project Database 1987-2010*, **Table 3** shows the average net tuition revenue at IHEs by Carnegie sector[37] in constant 2010 dollars for academic years 1999-2000 to 2009-2010 on a FTE student basis. Some of the key points shown by **Table 3** include the following:

- At public bachelor IHEs, the average net tuition revenue increased by 59% from AY1999-2000 to AY2009-2010, after adjusting for inflation. By comparison, the average net tuition revenue at private, nonprofit bachelor IHEs increased by 24% during the same time period.
- Across the AY1999-2000 to AY2009-2010 period, after adjusting for inflation, average net tuition revenue at public IHEs, depending on Carnegie Classification, increased annually by an average of 4.49%–4.79%. At private, nonprofit IHEs, after adjusting for inflation, average net tuition revenue increased annually on average by 1.70%–2.17%, depending on Carnegie Classification.
- Increases in net tuition revenue were the largest at public IHEs during the period from AY2002-2003 to AY2004-2005. This period also corresponds to a period of decline from state appropriations for higher education,[38] although federal aid available to students during this time did not significantly increase.
- Overall, the changes across the AY1999-2000 to AY2009-2010 period suggest that public IHEs may be relying on more revenue from the student (i.e., less institutional grant aid) during a period of decline in state appropriations for higher education.

[35] These panels include only degree-granting, public and private nonprofit institutions in the 50 states and the District of Columbia that consistently reported data on three variables for each of the years in the selected time period: instructional expenditures, full-time equivalent enrollment, and total completions.

[36] To properly account for variation in student enrollment across institutions, components of institutional revenue are weighted on a FTE student basis. The 11-year (1999-2009) panel dataset included in the *IPEDS Analytics: Delta Cost Project Database 1987-2010* provides pre-weighted revenue values on a FTE student basis, as well as pre-indexed revenue values based on changes in the CPI-U, among other measures of inflation. The 11-year panel matched set includes 2,146 institutions and was designed to overcome, as best as possible, differences in reporting standards across institutions.

[37]Carnegie Classifications provide the framework in which institutional diversity in U.S. higher education is commonly described. All accredited, degree-granting colleges and universities in the United States represented in the IPEDS system are eligible for inclusion in the Carnegie Classifications. Branch campuses that are separately identified in IPEDS are classified separately.

[38] See State Higher Education Executive Officers Association, *State Higher Education Finance FY2011*, http://www.sheeo.org/sites/default/files/project-files/All%20States%20Wavechart%202011.xls.

Table 2. Net Tuition Revenue per FTE Student by Carnegie Sector of Institution: Academic Years 1999-2000 to 2009-2010

In Constant 2010 Dollars

Institution Sector/Type of Tuition Revenue	1990-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	Avg. Annual Change
Public Research/Per FTE Student												
Net Tuition Revenue	$5,469	$5,511	$5,791	$6,138	$6,706	$7,116	$7,387	$7,574	$7,737	$8,106	$8,611	
Annual % Change		0.77%	5.08%	5.99%	9.25%	6.11%	3.81%	2.53%	2.15%	4.77%	6.23%	4.67%
Public Masters/Per FTE Student												
Net Tuition Revenue	$4,114	$4,170	$4,268	$4,595	$5,096	$5,364	$5,497	$5,625	$5,744	$5,960	$6,360	
Annual % Change		1.36%	2.35%	7.66%	10.90%	5.26%	2.48%	2.33%	2.12%	3.76%	6.71%	4.49%
Public Bachelor/Per FTE Student												
Net Tuition Revenue	$3,611	$3,647	$3,761	$4,077	$4,503	$4,759	$5,006	$5,155	$5,290	$5,471	$5,746	
Annual % Change		1.00%	3.13%	8.40%	10.45%	5.69%	5.19%	2.98%	2.62%	3.42%	5.03%	4.79%
Private Nonprofit Research/Per FTE Student												
Net Tuition Revenue	$17,509	$17,522	$18,168	$18,453	$18,757	$19,277	$19,305	$19,972	$20,265	$20,560	$20,718	
Annual % Change		0.07%	3.69%	1.57%	1.65%	2.77%	0.15%	3.46%	1.47%	1.46%	0.77%	1.70%
Private Nonprofit Masters/Per FTE Student												
Net Tuition Revenue	$12,312	$12,466	$12,843	$13,082	$13,536	$13,843	$13,939	$14,335	$14,423	$14,940	$15,192	
Annual % Change		1.25%	3.02%	1.86%	3.47%	2.27%	0.69%	2.84%	0.61%	3.58%	1.69%	2.13%
Private Nonprofit Bachelor/Per FTE Student												
Net Tuition Revenue	$11,502	$11,728	$12,045	$12,266	$12,665	$12,916	$13,079	$13,480	$13,707	$14,086	$14,257	
Annual % Change		1.96%	2.70%	1.83%	3.25%	1.98%	1.26%	3.07%	1.68%	2.77%	1.21%	2.17%

Source: CRS estimates and calculations from the 11-year panel (1999-2009) dataset included in the *IPEDS Analytics: Delta Cost Project Database 1987-2010*, U.S. Department of Education.

Notes: Constant dollar and FTE values taken from the respective indexed and FTE variables for each tuition revenue variable included in the *IPEDS Analytics: Delta Cost Project Database 1987-2010*.

Changes in Price Spanning Different Measures of Price

The examination of recent trends in college prices yields myriad results, depending on how price is defined, the source of the data, and the assumptions behind the methodology. The various trends in college prices presented above, however, share something in common: each price measure, regardless of source or definition, outpaced inflation. This trend is not limited to the last decade. In fact, if the trend line for four-year public institutions in **Figure 2**, which depicts the average annual percentage change in the published COA compared to the average change in inflation, is expanded to include the period from AY1991-1992 to AY2011-2012, it would show that the published COA outpaced inflation, on average, by 3% each year.[39] Furthermore, during the period from AY1990-1991 to AY1999-2000, published COA outpaced inflation at four-year public institutions each year, on average, by 2.2%. At four-year private[40] institutions, published COA outpaced inflation, on average, by 2.4% each year between AY1990-1991 and AY1999-2000 and 1.9% each year, on average, from AY1991-1992 to AY2011-2012.

Recent Changes in Student Aid

This section of this report has examined changes in various college prices. The remainder of the report explores a series of possible explanations for college price increases, examining most closely the relationship between student aid and college price increases. It is thus useful to briefly highlight recent changes in student aid.

Using data provided in The College Board's *2013 Trends in Student Aid*, **Table 3** shows annual changes in selected types of average student aid per FTE undergraduate student in constant 2012 dollars from AY2002-2003 to AY2012-2013. **Table 3** shows changes in student aid that both reduce the net price for students (e.g., average grant aid and average federal education tax benefits) and do not reduce the net price for students (e.g., average federal student loan aid). Some of the key points shown by **Table 3** include the following:

- Average grant aid per FTE undergraduate student has increased by 57% from AY2002-2003 to AY2012-2013, after adjusting for inflation. Over that same time period, after adjusting for inflation, loan aid and federal tax benefits per FTE have increased by 44% and 132%, respectively.
- Average grant aid per FTE increased substantially (23%) in AY2009-2010, even after adjusting for inflation. This large increase is likely due to the substantial increase in Pell Grant aid in AY2009-2010.[41] This corresponds with large boosts in loan aid and tax benefits per FTE in AY2008-2009 and AY2009-2010, which align with enacted expansions in loan limits on federal student loans and with the American Recovery and Reinvestment Act of 2009 (P.L. 111-5, ARRA) provisions expanding the value and availability of higher education tax credits.

[39] List price is the measure of price on which the most complete historical data are available.

[40] Data provided in the Digest of Education Statistics does not make a distinction between private, for-profit institutions and private, nonprofit institutions prior to 1999-00.

[41] The Pell Grant maximum award increased to $5,350 in AY2009-2010 from $4,731 in AY2008-2009.

- After adjusting for inflation, the annual changes in average aid per FTE student for the types of aid examined were more volatile (sometimes escalating by large increments and sometimes declining from year to year) than were the changes in prices under any of the measures of price presented in this report. This suggests that the aid and prices are moving in the same direction but can change in a manner that varies significantly from one another from year to year.

Table 3. Changes in Selected Types of Student Aid per FTE Undergraduate Student in 2012 Constant Dollars

2002-2003 to 2012-2013

Academic Year	Average Grant Aid[a] per FTE	% Change	Average Federal Education Tax Benefits per FTE	% Change	Average Federal Loan Aid[b] per FTE	% Change
2002-2003	$4,592		$526		$3,406	
2003-2004	$4,853	5.68%	$552	4.94%	$3,751	10.11%
2004-2005	$4,947	1.94%	$549	-0.58%	$3,915	4.37%
2005-2006	$4,928	-0.39%	$543	-0.96%	$3,951	.92%
2006-2007	$5,017	1.82%	$525	-3.40%	$3,799	-3.85%
2007-2008	$5,186	3.37%	$505	-3.86%	$3,978	4.73%
2008-2009	$5,335	2.86%	$731	44.94%	$4,752	19.46%
2009-2010	$6,547	22.72%	$1,057	44.49%	$5,239	10.23%
2010-2011	$7,161	9.38%	$1,180	11.63%	$5,276	0.71%
2011-2012	$7,007	-2.15%	$1,200	1.68%	$5,191	-1.61%%
2012-2013	$7,190	2.62%	$1,219	1.63%	$4,897	-5.67%

Source: *2013 Trends in Student Aid,* College Board, Table 3A. See http://trends.collegeboard.org/student-aid/figures-tables/grants-loans-and-tax-benefits-fte-undergraduate

Notes: College Board FTE student data reflect aid amounts divided across all students, including nonrecipients.

a. Grant aid includes grant aid from the following sources: Federal Pell Grant program, state grant programs, institutional grants, and private and employer grants.

b. Loan amounts do not include private nonfederal loans, which provide funding for students but do not involve subsidies.

If the trends in aid are examined for an additional decade somewhat similar patterns are found for loan and tax benefits. A year or two of large escalations in aid per FTE student (corresponding with a large change in benefits or introduction of new benefits) is followed by a period of little change or declining year to year value in aid per FTE student in constant dollars. For grants, periods of year to year growth ranging from 3% to 8% surround a four-year period of relatively small growth or decline in aid per FTE student in constant dollars.[42] During this preceding decade, after adjusting for inflation, the annual changes in average aid per FTE student for the

[42] See College Board, *2013 Trends in Aid*, Table 3A.

types of aid examined were generally more volatile than were the changes in prices under available measures of price. Over the decade, however, aid and prices moved in the same direction.

Explanations for Price Increases

Price increases likely result from a confluence of many factors. Student aid increases are theorized to be one factor contributing to price increases. This relationship is the primary focus of this report. To situate this relationship among the many others possibly affecting college prices, the next section of this report examines a broad range of explanations for rising prices. Some of these explanations are the focus of considerable empirical study, others are derived from economic principles, and still others are generated by authors intimately familiar with institutional practices. It is beyond the scope of this report to assess the evidence base for each of these explanations. Rather these explanations are offered to provide a sense of the factors researchers must consider when trying to isolate the effects of any single relationship on price, and to provide some context for interpreting any research on college prices.

There are myriad factors thought to be playing some role in contributing to the escalation of college prices. Some of the factors stem from forces that are external to colleges and universities, whereas others may be related to internal institutional practices and decisions.

Inflation

Inflation refers to the increase in the cost of living over time. Economy-wide, the cost of goods and services rises over time, historically by an average of roughly 3.3%, and over the last couple of decades by roughly 2.4%, per year.[43] Like any other productive endeavor, colleges are affected by this. As colleges incur more costs associated with heating and air conditioning buildings, purchasing insurance or technology, or maintaining their physical plant, these costs are passed on to consumers. However, the portion of college price increases that have garnered the most attention is the increment above the rate of inflation.

Cost Disease

The "cost disease" thesis was introduced to the higher education discourse by William J. Baumol and William G. Bowen in the mid-1960s and has subsequently been extended and updated by several authors.[44] It argues that wages increase more rapidly in service industries that are labor intensive and primarily reliant on highly educated workers than they do elsewhere in the economy. Some studies have documented the trend in higher education and other service fields

[43] CRS calculations based on data presented in Table 24, http://www.bls.gov/cpi/cpid1402.pdf. Historical average is 1913-2013.

[44] William J. Baumol and William G. Bowen, The Economic Dilemma: A Study of Problems Common to Theater, Opera, Music and Dance, Twentieth Century Fund, NY, 1966; William G. Bowen, The Economics of Major Private Universities, McGraw Hill, NY, 1968. For more recent works see Robert Archibald and David Feldman, Explaining Increases in Higher Education Costs, The Journal of Higher Education, Volume 79, No.3 (May/June), 2008; and Robert Archibald and David Feldman, Why Do Higher Education Costs Rise More Rapidly Than Prices in General?, Change, May/June 2008.

such as law, medicine, investment counseling, and fields reliant on actuaries and statisticians.[45] Supporters of this theory suggest that outsized labor costs are largely responsible for the increased cost of providing education, which gets passed on to students through price increases. Under this paradigm, these industries are afflicted by a "cost disease" because the principal service they provide is a limited-scale interaction between service provider and recipient and altering provider/recipient ratios is presumed to reduce the quality of the service. Likewise it is believed to be unlikely that the industries can become much more productive by substituting capital or technology for labor as is possible in many other industries.

At its heart the cost disease thesis is an opportunity cost argument, suggesting that as wages rise economy-wide, higher education has to pay higher wages to stay competitive in attracting and retaining high-skill workers. This in turn becomes a major driver of increases in college costs, and ultimately in prices charged to students.

Demand

A basic economic principle is that when there is limited supply of a good, high levels of demand drive up prices. Even though college prices have increased at rates well above inflation in recent decades, more students have continued to enroll in colleges during that time period. Over the last few decades, the population of students enrolled in four-year institutions of higher education has gone from 7.6 million in 1980 to 13.3 million in 2010. The share of the traditional college age population (18-24 year olds) attending four-year institutions has gone from 18.6% to 28.2% over that same time period.[46] If the total enrollment trends are examined, spanning two-year institutions as well, enrollment over that time period went from 12.1 million to 21.0 million and the share of 18-24 year olds enrolled in college went from 25.7% to 41.2%.[47]

One explanation for the strength of consumer demand is the earnings premium associated with college degrees. The U.S. Census Bureau has constructed synthetic work-life earnings estimates by educational attainment. Even when controlling for other demographic factors predicted to influence earnings, educational attainment is the most important factor for predicting earnings. In the aggregate, expected earnings over a 40-year time period for the population aged 25 to 64 who are employed full-time, year-round the entire time are $2.4 million for individuals with a bachelor's degree, compared to $1.4 million for individuals with a high school degree only.[48] While it may not be the case that all types of educational investments result in a good return, a desire to receive higher earnings and expand career opportunities is clearly strong motivation to pursue a college education.

Because of the value of the skills and knowledge imparted in college and the value of the degree itself, which serves as a prerequisite for many positions, colleges are selling a product that has great economic value to consumers. As credentialing institutions, colleges are selling a product

[45] See, for instance, Robert Archibald and David Feldman, *Explaining Increases in Higher Education Costs*, The Journal of Higher Education, Volume 79, No.3 (May/June), 2008.

[46] U.S. Department of Education, *Digest of Education Statistics 2011*, Table 199 and Table 213.

[47] Ibid.

[48] See Tiffany Julian, "Work-Life Earnings by Field of Degree and Occupation for People with a Bachelor's Degree: 2011," American Community Survey Briefs, ACSBR/11-04, Table 1, http://www.census.gov/prod/2012pubs/acsbr11-04.pdf.

many consumers believe is essential for their personal economic success. As such, the demand for the product has been very durable, or inelastic, and this may not place pressure on institutions to provide services in a more cost-effective manner.

Declining State Appropriations and Endowments

Postsecondary education is financed through a mix of government appropriations, gift and endowment revenue, and payments for tuition and fees. In recent years, prior to, during, and after the recession there have been reductions on a per-student basis in state subsidies to public institutions of higher education. Over the 25-year period spanning 1986-2011, state appropriations for higher education increased from $57.7 billion to $74.2 billion in constant (inflation adjusted) dollars. However, these increases did not keep pace with boosts in enrollment, and on a per student basis education appropriations declined by 21.6%, going from $8,025 to $6,290 in constant dollars.[49] When the state contribution per student has declined (or failed to keep pace with growth in enrollment), the institutions generally have relied more heavily on tuition revenues. This is reflected in trends in net tuition revenue, which comprised 23.2% of total revenues for public institutions in 1986 and 43.3% in 2011.[50]

Contributions to schools from endowments also fluctuate. While data are more limited on these contributions, available data suggest that in recent years the share of endowment funds used to support college operations is relatively stable, but the size of the endowments can fluctuate—moving up or down—in accordance with market conditions.[51]

Declining revenues from these sources have led some colleges to rely more heavily on tuition revenue and look to price increases to meet their costs.

Revenue Theory

The "revenue theory" thesis, introduced by Howard Bowen, suggests that internal institutional decisions play an important role in raising costs of higher education.[52] This in turn affects price. Bowen suggests that institutions of higher education are principally focused on educational excellence, prestige, and influence, and that there do not seem to be many strict limits on the amount institutions are willing to spend in support of these aims. He further suggests that each

[49] State Higher Education Executive Officers, *State Higher Education Finance FY2011*, Table 3, p. 23. Note adjustments for inflation in the *State Higher Education Finance FY2011* report are made using the Higher Education Cost Adjustment (HECA) index. HECA is a measure of provider prices, not consumer prices, like the CPIU—the index which is used throughout most of this document to adjust for inflation. While the general trends reflected in the HECA constant dollar adjustments would still be present if the CPIU were used to adjust for inflation, the amount of inflation reported would be lower under the CPIU. That is, using CPIU adjustments, in constant 2011 dollars, the state higher education appropriations increased from $54.5 billion to $74.2 billion and on a per student basis the appropriation declined from $7,585 to $6,290.

[50] Ibid, Table 2, p. 22.

[51] See the *2011 NACUBO-Commonfund Study of Endowment* results, made available at the National Association of College and University Business Officers (NACUBO) website: http://www.nacubo.org/Research/NACUBO-Commonfund_Study_of_Endowments/Public_NCSE_Tables.html. See, in particular, tables presenting data on endowment market value and percentage change, annual rates of return, and effective spending rates. Data are from 823 colleges and universities participating in an annual NACUBO survey.

[52] Howard Bowen, The Cost of Higher Education: How Much Do Colleges and Universities Spend Per Student and How Much Should They Spend?, Jossey Bass Publications, Washington DC, 1980.

institution raises as much money as it can, and spends all it raises. In effect, Bowen notes "the cost of any institution is largely determined by the amount of revenue it can raise." A take away point from the Bowen thesis is that colleges are principally focused on educational excellence and on enhancing the educational experience of students; they are not focused on efficiency.[53] While a focus on academic excellence may yield many benefits for individuals and society, it may also help explain growth in spending at institutions.

Scholarships and Other Forms of Discounting

A growing area of spending for colleges is on institutional student aid. While initially more of a private college phenomenon, institutional aid has been growing at public colleges as well. In the 2011-2012 academic year, the most recent year for which nationally representative data on student aid packages are available, approximately 20% of all undergraduates spanning all institution types received institutional grants averaging nearly $6,400. At public four-year institutions 21% of students received institutional grants averaging nearly $4,100, and at private, nonprofit four-year institutions 58% of students received institutional grants averaging roughly $13,200.[54] Looked at from an institutional spending perspective, $32.8 billion was spent on undergraduate institutional aid across all types of institutions in academic year 2011-2012.[55]

Spending on scholarships and other forms of institutional discounting may contribute to increases in the prices encountered by some students. It has been widely reported that one strategy that is used to help offset the cost of discounting prices for targeted students is charging higher prices to other students with greater ability and willingness to pay more. Some have identified this as a potential cyclical problem. As list price becomes higher and more students need scholarships, more discounting is done for targeted students to keep net price more affordable for them, placing a particular burden on and further escalating the price for those who pay list price or close to it.

Higher Price Signals Higher Quality

Some researchers and administrators believe that institutions have an incentive to publish high prices given the perception that a high price is associated with a higher-quality product. It is often reported that institutions are attentive to the prices established by peer institutions, and it has also been noted that many colleges feel it is not beneficial to be the low price point. Inherent in this line of thought is the notion that students prefer purchasing a high-quality product, and a higher price can signal a higher-quality product. This is sometimes referred to as a "Chivas Regal effect," whereby consumers choosing between products tend to think the higher-priced one is superior. Colleges embracing this notion may be inclined to set prices accordingly. They may also be inclined to believe that students prefer a high-priced product while receiving a discount (e.g., a grant) to purchasing a product with a lower sticker price.[56] This is theorized to be a factor that

[53] Some support for this thesis can be found in recent surveys of presidents and chancellors at public colleges and universities, who when asked to rank four competing institutional goals—quality, affordability, accountability, and equity—ranked quality highest (85% ranking it as the top priority) while more than half (55%) ranked affordability either third or fourth. See Alisa Hicklin Fryar and Deven Carlson, *Putting Colleges on Notice: Creating Smarter Strategies to Improve Affordability through Curbing Cost Increases*, Lumina Foundation Paper Series, April 2014.

[54] CRS analysis of NPSAS 11-12 data using *Powerstats*.

[55] College Board, 2012 *Trends in Student Aid,* Figure 2A.

[56] See, for example, "In Tuition Game, Popularity Rises with Price," *New York Times*, December 12, 2006; or "Why Colleges Cost Too Much," *Time*, January 24, 2001.

may be motivating colleges to raise list prices, which affects those who pay list price, and depending on how well accompanying discounts offset list price increases, may affect net price for a broader population of students.

Productivity

Critiques of practices, decisions, and organizing and governance structures at colleges are commonplace in literature on college costs and prices. Among the topics regularly identified are smaller than may be necessary class size and teaching loads, reluctance to seriously examine efficiencies that may accompany better uses of technology in instruction, tenure policies, faculty governance, a plurality of missions, and having multiple relatively independent constituencies and ineffective central control of costs. There seem to be a lack of studies that look closely at productivity or cost effective practices, but it is often posited that inefficient work processes and governance structures add to the cost of providing education and thereby play a role in price increases.[57]

Product Bundling

Some critiques raise questions about the "full service model" that colleges offer to students. These critiques suggest that amenities such as manicured lawns, state of the art dining halls, and residential and exercise facilities; intercollegiate athletic programs and arenas; and student enrichment activities collectively comprise a bundle of offerings, many of which may not be essential to the educational experience, and the bundling of these products may be helping to drive up prices. Some go further, suggesting an educational model consisting of faculty involvement in both the production and transmission of knowledge may constitute a bundled product and it may be unnecessary for as much subsidy to be devoted to time spent by faculty on research and publication across a broad range of institutions. Embedded in these critiques is the notion that it is difficult for consumers to bypass a bundled product to purchase just the services they seek. The bundle that is offered may be comprised of nonessential components that are driving up prices. Some suggest that it is the nonessential components in particular that may be driving up prices.[58]

[57] See Ronald G. Ehrenberg, *Tuition Rising: Why College Costs So Much*, Harvard University Press, 2002; "Productivity Issues in Higher Education," Chapter 3 in *Resource Allocation in Higher Education* (Ann Arbor, MI: University of Michigan Press, 1996); William F. Massey; *Remaking the American University: Market-Smart and Mission-Centered*, Rutgers University Press, July 2005, Robert Zemsky, Gregory Wegner, and William Massey; *Twenty-Five Ways to Reduce the Cost of College*, Center for College Affordability and Productivity, Washington, DC, September 2010. Additionally, many of the papers prepared for *Stretching the Higher Education Dollar: How Innovation Can Improve Access, Equity, and Affordability,* the American Enterprise Institute, September 9, 2013, edited by Andrew P. Kelly and Kevin Carey, address these issues.

[58] Many of the papers prepared for *Stretching the Higher Education Dollar: How Innovation Can Improve Access, Equity and Affordability,* the American Enterprise Institute, September 9, 2013, edited by Andrew P. Kelly and Kevin Carey, address these issues. Components are also addressed in Leigh Held, "This is Why College Costs So Much," MainStreet.com, August 27, 2013.

Bennett Hypothesis

Federal higher education policy, since the enactment of the Higher Education Act of 1965, has been principally focused on promoting college access and affordability through the provision of direct aid to students. Questions over the extent to which this aid actually makes college more affordable have been raised at various intervals since the HEA policies have been in effect. Often these questions arise when concerns about college prices have received a good deal of attention. The general issue that is raised was popularized by former Secretary of Education William Bennett in a 1987 *New York Times* op-ed titled "Our Greedy Colleges." Bennett wrote that student aid policies "enabled colleges and universities blithely to raise their tuitions, confident that federal loan subsidies would cushion the increase." Further, he noted that "Federal student aid policies do not cause college price inflation, but there is little doubt that they help make it possible."[59]

The general thesis forwarded by Bennett has come to be called the "Bennett Hypothesis." Whether or not its current use is a literal, precise depiction of the original thesis, the "Bennett Hypothesis" label is commonly used to represent the notion that increases in student aid may have the unintended consequence of leading to price increases.

Considering Student Aid as a Possible Explanation for College Price Increases

As noted in the introduction of this report, it has been undertaken in response to a series of questions from congressional offices about the effects of student aid on college prices. These questions have come in different forms, and have been raised with increasing frequency in recent years. It is useful to devote some attention to the differing nature of these questions prior to examining how empirical research addresses them.

Unraveling Questions about the Effects of Student Aid on College Prices

Generally speaking, two lines of inquiry are reflected in the questions CRS receives. One set of questions focus on *recipients of aid*. These questions are typically raised in the context of a possible increase in a type of aid that is intended to enhance college affordability (e.g., grants), and there is a desire to know whether recipients of the aid are likely to realize the reduction in net price that is intended.

Another set of questions focuses more broadly on whether there is evidence that increases in varied types of aid may inflate college prices. Here the focus can be on any type of aid, including aid that does not aim to reduce net price (e.g., loans), and the emphasis is placed on a likely *institutional price response* that may affect a broad group of students, including those who are targeted by the aid as well as those who are not. For research to address these questions the focus is not exclusively on prices faced by recipients of the aid.

[59] William J. Bennett, "Our Greedy Colleges," *New York Times*, February 18, 1987.

Each type of question is discussed in relation to federal aid programs in a little more depth below.

Is the Full Value of an Increase in Aid Likely to Be Realized by Aid Recipients?

An initial concern, when policy makers contemplate increasing the amount of aid made available to targeted populations if the aid is intended to enhance affordability for such students by lowering their net price, tends to focus on the likelihood that the full value of an increase will be realized by the aid recipients. That is, policy makers want to know if the aid strategy will have the intended effect of lowering net price for the targeted population by the targeted amount or not.

This question arises because it is understood that colleges establish different prices for different students and out of concern that colleges may enjoy pricing power (i.e., the ability to raise prices without destabilizing demand). Hence there is concern that colleges may act to *capture* part of an increase in aid, resulting in a lower than intended reduction in net price for recipients. Aid could be captured by increasing prices, or by allowing the increased federal aid to replace institutional aid that would have otherwise been available to the student, thus preventing the student from fully realizing the gain in purchasing power intended by the aid increase.

Will an Increase in Aid Have the Unintended Effect of Broadly Increasing Prices?

Another concern often expressed by policy makers pertains to whether increases in aid may actually fuel price increases. This concern centers on whether the availability of additional student aid revenue signals colleges that an opportunity may exist to increase spending or prices or to rely more heavily on tuition revenue to cover costs.

When this concern arises, it is generally assumed price increases could affect students targeted by the aid as well as students who are not. Questions about a potential broad effect on prices are commonly raised with regard to many types of aid. This is considered below with regard to a few of them.

Perhaps most commonly these issues surface with regard to loan aid. Loan aid is not explicitly focused on lowering net price for student borrowers. That is, it would not be expected that a $2,000 boost in loan limits would reduce the student's net price. Rather this aid is intended to facilitate students' and families' abilities to finance postsecondary education. For loans, questions tend to be focused on possible unintended effects of making large amounts of low-cost capital broadly available, which may signal colleges that more tuition revenue is potentially available. This could lead to more spending by colleges or heavier reliance on tuition revenue, each of which might result in price increases for students whether or not they are taking out loans.

Tax credits are the focus of many similar inquiries. They also are available to a broad range of students and families at varying income levels. Unlike loans, tax credits are intended to offset a student or family's tuition outlays, but they too are broadly targeted and concerns arise that they may provide enough broadly available assistance to result in institutional price responses.

Federal grants tend to be more narrowly targeted, concentrated on high-need students. Where grants are concerned, questions pertaining to unintended effects of grant increases on the price for all students (i.e., including those students not receiving the grants) do arise, but often as a second-

level question. Focus is often placed on whether desired gains in purchasing power will be realized by grant recipients or compromised by institutional behavior, as discussed in the first question, immediately above.

For aid designed to cover the student's cost of attendance completely (e.g., various forms of GI bill benefits), concerns arise that the promise by the government to meet students' full costs could provide incentive for institutions to elevate prices. Similar questions arose in the past when in order to realize the maximum value of a Pell Grant or tax credit some four-year institutions would need to charge more than they were charging and it was suggested that the ability to yield the full amount of available Pell aid by increasing charges might provide incentive to do so. The breadth of targeting (or number of recipients per institution) may be an especially important consideration with regard to potential unintended effects of this style of aid, which may or may not be available to a very small proportion of students at an institution.

As this report moves into a review of studies examining the effects of aid increases on prices, it will initially discuss their alignment with the policy questions CRS receives, in terms of the types of aid they study, and the extent to which studies focus on prices for individuals targeted by the aid versus the broad effect on prices. Subsequently, the report will discuss the consistency and direction of their findings.

Review of Studies Examining the Relationship between Federal Aid and College Prices

Identification of Studies

Over the last decade, a relatively small number of studies have sought to investigate the potential causal link between college prices and financial aid. To identify studies CRS searched primary databases for educational and social science research and literature as well as bibliographies and references from relevant literature and existing reviews of research. In the search and ultimately in the review for this report, CRS included published studies or working papers that were presented after the year 2000. It did not include secondary sources, correlational examinations, dissertations, or descriptive models that seek to fit existing data. It included primary sources in which the authors employed a quasi or natural experimental approach or tested a statistical model that attempted to isolate the effect of financial aid on some measure of college prices.

CRS identified nine studies that investigated the potential causal link between college prices and financial aid. Collectively, these studies focus on a variety of aid types (e.g., grants, loans, and tax credits), although grant aid is the most commonly studied form of aid. The studies vary in the extent to which *federal aid* is their principal focus. Five of the studies are designed to focus principally on the effects of federal aid on college prices, three are not principally focused on federal aid but consider it as an explanation for price increases, and one of the studies focuses exclusively on state grant aid.[60] Overwhelmingly, the studies focus on a broad institutional price

[60] This study is included in CRS's review because it is one of the most well-known studies examining the relationship between student aid and college prices. Given the relatively small number of studies identified overall, and that this study is sometimes discussed in relation to federal policy, it was decided to include it in this review. For CRS's purposes it is considered in terms of its potential relevance to federal aid.

response, rather than the extent to which student aid actually reduces net price for recipients. More specifically, the studies most commonly attempt to gauge whether changes in grant aid cause a broad price response. The relationship between prices and loans or tax assistance—the types of aid that are most widely available and that are available to students and families across higher income categories—is not the focus of much of this research. (See **Table 4**.)

Table 4. Focus of Studies

Primary Focus of Study	Type of Federal Aid Examined				Examination of Change in Price: Unit of Analysis	
	Grants	Loans	Tax Credits	All Title IV	Broad Institutional Price Response	Prices for Individuals Receiving Aid
Principally Focused on Federal Aid						
Acosta (2001), *How Do Colleges Respond to Changes in Federal Student Aid?*	x	x			x	
Long (2004), *The Impact of Federal Tax Credits for Higher Education Expenses?*			x		x	
Singell & Stone (2007), *For whom the Pell tolls: The response of university tuition to federal grants-in-aid*	x				x	
Cellini & Goldin (2012), *Does Federal Student Aid Raise Tuition? New Evidence on For-Profit Colleges*				x	x	
Turner (2012), *The Incidence of Student Financial Aid: Evidence from the Pell Grant Program*	x					x
Not Principally Focused on but Considers Federal Aid						
Rizzo & Ehrenberg (2004), *Resident and Nonresident Tuition and Enrollments at Flagship State Universities*	x	x			x	
Curs and Dar (2010), *Does State Financial Aid Affect Institutional Aid? An Analysis of the Role of State Policy on Postsecondary Institutional Pricing Strategies*	x				x	
Curs and Dar (2010) *Do Institutions Respond Asymmetrically to Changes in State Need- and Merit-Based Aid?*	x				x	
Exclusively Focused on State Aid						
Long (2004), *How do Financial Aid Policies affect Colleges? The Institutional Impact of the Georgia HOPE Scholarship*					x	

Source: CRS review of studies.

Review of Studies

The previous sections of this report established that both college prices and federal financial aid have increased over the last decade.[61] That is, college prices and federal financial aid are positively correlated with each other. As noted above, one hypothesis proffered on this relationship—the "Bennett Hypothesis"—seeks to explain this correlation with a causal explanation. Briefly restated, this hypothesis is based on comments from former U.S. Secretary of Education William J. Bennett, who wrote in part, "If anything, 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."[62] In other words, according to the Bennett Hypothesis colleges raise their prices in response to the availability of federal financial aid.[63]

Drawing causal conclusions from correlational relationships, however, is problematic in at least two ways. First, a correlational relationship between two variables cannot provide any information on whether one variable is causing another. For example, if federal financial aid and college prices are both increasing, the correlation itself cannot determine causality. An alternative explanation might be that a third variable (e.g., actual cost of attendance) is driving increases in college prices and in federal financial aid. Second, a correlational relationship between two variables cannot provide any information on the direction of the relationship. Again, the Bennett Hypothesis presumes that colleges raise their prices in response to the availability of federal financial aid as a means of capturing additional revenue. Alternatively, the relationship may run in the opposite direction—the availability of federal financial aid has increased in response to colleges raising prices.

There are a limited number of studies that attempt to study the Bennett Hypothesis, or more generally the relationship between financial aid and some measure of "price," and provide evidence that increases in federal financial aid lead to increases in college prices. Most of the available literature simply describes the correlational relationship between college prices and financial aid and does not attempt to isolate a causal effect. CRS has undertaken a targeted literature review that seeks to examine the most relevant literature on the relationship between college prices and financial aid. The review examined only those studies that attempt to isolate a causal effect and provide evidence that supports or fails to support the idea that colleges raise their prices in response to financial aid.

For readers seeking more information about the studies, the **Appendix** presents brief summaries of each of the nine that were reviewed. The summaries provide for each study a concise depiction of the research design, major hypothesis, main results, and caveats or limitations, many of which are identified by the studies' authors. **Table 5**, below, presents a summary of findings of the studies, which are considered in terms of consistency with the Bennett Hypothesis.

[61] Working with somewhat less-refined data, the trend can be documented in the prior decade as well.

[62] William J. Bennett, "Our Greedy Colleges," *New York Times*, February 18, 1987.

[63] In this section of the report, whether or not studies support the Bennett Hypothesis is reviewed. If there is evidence of a price increasing or an intended reduction in price not being realized (in the instance where prices for individual aid recipients are studied), the direction of the finding is in support of the Bennett Hypothesis.

Table 5. Summary of Findings Across Studies Testing the Bennett Hypothesis

Primary Focus of Study	Generally Supportive		Mixed Results		Generally Not Supportive		Outcome Measure		
	Public	Private	Public	Private	Public	Private	List Price	Inst. Grants	Mixed Measures
Principally Focused on Federal Aid									
Acosta (2001), *How Do Colleges Respond to Changes in Federal Student Aid?*				x	x				x
Long (2004), *The Impact of Federal Tax Credits for Higher Education Expenses?*			x[a]			x	x		
Singell & Stone (2007), *For whom the Pell tolls: The response of university tuition to federal grants-in-aid*		x	x				x		
Cellini & Goldin (2012), *Does Federal Student Aid Raise Tuition? New Evidence on For-Profit Colleges*		x					x		
Turner (2012), *The Incidence of Student Financial Aid: Evidence from the Pell Grant Program*		x			x			x	
Not Principally Focused on but Considers Federal Aid									
Rizzo & Ehrenberg (2004), *Resident and Nonresident Tuition and Enrollments at Flagship State Universities*	x						x		
Curs and Dar (2010), *Does State Financial Aid Affect Institutional Aid? An Analysis of the Role of State Policy on Postsecondary Institutional Pricing Strategies*					x	x			x
Curs and Dar (2010) *Do Institutions Respond Asymmetrically to Changes in State Need- and Merit-Based Aid?*					x	x			x
Exclusively Focused on State Aid									
Long (2004), *How do Financial Aid Policies affect Colleges? The Institutional Impact of the Georgia HOPE Scholarship*		x	x						x

Source: CRS review of studies.

Notes: This table summarizes only findings from these studies that are related to the policy question of primary interest (i.e., those that are more related to federal aid). For those studies that generated estimated effects from several regression modeling approaches (e.g., ordinary least squares, fixed effects, fixed effects with fixed effects with instrumental variable), findings from the authors preferred model are the ones reflected in this summary of findings. If a preference was not clearly specified, findings from the most elaborate model are reflected. Similarly, for studies that used a proxy measure of "net price" as an outcome variable, results estimating effects on net price are the ones depicted in this summary. Because actual "net price" data are not available, several studies examine the effects of increases in student aid on separate components of net price (e.g., list price for in-state and out-of-state tuition, list price for room and board, and institutional grant aid) in separate regression models. Under this research approach, it is assumed an "aid capture" has occurred and the Bennett Hypothesis is supported if, for example, list price goes up in response to increases in (federal) aid and institutional grant aid stays stable or declines. When different models, used to examine the effects of student aid on different components of net price, produce results that vary in terms of their support for the Bennett Hypothesis, this constitutes "mixed results." In other words, if both list price and institutional grants (price discounts) increase in response to student aid, the study has generated mixed results.

a. Study found support for Bennett Hypothesis with regard to increases in list price for tuition for public two-year institutions with lower tuitions, but not for other public institutions

When looked at closely, the foci of the studies and the analytical approaches employed vary a good deal. In fact, the studies vary across many dimensions, including the main research questions explored, theorized mechanisms of causation (i.e., how they theorize aid would be captured by institutions), the analytical/methodological approaches employed to examine causality (e.g., natural or quasi experimental versus regression based approaches), selection and use of data, construction and use of proxy measures for aid and price, model specification, and universe of colleges and universities studied. Broadly speaking the studies address common policy issues, but when examined closely they differ from one another in myriad ways. This makes it challenging to summarize the studies, and their findings, in a concise format. It is a particularly difficult body of studies to compare and contrast. That said, some broad themes surface when the studies are examined in relation to one another.

Direction of Findings

As **Table 5** shows, there is not a consensus, nor even a consistent set of findings, on the relationship between federal financial aid and college prices. When findings are considered across the nine studies, they are fairly evenly distributed between being generally supportive, having mixed results, or being generally not supportive of the Bennett Hypothesis. The same is true when only the findings from those studies that are principally focused on federal financial aid are considered. There is also not consistency in findings for either public or private colleges across the studies. Moreover, as the more detailed summaries of the studies in the **Appendix** illuminate, there are often contradictory findings *within* studies, depending on the specifications used in the different models.[64]

Limitations of Findings

Across the studies, findings are limited by challenges associated with measuring change in price as well as by challenges associated with isolating the effects of student aid on prices.

Measuring Change in Price

Not having the outcome measure of primary interest available—a good measure of net or effective price—is ultimately a substantial limiting factor in understanding the relationship between aid and price. The outcome variables used to measure "college price" differ, often times considerably across these studies, making it difficult to group, summarize, and compare results. There is no consensus on or consistent measurement of the outcome variable of interest, which can be measured by changes in institutional grant aid or through different components of charges to students.

Available data do not allow for researchers to measure change in price for individual students or for subgroups of students—such as aid recipients—within an institution. This precludes analyses that would be responsive to many prevalent policy questions, particularly those pertaining to the extent to which aid aiming to lower net price did so for targeted students or was captured by the

[64] This is displayed to some extent in the "mixed results" column in **Table 5**. Additionally, many of the studies present multiple regression models that produce divergent findings.

institution, as well as those seeking a more thorough understanding of what an institutional price response might look like across students.

The lack of individual level data or thorough or precise institution level data leads to reliance on measuring change in list price or in average institutional grant aid per FTE student.[65] Limitations associated with list price, an often discounted sticker price which many students do not pay, as a measure of the real prices paid by the student or charged by the institution are well documented. See, for instance, the early sections of this report.

Limitations associated with using average institutional grant aid as outcome measures also exist. One limitation associated with these averages is that they typically apply only to a segment and not the entirety of the student population at institutions. That is, these averages are generally constructed using data that apply only to full-time, first-time, degree-seeking fall enrollees. Part-time students and students not in their first semester of their first year are excluded from these averages. Year-to-year changes in price or grant aid may occur differently for students who are omitted and included in these averages, which would mean that part of an institutional price response would be missed if these averages are used to measure change in price.[66]

Another limitation associated with this set of outcome measures is that they do not reflect all of the charges comprised in prices. Available data do not allow for average institutional charges for room and board to be calculated, because the list prices for room and board cannot be weighted to reflect the portion of students paying them. This is consequential if an institutional price response is comprised in part of an increase in price for room and board. The average increase in room and board costs across students cannot be calculated, and room and board charges are generally omitted altogether from these analyses.

Moreover, a challenge stemming from the lack of actual, all inclusive, composite measures of average net or effective price at an institution is that it leads to researchers examining the effects of student aid on the component parts of net price (e.g., institutional grants, list price for tuition—for in state and out of state students) in separate models, theorizing that upward change in list price accompanied by no change or downward change in institutional grant aid can be used to confirm an institution has responded to an aid increase by capturing aid. Unfortunately, this approach often results in separate models with disparate findings that do not reinforce each other. It also does not allow for a true test of the extent to which movement in some of these variables (e.g., list price) may be partially offset by movement in the others (e.g., institutional grant aid).

If an institution raises or lowers its list prices for tuition, for example, this provides little information on how individual students or students across an institution are affected, which may depend on other factors such as tuition discounting through institutional aid or adjustments to room and board charges. Thus, how much of the additional revenue from an increase in financial aid an institution "captures" depends on its response through a variety of mechanisms. Ideally, measuring the impact of financial aid on actual prices for students might take the form of

[65] Two of the studies measure change in a proxy for average net price constructed by subtracting average institutional grant aid from list tuition levels for in-state and out-of-state students.

[66] The omission of part-time students would constitute a large issue at schools like community colleges, which do not factor prominently in this review. However, the omission of students not in their first year may be significant, as analyses have shown substantially differing levels of grant aid awarded to first year and other students at moderately and less selective institutions (possibly due to a practice known as front-loading). See Mark Kantrowitz, *Flaws in the Statutory Definition of Net Price*, Fastweb.com, October 11, 2011, p.1.

thoroughly analyzing net or effective prices across students, and institution-wide. Due to data limitations, however, the ideal outcome measure (individual level net or effective price) is not available. As shown in the literature review, there is not even agreement on the use of outcome variables among the next-best measures (i.e., measures of price other than individual net price variables). As a result, empirical studies are focusing heavily on changes in list prices, and often look as well, although separately, at changes in average institutional grants. This raises the fundamental question of whether, across the studies, the outcome variables actually measure change in the outcome of interest.

Establishing Causality

In addition to the specific problem of not having an outcome variable that captures change in price in an analytically precise way, studies on the relationship between grant aid and prices are limited by more general problems in social science research—establishing causality. Ideally, a research design would allow analysts to determine the impact of any given variable (independent variable) on an outcome of interest (dependent variable) and to attribute causality to that independent variable. In social science, however, such studies are fairly rare due to the inability to control the environment in which policy is implemented. In this particular research agenda, there is no planned or easy-to-study natural experiment that allows firm conclusions to be drawn about the relationship between forms of federal financial aid and college prices. Most of the studies rely on some sort of regression analysis to try to draw causal connections between aid and prices. While multivariate regression analysis is a standard tool for examining a relationship such as that between federal aid and college prices, regression analysis can also be affected by factors that make establishing causality difficult, some of which are described below.

- Covariates. A wide and divergent set of covariates are used across these studies. Different researchers choose to control for different factors that they hypothesize will affect some measure of college price. In many of the studies, for example, some measures of state appropriations for higher education, endowment, income per capita, and selectivity are used. In other studies, however, these more common covariates are included with less common covariates, such as home equity in the area of the college, unemployment in the state, percentage of population aged 18-24, and number of governing boards. There is little to no consistency about the mix of covariates across studies. As such, covariates that are found to be statistically significant in some studies are not present in other studies, thus making comparisons across studies difficult. This in turn makes it difficult to find a consensus or consistent set of robust conclusions in this literature. There are often contradictory findings *within* studies, depending on the specifications used in the different models.
- Direction of Causality. In regression models, causality runs from the independent variables to the dependent variable. To be statistically valid, a regression model must meet certain criteria, one of which is that neither the dependent variable, nor another independent variable or a missing variable, can influence any independent variable. In the world of actual policy phenomena, this criterion rarely holds because of the complex interactions among variables. For example, in the current case, it is possible that the level and structure of financial aid (independent variable) is influenced by the pricing strategies of institutions of higher education (dependent variable). In studies that include a measure of state aid as an independent variable, for example, the estimates may be biased if the

dependent variable (a measure of college prices) affects state aid. This is a form of endogeneity bias.

- Instrumental Variables. One way to address engodeneity bias is through the use of instrumental variables. That is, if the independent variable is endogenous to the dependent variable, an instrumental variable that is related to the independent variable but exogenous to the dependent variable may be used to understand the causal effect of the variable of interest on the outcome variable. For example, the typical outcome variable in the studies under review is some measure of price. But, as noted, price may affect a key explanatory variable—financial aid. Thus, to understand the effect of aid on price, some researchers try to identify a variable that is related to aid but only affects price through aid rather than affecting it directly. One study, for example, uses state general tax revenue and state lottery revenues as instruments for state financial aid. The choice of valid instruments can be difficult but may be important to correct for endogeneity bias. The range of instrumental variables used in the studies under review shows the difficulty in choosing valid instruments. A partial list of instrumental variables includes state lottery revenues, median home equity, Barron's ranking of institutional quality, average SAT scores of high school seniors, and dummy variables for changes in the need analysis formula. In many of the studies, the direction and magnitude of the findings change dramatically when instrumental variables are included, displaying the potential importance of the selection of instrumental variables, and sometimes making it difficult to interpret the substantive meaning of their effect on findings and difficult to discern the best model to explain changes in prices.
- Omitted Variable Bias. If a regression equation does not control for a factor that affects the outcome variable, then the effects of the other independent variables in the regression equation will be biased. Thus, when variables with explanatory variables are omitted, the effects of the included variables are biased (the effects of positively correlated variables will be overstated and negatively correlated variables understated). Given real world data limitations, it is not possible to construct a perfectly controlled study that includes every variable with explanatory power, but it is possible to include many control variables that explain some but not all variation in prices. In the case of studies examining the relationship between grant aid and prices, for example, there are likely variables that affect prices but are not included because they cannot be measured well (e.g., prestige or demand) or because data are not consistently available (e.g., availability of home equity credit). If factors that do have an effect on college prices are not included in a regression equation, then the regression would attribute their (the excluded variables) effects to other variables that are included in the regression equation, such as grant aid.

Where studies rely on natural and quasi experimental designs to establish causality, some of the challenging factors encountered involve constructing well-matched comparison groups and having the data needed to construct "difference in difference" comparisons.

Final Thoughts

The review of studies presented in this report suggests the body of research on the relationship between federal financial aid and college prices does not provide conclusive results in any direction. In fact, there are often contradictory findings *within* a single study and there is certainly

no consensus on the existence, and certainly not the magnitude, of causal relationship between aid and price.[67] This suggests the difficulty in isolating the effect of one variable—financial aid—on a phenomenon—rising college prices—with many likely causes. Put differently, it is not plausible to say that college prices would not have gone up much or at all in the absence of increases in federal financial aid. Rather the reality of rising costs in higher education is likely over determined. As Long notes in an earlier review of some of the college cost literature, other factors have been shown to be determinants of rising prices, including reductions in state appropriations for higher education, increasing costs of faculty and staff, greater investment in technology and student services, and the growing use of institutional aid.[68]

Even if the relationship between financial aid and price changes is not clear cut, that absence of evidence does not mean that cause and effect does not exist. This lack of a consensus finding is likely due in no small part to the fact that changes in the main independent variable, or the treatment, in many of the studies (i.e., Pell increases) were not common in the periods under study. Or, as Long notes, in the "case of the Pell Grant, there has not been a large, discrete change in its maximum since its creation."[69] In addition, it is not likely that there is one relationship between changes in financial aid and changes in price but instead that there are many, primarily because of different abilities and incentives of different institutions to respond. For example, institutions with greater power to increase prices (e.g., highly selective institutions) might not have as much to gain from "capturing" increases in federal grant aid because this type of federal financial aid is not a large source of revenue. On the other hand, institutions with greater incentive to capture aid (e.g., community colleges) might have difficulty in doing so because of a mission more focused on maintaining access and affordability. Finally, the widespread use of tuition discounting (i.e., raising the list price but varying the net prices for individual students) means that using averages or list prices is unlikely to unravel the underlying relationship between aid changes and price changes, as there is a complex chain between a list price, the cost to an individual, and the actual revenue received by an institution.

Implications for Policy

Implications for the Identification of Policy Options

Given existing data constraints, methodological challenges, and the plethora of rival explanations for why prices continue to increase, it is unlikely in CRS's view that research is on the horizon that will illuminate a clear diagnosis or prescription for price increases that consistently outpace inflation. There is growing concern that college affordability is a significant problem. There are many levers available to Congress to attempt to address affordability, but clear evidence on the effects of aid on prices is seemingly not available to help guide decisions.

[67] Despite this lack of consensus, it does appear that of the studies that find a positive association between some measure of federal financial aid and some measure of price, most also report that this effect is stronger in private institutions than in public institutions.

[68] Bridget Terry Long, *What Is Known About the Impact of Financial Aid? Implications for Policy*, National Center for Postsecondary Research, New York, NY, April 2008, pp. 33-34, http://www.postsecondaryresearch.org.

[69] Ibid, p. 32. While in very recent years there has been a substantial boost in the maximum award level, it occurred too late to be captured in these empirical studies.

Considerations for Policy Related Research

It is sometimes suggested that there is asymmetry in the information available to those setting prices and those paying and subsidizing prices. That is, colleges gather expansive information about students' financial circumstances and their ability to pay varied prices, and share fairly limited information about the prices they actually set for different students. Generally this is discussed in the context of the quality of available consumer information. The limited availability of information about actual prices charged affects oversight and research as well. Research on a potential causal link between student aid increases and price increases is impeded by the limited availability of institutional and individual level data on real prices. What is more, it is not possible to do good descriptive analyses on the prices faced by students at institutions and on pricing behavior of institutions. Without data improvements, desired research may not materialize.

In addition to data issues, although likely connected to those issues, it is worth noting that some of the policy questions CRS encounters most regularly are not typically the focus of the empirical research in this area. Partially this pertains to the types of aid studied. In particular, the effect on price of student loans and tax credits, the forms of federal aid that are most widely available and that are available to students and families from middle and higher income levels, is not the focus of much research.

Additionally, existing studies are generally focused on a broad price response and not on effects on prices for aid recipients or subgroups of students. This is likely, at least in part, a result of data limitations. It is not clear that there is consistently conceptual alignment between commonly asked policy questions and empirical research as it pertains to the hypothesized relationship(s) to be examined. At issue is whether "the typical student" or a group of students or the school is the unit of analysis. That is, does the research need to focus on students or a particular group of students or the pricing behavior of institutions? From a disciplinary standpoint, many researchers may be inclined to focus on the institutions, although from a policy maker standpoint, examining change in average prices at schools is unlikely to be nearly as informative as studying the underlying distribution of prices as well.

Appendix. Summaries of Studies Examining Effects of Student Aid on College Prices

This appendix presents brief summaries of each of the nine studies reviewed in this report. The summaries provide for each study a concise depiction of the research design, major hypothesis, main results, and caveats or limitations. In the summaries, only information related to the research questions of interest in this report is included. (Also see **Table 4** and **Table 5**).[70]

Acosta

Acosta (2001) uses a series of regression models to test the relationship between federal student aid and institutional aid and tuition revenues. The study finds an overall positive association between federal student grant aid and public and private tuition revenue, but the effects are attenuated by changes in institutional aid.[71] That is, the author finds that for an additional $1 per student in federal student aid, private institutions increase tuition revenues by $3.24 per student but only increase institutional aid per student by $1.48, for a net revenue gain of $1.76 per student. A similar, but smaller, effect is found for public institutions but the results are sensitive to the specification used and are not significant overall. Despite the significant finding for private institutions, the explanatory power of the model is generally low. A model with low explanatory power generally indicates that the researchers did not account for variables that likely explain most of the relationship between federal grant aid and tuition. The variables were not included in the model because they are either unknown contributors to changes in tuition or they are too difficult to measure. Regardless, a significant finding with low explanatory power indicates that federal grant aid is not the only factor contributing to changes in tuition.

Cellini and Goldin

In a study that employs a quasi-experimental design comparing tuition responses of Title IV eligible and non-Title IV eligible institutions in five states, Cellini and Goldin (2012) test for a tuition premia for Title IV eligible institutions.[72] They hypothesize that Title IV eligible institutions likely charge higher tuition than comparable non-Title IV eligible institutions, in part due to the availability of federal financial aid to Title IV students. The authors find that for comparable full-time non-degree programs in the same field, Title IV institutions charge, on average, around 75% more in tuition than non-Title IV eligible institutions. The suggestion of this finding is that Title IV institutions, which are able to receive federal aid, are raising tuition as a response to that aid and thus capturing the additional aid. These findings, however, are possibly

[70] An additional table can be provided to congressional requesters containing more information about technical details of these studies upon request.

[71] Rebecca J. Acosta, *How Do Colleges Respond to Changes in Federal Student Aid?*, Department of Economics, University of California, Los Angeles, Working Paper Number 808, Los Angeles, CA, October 2001, http://www.econ.ucla.edu/workingpapers/wp808.pdf.

[72] Stephanie Riegg Cellini and Claudia Goldin, *Does Federal Student Aid Raise Tuition? New Evidence on For-Profit Colleges*, National Bureau of Economic Research, Working Paper 17827, Cambridge, MA, February 2012, http://www.nber.org/papers/w17827.

mitigated. It is not clear if all of the non-Title IV institutions are accredited. If not, the tuition premium attributed to Title IV institutions being able to capture federal aid through higher tuition might be due in part to accreditation status and possible qualitative differences instead. The difficulty in determining comparability may mitigate the strength of the causal findings. Furthermore, as the authors acknowledge, there is some concern about unobservable differences between Title IV and non-Title IV institutions that may affect the finding of a tuition premium. Finally, while this study produces significant, consistent findings in support of the Bennett Hypothesis, it is not clear how generalizable the results are to the full universe of higher education. The findings in this study apply to non-degree and sub-baccalaureate programs only. Also noteworthy, however, this is the only study profiled that focuses on for-profit institutions where tuition discounting is much less common. In this sector a "tuition" or list price variable is likely a good measure of the effective price students are actually asked to pay, alleviating a challenge faced by other studies considered here.

Curs and Dar (1)

Curs and Dar (2010) use regression models to explore whether institutions of higher education adjust net price—by increasing list tuition and fees or decreasing institutional aid—in response to changes in state financial aid policy. The authors have a primary interest in examining whether or not institutional responses depend on higher education governance structures (i.e., structure of higher education governing boards). They seek to understand whether institutional pricing policies are reinforcing of state financial aid policies. As part of this examination Curs and Dar test whether institutions respond to changes in federal grant aid. Curs and Dar generally find a negative, but not always significant, association between federal student grant aid and public and private net price.[73] That is, for a $1 increase in federal grant aid, net price at private institutions falls by $0.48.[74] The results for public institutions were not significant. These findings are sensitive to model specification and the use of instrumental variables. For example, in the fixed effects models, Curs and Dar find a significant negative relationship between average federal grant aid and net price across institution type. In the instrumental variable models, however, they only find a significant negative relationship for net price in private institutions.

Curs and Dar (2)

Curs and Dar (2010) use a series of regression models to test the relationship between financial aid programs and institutional pricing strategies. Specifically, the researchers hypothesize that institutions may implement different net price strategies (i.e., changes in list tuition and fees or institutional aid) in response to changes in state merit-based and need-based grant aid. Once again, the response to changes in federal grant aid is tested as well. Curs and Dar find a negative association between federal student grant aid and public and private net price.[75] That is, for a $1 increase in federal grant aid, in-state net price falls $0.42 and out-of-state net price falls $0.51 at public institutions. For private institutions, a $1 increase in federal grant aid is associated with a

[73] Bradley R. Curs and Luciana Dar, "Does State Financial Aid Affect Institutional Aid? An Analysis of the Role of State Policy on Postsecondary Institutional Pricing Strategies," July 2010, http://ssrn.com/abstract=1641489.

[74] Note that "net price" is examined by subtracting average institutional grant aid from list price for in-state and out-of-state tuition. The authors are not examining net price for federal grant recipients.

[75] Bradley R. Curs and Luciana Dar, "Do Institutions Respond Asymmetrically to Changes in State Need- and Merit-Based Aid?," Presentation at the 2010 Association for the Study of Higher Education Annual Meeting, Indianapolis, IN, November 2010, http://ssrn.com/abstract=1702504.

$0.39 decrease in net price. These findings, however, appear fairly sensitive to model specification. Specifically, in an earlier version of this research, Curs and Dar found only a negative, significant association between federal grant aid and net price at private institutions. The only difference between the previous finding and the current finding appears to be the splitting of a covariate (state grant aid) into two components—merit-based and need-based. Yet it appears that this single additional specification caused the association between federal grant aid and public institution net price to change from insignificant to significant. It is not clear why this is the case. When results are inconsistent due to small changes in model specification, it is likely that the model does not adequately explain the relationship between federal aid and price. It is likely that other unknown variables are significantly contributing to changes in price.

Long (1)

In her study of the effect of the Georgia HOPE Scholarship program on list tuition price, employing a difference in differences design based on a natural experiment, Long (2004) hypothesizes that the HOPE program increased incentives for institutions to raise tuition, due to the introduction of additional financial aid in the new scholarship program. She found, however, that public institutions had a relative decrease (compared to control group of southeast colleges) of about 3% in list tuition price.[76] This finding is contrary to the Bennett Hypothesis. For private institutions, however, Long finds a relative increase in tuition compared to the control group. When testing for institutional response for room and board the reverse occurs. That is, Long finds public institutions raised room and board fees in response to HOPE but private institutions did not. Taken as a whole, Long's findings suggest that private institutions responded to HOPE by raising tuition and lowering institutional aid, resulting in recouping as much as $0.30 for every $1 of HOPE aid. On the other hand, there is some evidence that public institutions responded differently by decreasing tuition but raising room and board fees (by about $0.10 more than the comparison group). So Long's evidence from the Georgia HOPE program suggests that it is not easy to make a definitive general statement about aid and price but that sector does appear to matter in understanding this relationship, as it does in other studies under review in this report.

Long's study of the Georgia HOPE scholarship may provide a higher level of evidence than other studies under review. As Long notes, the "introduction of a new program that affects some students but not others can provide a useful research opportunity with the aid-eligible students being the 'treatment group' and other being the 'control group.'"[77] The Georgia HOPE Scholarship was first introduced in 1993 and provides full tuition, fees, and a book allowance to Georgia residents attaining at least a "B" average who attend a Georgia public college (comparably valued compensation is given to similar students who attend Georgia private colleges). The introduction of HOPE offers a natural "break" that possibly allows causal inference to be drawn. That is, changes in institutional behavior after the introduction of HOPE might be attributed to HOPE to the extent that other possible explanations are controlled for. In addition, the fact that surrounding states that might reasonably be assumed to be subject to the same trends and economic shocks as Georgia did not introduce similar merit-based programs at the same time provides a reasonable "control group" against which to compare any observed

[76] Bridget Terry Long, "How Do Financial Aid Policies Affect Colleges? The Institutional Impact of the Georgia HOPE Scholarship," *The Journal of Human Resources*, vol. 49, no. 4 (Autumn 2004).

[77] Bridget Terry Long, *What is Known About the Impact of Financial Aid? Implications for Policy*, National Center for Postsecondary Research, Working Paper, New York, NY, April 2008, p. 16, http://www.tc.columbia.edu/centers/i/a/document/6963_LongFinAid.pdf.

changes in the behavior of institutions of higher education in Georgia. For these reasons, results from the HOPE study may represent a more robust form of evidence than other regression analyses. Generalizability of these findings to federal aid programs is less clear because federal aid programs are not merit-based.

Long (2)

Long (2004) uses a differences-in-differences-in-differences design based on a natural experiment of the introduction of the federal Hope Learning Credit (HTC) and the Lifetime Learning Tax Credit (LLTC). The natural experiment compares institutions that are likely to take advantage of the HTC and the LLTC (i.e., a treatment group) and institutions that are not likely to take advantage of the tax credits (i.e., a control group). The hypothesis is that institutions with greater incentives to take advantage of the credits (i.e., those with many credit-eligible students and low tuition) are more likely to raise list tuition price in response to credit availability than institutions that have few eligible students and higher tuition. The experiment is premised on some colleges having greater incentives to take advantage of tax credits because they are lower-cost colleges and have many students eligible for the credit. For public, two-year institutions, those with greater incentives to raise tuition experienced 18% faster list tuition price growth than institutions with lower incentives. For public, four-year institutions there were no statistically significant differences between these two groups. In states with relatively high levels of state aid, public two-year and four-year institutions raised tuition faster than other states. Within this group, two-year institutions with many credit-eligible students experienced faster tuition growth than other schools. There is largely no effect for private institutions.[78] The outcome variable is list tuition price, not a net measure. There are a lot of interactive effects in this model, which makes conclusions dependent on the different variables at work. The contingent nature of this model makes it difficult to compare with others but her finding of an effect in public institutions, particularly two-year institutions, is consistent.

Rizzo and Ehrenberg

Rizzo and Ehrenberg (2004) use a series of regression models to test several hypotheses related to tuition and enrollment. Although the primary interests in this study are the causes and consequences of nonresident enrollment at flagship public universities, the authors include a Pell Grant variable in their equations, in part to test whether institutions respond to Pell increases with list tuition increases. Rizzo and Ehrenberg report a positive and significant association between the maximum Pell Grant award and in-state tuition (but this positive association is not significant for out-of-state tuition).[79] Specifically, the authors find that a 10% increase in the maximum Pell award is associated with a 4.8% increase in in-state tuition. Although the relationship between federal grant aid and tuition was significant in some models, it was not consistently strong enough, and was negative and insignificant in some models, to make broad conclusions. The sample in this study includes only "flagship public research institutions," so the price response of private institutions is not modeled. In other studies, the response of private institutions is often

[78] Bridget Terry Long, "The Impact of Federal Tax Credits for Higher Education Expenses," in *College Choices: The Economics of Where to Go, When to Go, and How to Pay For It*, ed. Caroline M. Hoxby (Chicago: University of Chicago Press, 2004).

[79] Michael J. Rizzo and Ronald G. Ehrenberg, "Resident and Nonresident Tuition and Enrollment at Flagship State Universities," in *College Choices: The Economics of Where to Go, When to Go, and How to Pay For It*, ed. Caroline M. Hoxby (Chicago: University of Chicago Press, 2004).

stronger than that of public institutions, which in some cases have no tuition changes in response to changes in federal grant aid. In addition, the subset of public institutions in this study (91 flagship public research institutions) does not capture the full range of response from lower-status public schools. Finally, the number and type of covariates in this particular study make it difficult to compare with other studies, most of which use a smaller number of covariates and a wider sample of institutions (e.g., all public, private). The study also presents findings from many models and it is not entirely clear why the model specification for those models generating the featured findings is superior to other models presented in the study.[80]

Singell and Stone

Singell and Stone (2007) use various regression models to test the Bennett Hypothesis. That is, the authors use a longitudinal dataset of public and private universities to examine the response of list tuition to changes in the average Pell Grant award amount over time. Singell and Stone report mixed effects of Pell Grant aid on list tuition price, depending on institution, student type, and statistical model.[81] Specifically, the authors find a positive, significant relationship between average Pell Grant aid and public in-state list tuition price in two of their three models. Notably the absence of significance is in their fixed-effects instrumental variable model. For public out-of-state tuition, they do find a significant, positive association between Pell Grant aid and public out-of-state list tuition in two of their three models. Finally, they find significant but mixed results for private tuition. In one model, they report a significant, negative relationship between Pell Grant awards and private tuition but in the two other models, they find a significant, positive relationship. Looking only at the authors' preferred specification (fixed effects, instrumental variables), Singell and Stone find for every $1 increase in Pell Grant per recipient, public out-of-state tuition goes up by $0.80 and private tuition goes up by $0.86. As the authors note, it is possible that any list tuition effects resulting from changes in Pell aid might be offset by changes in net tuition (i.e., list tuition minus tuition discounts and non-Pell financial aid). Singell and Stone do report on a subset of 71 public and private universities for which institutional aid data exist and find little difference between list and net tuition effects of Pell Grants. However, the sample size of 71 does not provide the same robustness of results that the full sample does. Finally, like other studies, the findings reported are sensitive to model specification, the substantive implications of which are not always clear.[82]

Turner

Turner's (2012) use of a higher form of regression analysis (regression discontinuity and regression kink) adds further nuance to understanding the response of institutions to Pell Grant

[80] The authors also include independent dummy variables in their models for years subsequent to 1979 and 1992 intended to capture increased access to subsidized federal loans resulting from two legislative changes that affected consideration and calculation of need in determining loan awards and eligibility. Given the potential for these proxy measures to additionally reflect other changes to student aid benefits during that period, and the limited attention devoted to findings related to these explanatory variables by the authors, they are not discussed in detail here.

[81] Larry D. Singell Jr. and Joe A. Stone, "For whom the Pell tolls: The response of university tuition to federal grants-in-aid," *Economics of Education Review*, vol. 26 (2007), pp. 285-295.

[82] For example, in the finding with the largest coefficient for Pell Grant aid (for private institutions), the base regression model (ordinary least squares) shows a negative and significant coefficient (i.e., Pell Grant aid increases are associated with decreases in tuition) while the fixed effects and fixed effects/instrumental variable models show positive and significant associations between Pell and tuition.

aid.[83] Turner takes a slightly different approach in that she examines the channel of potential capture of Pell funding through institutional aid, not tuition. In other words, Turner hypothesizes that institutions will adjust to changes in Pell Grant aid through raising or lowering institutional aid, not through tuition or room and board fees. Across all sectors, she estimates that each dollar of Pell Grant aid reduces students' effective prices by 84%, implying that institutions capture the remaining 16% through lower institutional grant aid. But this capture varies across sector and selectivity of institutions, with selectivity being the primary determinant of Pell capture. Nonselective private institutions, a group that includes nonprofit and for-profit schools, are estimated to capture 18% of every Pell dollar, while selective nonprofits capture 79% of every Pell dollar. In the public sector there is not a significant effect.

Capture in this study is measured by the percent that institutional grant aid changes in response to Pell Grant aid. Thus "capture" becomes a measure of "effective price" based on how much institutions can capture of changes in Pell Grant aid. But net revenue or effective price consists of other variables, such as room and board or other fees. It is possible that changes in the other sources of institutional revenue (in response Pell or other federal aid) affect the overall "capture" but it is not part of this model. In addition, the Turner study does not consider the possible effect of Pell Grant aid on tuition because the relationship is assumed to be not causally connected. Specifically, Turner asserts that because tuition is set prior to the announcement of Pell Grants, it is not possible for tuition to respond to Pell Grant aid. This assumption is not part of the other studies under review and shuts off a potential channel of adjustment. Turner's study is the only one under review in this report that uses data from the National Postsecondary Student Aid Study (NPSAS), which is, unlike the IPEDS data used in the other studies, an individual-level data set consisting of information on demographic characteristics of students and financial aid data (from institutional and government data). While Turner's analysis is based on NPSAS data, it is an aggregation of four NPSAS waves of data (1996, 2000, 2004, and 2008). It is not clear if there are implications of combining four samples across 12 years, given that the mix of institutions and students is different across survey cohorts and individual sample years are designed to be representative in that given sample period.

Regression discontinuity is a quasi-experimental method that approximates natural or randomized experiments by allowing for a clear pretest-posttest design. This break point, or discontinuity, in the population (individuals or institutions) provides researchers some ability to infer causality because the break is determined by a cutoff point in an otherwise similar group. For example, the existence of a Pell Grant eligibility threshold means there is a discrete (zero, non-zero) cutoff, below which an individual receives $0 and above which an individual receives $400. This cutoff allows for the use of RD and creates a sort of natural experiment with a treatment and control group because individuals on either side of the cutoff are presumably similar in most other characteristics.

[83] Lesley J. Turner, *The Incidence of Student Financial Aid: Evidence from the Pell Grant Program*, Department of Economics, Columbia University, New York, NY, April 29, 2012, http://econweb.umd.edu/~turner/LTurner_FedAid_Apr2012.pdf.

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