Linking Costs and Postsecondary Degrees

Key Issues for Policymakers

Future of American Education Project

Nate Johnson

Working Paper 2011-03

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Foreword

As college costs and public expectations continue to grow in higher education, policymakers and institutional leaders have struggled with ways to cut spending while improving student success rates. However, outside of out-of-pocket costs to students and coarse college-level spending data, there is often little concrete guidance on what it actually costs to produce a college degree and how this information can be used to inform planning, policy, and reform. Given the tight fiscal environment, it is critical that policy makers have solid grasp on how to think about college costs and accountability so that they will be prepared to make important decisions about budget cuts and higher education policy in the years ahead.

In "Linking Costs and Postsecondary Degrees: Key Issues for Policymakers," higher education policy consultant Nate Johnson offers practical advice for decision-makers who are struggling to rein in college costs while improving productivity. Johnson provides a step-by-step guide to different approaches for calculating costs, highlights the tremendous variability in cost across programs within institutions, and documents some of the "hidden costs" of higher education. Rather than cut budgets across the board, as many cash-strapped schools have done, Johnson argues that budget decisions should be grounded in clear and reliable data that prioritize performance and productivity.

For policymakers interested in spending higher education dollars more strategically, Johnson offers five simple "rules of the road" that should inform efforts to link finance more tightly to institutional performance:

1. Not all certificates and degrees cost the same or produce the same benefits.
2. Private universities show where growth is (and isn't) possible without massive subsidies.
3. Seek economies of scale where appropriate.
4. Do not confuse enrollments with degrees.
5. Past performance may not indicate future results.

Refreshingly, Johnson's paper eschews quick fixes for higher education spending, and instead focuses on the need to empower leaders to make better decisions with granular, output-centered data. "There is not a magic formula to arrive at a cost of education that will serve every possible need," Johnson cautions. "Yet with a few key concepts in mind, and access to accurate and timely information, it is possible for policymakers to make good use of cost data in setting goals, allocating resources, and asking tough questions of higher education leaders."

I am confident that you will find Johnson's piece to be as thought-provoking as I have, especially in light of tight state budgets and the push to expand college completion. For further information on the paper, Nate Johnson can be reached at nate_johnson@hcmstrategists.com. For other AEI education working papers, please visit www.aei.org/futureofeducation. For additional information on the activities of AEI's education policy program, please visit http://www.aei.org/ra/29 or contact Ms. Olivia Meeks at olivia.meeks@aei.org.

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Nate Johnson is an independent higher education consultant based in Tallahassee, Florida and an affiliated consultant with HCM Strategists, LLC. He specializes in higher education policy, funding, and student success issues. He has worked in education policy, planning, and institutional research at the national, state, and institutional levels. Nate served for five years as executive director of planning and analysis for the State University System of Florida in the office of the chancellor. He facilitated the first statewide strategic plan for the Board of Governors after it was created in the Florida Constitution in 2003. He also served as associate director of institutional research at the University of Florida and as a policy analyst in Florida's nationally-recognized Office of Articulation, where he helped develop policies related to inter-sector transfer, high school graduation standards, and college admissions. Nate's long-term consulting projects include Lumina Foundation-supported work as the external higher education productivity adviser to the state of Tennessee and as leader of a "strategy lab" for state policymakers on student incentives to complete courses and programs. Nate earned his bachelor's degree from Whitman College in Walla Walla, Washington and his Ph.D. in English literature from Cornell University.

As one of the largest groups of new governors and legislators in history begins its work this year, many of them share ambitious goals for higher education in their states. Nationally, President Obama has set his sights on eight million additional degrees by 2020. State leaders, regardless of their political leanings, almost all have their own version of the attainment goal. Virginia is targeting 100,000 more degrees by 2025. Tennessee is set on 210,000 more by that time. Kentucky wants to "double the numbers." Indiana aims at 10,000 more degrees awarded per year. Oregon's business leaders seek to have 60 percent of adults with some form of postsecondary credential.

With state revenues drastically curtailed, such visionary goals raise serious questions about cost. What will it take to reach these goals? What does a postsecondary degree in this country actually cost taxpayers and students? It is a reasonable question, and one that can be answered, provided that the purposes and policy issues underlying it are clearly understood. It is one thing to say how much has been spent in the past, for example, but quite different to project what graduating more students might cost. And while elaborate accounting systems and student databases can tease out the cost differences between a history degree and a chemistry degree, it does not follow that channeling more or less money to different departments will yield commensurate changes in the proportions of students graduating in each field, or that the money spent on some degrees could be banked just by closing a program.

To make well-informed policy and budget decisions, policymakers and higher education leaders need clear and appropriate information about costs. Unfortunately, such information can be difficult to come by.

To make well-informed policy and budget decisions, policymakers and higher education leaders need clear and appropriate information about costs. Unfortunately, such information can be difficult to come by.[1] The simplest types of cost data available can be misleading, and more complex calculations of cost are subject to error or intentional distortion. There are easy ways to inflate costs to make a program, institution, state, or an entire sector of higher education appear wasteful. There are equally easy ways to minimize costs or to manipulate results to favor one institution over another. Undergraduate education at research universities, for example, is either a hopeless money pit or a model of organizational efficiency—depending on how analysts account for the costs and overhead associated with graduate education and research. Community colleges are either a huge bargain for their low cost per credit hour or terribly wasteful and inefficient on a cost per degree basis.

Rather than provide an all-purpose formula to resolve these issues, this paper outlines four concepts that will help guide policymakers in thinking about costs of higher education, whether the question is as broad as "What might it cost to reach President Obama's goal?" or as narrow as "Which of these two physics departments educates students more efficiently?" First, not all credit hours or degrees are equal; degree level and academic disciplines

are big factors in determining higher education costs. Second, the cost of instruction is not the same as the cost of *completed* instruction, and there are several ways to calculate a "cost per degree." Third, past performance does not guarantee future results. The marginal future cost of adding students or degrees may have little to do with the current average cost. And last, when comparing different institutions or different modes of delivering higher education, the hidden costs and subsidies in higher education need to be considered even when they are difficult to estimate precisely.

The Simple Approach

Perhaps the easiest way to calculate the cost of a college degree nationally is simply to combine numbers from the *Digest of Education Statistics*.[2] Table 1 summarizes expenditure data from the *Digest*, showing $273 billion in total higher education expenditures at public higher education institutions in 2008-09. Divide by the 1.96 million degrees reported the same year (shown in Table 2 on page 3), and the result is about $139,000 per degree. As a simple index or ratio of total expenditures to degrees to track from year to year, there is nothing wrong with that figure. Granted, most degrees are earned over more than one fiscal year, but the result varies only by a few percentage points with inflation-adjusted three- or five-year averages of *Digest* numbers, or with various weightings to approximate when the costs might have been incurred to produce the degrees awarded.

But on closer scrutiny, much of that $139,000 expenditure relates to activities unrelated to instruction. Today's colleges and universities are conglomerates of a sort. In addition to teaching students, they conduct research, act as landlords (dormitories), operate restaurants (dining halls, concessions), deliver medical care (through teaching hospitals and student health centers), and provide entertainment (intercollegiate athletics, bowling alleys, theaters, films, etc.). These functions could be outsourced entirely to private business, and that $139,000 number would drop considerably. (Indeed, many institutions do outsource such functions.) But students would continue to pay rent, buy food, attend sporting events, and go to the doctor, so little might change in terms of what states or students spend, though much of it would no longer be reported. There are exceptions worth considering—mandatory activities and athletics fees, for example, might exceed what students would spend on their own on similar services—but clearly $139,000 is too high to be a realistic measure of degree costs.[3]

Table 1

Public Higher Education Expenditures, Degree-Granting Institutions, 2008-09 (in Billions)

Direct Mission Expenses	
Instruction	$ 75.1
Research	$ 26.7
Public Service	$ 11.2
Subtotal	**$ 113.0**
Indirect Mission Expenses	
Academic Support	$ 18.8
Student Services	$ 12.9
Institutional Support	$ 23.1
Operation and Plant Maintenance	$ 17.8
Subtotal	**$ 72.7**
Miscellaneous	
Depreciation	$ 13.7
Scholarships and Fellowships	$ 11.1
Auxiliary Enterprises	$ 20.6
Hospitals	$ 25.9
Independent Operations	$ 1.2
Other	$ 4.6
Non-operating Expenditures	$ 10.3
Subtotal	**$ 87.4**
Total Reported	**$ 273.0**

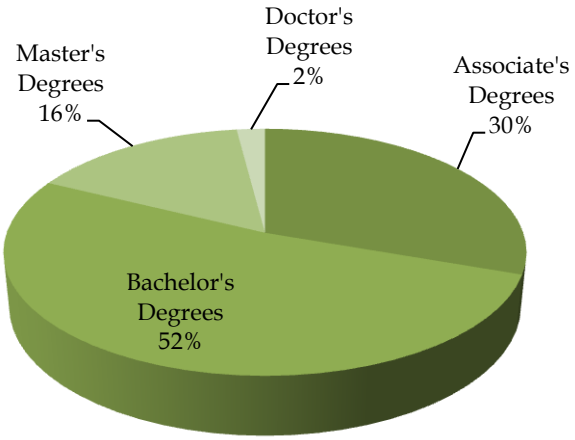
Sticking with the *Digest* for the moment, the next step would be to note that, of the $273 billion spent by public institutions in 2007-08, $113 billion went to direct mission-related costs, much of that in the form of salaries for faculty,

researchers, extension agents, etc. Another $73 billion was spent on indirect costs. This includes such things as plant operations, administration, libraries, student services, information technology and accounting (including the substantial costs of producing the federally-required reports used to create the tables in the *Digest*). So the total expenditure to account for in the most recent year would generally be limited to the $113 billion in direct, and $73 billion in indirect outlays, or $186 billion.

Table 2

Degrees Awarded by U.S. Public Institutions, 2008-09

(Total: 1,964,650)



That number reflects how much institutions spend on their core business, but it is still not limited to instruction. Public and nonprofit higher education in the U.S. has three elements in its mission: instruction, research and public service. Although the mix varies by institution, instruction accounts for the lion's share of expenditures nationally. The research and public service functions are concentrated at a small number of institutions. In 2008-09, according to the *Digest of Education Statistics*, 66 percent of the $113 billion in direct mission-related spending was for instruction, with 24 percent for research and 10 percent for public service. A very narrow interpretation of degree costs might take only the $75 billion spent directly on instruction in 2008-09 and divide by the 1.96 million degrees, yielding an estimate of about $38,000 per degree awarded.

Most researchers, however, make some attempt to apportion the "indirect" or overhead costs of colleges and universities along with the direct expenditures. These are what the Delta Cost Project has described as "Education and Related" expenditures.[4] If the $73 billion in indirect expenditures in the *Digest* is attributed in proportion to that 66 percent instruction/24 percent research/10 percent public service split (except for student services, which goes entirely to the instruction side), the "Education and Related" amount for the U.S. in 2008-09 was $130 billion, or $66,000 per degree. Given the common accounting definitions used for reporting to the U.S. Department of Education, that is probably the best simple way to estimate what higher education institutions nationally spend for every degree they produce.

For some purposes, this estimate may be enough. Most analysts and policymakers, however, will be approaching the question of costs with a more specific question in mind: how much does it cost to provide degrees in a particular state or set of institutions, how do the costs of undergraduate education compare to graduate education, or are certain disciplines more expensive to offer than others? The rest of this paper, using bachelor's-level education for most of the examples, provides a conceptual tool set for thinking about the issue in different contexts. To make good decisions using cost data, policymakers will benefit from an awareness of four key ideas: 1) how costs vary among education levels and disciplines, 2) the distinction between cost of education and cost of *completed* education, 3) the difference between average cost and marginal cost, and 4) the existence of little-discussed "hidden" costs in higher education.

How Costs Vary by Level and Discipline

In most cases, policymakers are not interested as much in the general cost of all degrees nationally or across a whole state. They want a

sense of how much it costs to graduate a student with a bachelor's degree, for example, or how costs differ across institutions. Since institutions vary widely in the types of degrees they award, it makes little sense to compare the overall cost per degree between one that awards mostly education degrees and one that graduates mostly engineers.

For this reason, many states analyze their expenditures at different levels and in different disciplines.[5] The typical analysis presents a cost per student credit hour. The student credit hour is the unit of measurement that has been common academic currency in higher education for most of the past century.[6] For those within the industry, it is the standard unit for just about everything: transfer, accreditation, accountability, planning, pricing, and legislative funding. The "full-time equivalent" (FTE) student is part of the same measurement system, representing a fixed number of student credit hours, usually 30 for undergraduates or 24 for graduate students over the course of a year.[7]

In typical cost analyses, states and institutions allocate the salaries of faculty and staff according to the time they are assigned to different activities, or the time they report actually having spent. Then they divide those costs by the number of student credit hours generated. In general, high-enrollment classes are likely to have a lower cost per-credit hour than smaller courses. For example, a three-credit course with 100 students would generate 300 credit hours, while the same course with 10 students would generate 30 credit hours. If the professor spends equal amounts of time on each one, the salary component of the cost per credit hour in the low-enrollment course would be ten times as high as in the high-enrollment course.

Since institutions vary widely in the types of degrees they award, it makes little sense to compare the overall cost per degree between one that awards mostly education degrees and one that graduates mostly engineers.

In addition to the salary and benefits paid to the professor and/or teaching assistants who taught the course, the expenses would also include supplies used for the course, and a prorated share of the overhead of the engineering school and the university as a whole: libraries, groundskeeping, the university president's salary, the accounting department, etc. The biggest factors in the cost per hour for a particular course, however, are the compensation level of the faculty and instructional staff teaching the course, the percentage of their time they devote to it, and the number of students enrolled.

Costs Vary Considerably By Level and Discipline

A recent summary of cost studies in four states by the State Higher Education Executive Officers (SHEEO) association provides a good overview of common patterns among states.[8] Not surprisingly, expenditures per student hour increase significantly at each rung up the ladder: upper division undergraduate is more expensive than lower division, master's level more expensive than upper division undergraduate, and doctoral level more expensive than master's level.

On average, among Florida, Ohio, and Illinois—which have the most comparable categories of the four states studied—a doctoral credit hour costs about four times as much as a lower division undergraduate (freshman or sophomore level) credit hour. In those three states, graduate education overall accounted for 16 percent of the instruction and about a third of the costs. The cost differences are attributable both to smaller class sizes and instructor/student ratios as the instructional level increases, and to the fact that the most highly compensated instructors tend to teach more upper division and graduate students, while lower division students are often (not always) taught by graduate students, adjuncts, or less senior regular faculty.

Also not surprisingly, some disciplines are more expensive than others. Science, engineering, and fine arts are usually among the most costly; psychology and social sciences are generally among the least. On average among Florida, Ohio, and Illinois, a junior or senior level engineering credit costs twice as much as a psychology credit. Graduate education in some disciplines costs less than upper level undergraduate instruction in others.

Table 3 on page 6 shows the average of the Florida, Ohio, and Illinois cost per credit hour in the largest disciplines, as presented in the SHEEO report. About half of the credit hours were awarded in disciplines with a cost per hour of less than 90 percent of the average; about a quarter were within 10 percent of the average; and another quarter were more than 10 percent above the average. These might be considered, broadly, to be the "low-cost," "average-cost," and "high-cost" disciplines.[9] The high cost programs here accounted for a quarter of the student credit hours in the three states, but more than a third of the instructional costs. The low-cost programs accounted for half the instruction, but only 40 percent of the costs.

The state cost studies that SHEEO's report summarizes help give a quantitative expression, at least on the expenditure side, to some of the qualitative differences among programs—doctoral- vs. bachelor-level, engineering vs. business—so that we do not mistake differences or changes in degree level or discipline mix for differences in efficiency or cost-effectiveness.

A general awareness of these differences should be part of the conceptual tool kit of any policymaker who wants to make sound decisions about resource allocations in higher education. In today's climate especially, the squeeze on state funding is most challenging in higher-cost fields. Given that undergraduate tuition is often charged at a flat rate, unrelated to the costs of the discipline, the public subsidy to higher education increasingly goes directly or indirectly to the disciplines in the higher-cost categories and to graduate education. Sometimes this allocation is made at the state level, through funding formulas that use cost study data to weight disciplines, and sometimes it is the institution's prerogative.

Expressed in 2006-07 dollars (to be consistent with the cost data), average tuition in the three states above was $254 per student credit hour in fall 2010. Assuming their overall costs per credit have not changed, that would make undergraduate programs in the lower-cost programs nearly self-sustaining in terms of operating costs, perhaps even fully self-sustaining when taking into account the lower costs of lower-division instruction.

Cross-Subsidies And Cost-Cutting

These differences in cost by discipline bring up the issue of "cross-subsidies" in colleges and universities. Cross-subsidies are often a source of contention among departments, although most accept them at some level as necessary to both the academic mission and to the business model of comprehensive colleges and universities. When state subsidies accounted for a higher proportion of institutional revenues, most programs at most public institutions depended on public funds for part of their budgets, even if the subsidy was less than in higher cost programs. Currently, however, in some low-cost programs with relatively high tuition, in-state tuition already generates an operating "profit" that subsidizes other institutional programs and priorities. This raises the possibility that when some in-state students are charged more than their own programs actually cost in order to support higher cost programs, they may start resisting tuition increases unless the proceeds are reinvested in their own programs, and they may find public or private alternatives that have kept prices down by not offering or not cross-subsidizing high-cost programs.

These differential costs are one reason why it is so difficult to deal with reductions in state appropriations with across-the-board cuts at institutions, or with cuts focused on the low-cost programs that are sometimes criticized as having less practical value, such as psychology or sociology. When tuition is $254 a credit, and

Table 3

Cost Profiles of Major Disciplines from SHEEO Four-State Cost Study (Average of Florida, Illinois, and Ohio)

	% of Total	Three-State Average Cost	Percent of Average Cost	% of Three-State Average Tuition and Fees Per Credit ($254)
Average for All Upper-Division (Junior/Senior) Undergraduate Credits		**$338**		**133%**
High-Cost (More than 110% of Average)	**25.2%**	**$453**	**134%**	**178%**
Engineering	5.3%	$519	154%	205%
Visual and Performing Arts	6.1%	$462	137%	182%
Physical Sciences	3.3%	$450	133%	177%
Computer and Info. Sciences	1.8%	$417	123%	164%
Biological and Biomedical Sciences	4.0%	$379	112%	149%
Average-Cost (90-110% of Average)	**24.3%**	**$329**	**97%**	**130%**
Health Professions and Related	6.1%	$363	107%	143%
Mathematics and Statistics	3.7%	$331	98%	131%
Public Administration and Social Service	1.3%	$322	95%	127%
Foreign Languages, Literatures, and Linguistics	3.6%	$318	94%	125%
Communication, Journalism, and Related	3.4%	$312	92%	123%
English Language and Literature/Letters	5.4%	$307	91%	121%
Low-Cost (Less than 90% of Average)	**50.3%**	**$284**	**84%**	**112%**
Education	9.8%	$302	89%	119%
Business, Management, Marketing, and Related	15.8%	$297	88%	117%
Philosophy and Religious Studies	1.6%	$294	87%	116%
Social Sciences and History	11.2%	$280	83%	110%
Family and Consumer/Human Sciences	2.0%	$267	79%	105%
Parks, Recreation, Leisure, and Fitness	2.1%	$265	78%	104%
Psychology	5.4%	$264	78%	104%
Security and Protective Services	2.2%	$207	61%	82%

psychology courses cost about the same to offer, cutting the psychology department is not going to take any college very far down the path to budget balance.

The more expensive science and engineering departments, on the other hand, are often perceived as having high value for the innovation and economic development they bring to states' economies. Cutting back in those areas looks foolish to the public and policymakers, but is often what institutions are forced to do when considering how their cash flows actually work and the tuition they are allowed to charge. Many institutions have begun charging different tuition rates for different programs, even at the undergraduate level. At Penn State, the University of Michigan, and the University of Iowa, for example, tuition is higher for science and engineering majors than for those in other fields. Such differentiation is likely to become increasingly common.

There is nothing inherently wrong with cross-subsidies. Other public and private enterprises do similar things all the time. Not every element of a complex business is equally profitable; some specialized units in a nonprofit hospital make money, while others generate losses. But since higher education serves a public function and is largely subsidized by public funds and a favorable tax code, such subsidies and the reasons for them should be much more transparent than they often are.[10] Public and elite nonprofit colleges are correct to point out, as they often do, that tuition pays only part of the cost of education, while state subsidies or endowment income make up the rest. But that is much more true for an engineering major than a business major at a typical public university, and for a chemistry major than a political science major at a top-notch private school.

Public Sector Tuition Increases Benefit For-Profit Colleges in Low-Cost Programs

The rise in tuition across both high- and low-cost programs has benefited another set of institutions: for-profit colleges. In addition to increased federal subsidies, another key factor that explains the rise of for-profit colleges is the decline in state subsidies for public institutions and the corresponding tuition increases, increases that are typically implemented across-the-board, without regard to the very different fiscal situations of institutions and academic disciplines. Together, these two trends have made it possible for for-profit colleges to offer programs in lower-cost disciplines that are price competitive with the public sector, at least in lower-cost areas. Over the six-year period from 2002-03 to 2008-09, published tuition rates for in-state students at public four-year colleges rose by an average annual rate of 4.1 percent above the rate of consumer inflation, up from a 3.1 percent inflation-adjusted rate in the preceding six years.[11]

Since higher education serves a public function and is largely subsidized by public funds and a favorable tax code, cross subsidies and the reasons for them should be much more transparent than they often are.

In that same period, as Table 4 on page 8 illustrates, the number of bachelor's degrees at for-profit colleges nearly tripled (medium-cost fields increased at an even faster rate, although the total numbers were much smaller). Most of that growth—69 percent—was in degree disciplines identified in the table above as low-cost. In security and protective services, the lowest-cost field in the table above, degrees awarded by for-profits grew twenty-five fold (from 265 to 6,610). For-profit colleges could even set tuition at the level of the maximum Pell grant—now $5,550, or $231 per credit for the 24 credits required for full-time attendance—and still more than cover the average public institution's cost of operating these programs. Any savings over the public model they can generate with volume, lower-cost instructors, or with back office efficiencies goes straight to a for-profit's bottom line. And unlike public colleges, which are often expected to offer a range of program offerings—including

Table 4
Degree Growth by Discipline Cost Area[12]

Cost Profile	2008-09 Bachelor's Degrees	Increase from 2002-03 (#)	Increase from 2002-03 (%)
Public			
High	267,950	32,838	14%
Medium	234,983	49,831	27%
Low	520,939	73,393	16%
Total	1,023,872	156,062	18%
Non-Profit			
High	119,151	7,867	7%
Medium	112,473	24,768	28%
Low	261,930	21,565	9%
Total	493,554	54,200	12%
For-Profit			
High	20,585	5,306	35%
Medium	13,020	11,162	601%
Low	51,528	37,362	264%
Total	85,133	53,830	172%

the higher-cost options—for-profits can stick with the "cash cows."

For-profit American InterContinental University, for example, offers mostly low-cost programs, such as business and criminal justice, and charges a relatively competitive $290 per credit hour.[13] Where the market allows, they are also free to charge higher tuition for higher-cost programs, while public institutions are often limited in the number of subsidized slots available and have to ration access through competitive admissions, waiting lists, or restricting course schedules and locations available. Another for-profit, Full Sail University, offers popular programs geared toward the entertainment industry, with tuition rates ranging from $412 per credit hour for bachelor's-level creative writing to $622 per hour for film.[14]

This trend will probably continue or even accelerate. Even steeper tuition increases (7.9 percent, inflation-adjusted) at public institutions over the last two years have come with the great recession's sharp cuts in state support for higher education.[15] These shifts will mean that more programs are effectively unsubsidized in terms of operating costs for in-state students, and public institutions will increasingly be competing for students and their tuition dollars on a more level playing field with their nonprofit and for-profit counterparts.

Cost Per Credit Hour and Cost Per Degree

Treating institutions and disciplines equally, while their curricula and costs are very different, is one mistake that analysts and policymakers can be prone to make. Another is to treat cost of instruction and cost of *completed* instruction as the same thing. Tuition and state funding mechanisms usually go by the credit hour. Most individual students, however, set out to earn a degree, employers seek college graduates, and as a nation we compare ourselves to others in terms of educational attainment. Degrees are not

the only purpose of postsecondary instruction, but they are clearly an important one.

It can be misleading to identify institutions that generate many low-cost credit hours that do not result in degrees as "less expensive" or more cost-effective than others where instruction is more expensive, but more likely to result in a credential. This often comes up, for example, when comparing the costs of "less expensive" community colleges with "more expensive" four-year institutions. When taking into account the lower-graduation rates of similarly-qualified students who transfer compared with those who do not, community colleges may still come out ahead, but it is not an easy comparison to make.

Going from cost-per-credit studies to calculating the cost of particular degrees requires another set of estimates and practical judgments. While students in a given course are generally asked to complete a similar set of activities to earn credit hours—making the cost of the hours in any given course roughly comparable—there are almost as many routes to a degree as there are students. As a result, the question of what a given type of degree costs is more complex than it might seem at first blush.

Three different approaches described in more details in an earlier report are worth reviewing here: catalog cost, transcript cost, and full cost attribution.[16] Degree programs in Florida make for a good example, because Florida's cost data are sufficiently granular to allow for these three methods of cost accounting. For policymakers interested in what degrees in different fields cost at different institutions, each method provides a somewhat different answer and way of thinking about the issue.

"Catalog Cost" of a Degree

The "catalog cost" approach looks at the cost of the credit hours required for a degree. For a typical bachelor's degree, that would include a large number of courses in the major field, related courses required for the major (physics for engineering majors, for example), general education or distribution requirements (math, English, social science, natural science, etc.), and electives. In Florida in 2005-06, the average cost of a bachelor's degree calculated this way was $26,485. The cost of each course is considered separately, since a bachelor's degree in engineering, for example, doesn't consist just of high-cost engineering courses; lower-cost general education requirements and electives are also included.

This can be a useful tool for comparing costs that are built into the curriculum, which is the variable most directly attributable to institutional and state policies. One reason Florida's costs are low, for example, is that degree requirements for all but a few bachelor's-level programs have been capped at 120 hours. For states or institutions that require more than that, the catalog cost of the degree is higher, even if the costs per credit hour are the same. Given two institutions that have the same costs per credit hour, one that requires 128 credits for a degree will incur 6 percent higher costs than one requiring 120 credits, simply by virtue of its curriculum. These additional costs are structural in nature—not a matter of student choices or academic preparation levels.

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"Transcript Cost" of a Degree

Of course most students do not take only the required minimum number of credit hours. Major changes, failed courses, "minors" and double majors, and nontransferable courses all add to the total by the time a graduate walks across the stage. The "transcript cost" estimate is based on the average current cost of courses on students' transcripts when they graduate. In Florida, this number ended up being about 27 percent higher than the "catalog cost" for an

average bachelor's degree, or $33,672 in 2005-06 dollars. "Extra" courses that students take that are not required for their degrees account for about half the difference in costs between the catalog and transcript cost. Failed, withdrawn, and repeated courses account for the other half.[17]

One national study found the highest number of credits earned by graduates in engineering (151) and the lowest in humanities (133),[18] so that the difference in the transcript costs of these degrees is not just the substantial difference in instructional cost per credit revealed in the SHEEO study, but the cost of the typically longer list of courses on graduates' transcripts.[19] Difficulty getting required courses can also contribute, if students have to take unneeded courses to retain their full-time status and financial aid eligibility. In Wisconsin, 16 percent of seniors at a consortium of public universities reported in a survey that difficulty getting required courses was the biggest obstacle to completing their degree.[20]

In Florida, an analysis of transcript costs found an average cost of $47,257 for the courses on a typical 2003-04 mechanical engineering graduate's transcript, compared to $31,184 for the courses taken by elementary teacher education graduates. The difference reflects the higher instructional costs in engineering, the longer program requirements, and the additional credits attempted or earned by mechanical engineers (145 vs. 131 on average for students who started as freshmen in the same place).

The transcript cost is helpful, alongside the catalog cost, for understanding the financial consequences of excess credit hours. It is also a more realistic estimate of what it actually takes to get a successful student from entry to graduation. When applied at the level of the program or discipline, however, analyses must take account of the fact that most students change their majors at least once, and they do so in some predictable patterns. Many students, for example, start out in engineering but end up graduating in business programs. The reverse is rarely true. That means that the average "transcript" cost for business graduates may include the cost of many failed attempts to major in engineering. On the other hand, the transcript cost for engineering will be the average cost for successful students, and will not include the costs incurred for the students who drop out.

"Full-Cost" Attribution

What neither the catalog nor the transcript cost estimates take into account are the costs of instructing students who never graduate at all. In one sense, these costs are not really the costs of degrees, but the costs of non-degrees, or the costs of attrition. There are few colleges in the country, however, with perfect retention rates. Any attempt to plan for growth, or estimate degrees awarded at a new institution, would almost always include some rate of attrition. Nationally, about 37 percent of all full-time, degree-seeking students who started in any form of postsecondary education in 2003-04 left without completing a degree by 2008-09, although the proportion of costs such dropouts account for is lower, since they took fewer courses than students who finished.[21] If the point of an analysis is to talk about what it takes to raise the country's or a state's education attainment—i.e., the proportion of the population with degrees—then it would be wrong to assume that every additional student who gets into the higher education system is just going to take the basic degree requirements (the "catalog cost") or that they will all finish what they start (the "transcript cost"). Analysts must account for the reality of student attrition.

A full cost estimate takes the entire cost of instruction for all students seeking a particular type of degree and divides that by the number of degrees actually awarded. In theory, it sounds simple, but in practice many decisions have to be made to determine which years to include and, at institutions that award more than one type of degree, which students and credit hours to include. It is not simply a matter of dividing all costs by all degrees.[22]

In Florida, again in 2005-06 dollars, the full cost attribution method produces an average cost of a bachelor's degree for a non-transfer student in the State University System of $40,645, which is 21 percent higher than the "transcript cost"

Table 5

Comparison of "Catalog," "Transcript," and "Full" Costs of Bachelor's Degrees in Florida, Adjusted to 2005-06 dollars

Catalog Cost *(for 120 hours, 2005-06)*	$26,485
Transcript Cost *(adjusted to 2005-06 cost per credit)*	$33,672
Full Cost *(adjusted to 2005-06 cost per credit)*	$40,645

method and 53 percent higher than the catalog method. The results of all three cost approaches for a typical bachelor's degree are summarized above in Table 5.

These methods raise important questions about transfer students, particularly the fact that the proportion of transfer students varies considerably across states and across institutions. Less than 60 percent of entering students at four-year public colleges in the U.S. are true "first-time" students; the rest are coming in with prior postsecondary experience and credit, often from community colleges. In nine states, fewer than half of entering students are "first-time," and the range is from a low of 34 percent in Nevada to 87 percent in Delaware. If we were to compare the expenditures per bachelor's degree in those two states without limiting the analysis to just first-time students, we would be comparing institutions in Delaware that are doing the full four years of instruction for most students, to institutions in Nevada that are starting out with students who have had much of their instruction taken care of somewhere else. A simple comparison would lead us to believe that costs in Delaware were substantially higher. Variations among individual institutions are even greater.

For community colleges and some four-year institutions, it is also important to recognize that many students who do not complete a degree there do in fact finish one somewhere else. Among the two-year degree programs offered at community colleges, some, such as nurse (R.N.) training, are complete professional qualifications. But many are intended as transfer degrees—the first two years of a bachelor program. Some students—often the best-prepared ones—transfer before achieving the associate's degree.

As such, with the exception of cases where the instructional mission of a two-year institution does not include transfer, or where transfer without a degree is rare, it is inappropriate to try to attribute all the cost of community college instruction only to degrees awarded without making a serious effort to find those who transferred out successfully and completed degrees somewhere else.

In spite of the complications, the full cost attribution method is intuitively the most appealing to many policymakers who want to see the effect of high dropout rates on the ultimate cost of graduating students. Some of the most important findings, however, are in the components of the calculation rather than in the final number. Using the full cost method, a wealthy institution with highly paid faculty, small classes, and well-prepared students might have a very high graduation rate and a reasonable "cost per degree." A financially struggling college with poorly prepared students might have a terrible graduation rate but the same cost per degree as the wealthy institution because it spends so little per student. There would be little analytical or policy value in simply placing the two cost-per-degree numbers side by side, without thinking about the components that underlie each calculation.

Average vs. Marginal Cost

At all levels of government, from city mayors to the President of the United States, leaders of all political stripes claim to want to increase the number of college graduates. Given the state of public finances, the natural question is: how will we pay for all of those additional degrees? If policymakers and analysts would like to forecast the cost of producing additional degrees and

target resources where there is more "bang for the buck," they would be wise to keep the distinction between average costs and marginal costs (i.e., what it costs to add an additional degree) in mind.

In other words, it is important to be clear whether the purpose of using cost data is about looking back for accountability purposes, or forward, for planning and resource allocation. The historical average cost of instruction or of degrees may have little to do with what increasing the number of degrees would cost.

Colleges and universities that have high costs per degree, for example, may also be the ones that have extra capacity, since under-enrollment or failure to graduate students can be causes of high costs. These might be precisely the same places where the lowest-cost gains could be made, if that capacity could be put to better use. It might cost more to try to increase the capacity of institutions that are already stretched—those with the lowest historical costs—*if* their costs were lower because of high levels of enrollment or degree awards relative to expenditures. If new institutions or new campuses are required to expand capacity, costs are likely to be much higher than the historical average, at least for the first decade or so.

As a simple illustration, consider the University of California system's new Merced campus, which in 2007-08 had $47 million in education and related expenditures for just 76 degrees, or $620,000 per degree. While this is an accurate reflection of past spending and degree patterns, the marginal cost of future degrees at UC Merced, as the institution's enrollment and graduation patterns mature to fit its capacity, will obviously be much lower.

Even beyond the extreme cases, there are clear economies of scale in higher education. Small institutions' costs per student or per degree are, on average, higher than those of larger colleges, and institutional size is a major driver of unit costs, as Figure 1 on page 13 illustrates.

The average expenditure per degree at public institutions that awarded between 600 and 799 degrees or certificates was $91,000, but it would be a mistake to infer that the marginal cost of graduating more students at those institutions would be the same. At colleges that awarded 2,000-2,499 credentials, the average cost was $52,000. The marginal cost difference between an institution that awards 700 credentials, and one that awards 2,200, is just $34,000 per additional degree awarded. (While there is an apparent uptick in cost per degree at the high end of the chart, that is due primarily to the discipline mix at the largest public institution where many costly science, engineering, and health programs are concentrated.)

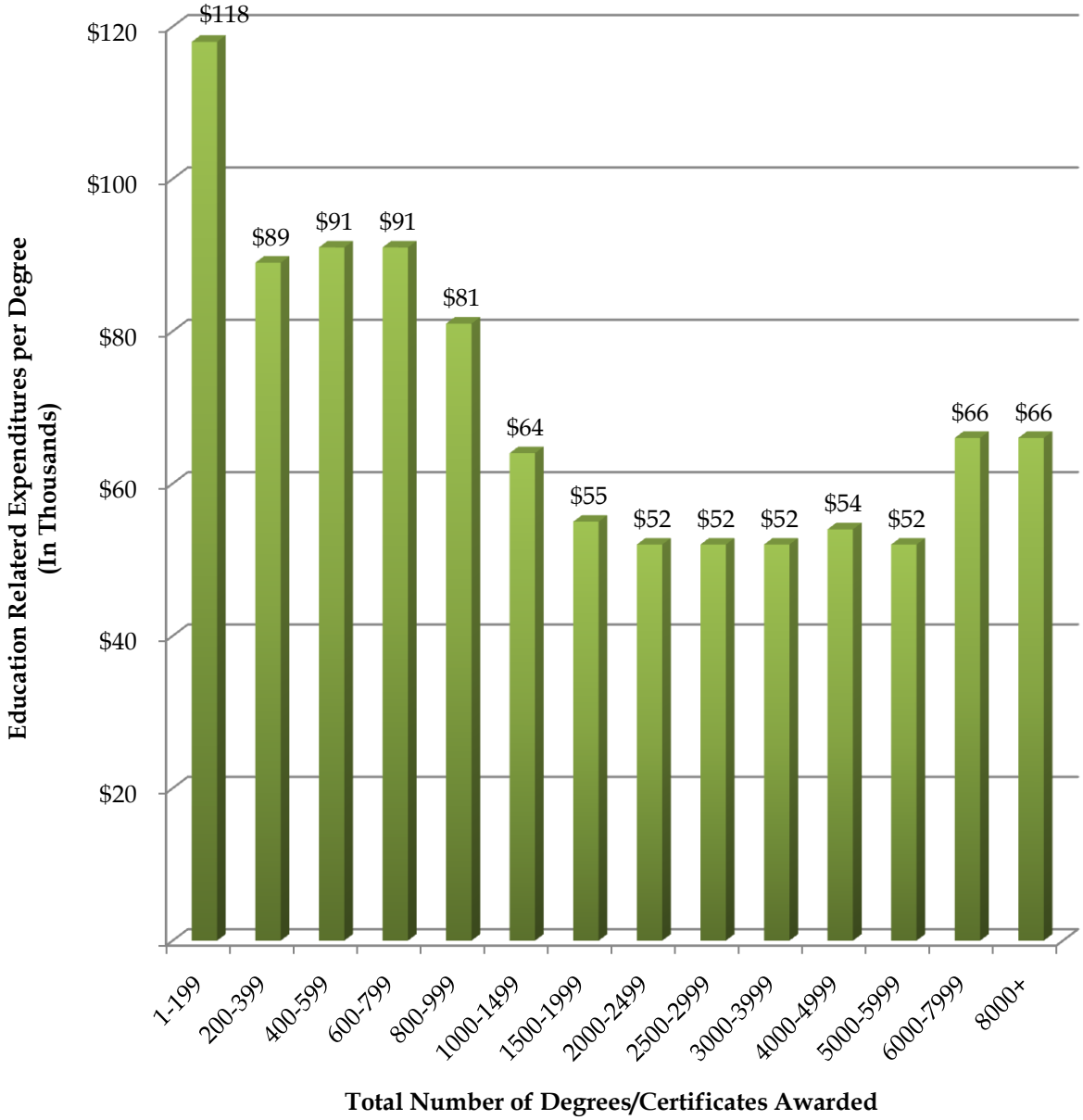
The idea of marginal cost is especially important in the current environment because it means that there is often the potential to expand higher education at a cost much lower than the current average cost of doing business. Most growth over the next twenty years or so will almost certainly come from expansion at currently existing institutions—not from creation of new ones. In fact, unless it is the result of merging or re-purposing existing campuses, and thereby increasing economies of scale, creating new institutions should be the last resort as a means to increase degree attainment in the U.S. With 7,000 postsecondary institutions and technologies available to extend access to many programs virtually, it is hard to make a case that the higher education infrastructure here is underdeveloped. And once institutions are created, they are very difficult to close down, as states and communities with declining populations and enrollments are finding out. Whether through growth or mergers, larger institutions (though not necessarily larger classes) are one way to stretch the growing costs of college presidents, football coaches, IT systems, and other higher education overhead.

"Hidden" Costs of College Degrees

There are many ways to accidentally or intentionally inflate the apparent cost of undergraduate education—by including expenditures only tangentially related to the purpose, ignoring students who transfer out, failing to recognize research or public service as components of higher education's mission. It is

Figure 1

Economies of Scale at Four-Year Public Colleges and Universities, 2007-08[23]



also important to recognize, however, that there are many direct and indirect costs that are rarely included in higher education discussions but would need to be part of a comprehensive look at the public's return on investment in colleges and universities.

Capital Costs

Capital costs are one big omission in most state cost studies. Little has changed since the first modern college cost study in 1910, in which Harvard's President Eliot is quoted as saying "We try to come as near forgetting the value of our lands and buildings as possible. This makes the simplest bookkeeping."[24] Even if states provided none of the operating costs for public

colleges and universities, the legacy of capital investment in the institutions would still be substantial, not to mention the value of the "brand" created since the institutions' founding. Neither the federal data collection system (IPEDS) nor most state cost studies provides an easy way to take into account the value of colleges' and universities' land and buildings, though it is obviously considerable. For-profit colleges generally lease most of their space and would count it as an operating expense (a complication in doing any cross-sector comparisons), while many public institutions have land and buildings whose value is unknown or out of date.

Policymakers should ask: are nominally lower-cost approaches saving both the taxpayer and the student money, or are they just shifting the cost burden?

Tax Expenditures

Federal and state tax codes are also a major source of indirect subsidy to public and nonprofit colleges that does not show up in their revenue or expenditure reports. In addition to paying no property or corporate income taxes, public institutions generally pay no sales taxes, few or no vehicle registration fees, and no lodging or car rental taxes when their employees travel within state. Such subsidies are not evenly distributed among states. States and local governments that rely heavily on sales and property taxes or corporate income taxes end up providing much larger (though hard to quantify) indirect subsidies to their public colleges than those that rely heavily on personal income taxes, since public college employees generally pay the same income taxes as everyone else.

The subsidies are significant enough that disputes flare up from time to time. In 2009, for example, the mayor of Pittsburgh proposed a 1 percent tuition tax, citing the fact that the city of 300,000 had 100,000 students who paid little or no city taxes.[25] Strong opposition from both college leaders and students helped block the initiative, but the episode raises the issue of the public service subsidy that college students received.[26] In a city where the biggest industries have shifted from privately-owned steel mills that were part of the tax base to colleges and hospitals that are generally excluded from it, this is a significant question for cash-strapped city leaders. Boston, too, has recently attempted to negotiate higher payments from some of the colleges within its city limits.[27]

Students' Non-Tuition Costs

Students' costs (*other* than tuition) are another part of the equation that rarely incorporated in accounting studies. According to the College Board's latest "Trends in College Pricing" report, the average published tuition and fees for students at public four-year colleges in 2010-11 was $7,605, which would amount to about $30,420 over a standard four-year degree.[28] Add in the other costs—room, board, transportation, books—usually included in the estimated student budget, and it adds up to about $64,560 for four years.

In fact, while tuition is one of the two major revenue sources colleges draw on for instructional expenditures, room and board are not really part of the cost of college. They are part of the cost of living, since they are expenses that would have to be paid one way or another whether someone is in college or not. When economists calculate the return on investment in education, they tend instead to estimate the opportunity costs of college enrollment—the foregone income students could have earned had they worked full time rather than enroll.

From one perspective, it would seem fair to include students' opportunity costs as part of the cost of a college degree. The most comprehensive approach to degree costs would add the value of students' time to the direct financial investment in the form of tuition and state subsidies. Students, after all, are not only responsible for much of their own learning, but they contribute to one another's educational experience and outcomes as well, as research into "peer effects" in higher education has shown.[29]

In practice, including these types of student costs would usually be impractical. But failing to think about them could lead to avoidable policy errors. Policymakers should ask: are nominally lower-cost approaches saving both the taxpayer and the student money, or are they just shifting the cost burden? For example, it might cost less to an institution to offer a course once a year to 50 students than twice a year to 25 students, but this could delay some students' graduation by a few months, along with the salary increase they anticipated as a result. Or it might cost less to the local community college to make fifteen hospital employees commute an hour to campus than to pay an instructor to make the trip. While such cutbacks may save institutions money in the short-run, they are actually adding to the overall "cost" of education for their students and, indirectly, for taxpayers.[30]

There is not a magic formula to arrive at a cost of education that will serve every possible need. Yet it is possible for policymakers to make good use of cost data in setting goals, allocating resources, and asking tough questions of higher education leaders.

Conclusion

As states contribute less and less to higher education budgets, with students and families taking on an increasing share through tuition, some institutions or systems might argue that policymakers and taxpayers are not entitled to expect more of public higher education. The other view, however, is that when dollars are as scarce as they are, it is all the more important to direct them where they will make the biggest difference. And connecting dollars to high-quality degrees—whether through formal performance funding systems or through the good habit of reviewing budget and performance data at the same time—can be one way to do that.

Much of the money in higher education is already tied to performance. Institutions receive more tuition (and often more state funding) for getting students into classes, regardless of whether they get out. Successful researchers attract more federal and corporate research funding. Presidents get paid more when they raise funds successfully. Football coaches get bonuses for winning bowl games. Sometimes it seems about the only thing that does not come with a financial reward is graduating students.

This paper lays out some of the issues policymakers should consider when making that connection. The details will vary in each situation, but policymakers should start with an understanding of a few key "rules of the road."

These include:

1. ***Not all certificates and degrees are equal.*** What kinds of graduates are coming out of different institutions? Certificate-level completions? Doctoral degrees? Engineering majors? Marketing majors? Trying to fund a specific degree can sometimes backfire, but it is important not to think about all degrees equally.
2. ***The private sector shows where growth is (or isn't) possible without massive subsidies.*** Where private colleges have been able to grow the most, it is often because public institutions have not been able to meet a particular demand. Ask what the private colleges in your state are doing and how much it costs them to do it.
3. ***Seek economies of scale where appropriate.*** Small institutions are costly, and not necessarily better. Since college presidents' salaries and athletics programs are expensive, try not to have too many of them. Some institutions might be able to share facilities, administrative functions, or even merge entirely.
4. ***Do not confuse enrollments with degrees.*** Colleges that take in a lot of students and offer low-cost instruction might seem like a good deal, but if students aren't learning, or aren't finishing the courses and programs they start, it may be a false

bargain. Some of the most common measures of graduation rates are not particularly helpful, but at least consider trends in degrees awarded. Are they going up or down? Faster or slower than enrollments or revenues? What kinds of degrees are increasing most rapidly?

5. ***Past performance may not indicate future results.*** The historically lowest-cost institutions may be at or near their maximum capacity, and may already have taken advantage of some of the most obvious opportunities for efficiency. They may not be able to graduate more students without more funding. High-cost institutions, on the other hand, may have unused capacity or be able to find new savings as lower-cost institutions have already done. As a result, they may be able to enroll and graduate more students with little or no new investment.

Just as higher education provides a complex and often hard-to-agree-upon range of benefits, it involves similarly complex tradeoffs in costs. Those costs need to be presented as frankly and as clearly as possible, with the assumptions stated up front and a clear policy purpose in mind for the data. There is not a magic formula to arrive at a cost of education that will serve every possible need. Yet with a few key concepts in mind, and access to accurate and timely information, it is possible for policymakers to make good use of cost data in setting goals, allocating resources, and asking tough questions of higher education leaders.

[1] The Delta Project on Postsecondary Education Costs, Productivity, and Accountability (www.deltacostproject.org) publishes data and reports intended to help fill that gap. Note that "cost" here and throughout the paper refers to the total cost, and should not be confused with "price," which is what the student pays.

[2] Thomas D. Snyder and Sally A. Dillow, *Digest of Education Statistics,* http://nces.ed.gov/programs/digest/d09/ (accessed October 19, 2010).

[3] If room and board were to be considered in the overall cost, and institutional expenditures on dormitories and food service were to be included, then estimates would be required for the cost of feeding and housing the 85% of students who live off campus as well. See National Center for Education Statistics, *National Postsecondary Student Aid Survey 2008* (Washington, DC: U.S. Department of Education, 2010).

[4] Donna Derochers, Colleen Lenihan, and Jane Wellman, *Trends in College Spending* (Washington, DC: Delta Project on Postsecondary Costs, 2010).

[5] One way to try to separate the cost of bachelor's degrees from the others might be to look at institutions that awarded only degrees at that level. Unfortunately, there aren't many, at least among public colleges. Of more than 1,700 public degree-granting institutions, there were just eighteen that awarded only bachelor's degrees in 2007-08. The average education and related expenditure at those colleges was $68,755 per degree awarded. This small group of colleges, though, awarded only 7,600 degrees among them in 2007-08, less than a tenth of a percent of the total, and it is not especially typical of bachelor's-level education in the U.S. (It includes, for example, a number of state-supported liberal arts colleges and the U.S. Merchant Marine Academy.) For the 603 more typical public colleges that awarded bachelor's degrees along with other types of degrees or certificates, we are back to the question of appropriate weights.

[6] Sara Lipka, "Academic Credit: A Currency with No Set Value," *Chronicle of Higher Education*, October 22, 2010, A1-A19.

[7] The student credit hour was an invention borne out of efforts to measure institutional efficiency. In fact, 2010 was the 100th anniversary of the report that gave rise not only to the student credit hour, but to the cost analysis categories that still underlie most of public higher education accounting. When we distinguish between "direct" and "indirect" costs, or seek to consistently separate expenditures on research from expenditures on instruction, we owe a continuing debt to the industrial engineer who penned a 1910 report to the Carnegie Foundation. Morris Llewellyn Cooke, *Academic and Industrial Efficiency: A Report to the Carnegie Foundation for the Advancement of Teaching* (New York: Carnegie Foundation, 1910).

[8] Sharmila Basu Conger, Alli Bell, and Jeff Stanley, *Four-State Cost Study* (Boulder: State Higher Education Executive Officers, 2009).

[9] The significant breaks between the top of the "low-cost" and bottom of the "average-cost" categories tend to support such a grouping.

[10] A model of such transparency is the tuition policy adopted by the University of Toronto's academic governing council, which states explicitly that tuition rates and cross-subsidies for each program should be set based on program costs, program quality and competitiveness, and graduates' future earnings prospects, among other considerations. University of Toronto's Tuition Fee Policy, http://www.governingcouncil.utoronto.ca/Assets/Governing+Council+Digital+Assets/Policies/PDF/ppapr301998i.pdf (accessed May 11, 2011).

[11] Sandy Baum and Jennifer Ma, *Trends in College Pricing* (New York: College Board, 2010).

[12] Author's analysis of IPEDS Completions data and SHEEO four-state cost study discipline costs.

[13] American Intercontinental University 2011 Tuition and Fees Schedule, http://www.aiuniv.edu/Admissions/~/media/AIU/Pdf/AIU-Online/AIU-25571_AIUO_Tuit_010611.ashx (accessed May 11, 2011).

[14] Full Sail University Tuition and Fees Policies, http://www.fullsail.edu/admissions/tuition (accessed November 5, 2010).

[15] Baum and Ma, *Trends in College Pricing*, 2010.

[16] Nate Johnson, *What Does A College Degree Cost? Comparing Approaches to Cost Per Degree* (Washington, DC: Delta Project on Postsecondary Costs, 2008).

[17] A recent paper used the transcript approach for community colleges and found that, just as the highest cost degrees in four-year institutions tend to be those in science and engineering fields, technical programs tend to be the most expensive at the community college level, with radiologic technology at the high end (about $50,000), and early childhood education at the low end of associate degrees (around $12,000). Richard Romano, Regina Losinger, and

David Millard, *Measuring the Cost of a College Degree: A Case Study of a SUNY Community College,* Working Paper #135 (Ithaca: Cornell Higher Education Research Institute, 2010).

[18] Unlike the Florida numbers cited, these data do not include attempted credits—one of the biggest sources of excess credits.

[19] Clifford Adelman. *Principal Indicators of Student Academic Histories in Postsecondary Education, 1972-2000* (Washington, DC: U.S. Department of Education, Institute of Education Sciences, 2004).

[20] It is not clear whether this number is high or low, since most institutions and state systems do not even ask the question. The consortium at UW deserves credit for doing so. University of Wisconsin Office of Policy and Planning. *University of Wisconsin-Stevens Point, National Survey of Student Engagement, 2008 Consortium Report, UW-SP vs. UW Peers.* (Madison: University of Wisconsin System, Office of the Chancellor, 2009).

[21] Author's analysis of public *Beginning Postsecondary Students 2004/09* data on National Center for Education Statistics website at http://nces.ed.gov/datalab/.

[22] At a minimum, the costs of teaching transfer students have to be separated from the costs of teaching those who started out as freshmen. And with undergraduates, some account usually needs to be made for students who have not declared a major. There are ways to do this, but policymakers who want this type of analysis should be prepared to spend some time understanding the methods analysts decide to employ, and should be cautious about comparing results across studies or across states.

[23] Author's analysis of IPEDS completions and expenditures data, 2007-08.

[24] Morris Cooke, 1910.

[25] Luke Ravenstahl, "Mayor Luke Ravenstahl's 2010 Budget Address," November 9, 2009. http://www.city.pittsburgh.pa.us/mayor/html/budget_address_2010.html (accessed September 4, 2010).

[26] Mary Hines, "PCHE Statement on Tuition Tax Presented to Pittsburgh City Council November 30, 2009," *Pittsburgh Council on Higher Education,* November 30, 2009, http://76.12.104.172/index.php?option=com_content&task=view&id=80&Itemid=2 (accessed September 4, 2010). Carnegie Mellon University Student Government, "Stop the Tuition Tax," 2009, http://www.stoptuitiontax.org/ (accessed September 4, 2010).

[27] Kevin Kiley, "A Pseudo-Taxing Debate," *Inside Higher Education*, April 26, 2011.

[28] Baum and Ma, *Trends in College Pricing*, 2010.

[29] Gordon Winston, *A Guide to Measuring College Costs* (Williamstown, MA: Williams Project on the Economics of Higher Education, 1998).

[30] One important niche that for profit colleges (as well as some entrepreneurial publics and nonprofits) have filled is in offering courses outside the traditional academic calendar, though often doing so is nominally more expensive. Full Sail University is a for profit college that specializes in multimedia programs in Orlando, charges much higher tuition than public universities in the state with comparable degree programs, but offers courses on a schedule that allows students to graduate in half the time. It prices its tuition by the full degree program, guaranteed not to change, and asks students to evaluate the additional cost against the higher wages that would be lost from starting their careers later.