

Who Subsidizes Whom?

An Analysis of Educational Costs and Revenues

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Center for College Affordability and Productivity

The Center for College Affordability and Productivity (CCAP) is an independent, nonprofit research center based in Washington, DC that is dedicated to researching public policy and economic issues relating to postsecondary education. CCAP aims to facilitate a broader dialogue that challenges conventional thinking about costs, efficiency and innovation in postsecondary education in the United States.

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Introduction

Conventional wisdom holds that colleges and universities heavily subsidize their students. This assertion seems correct, given that total spending per student is almost always in excess of per student tuition payments. However, as we show in this report, the conventional wisdom is wrong because it inappropriately compares only one revenue source—tuition payments—to total institutional spending. Such a comparison is seriously misleading because institutional spending encompasses far more than just the educational expenditures that tuition revenues are ostensibly designed to cover. The more logical comparison—and the one which we make here—is between what colleges and universities are paid to provide an education versus what those institutions actually spend to provide that education.

In many cases student tuition and third-party payments on behalf of students easily cover the portion of spending that is actually used for educational activities. Between 52% and 76% of all students attend institutions where educational payments exceed educational spending. For four-year students, this figure is between 59% and 87%, and for two-year students, it is between 24% and 63%.

The Conventional Wisdom

The notion that colleges and universities subsidize students is an article of faith among many higher education administrators and lobbyists. Southwestern College President Dick Merriman made clear that the College subsidizes its students, stating that, —None of you, not even that very rare student who receives no financial aid from the college, will come close to paying what it is going to cost the college to educate you.”¹ Such a view is hardly restricted to college administrators; indeed, many academics hold similar beliefs. In his popular book, *The Economic Naturalist*, Cornell University economist Robert Frank claims, —Tuition payments cover only a fraction – in many cases, less than one-third – of the total cost of educating a student.”²

The Source of Confusion

The main point of our analysis in this report is to disprove the conventional wisdom that holds that colleges almost universally subsidize their students. But why is this perception so widely held in the first place? Essentially, the conventional wisdom prevails because colleges, universities, and their proponents have a tendency to attribute all spending to the cost of providing an education.

One of the best illustrations of this mindset comes from the Dartmouth College Fund (DCF). In its fundraising materials, the DCF defends what it refers to as a —wacky” business model: selling its product at a discount, and then —begging” for money.³ The DCF argues that —Dartmouth charges \$49,974 for

¹ Dick Merriman, —The College as a Philanthropy. Yes, a Philanthropy,” *The Chronicle of Higher Education*, October 31, 2010.

² Robert H. Frank, *The Economic Naturalist*, Basic Books, 2007.

³ The text and movie are from: Dartmouth College Fund, You Wouldn’t Run a Business This Way. Here’s Why Dartmouth Does., and can be accessed at http://www.dartmouth.edu/~alfund/why_give/business_model_text.html. If the link or materials are later changed, we have a cached version of both the text and movie that is available by emailing the authors.



undergraduate tuition, room, and board, even though it spends \$104,402 per student per year,” and it further argues that once financial aid is taken into account, students are paying only \$14,724.⁴

Dartmouth and many other colleges spend more per student than what is received in per student tuition payments, *but this does not mean that students are being subsidized because not all of that spending is used towards specifically educational purposes.* While the DCF does not explain how the \$104,402 figure is derived, typically, when colleges compute their costs per student, they add up total spending; this approach allows colleges to claim they are subsidizing a specific activity (in this case teaching) by comparing their total spending on all activities to the revenue generated from teaching alone. By this logic, General Electric could insist that they subsidize everyone who buys an alarm clock because their revenue from selling alarm clocks does not come close to covering GE’s costs for all products. It does not take a Dartmouth graduate to spot the flaw in this line of reasoning. Specifically, because GE makes lots of things other than alarm clocks, it is inappropriate to draw inferences by comparing revenue from alarm clock sales to all costs, such as the costs of producing jet engines, dishwashers, etc.

Just as GE makes a variety of products, colleges and universities do much more than simply teach students. In fact, the largest per student spending category at Dartmouth is \$37,000 per student for —Academic Support,” not to be confused with the \$15,000 per student for —Institutional support,” or the \$12,000 per student for —Student Services.” Dartmouth also spends \$24,000 per student on —Research.”⁵ Adding all this up implies that Dartmouth is already spending \$88,000 per student before even counting anything that could pass for a direct instructional cost (such as professors’ salaries). But just as we should not expect revenue from alarm clock sales to cover the costs of making jet engines, we should not expect tuition to cover research expenses. In fact, very little of that \$88,000 is properly attributed to the cost of providing an education, but is only by including such spending that many colleges and universities can assert that payments do not cover costs.

Determining Who Subsidizes Whom

We now turn to our analysis of whether it is true that colleges and universities generally subsidize their students’ education. To make this determination we need to compare what these schools are paid to provide an education with what they actually spend to provide it. If colleges and universities are paid more to educate students than it actually costs to provide the education, then the students are subsidizing the schools. On the other hand, if the colleges and universities are paid less than the actual cost of providing an education, then the schools are subsidizing the students. In theory, this comparison is quite straightforward and simple, but due to data availability, such an analysis is difficult to conduct with precision.

⁴ The DCF obtains the \$49,974 figure by summing the 2009-10 undergraduate tuition and Room and Board charges. See <http://nces.ed.gov/collegenavigator/?q=dartmouth+college&s=all&id=182670#expenses>.

⁵ The DCF’s \$104,402 figure refers to the 2009-2010 academic year, but the spending by category figures are for 2008-2009 because the Department of Education has only released data through the 2008-2009 school year.



TABLE 1
Estimates of Per Student Revenues

Estimate	What It Measures	How We Calculate It
Net Tuition (Out of Pocket)	This figure represents the average net tuition, which is what students and their families pay out of pocket on average.	It is published tuition minus all grant aid and tax benefits.
Total Tuition	This figure represents the average tuition received by the university or college. It can be thought of as total tuition revenue per student.	It adds tax benefits as well as federal, state, and local financial aid grants to what the student pays (equivalently, you can just subtract institutional aid from published tuition).
Total Payment	This figure represents the average total payment that the university or college receives from or on behalf of students. It is generally the case that total tuition equals total payment for private institutions since few private institutions receive government appropriations.	It adds state and local appropriations to total tuition.

How Much Are Colleges Paid?

While the published tuition for each institution is available, it is not necessarily an accurate measure of what students pay or what schools receive because financial aid programs and state appropriations can cover significant portions of the direct cost to individual students. We have developed three different estimates for the amount of money colleges receive to educate students which we term Net Tuition, Total Tuition and Total Payment.

Net Tuition, a commonly used figure within higher education policy circles, measures how much students (individually or with assistance from their parents or other family members) pay directly out of pocket to cover tuition charges. Total Tuition measures the amount of per student tuition revenue schools actually receive; it is essentially published tuition less institutional student aid, that is, aid provided by the colleges and universities themselves. Finally, Total Payment adds government appropriations to Total Tuition to measure the full amount of revenue schools receive to provide education for each individual student. Table 1 summarizes these measures; a more detailed explanation of each revenue estimate calculation and the potential problems associated with each measure is included in *Appendix B*.

Some may argue that not all state appropriations are for educational purposes, and that our Total Payment estimate is, therefore, an overestimate of institutional *educational* revenues. While this may be a valid point in some instances, there is no objective method of determining to what extent, if any, this is the



case. Moreover, university officials often claim that cuts to state appropriations will result in higher tuition. Thus, arguing that our Total Payment figure is an overestimate because not all state appropriations are used for educational purposes is a dangerous argument for our critics to make because it implies that cash strapped states could cut some portion of appropriations without any adverse effect on education.

How Much Do Colleges Spend to Educate Students?

Determining how much it costs to provide an education is even more complicated than determining how much is paid to colleges. The Department of Education's Integrated Postsecondary Education Data System (IPEDS) does have a variable titled "Instruction Expenses."⁶ Unfortunately, this variable does not accurately report what it actually costs to provide an education for the following three reasons.

First, there are a number of costs not included in the "Instruction Expenses" expenditure category which should be included in the total cost of providing an education, such as the costs of running registration systems, financial aid offices, career counseling events, etc. The solution to this problem is to account for these other expenses in measuring educational expenditures. The Delta Cost Project has developed a method of calculating this figure, and calls the resulting value "Education and Related" spending.⁷ According to the Delta Cost Project, this figure reflects the full cost of providing an education because it includes all instructional and student services spending, as well as an appropriate share of other costs directly associated with collegiate education, including academic support, institutional support, and operation and building maintenance.⁸ The Delta method, which we use to estimate spending directly on education and related functions, allows us to employ an objective and accepted method for determining actual education spending by colleges and provides for a highly inclusive definition of educational costs. All of the spending estimates we derived in this report make use of Delta's methodology, meaning that all spending figures in this report refer to the full cost of education, as defined by the Delta Cost Project.

The second problem with the IPEDS instructional expenses figure is that each sector uses different accounting standards. For instance public institutions use "Governmental Accounting Standards Board" (GASB) guidelines while private non-profit institutions use "Financial Accounting Standards Board" (FASB) guidelines. To the extent that these standards differ, the figures are not strictly comparable between GASB and FASB institutions. We nevertheless use these data because at this level of aggregation, there is little reason to believe that there are major differences, and more importantly, they are the only data available.

The third problem with the IPEDS instruction expenses category is that it includes many costs that should not be classified as instructional expenses. For instance, any research that is not funded by external grants is typically counted under instruction rather than research. We devised a method to partially correct for

⁶ For a detailed description of the "Instruction Expenses" IPEDS expenditure category, please see Appendix B.

⁷ For details on the technique the Delta Cost Project uses to compute Education and Related Spending, see: Issue Brief #2: Metrics for Improving Cost Accountability, Delta Cost Project, February 2009.

Note that the Delta method calls for applying the educational share to operations and maintenance expenses. Financial figures for 2008 already attribute operations and maintenance expenses to each of the other categories, so there is no separate operations and maintenance category in our calculations, as it is already included in the others.

⁸ For a detailed description of each of the IPEDS institutional expenditure categories, including Instructional, Student Services, Academic Support, Institutional Support, and Operation and Building Maintenance, please see Appendix A.



this using average course load, class size, and faculty compensation data from a different U.S. Department of Education database, the Data Analysis System (DAS).

We have computed three separate estimates for spending by colleges to provide an education: Education and Related Spending, Adjusted Education and Related Spending, and Achievable Education and Related Spending. Education and Related Spending is derived, using the Delta method, directly from the officially reported spending on education and other necessary functions. Given the over-reporting of instructional spending (counting non-grant funded research as an instructional cost), we devised two alternative estimates for spending related to education which may be more accurate in determining the actual direct cost to institutions for providing a collegiate education to their students. Adjusted Education and Related Spending, uses average course loads and class sizes to adjust the reported instructional cost component to reduce the overestimate of instructional spending. For this reason, we argue that Adjusted Education and Related Spending is the best estimate of actual educational spending by colleges and universities.

But we are also concerned about excessive spending, so we have devised Achievable Education and Related Spending, which revises all components of spending and is therefore a hypothetical estimate of what it *should* cost to educate a student, rather than what colleges and universities actually spend. A brief summary of each is provided in the following table, and *Appendix B* offers a more detailed explanation of each calculation and the potential problems with each measure.

TABLE 2
Estimates of per Student Educational Costs

Estimate	What It Measures	How We Calculate It
Education and Related Spending	It includes all reported instructional and student services costs, as well as a share of other valid costs.	This is the total cost of providing an education as determined using official Department of Education figures and the Delta method.
Adjusted Education and Related Spending	This figure tries to adjust Education and Related Spending to reduce the upward bias caused by misattributing research as an instructional cost. It replaces instructional costs with a more realistic figure.	This figure uses an alternative estimate of instructional costs designed to reduce the upward bias in the official value.
Achievable Education and Related Spending	This figure tries to answer the question —“how much should it cost to provide an education?” It replaces instructional, student services, academic support, and institutional support spending with more realistic figures, based on actual spending patterns.	This figure uses the lower of either observed spending or alternative figures for each category of spending. It is designed to preclude excess spending.



To illustrate how these calculations work in practice, it is helpful to look at a concrete example; we will use Dartmouth College. The six figures for revenue and spending at Dartmouth College are reported in Table 3.

The data indicate that after taking all grant aid and tax benefits into account, net tuition (the out of pocket tuition paid by students) is \$21,688 at Dartmouth. Colleges and universities also receive payments from third parties on behalf of students, and one set of payments takes the form of grants (such as Pell grants) that are used by students to pay tuition. Adding these grants to what students pay out-of-pocket yields the tuition revenue for a school (our Total Tuition figure), which was \$23,079 at Dartmouth. Institutions also receive state and local appropriations to cover educational costs. Adding these to Total Tuition gives the per student Total Payment received by the institution for the purpose of providing an education. Dartmouth is a private non-profit institution and doesn't receive state appropriations, so its Total Payment figure is equal to its Total Tuition figure (most public institutions do receive state appropriations, so Total Payments differs from Total Tuition). Thus, on the revenue side, Dartmouth receives \$23,079 as payment for educating each student.

TABLE 3
**Illustrating the Revenue and Spending Estimates:
Dartmouth College**

Measure	Estimate
Net Tuition (Out of Pocket)	\$21,688
Total Tuition	\$23,079
Total Payment	\$23,079
Education and Related Spending	\$64,973
Adjusted Education and Related Spending	\$51,762
Achievable Education and Related Spending	\$14,151

SOURCE: Authors' calculations.

On the spending side of things, using just the raw Department of Education spending data and the Delta Cost Project formula, Education and Related Spending is \$64,973 at Dartmouth. But the reported data are biased for many institutions (particularly those that perform significant research), yielding an overestimate of educational costs. Using what we call the Adjusted Education and Related Spending estimate (which makes use of course loads and class sizes in estimating actual instructional expenses), the adjusted figure is \$51,762. The fact that the adjusted figure is less than the figure derived directly from the reported data indicates that many professors at Dartmouth are given low course loads, presumably in order to allow them to conduct research. Correcting for this shift in resources towards research reduces educational costs by over \$13,000 per student, (from \$64,973 to \$51,762).

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Based on course load and class size data for similar institutions,⁹ we estimate that the portion of faculty compensation attributable to teaching at Dartmouth comes out to about \$9,100 per student. So what makes up the rest of the \$51,762 adjusted figure? Student Services accounts for \$12,300, leaving over \$30,000 per student in Institutional and Academic Support (one can loosely think of these as

⁹ For the purposes of this calculation, "similar institutions" are those that share the same Carnegie Basic Classification in 2000. Those institutions which are similar to Dartmouth, then, are those that were classified as "Doctoral/Research Universities—Intensive" by the Carnegie Foundation in their 2000 classification.



administrative spending, though there are things like libraries included as well). Keep in mind that this is just the educational share of those expenses.

If one is willing to entertain the possibility that colleges and universities can overspend, then the use of a third estimate for spending, Achievable Education and Related Spending, may be warranted. We use this figure to further refine the Education and Related spending value by hypothetically forcing each institution to meet the average course load and class size for its institution type or the national average, whichever leads to lower costs. For student services, institutional support, and academic support spending, we use the institution's actual spending in those categories or the median spending in that category for institutions of the same level, whichever is lower.

Using this approach allows us to use Achievable Education and Related Spending as a reasonable estimate for what an education should cost the institution. In the case of Dartmouth, Achievable Education and Related Spending figure is \$14,151. For high spending institutions like Dartmouth, Achievable Education and Related Spending is often dramatically lower than the other two cost estimates (for many low spending institutions, our revised figure is often actually higher than the other two figures). On the teaching side, any savings come from increasing the institution's teaching loads to the levels which are more typical for colleges and universities.¹⁰ On the non-teaching side, any savings come from reducing spending which is not directly related to education to the level of spending at the institution attended by the median student. It is therefore difficult to argue that the typical spending levels we use are inappropriate since half of students currently attend institutions spending less than the figures used. In this case, Dartmouth's actual spending of over \$30,000 per student for Institutional and Academic Support was replaced with the more typical spending of just over \$4,000 per student for these categories.

So does Dartmouth subsidize their students? Our answer is yes, but only because they spend excessively in non-instructional areas. Focusing on Total Payments and Adjusted Education and Related Spending indicates that Dartmouth spends more than it is paid. Keep in mind, however, that these figures include spending of \$12,300 per student on Student Services, and over \$30,000 per student on Institutional and Academic Support.

Our Achievable Education and Related Spending calculation precludes such excessive spending, and when compared to Total Payments, it is clear that Dartmouth does not subsidize its students if excessive spending is not allowed (Dartmouth collects \$23,079 per students but could provide an education for \$14,151).

¹⁰ It is important to note that none of the savings we estimate using the Achievable Education and Related Spending come from assuming lower faculty pay.



Results

We derived each of the six values for every institution with sufficient data and used these derived figures to calculate enrollment weighted averages by institution type.¹¹ Table 4 reports per student national averages for each of the six measures by school type, and Figure 1 shows these averages graphically.

There are two important questions that can be answered from these national averages. The first one is whether current payments are sufficient to cover observed spending on education. For this we should focus on Total Payment and Adjusted Education and Related Spending. Total Payments typically exceed Adjusted Education and Related Spending at the following types of institutions:

- Public 4-year or above
- Private for-profit 4-year or above
- Private for-profit 2-year

On average, public four-year, for-profit four-year, and for-profit two-year institutions are paid more than they spend on providing an education and are able to use excess funds for other purposes. Note that for each of these types of institutions, Total Payment exceeds Education and Related Spending as well. This means that the spending figures reported by the schools themselves indicate that these institutions, on average, receive more than they spend, in spite of any real or imagined flaws in our methodology for calculating Adjusted or Achievable Education and Related Spending. To be blunt, there is no getting around the fact that, on average, four-year public and both types of for-profit institutions are paid more to provide an education than they actually spend in providing it.

The fact that for-profit institutions receive payments in excess of their educational costs is unsurprisingly since such institutions explicitly adopt a business strategy of making profits from providing education. What is not necessarily expected is the fact that on average, four-year public institutions receive payments in excess of educational costs. It appears that these institutions (ostensibly government operated non-profits) are making a “profit” at providing education and using that “profit” to subsidize their non-educational endeavors.

The second question we can answer from the national averages is whether current payments are sufficient to cover a realistic estimate of what spending should be. For this, we compare Total Payment and Achievable Education and Related Spending. Total Payments exceed Achievable Education and Related Spending at:

- Public 4-year or above
- Private not-for-profit 4-year or above
- Private not-for-profit 2-year
- Private for-profit 4-year or above
- Private for-profit 2-year

¹¹ Enrollment weighted averaging uses full-time equivalent (FTE) student enrollment and gives more weight to larger schools. For example, a school with 2,000 students would count twice as much as a school with 1,000 students when calculating the national average.

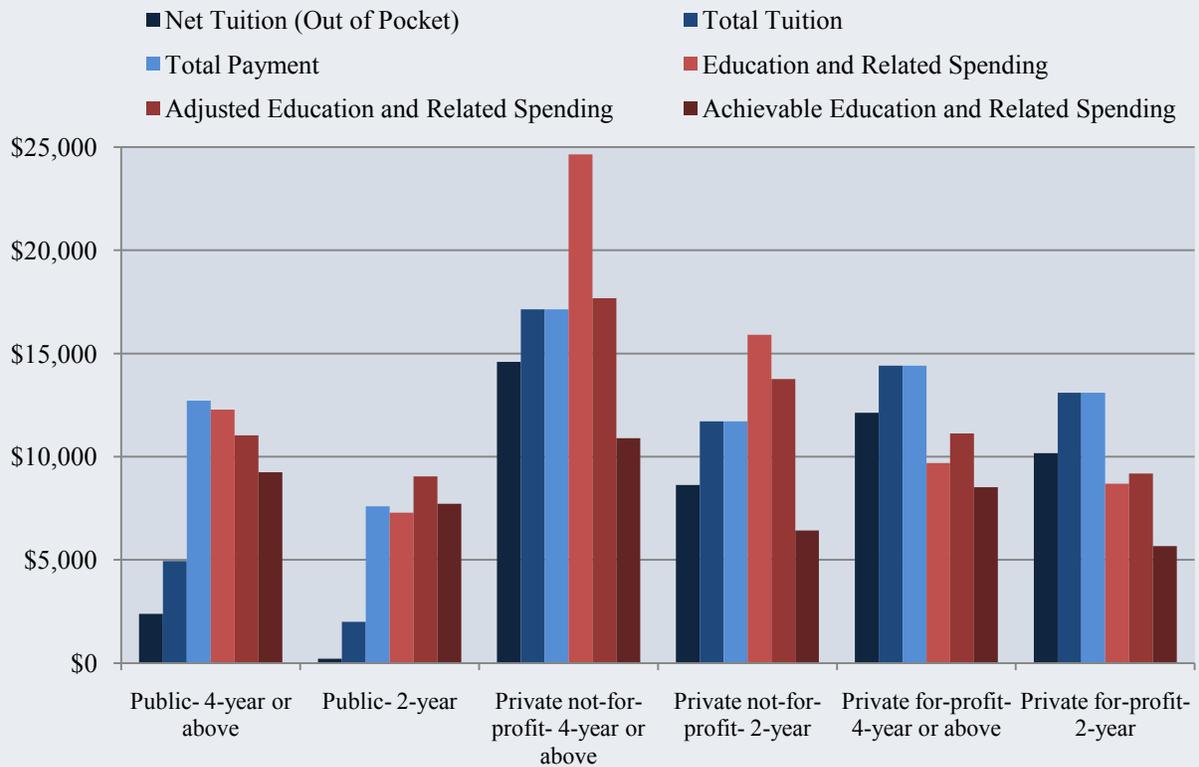


TABLE 4
Average Revenue and Cost of Education per Student by School Type

Institution Type	Net Tuition (Out of Pocket)	Total Tuition	Total Payment	Education and Related Spending	Adjusted Education and Related Spending	Achievable Education and Related Spending
Public 4-year or above	\$2,389	\$4,937	\$12,714	\$12,283	\$11,025	\$9,243
Public 2-year	\$204	\$1,999	\$7,599	\$7,283	\$9,043	\$7,712
Private not-for-profit 4-year or above	\$14,594	\$17,136	\$17,136	\$24,646	\$17,679	\$10,895
Private not-for-profit 2-year	\$8,632	\$11,706	\$11,706	\$15,905	\$13,760	\$6,428
Private for-profit 4-year or above	\$12,133	\$14,402	\$14,402	\$9,699	\$11,123	\$8,514
Private for-profit 2-year	\$10,166	\$13,104	\$13,104	\$8,691	\$9,188	\$5,665

SOURCES: National Center for Education Statistics, authors' calculations.

FIGURE 1
Average Revenue and Cost of Education per Student by School Type



SOURCES: National Center for Education Statistics; authors' calculations.



In other words, based on a realistic calculation of what educational spending should be, every type of institution—with the lone exception of public two-year colleges—is paid more than it should cost to provide an education.

Additional Findings

As we would expect, at institutions which are research focused (public and private non-profit four-year schools), Education and Related Spending exceeds Adjusted Education and Related Spending. The magnitude of these differences indicates that there is significant systematic bias or chicanery in the official statistics for these schools, particularly regarding the item of instructional expenses.

At for-profit schools, even the smallest of the revenue figures (Net Tuition) covers the cost of education, regardless of the estimate one uses to measure educational costs (again, this result is hardly surprising and is to be expected, given the nature of such institutions). For two-year public and both types of for-profit institutions, Adjusted Education and Related Spending is greater than Education and Related Spending. The adjusted figures assume that all courses are taught by full-time faculty, so this indicates that these institution types rely very heavily on lower paid contingent faculty. If that is the case, then both the Adjusted and Achievable spending figures are overestimates of actual costs.

While the national averages are interesting and informative, they do obscure considerable differences among institutions of the same type. For instance, even though on average, Total Payment exceeds Achievable Education and Related Spending by more than \$3,000 at public four-year schools, for 16.3% of students attending that type of school, Achievable Education and Related Spending exceeds Total Payment. Table 5 reports the share of students that attend schools that are paid more to provide an education than they spend providing one.

Table 5 reveals many interesting results. First, even when using the biased Education and Related spending figures (E_1), more than two-thirds of students at four-year public schools attend institutions that are paid more than they spend providing an education ($R_3 > E_1$). This figure rises to nearly 84% when using the hypothetical measure (E_3) of what an education should cost. At the four-year privates, the percentages are also large, with nearly 30% of students attending institutions that receive more in Total Payments than they spend on Education and Related costs ($R_3 > E_1$). This figure balloons to over 90% of students when comparing Achievable Spending to Total Payments ($R_3 > E_3$).

Next, the results show that regardless of control, four-year institutions are more likely than two-year institutions to be paid more than they spend providing an education. This suggests that the four-year institutions are more likely to use educational payments for non-educational purposes.

Finally, even under the most conservative estimates that count only Net Tuition (R_1) and Education and Related Spending (E_1), some students at private not-for-profit institutions (and a majority at for-profits) are paying more than their college is spending to educate them.



TABLE 5
Share of Students Attending Institutions Where Revenue Exceeds Spending

	$R_1 > E_1$	$R_1 > E_2$	$R_1 > E_3$	$R_2 > E_1$	$R_2 > E_2$	$R_2 > E_3$	$R_3 > E_1$	$R_3 > E_2$	$R_3 > E_3$
Public 4-year or above	0.0%	0.0%	0.0%	0.3%	0.3%	3.2%	69.7%	67.5%	83.7%
Public 2-year	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	61.9%	20.5%	44.2%
Private not-for-profit 4-year or above	12.6%	29.4%	70.5%	29.1%	51.3%	90.5%	29.1%	51.3%	90.5%
Private not-for-profit 2-year	16.9%	16.3%	59.2%	30.6%	51.1%	89.1%	30.6%	51.1%	89.1%
Private for-profit 4-year or above	71.8%	55.1%	83.5%	87.9%	80.1%	97.9%	87.9%	80.1%	97.9%
Private for-profit 2-year	56.7%	53.9%	83.3%	79.5%	79.7%	100.0%	79.5%	79.7%	100.0%

SOURCES: National Center for Education Statistics; authors' calculations.

NOTES: R_1 = Net Tuition (Out of Pocket); R_2 = Total Tuition; R_3 = Total Payment; E_1 = Education and Related Spending; E_2 = Adjusted Education and Related Spending; E_3 = Achievable Education and Related Spending.

Conclusion

We have shown that conventional wisdom is often wrong in regards to colleges subsidizing their students. In reality, between 52% and 60% of students attend institutions that are paid more than they spend to educate them. If wasteful spending is disallowed, the figure rises to 76%. At four-year institutions, it is between 59% and 87%. In other words, not only are most students not being subsidized by their college, but most colleges are able to divert money towards non-educational activities, all the while claiming that this spending is for the benefit of students. As Bob Samuels noted, “Many professors have told me, they do not believe that the public would support the research mission of the university, so the university has to hide how it spends its money.”¹²

Convincing people that you are giving them a big discount when you are doing no such thing is not a new idea. What *is* new is its application to and celebration within higher education. As the Dartmouth College Fund video concludes, “Is it a wacky business model? Sure it is. But there are those who love it.”¹³ We bet there are. But they're probably not those who are being misled and overcharged.

¹² Bob Samuels, “The Solution They Won't Try,” *Inside Higher Ed*, June 4, 2010.

¹³ Dartmouth College Fund, “You Wouldn't Run a Business This Way. Here's Why Dartmouth Does.” http://www.dartmouth.edu/~alfund/why_give/business_model_text.html, accessed January 17, 2011.



Appendices

Appendix A: Data Sources and Descriptions

Data Sources

Course load, class size, and tax benefit data came from the Data Analysis System (DAS) of the Department of Education. The tax benefit data is from a 2008 survey, while the course load and class size data is from a 2004 survey.

See: <http://nces.ed.gov/das/>.

Faculty benefits data was used to find faculty compensation, and came from the American Association of University Professors, specifically Table 4 for the 2008-09 data.

See: <http://www.aaup.org/AAUP/comm/rep/Z/ecstatreport08-09/TOC.htm> and

<http://www.aaup.org/NR/rdonlyres/4041489A-90C4-4312-9BA4-135F82D3CD4E/0/tab4.pdf>

Student shares by institution type were calculated from data in the Digest of Education Statistics.

See: http://nces.ed.gov/programs/digest/d09/tables/dt09_218.asp

All other data is for the 2008-2009 school year, and comes from the Integrated Postsecondary Education Data System (IPEDS).

See: <http://nces.ed.gov/ipeds/>

Descriptions of IPEDS Expenditure Categories

Instructional Expenses: –A functional expense category that includes expenses of the colleges, schools, departments, and other instructional divisions of the institution and expenses for departmental research and public service that are not separately budgeted. Includes general academic instruction, occupational and vocational instruction, community education, preparatory and adult basic education, and regular, special, and extension sessions. Also includes expenses for both credit and non-credit activities. Excludes expenses for academic administration where the primary function is administration (e.g., academic deans). Information technology expenses related to instructional activities if the institution separately budgets and expenses information technology resources are included (otherwise these expenses are included in academic support). Institutions include actual or allocated costs for operation and maintenance of plant, interest, and depreciation.”

See: <http://nces.ed.gov/ipeds/glossary/?charindex=I>.

Student Services Expenses: –A functional expense category that includes expenses for admissions, registrar activities, and activities whose primary purpose is to contribute to students emotional and physical well-being and to their intellectual, cultural, and social development outside the context of the formal instructional program. Examples include student activities, cultural events, student newspapers, intramural athletics, student organizations, supplemental instruction outside the normal administration, and student records. Intercollegiate athletics and student health services may also be included except



when operated as self-supporting auxiliary enterprises. Also may include information technology expenses related to student service activities if the institution separately budgets and expenses information technology resources (otherwise these expenses are included in institutional support.) Institutions include actual or allocated costs for operation and maintenance of plant, interest, and depreciation.”

See: <http://nces.ed.gov/ipeds/glossary/?charindex=S>.

Academic Support Expenses: –A functional expense category that includes expenses of activities and services that support the institution's primary missions of instruction, research, and public service. It includes the retention, preservation, and display of educational materials (for example, libraries, museums, and galleries); organized activities that provide support services to the academic functions of the institution (such as a demonstration school associated with a college of education or veterinary and dental clinics if their primary purpose is to support the instructional program); media such as audiovisual services; academic administration (including academic deans but not department chairpersons); and formally organized and separately budgeted academic personnel development and course and curriculum development expenses. Also included are information technology expenses related to academic support activities; if an institution does not separately budget and expense information technology resources, the costs associated with the three primary programs will be applied to this function and the remainder to institutional support. Institutions include actual or allocated costs for operation and maintenance of plant, interest, and depreciation.”

See: <http://nces.ed.gov/ipeds/glossary/?charindex=A>

Institutional Support Expenses: –A functional expense category that includes expenses for the day-to-day operational support of the institution. Includes expenses for general administrative services, central executive-level activities concerned with management and long range planning, legal and fiscal operations, space management, employee personnel and records, logistical services such as purchasing and printing, and public relations and development. Also includes information technology expenses related to institutional support activities. If an institution does not separately budget and expense information technology resources, the costs associated with student services and operation and maintenance of plant will also be applied to this function. Institutions include actual or allocated costs for operation and maintenance of plant, interest and depreciation.”

See: <http://nces.ed.gov/ipeds/glossary/?charindex=I>.



Appendix B: Methodological Description

How Much Are Colleges Paid?

1. Net Tuition (Out of Pocket)
 - a. What this measures
 - i. Net tuition gives the average out of pocket spending on tuition and fees after taking all grants and tax benefits into account.
 - b. How we calculate it
 - i. Net tuition is calculated as: Published tuition less all grants and tax benefits received by students.
 - c. Key assumptions
 - i. Our estimate for net tuition assumes that the costs incurred and aid received by full-time first-time degree-seeking undergraduates are representative of the costs faced by, and aid given to, the entire undergraduate body. This assumption is driven by data availability because average grant data is only available for full-time first-time degree-seeking undergraduates.
 - ii. Our estimate also assumes that students at each institution receive the average tax benefits for the respective type of institution due to the fact that average tax benefits are only available by institution type.
 - d. Likely biases
 - i. Our estimate of net tuition may understate true net tuition in the following ways:
 1. The estimate assumes that all grant aid is used for tuition but some is used for room and board.
 - ii. Our estimate may overstate true net tuition because:
 1. The estimate assumes that the aid first year students receive is representative of all students, but according to DAS, first year students receive less aid than other students.
 2. Some private scholarships are not counted.
 - iii. Without better data on the relative magnitudes of these three sources of bias, we do not know whether the net tuition figure is an overestimate or an underestimate.
2. Total Tuition
 - a. What this measures
 - i. Our estimate for total tuition reports the average tuition payment received from students; it is the net tuition revenue for the school. This includes what the student pays, as well as federal and state grants to students but excludes state appropriations or institutional aid.
 - b. How we calculate it
 - i. Total tuition is the sum of net tuition and federal, state, and local grants and tax benefits.
 - c. Key assumptions
 - i. Our estimate for net tuition assumes that the costs incurred and aid received by full-time first-time degree-seeking undergraduates are representative of the costs



faced by, and aid given to, the entire undergraduate body. This assumption is driven by data availability because average grant data is only available for full-time first-time degree-seeking undergraduates.

- ii. Our estimate also assumes that students at each institution receive the average tax benefits for the respective type of institution due to the fact that average tax benefits are only available by institution type.

d. Likely biases

- i. Our estimate of net tuition may understate true net tuition in the following ways:
 - 1. The estimate assumes that all grant aid is used for tuition but some is used for room and board.
- ii. Our estimate may overstate true net tuition because:
 - 1. The estimate assumes that the aid first year students receive is representative of all students, but according to DAS, first year students receive less aid than other students.
 - 2. Some private scholarships are not counted.
- iii. Without better data on the relative magnitudes of these three sources of bias, we do not know whether the net tuition figure is an overestimate or an underestimate.

3. Total Payment

a. What this measures

- i. Our estimate for total payment gives the average total payment received by the institution for the purpose of educating a student.

b. How we calculate it

- i. Total payment is the sum of total tuition and state and local appropriations.

c. Key assumptions

- i. Our estimate for net tuition assumes that the costs incurred and aid received by full-time first-time degree-seeking undergraduates are representative of the costs faced by, and aid given to, the entire undergraduate body. This assumption is driven by data availability because average grant data is only available for full-time first-time degree-seeking undergraduates.
- ii. Our estimate also assumes that students at each institution receive the average tax benefits for the respective type of institution due to the fact that average tax benefits are only available by institution type.
- iii. Our estimate for total payment also assumes that all state and local appropriations are intended as payment for educational costs.

d. Likely biases

- i. It is possible that in some states or for some institutions, a portion of state appropriations are not restricted to paying for educational costs. In these cases, the total payment figure will likely be an overestimate.



How Much Do Colleges Spend to Educate Students?

4. Education and Related Spending

a. What this measures

- i. Education and Related Spending provides a measure of the full cost of providing a collegiate education by adding other necessary expenditures to the reported instructional expenditures.

b. How we calculate it

- i. Education and Related Spending is the sum of instructional expenditures, student services and the educational share of academic and institutional support expenditures.

1. The Educational Share (ES) of academic and institutional support is

$$\text{computed as ES} = \frac{\text{Instruction} + \text{Student Services}}{\text{Instruction} + \text{Student Services} + \text{Research} + \text{Public Service}}$$

c. Key assumptions

- i. This estimate assumes that the educational share formula (developed by the Delta Cost Project), appropriately attributes costs.

d. Likely biases

- i. This figure is almost certainly an overestimate of educational spending since the instruction expenditure category includes many costs that should not be classified as instruction.

5. Adjusted Education and Related Spending

a. What this measures

- i. Adjusted Education and Related Spending provides a more accurate figure for the full cost of providing an education by using a more accurate figure for instructional spending, correcting for some of the misattribution of research spending as instructional spending.

b. How we calculate it

- i. The calculation is the same as for Education and Related Spending above, but with a revised instructional spending figure.

1. The revised instructional spending figure is calculated as

$$\frac{\text{FTE Enrollment} \times 8 / \text{Average Class Size}}{\text{Average Course Load} \times 2} \times \text{Average Faculty Compensation}$$

- i. In this equation, average class size and course load are equal to the institutional type average.

c. Key assumptions

- i. This estimate assumes that the educational share formula (developed by the Delta Cost Project), appropriately attributes costs.
- ii. This estimate also assumes that each institution has the average course load and average class size for institutions of its type (course load and class size data is only available by institution type).
- iii. It assumes that each student takes 8 courses per year.
- iv. It assumes that each professor teaches the average course load for both semesters (i.e., there are no sabbaticals, research leave, etc.).



- v. That all courses are taught by full time faculty receiving the average full time faculty compensation at that school.
 - d. Likely biases
 - i. This figure likely overstates educational spending because
 - 1. It assumes that all courses are taught by full-time faculty when in reality, part-time faculty and TA's teach about half of all courses, and are paid much less than full-time faculty.
 - a. The reliance on lower paid adjuncts, particularly at public two-year and for-profit institutions, indicates that this figure could significantly overstate costs at those institutions.
 - 2. It assumes that the course load data from 2004 is still applicable. In reality, there has been a downward trend in this variable over time (though this may be offset by a trend towards larger class sizes).
 - 3. Using the national average course load and class size data reduces, but does not eliminate, the upward bias from the misallocation of research spending.
6. Achievable Education and Related Spending
- a. What this measures
 - i. This figure is a hypothetical estimate of what it should cost to provide an education. It uses a revised figure for instructional spending by correcting for the misattribution of research spending. It also replaces other spending categories with the median value for institutions of that level.
 - b. How we calculate it
 - i. The formula is the same as for (4) above, but each of the spending categories is revised.
 - 1. The revised instructional spending figure is calculated as the lower of (5) above, or the same calculation using the overall national average for class size and course loads.
 - 2. The revised student services, academic support, and institutional support spending figures are the lower of actual spending, or the spending per student in that category at the median student's institution of that level.
 - c. Key assumptions
 - i. This estimate assumes that the educational share formula (developed by the Delta Cost Project), appropriately attributes costs.
 - ii. This estimate also assumes that each institution has the average course load and average class size for institutions of its type (course load and class size data is only available by institution type).
 - iii. It assumes that each student takes 8 courses per year.
 - iv. It assumes that each professor teaches the average course load for both semesters (i.e., there are no sabbaticals, research leave, etc.).
 - v. That all courses are taught by full time faculty receiving the average full time faculty compensation at that school.



- vi. This estimate assumes that the median spending figures are appropriate for each institution of that type.
- d. Likely biases
 - i. This figure overstates educational spending because
 - 1. It assumes that all courses are taught by full-time faculty when in reality, part-time faculty and TA's teach about half of all courses, and are paid much less than full-time faculty.
 - a. The reliance on lower paid adjuncts, particularly at public two-year and for-profit institutions, indicates that this figure could significantly overstate costs at those institutions.
 - 2. It assumes that the course load data from 2004 is still applicable. In reality, there has been a downward trend in this variable (though this may be offset by a trend towards larger class sizes).
 - 3. Overall, this figure is therefore likely to slightly overestimate the cost of providing an education.

