The Awkward Economics of Private Liberal Arts Colleges

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Abstract: The main goal of liberal arts colleges is to enhance their prestige, which comes from a reputation for producing high-quality graduates. People judge the quality of a college's graduates by observable indicators of the quality of the college's entering students and the quality of its faculty and facilities. Colleges can use endowment earnings and alumni gifts to "purchase" the factors that provide prestige. Need-based and merit scholarships help selective colleges enroll better students than they could otherwise. They can help less-selective colleges fill empty seats, providing revenue to enhance their educational programs. Many tuition-dependent colleges can offer more need-based and merit scholarships than do colleges with abundant donor support because they post sticker prices that substantially exceed their per-student expenditures. Some schools post sticker prices that exceed what any student pays because students take the posted price as an indication of the value of the colleges' services. Merit scholarships can crowd out need-based scholarships. But, when schools use merit scholarships to fill empty seats, they can enhance school revenue and support need-based scholarships.

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I. Introduction

This paper analyzes non-profit private liberal arts colleges as business entities. This is a fascinating sector of the economy that does not fit standard introductory microeconomic models and raises puzzling questions. For one thing, what is the main goal of the colleges? Since they don't have owners to whom they can distribute profits, they clearly have no incentive to maximize profits, the assumption economists typically use to explain firm behavior. A subset of liberal arts colleges persistently has more qualified applicants willing to pay their fees than they have space for. Why don't these colleges raise their price (tuition) and use the revenue to enhance their academic or extracurricular programs? Liberal arts colleges offer need-based scholarships. What motivates this policy? Many "rich" colleges, i.e. those with large endowments and significant annual alumni gifts, express concern about the budget pressures created by offering deep tuition discounts to students from low- and middle-income families. Yet, many tuition-dependent colleges with very modest endowments enroll higher percentages of students with such discounts than do the rich colleges. If it is costly to provide need-based scholarships, how can many tuition-dependent colleges provide them to higher percentages of students than do the rich colleges? In addition, many liberal arts colleges, but not all, offer "merit" scholarships, meaning that they offer discount prices to students without financial need whom they most want to enroll. Why would some colleges do this but not all? And, finally, a significant subset of colleges posts a sticker price that is higher than any of their entering students pay. Why don't these colleges cut their sticker prices to reflect actual tuition payments?

Below I offer answers to these questions. I should acknowledge at the outset that most of these questions about the practices of liberal arts colleges apply to nearly all not-for-profit institutions of higher education. So why focus on liberal arts colleges? A major theme of this paper is that differences in schools' financial endowments and alumni gifts, as well as differences between what colleges spend per-student and their posted comprehensive tuitions, can explain much of the differences across colleges in their selectivity and use of need-based and merit scholarships. This is also likely true for big private universities, but by examining data from a relatively homogenous set of schools --- liberal arts colleges --- the critical roles played by donor

[1] I thank Sandy Baum, Charles T. Clotfelter, Ronald G. Ehrenberg, Janet Ginzberg, Catherine Bond Hill, Philip Jefferson, Mark Kuperberg, and Lawrence Schall for helpful comments on an earlier draft of this paper. They do not necessarily agree with any of the views I express. I thank Braeden DeWan, Matt Palmer, Jake Rosen, and Alex Scott for excellent research assistance.

support and the gap between per-student expenditures and posted tuitions are prominent. If I were to include universities in the mix, I would have to adjust for the financial complexities of large institutions with multiple professional schools and extensive research contracts. I also exclude the relatively small number of public liberal arts colleges from my analysis since their policies can be constrained by their partial dependence on state funding and the accompanying oversight.

Before proceeding further, I should explain what defines a liberal arts college. Although there is no official definition or licensing that clearly distinguishes these colleges from other institutions of higher education, liberal arts colleges are relatively small schools where all, or nearly all, students are undergraduates and most students study subjects in the arts, humanities, social sciences, or sciences. The colleges generally offer little or no preparation in vocational or professional fields. Much of their instruction takes place in small classes and the colleges encourage close student-faculty working relationships. The colleges also encourage close interaction among their students by requiring most students to attend full-time and by housing a large share of the student body on campus in college-provided housing.

This paper is organized as follows. The next section, section II, discusses the data that I use in the paper. In section III, I argue that the main goal of liberal arts colleges is to enhance their reputation for producing high-quality graduates, which I call "prestige" for short. Since most outsiders don't have the information required to judge the quality of a college's graduates, they typically use easily observable indicators thought to be associated with this quality. These indicators are the quality of the college's entering students and the quality of the college's faculty and facilities. In the fourth and fifth sections, I explain why colleges, with an excess demand by students willing to pay their posted prices, do not raise their tuitions and use the money to enhance their educational programs. I also explain how colleges can use endowment earnings and alumni gifts to "purchase" the factors that provide prestige. In section VI, I discuss the role of need-based scholarships. These scholarships can raise the prestige of selective colleges by enabling them to enroll better students than they could otherwise. In the case of less-selective colleges, need-based scholarships can help fill empty seats, providing revenue to enhance the schools' educational programs. In this section, I also argue that a large positive gap between colleges' sticker prices and their per-student expenditures explains how many tuition-dependent colleges can afford to provide need-based scholarships to high percentages of their students. In section VII, I explain why some schools, but not all, can raise their prestige by offering merit scholarships. In section VIII, I argue that many less-selective colleges use merit scholarships to fill empty seats, enabling them to maintain or strengthen their educational programs. I explain why some schools post misleading sticker prices, in the sense that they are higher than any of their students actually pay. I also note often-overlooked complexities in the allegation that colleges that provide significant merit-based scholarships must cut their funding of need-based scholarships.

To keep this paper reasonably brief, I cannot survey the literature on the economics of higher education institutions, but I do need to emphasize that very few of the arguments that I make about the behavior of colleges are new. Most previous studies of the economics of higher

education institutions, however, have not focused on liberal arts colleges and they do not draw on the data in the same way I do.[2] This said, I must pay tribute to Gordon Winston's 1999 article, "Subsidies, Hierarchy and Peers: The Awkward Economics of Higher Education," since it shaped my thinking about the topic and gave me the title for this paper. One of the key points he made in that article, which is reflected in my own analysis, is that a major factor determining the relative prestige of colleges and universities is their access to sources of revenue other than tuition, namely endowment earnings, alumni gifts, and, in the case of public schools, allocations from state legislatures.

II. The Data

Most of the data presented in this paper comes from the U.S. Department of Education's Integrated Post-Secondary Educational Survey (IPEDS). The financial and operational data are for the colleges' 2014/15 fiscal year. The data on the characteristics of students are for first-year students entering in the fall of 2015. One limitation of the IPEDS data for my purposes is that, although the data set does report the percentage of entering students with a tuition discount and the average value of that discount, it does not distinguish between need-based discounts, merit-based discounts, and athletic scholarships. Consequently, the data I present on the percentage of entering students at a college who receive need-based scholarships or merit-based scholarships and the average amount of these tuition discounts come from the Common Data Set (CDS), a collaborative project of the College Board, Peterson's, and *U.S. News and World Report*, to which nearly all well-known colleges and universities voluntarily report extensive data about their admissions and scholarship policies.

To select the specific liberal arts colleges included in this study, I identified the schools in the IPEDS data that the Carnegie Commission on Higher Education categorized in its 2010 classification as offering four-year undergraduate degrees focused on the arts and sciences or on arts and sciences plus professions, meaning that at least 59 percent or more of their undergraduate degrees were in the arts and sciences. I excluded public colleges, schools with total enrollments of fewer than 500 students, schools where graduate students made up more than 25 percent of the student population, and schools where part-time students were more than ten percent of the undergraduate student body. I also excluded colleges that did not report either the IPEDS data or CDS data that I need for this study. After making these screenings, my data set covers 125 liberal arts colleges (listed in Appendix I), including nearly all prominent ones. They range in size from Centenary College of Louisiana, with 523 undergraduates, to Bucknell University, with 3,569 undergraduates. Collectively, the 125 colleges enrolled about 222,000 undergraduates in 2014/15, a small share of the 2.8 million undergraduates enrolled in four-year degree programs at

[2] Almost 25 years ago, David Breneman (1994) investigated the financial sustainability of liberal arts colleges given the trends of that time. Many of the issues he raised in the book are still relevant. More recently, John F. O'Connell and George Perkins (2003) and Christian Buss et al (2004) used 1990s data from liberal arts to address some of the same issues I do in this paper.

private not-for-profit colleges and universities (Table 303.70, 2016 Digest of Education Statistics, National Center for Education Statistics).

III. Why Do Colleges Seek to Maximize Prestige and How Do We Measure Prestige?

I argue that one can explain the peculiar business practices of private liberal arts colleges by assuming that they seek to maximize the perceived quality of their graduating students, where "quality" is a multi-dimensional concept that includes intellectual ability, knowledge, creativity, leadership skills, etc. This is a mouthful, so for linguistic convenience I will say that they seek to maximize their "prestige."

Why might a college seek to maximize its prestige defined in this way? Private non-profit colleges are governed by boards of directors that generally consist of successful college alumni. Undoubtedly, a college's board members would like the institution that they are associated with, and that they support by donating time and money, to be recognized for producing high-quality graduates. Not only does this suggest that the college is doing successfully what most people consider to be its primary mission, but it also benefits the alumni of the college since people may presume, until shown otherwise, that an alumnus is also a high-quality graduate. This "signaling" aspect of colleges plays an important role in my analysis. The idea is that people and employers cannot quickly assess an individual's knowledge, intellectual ability, honesty, judgment, etc. Consequently, they often use the college one attended as a signal of these attributes. Of course, they will revise this snap judgment as they get to know the individual, but a favorable initial impression can help an individual get his or her foot in the door.

There are three common objections to the claim that colleges' policies are largely shaped by their desire to maximize prestige, or the perceived quality of their graduates. First, people argue that colleges have goals beyond prestige-maximization, such as an obligation to provide their educational service to a socioeconomically diverse set of students.[3] Second, people point out that some colleges struggle just to survive, and can't worry about how their policies affect their prestige. Third, some critics argue that the most admired colleges should be those that are highly effective at educating and enriching the lives of their students, regardless of the preparation or capabilities those students have when they begin college. According to this "value-added" standard, the most prestigious college could be one whose students graduate with rather average levels of education, but whose students entered college at the lowest end of the distribution in this regard.

[3] In an article on ethical issues related to university admissions and financial aid policies, Ronald G. Ehrenberg (2017, p. 2) argues, "Because many of our nation's leaders are graduates of these institutions and a well-functioning democratic society requires that its leaders come from diverse socioeconomic backgrounds, these institutions have long understood that they have a special obligation to admit and enroll students from all socioeconomic backgrounds."

These objections are not, however, problematic for my purposes. First, to the extent that people disparage colleges that are not economically and socially diverse, or if people think that colleges with more diverse student bodies produce better educations than similar colleges with less diverse student bodies, then colleges that seek prestige will want to become socioeconomically diverse.[4] In other words, colleges will establish policies to maximize the perceived quality of their graduates within the constraint that their student bodies achieve at least a minimally-acceptable level of socioeconomic diversity. Second, a struggling college certainly can't afford to worry about prestige in the same way that a financially-secure college can, but this does not undermine the explanatory power of the assumption that colleges seek to maximize their prestige. After all, a college has to survive to have any prestige at all. Finally, it may be true that society *should* assign prestige to the colleges that are the most effective in working with the students they have, but this value-added is very hard to gauge, especially if one cares about more than just easy-to-quantify characteristics, such as the earnings of graduates. Inevitably prestige is associated with the perceived quality of a college's graduates, not the change in that quality.

One serious problem with the notion that colleges adopt policies to maximize prestige, or the perceived quality of a suitably diverse set of graduates, is that there are almost no indicators of this quality. So how do people judge the quality of a college's graduates, especially people who do not know a representative sample of the college's recent graduates? Casual empiricism suggests that people, quite reasonably, assume that the average quality of a college's graduates is closely correlated with the quality of the students it enrolls and, probably more weakly, related to the quantity and quality of the school's faculty, facilities, and extracurricular resources.[5] These inputs into a school's production process are themselves imperfectly assessed, but there are indicators that are widely published or available for campus visitors to see.

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[4] Jerome Karabel (2005) presents an engaging history of admissions processes at Harvard, Princeton, and Yale over the 20th century and discusses these schools' efforts to become socially and economically diverse. I am not aware of any such account for liberal arts colleges. Clearly, however, the degree of economic and social diversity that colleges seek and that society expects of them has changed over time.

[5] Howard Bowen (1980, p. 19), who served as president of Grinnell College and the University of Iowa, in reflecting on his experiences and observations wrote, "The dominant goals of [colleges and universities] …are educational excellence, prestige, and influence. The 'excellence' or 'quality' of institutions are commonly judged by such criteria as faculty-student ratios, faculty salaries, number of Ph.D.s on the faculty, number of books in the library, range of facilities and equipment, and academic qualifications of the students. These criteria are resource inputs most of which cost money, not outcomes flowing from the educational process. The true outcomes in the form of learning and personal development of students are on the whole unexamined and only vaguely discerned."

What indicators do people commonly use to assess the quality of students enrolling in a college? Judging from popular college guidebooks, they mainly use two indicators. First, they use published data related to the academic preparation of entering students. These indicators are standardized test scores and the students' relative performance in high school. But most people know that the schools themselves look for a variety of other quality indicators: motivation, perseverance, leadership skills, artistic and athletic ability, ethical standards, etc. Colleges, especially residential colleges, recognize that students influence each other educationally and socially, and they look for students who will contribute positively to the overall quality of the student body. Outside observers, to some extent, must trust the colleges to assess such characteristics, knowing that the college admissions staff have much more information than any outsider can. And the colleges that can be most selective about which students to enroll will presumably be able to choose, on average, higher quality students across many dimensions than colleges that need to enroll almost any student willing to come. Thus, in addition to using data on the standardized test scores and high-school rank of entering students, outsiders also judge the quality of a college's entering students based on the college's admissions selectivity.

Since, for my purposes, I do not need to make fine distinctions in the prestige of colleges, this brief exposition is sufficient. The simple claim is that the prestige of colleges is positively correlated with the average quality of their entering students. Rough indicators of this quality are the standardized test scores and high school rank of entering students as well as the admissions selectivity of the colleges.

There are two standard measures of selectivity. One is the percentage of applicants admitted. A second is the "yield," or percentage of admitted students who actually enroll. According to these traditional indicators, the more selective a college is, the lower is its acceptance rate and higher is its yield. Of course, colleges can use a variety of policies to influence both measures. A college can, for example, advertise extensively and minimize the cost and effort to apply even among obviously unqualified applicants so that it can report a low admissions rate. Similarly, it can offer a binding early-decision option to raise its yield. Nevertheless, the data suggest that such policies do not overturn the common notion that the colleges that appear to be the most selective using the traditional measures enroll the highest-quality students on average. Table 1, for example, reports the five colleges in my data set with the lowest acceptance rates for the 2014/15 academic year and the five with highest rates. It also reports admission yields and the cut-off points for a student to be in the lower 25 percent in the distribution of standardized test scores of enrolling students. As shown in the table, the colleges with high applicant rejection rates tend to also have relatively high yields and enroll students with high standardized test scores.

Table 1
Standard Indicators of Selectivity & Student Academic Quality

Top 5 & Bottom 5 of % Admitted	Percent Admitted	Admissions Yield	SAT Critical Reading 25th Percentile Score	SAT Math 25th Percentile Score	ACT Composite 25th Percentile Score
Pomona College	10	48	670	690	30
Claremont McKenna College	11	44	670	670	29
Swarthmore College	12	42	670	670	30
Harvey Mudd College	13	40	670	730	32
Pitzer College	13	44	Not reported	Not reported	Not reported
Mean	**53**	**26**	**553**	**555**	**25**
Warren Wilson College	84	29	518	470	21
The College of Idaho	90	23	Not reported	Not reported	Not reported
Wisconsin Lutheran College	92	41	435	495	21
Gordon College	93	26	480	470	23
Transylvania University	93	22	Not reported	Not reported	Not reported

Source: IPEDS

As noted above, the other inputs into a college's production process that people commonly associate with the quality of its educational program are the quality and quantity of its faculty, facilities, and extracurricular activities. These too cannot be known perfectly by outsiders, but relevant published data include the percentage of faculty with Ph.D.s, the student-to-faculty ratio, the number of sports teams, lists of student arts organizations, etc. A quick campus visit reveals the number and grandeur of a college's buildings and the size and maintenance of the campus. Of course, facilities and faculty cost money, so one would expect these standard indicators to be highly correlated with per-student expenditures. Table 2 lists the five schools with the highest per-student operating expenses in 2014/15 and the five with the lowest, as well as the unweighted mean for the 125 colleges.[6] It shows that higher per-student spending is associated with lower student-to-faculty and student-to-employee ratios overall, and with higher faculty salaries. It is not shown in the Table, but it is safe to assume that the schools with high per-student expenses generally have more extensive and higher quality facilities than schools that spend substantially less.

[6] Appendix II briefly reviews the expenditures that are included in operating expenses, notes the major expenditure and revenue categories in the IPEDS data, and presents averages across the 125 colleges for the major categories. Throughout the paper, financial data presented on a per-student basis include any graduate students at the school.

Table 2
Operating Expenses per Student, FY 2014/15

Top 5 & Bottom 5	Per Student Operating Expense	Students per FTE Instructional Staff	Students per FTE Employees	Average 9-month Salary for FT Instructor – All Ranks
Williams College	$102,108	6.5	2.0	$110,000[7]
Amherst College	$100,395	7.8	2.0	$111,996
Pomona College	$94,488	7.3	2.2	$113,796
Swarthmore College	$87,263	7.2	1.9	$112,122
Bowdoin College	$85,760	8.1	2.0	$102,303
Mean	**$48,287**	**10.2**	**3.4**	**$80,330**
Coe College	$26,929	11.4	4.6	$64,836
Wisconsin Lutheran College	$26,175	16.0	6.6	$54,936
Albright College	$24,016	15.7	5.8	$58,680
Moravian College	$23,984	10.3	4.5	$66,771
Oglethorpe University	$22,158	16.3	6.1	$59,112

Source: IPEDS

Finally, returning to the signaling concept, it should be clear that any change to a college's prestige is likely to have a self-reinforcing feedback effect. Students benefit from attending a college that has a reputation for producing high-quality graduates since people will assume that an unknown graduate of that college is also high-quality. Thus, if a college gains prestige for some reason, more students are likely to apply to attend, which enables it to restrict admissions to higher quality students, further enhancing its prestige.

IV. The Optimal Tuition for a Selective College

All the colleges in my data set offer need-based scholarships, meaning that they charge their students different tuitions based on what they believe the students can afford to pay. In this section, however, I analyze from a theoretical point of view what the optimal tuition would be for a selective prestige-maximizing college that must charge all its students the same price. This exercise establishes a basic theoretical framework that I will use to tackle more complex issues later in the paper. It also, as noted below, provides an answer to one of the puzzling questions about college behavior posed in the introduction.

Before I present the theoretical analysis of what would determine a school's optimal tuition, I should note two background issues. First, the analysis assumes that the size of the student body and fundamental infrastructure of the college have already been decided upon and are invariable within the period of interest. Second, the analysis applies to a "selective" college, which

[7] I estimated this from the previous year's data for Williams College since there was clearly an error in the 2014/15 data on instructors' salaries. See the "Notes" section of Appendix I.

I define to mean a school that can fill all available seats with qualified students willing and able to pay the posted tuition.[8]

To analyze the trade-offs this college faces in setting tuition, I make four simplifying assumptions. First, I assume that the college seeks to maximize its prestige and that prestige is a function of the quality of the students it enrolls and its per-student expenditures. This is consistent with my earlier discussion of colleges and prestige. Second, I assume that the average quality of a college's students increases as applications increase. The rationale is simple. The more applicants a college has, the more it can restrict admissions to the highest quality applicants and still fill its seats. Later in the paper, I will analyze the case where a college can't fill all the seats it has available for students at its posted tuition. Third, I assume that the demand to attend the college decreases as a college raises its tuition, holding all else constant. I also assume that the demand to attend a college depends on the college's prestige at the end of the previous year, i.e. its inherited reputation. Finally, I assume that college spending on a per-student basis equals tuition payments plus any steady-state endowment earnings and gifts on a per-student basis. In other words, the college spends all the revenue it receives from tuition, gifts, and a sustainable rate of withdrawal from its endowment.

A college, under this set of assumptions, has only one financial decision to make --- how much tuition it should charge. An increase in tuition allows the school to spend more, which enhances its prestige. But the increase in tuition discourages applications, which reduces the quality of the student body and the school's prestige. In other words, tuition charges and school expenditures rise in tandem, and have opposite effects on prestige. A college that seeks to maximize its prestige will push up tuition and spending until the prestige-reducing effects from tuition increases just match the prestige-enhancing effects from increases in per-student spending.

This analysis answers one of my opening questions: Why don't the colleges that have more qualified applicants willing to pay full tuition than they have space for, raise their prices until demand to attend closely matches available seats? The colleges could use the additional tuition income to enhance their academic or extracurricular programs. In fact, prestige-maximizing colleges would do this if prestige came only from the quality of the academic and extracurricular programs. But prestige also depends on the quality of incoming students, and colleges attain high quality students by attracting large numbers of applicants and being selective about whom they admit. And, while applicants like the amenities that come from high spending levels, they also like low tuition rates. A prestige-maximizing college will set tuition to balance these positive and negative effects of changes in tuition. The net result can leave a college with

[8] If a school cannot fill all its seats, the analysis is similar to the selective-school case, with two differences. First, changes in tuition cause changes in enrollment, which also affects revenue. This has a magnified effect on discretionary expenditures due to fixed costs. Second, in addition to changing tuition, the college can alter enrollments by changing its minimal-quality threshold for acceptance.

more applicants than it has space for and, at the same time, academic and extracurricular programs that could be improved if the college had more revenue.

V. How Do Donor Resources Buy Prestige?

Using this simple theoretical framework, consider what happens to college prestige when the college receives a large donation that significantly increases its endowment. Earnings from the endowment enable this school to increase per-student expenditures without raising tuition. This increases the prestige of the school. In addition, there is a positive feedback effect over time since the increased prestige will increase applications in the subsequent year, raising student quality and further enhancing prestige. This feedback effect dies out over time, but it means that any outside event that affects current prestige positively or negatively will continue to influence the school's prestige in the same direction over the next few years.

Alternatively, a college could use new donor resources to maintain per-student spending while cutting tuition. Such a measure would also increase applications, student quality, and the prestige of the college. A college will presumably choose the combination of expenditure increases and tuition reductions that do the most to raise its prestige, and this will depend on the preferences of the students the college is trying to attract and the extent to which student quality and college spending affect college prestige.[9] The key point is that colleges with substantial donor support can spend far more per student than what they charge their average student in tuition. From the perspective of potential students, this subsidy makes these schools "good deals" relative to schools that depend heavily on tuition revenue to cover their expenses. This attracts applicants, enables the schools to be more selective, and presumably provides the colleges with relatively high-quality students on average.

The data from the 125 liberal arts colleges support the notion that donor support "buys" prestige, meaning that strong donor support is associated with high-quality students and relatively generous spending on academic and extracurricular programs. Before examining the supporting data, it is important to create a common measure of donor support across the colleges. My "standardized" measure is based on the colleges' endowments and unrestricted gifts. Earnings from a college's endowment vary from year to year, so most colleges take about four to six per-

[9] There are good reasons to think that most schools would opt to increase spending rather than cut tuition following a large increase in donor resources. Presumably students from high-income families who can easily afford college tuition would prefer a school to use donor support to enrich its academic and extracurricular program rather than cut tuition. And, if the college asks students from lower-income families to pay only what their family income allows, these students would also prefer the college to use any new donor resources to increase per-student expenditures. In a different context, using a similar analytical framework, Catherine Bond Hill (2015) proposes that the post-1970 rise income and wealth inequality among American families contributed to the increase in the cost of selective private colleges and universities on recent decades.

cent of their endowment each year to support the operating budget. To be consistent across colleges, my measure of donor support assumes that all colleges take five percent from their endowments each year to support the colleges' operating expenses. Unrestricted gifts can also be highly variable from year to year. To reduce the odds that one unusually favorable or unfavorable year creates a misleading impression, my measure of donor support includes the past 3-year average of unrestricted gifts, rather than just the past year's gifts.[10] Thus, the standardized measure of per-student donor support that I use for inter-college comparisons in this paper is the sum of five percent of the value of the endowment at the beginning of the academic year plus the average of the current and past two years' unrestricted gifts divided by the total number of students in the college, including any graduate students. Table 3 lists the five schools in my data set with the highest levels of per-student donor support in 2014/15 and the five with the lowest. There is clearly a large difference between the two extremes.

Table 3
Donor Support per Student

Top 5 & Bottom 5	Standardized Measure of Annual Per-Student Donor Support (sum last two columns)	Per-Student Endowment, Beginning Fiscal Year	Annual Per-Student Support with 5% Endowment Withdrawal rate	Per-Student 3-year Average Unrestricted Gifts
Amherst College	$68,758	$1,197,327	$59,866	$8,892
Pomona College	$68,444	$1,263,657	$63,183	$5,261
Swarthmore College	$65,536	$1,187,014	$59,183	$6,186
Williams College	$57,007	$987,173	$49,359	$7,648
Grinnell College	$55,356	$1,073033	$53,652	$1,704
Mean	**$14,344**	**$220,391**	**$11,020**	**$3,324**
Gordon College	$2,791	$21,520	$1,076	$1,715
Eckerd College	$2,296	$26,935	$1,347	$949
Oglethorpe University	$2,109	$17,025	$851	$1,257
College of Saint Benedict	$1,968	$29,501	$1,475	$493
Albright College	$1,908	$28,418	$1,421	$487

Source: IPEDS

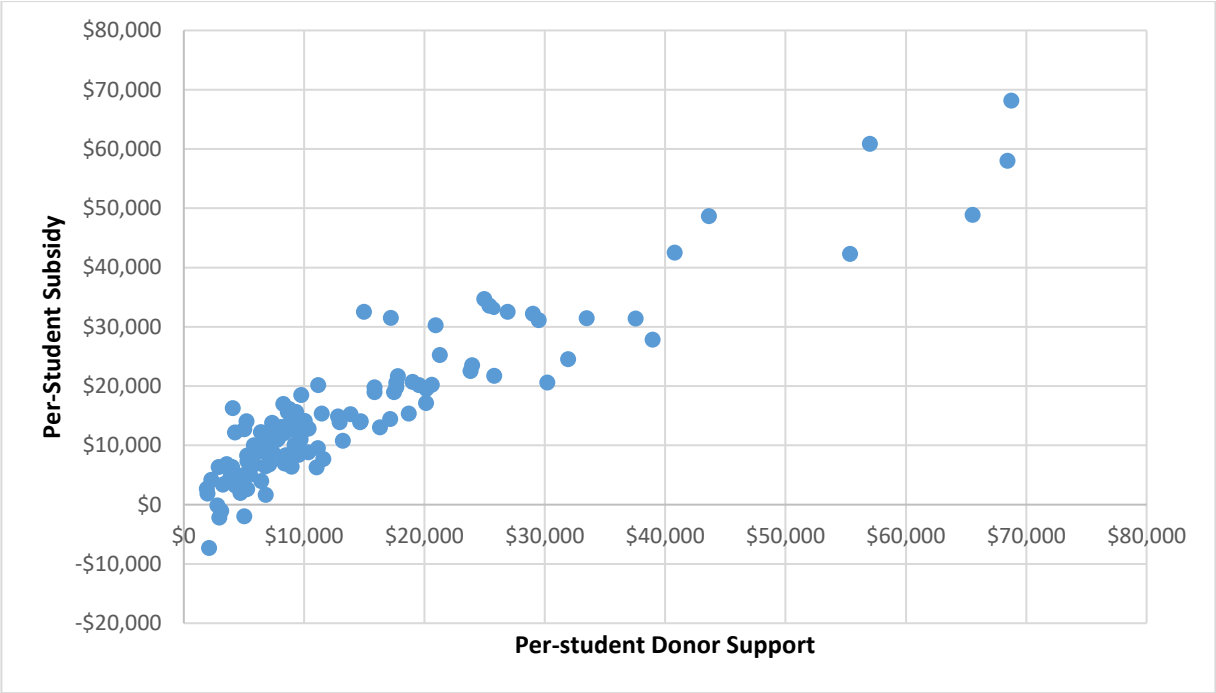
Colleges use their donor support to fill the financial gap between the revenue the colleges receive from comprehensive student payments (tuition, room, and board) and the colleges' operating expenses. For simplicity, I refer to this gap as the "per-student subsidy." Note that,

[10] Appendix II includes a brief discussion of the budget implications of restricted gifts. Some restricted gifts can provide immediate budget support, so it is not obvious that restricted gifts should be excluded. Including restricted gifts in my measure of annual donor support does not change the basic patterns in the data.

throughout this paper, data on student payments to a college reflect their actual payments, after discounting for any college-provided scholarships that the students receive. In other words, a college-provided scholarship is not a cost in the sense of money that the college pays out to a student. Rather, its cost is reflected in reduced student revenue.

Figure 1 illustrates the close connection between student subsidies and donor support for all 125 colleges. In fact, for the colleges in my data set, the simple correlation between the schools' level of per-student subsidy and the standardized measure of per-student donor support is 0.93.

Figure 1
Per-Student Donor Support versus Per-Student Subsidy



I argued above that a college's selectivity and the average quality of its entering students will be related to donor support because these funds enable a college to increase its spending without increasing its tuition, or to decrease its tuition without cutting its spending. Of course, as noted above, prospective students care about the absolute level of spending and tuition and not just the gap between the two, so selectivity should not perfectly align with the level of per-student student subsidy. Moreover, as will be discussed in the next two sections, the distribution of student subsidies can matter for selectivity. A college might, for example, subsidize all of its students equally or it might heavily subsidize students from low-income families or students with the strongest academic records. Selectivity can also depend on a college's reputation, its average winter temperatures, whether it has an urban or rural location, it religious affiliation, etc. In other words, selectivity will depend on a variety of factors other than donor support.

With this qualification in mind, it is nevertheless interesting to examine the degree to which the colleges with greater per-student donor support are also among the more selective colleges. The assumption is, as explained earlier, that the more selective colleges enroll higher quality students on average and gain prestige from the perception that their graduates are also high quality. To examine succinctly the link between student subsidies and selectivity, I need a single indicator of selectivity. For simplicity, I'll define this "Index of Selectivity" as equal to the average of a school's applicant rejection rate plus its yield, i.e.

Index of selectivity = (percent applicants rejected + yield)/2

Of course, no such indicator is a perfect measure of selectivity, but this one should serve to distinguish significant differences among the selectivity of the various colleges. Table 4 lists the five colleges in the data set with the highest levels of per-student donor support in 2014/15 and the five with the lowest levels. It also lists the indices of selectivity of each of these colleges as well as the average for all 125 colleges. As expected, the colleges with the highest levels of per-student donor support are notably more selective than those with the lowest levels.

Table 4
Index of Selectivity & Donor Support

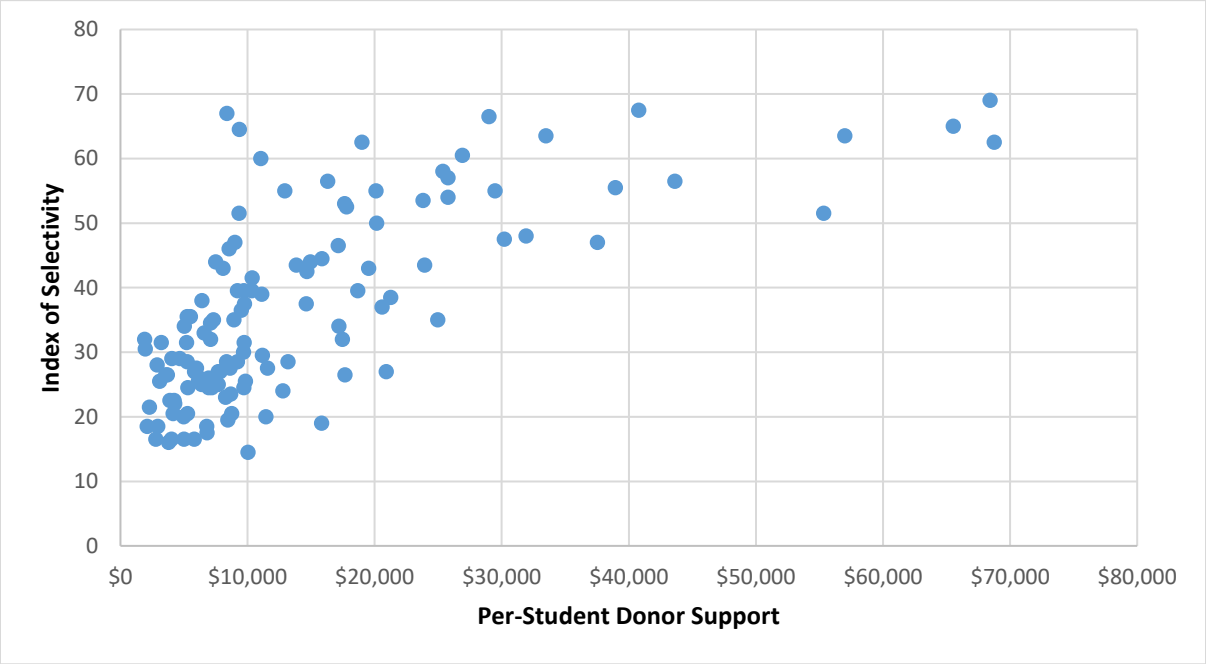
Top 5 & Bottom 5 by Donor Support	Standardized Measure of Per-Student Donor Support	Percent Admitted	Admissions Yield	Index of Selectivity
Amherst College	$68,758	14	39	62.5
Pomona College	$68,444	10	48	69
Swarthmore College	$65,536	12	42	65
Williams College	$57,007	18	45	63.5
Grinnell College	$55,356	25	28	51.5
Mean	**$14,304**	**53**	**26**	**36**
Gordon College	$2,791	93	26	16.5
Eckerd College	$2,296	72	15	21.5
Oglethorpe University	$2,109	78	15	18.5
College of Saint Benedict	$1,968	74	35	30.5
Albright College	$1,908	49	13	32

Source: IPEDS

Figure 2 presents a graphical representation of the positive relationship between per-student donor support and the colleges' admissions selectivity for all 125 colleges. The correlation between per-student donor support and the index of selectivity is 0.70. But, as discussed above, numerous factors affect selectivity, so it is not surprising that some colleges are highly

selective despite relatively low levels of donor support and some are less selective despite high levels of donor support.[11]

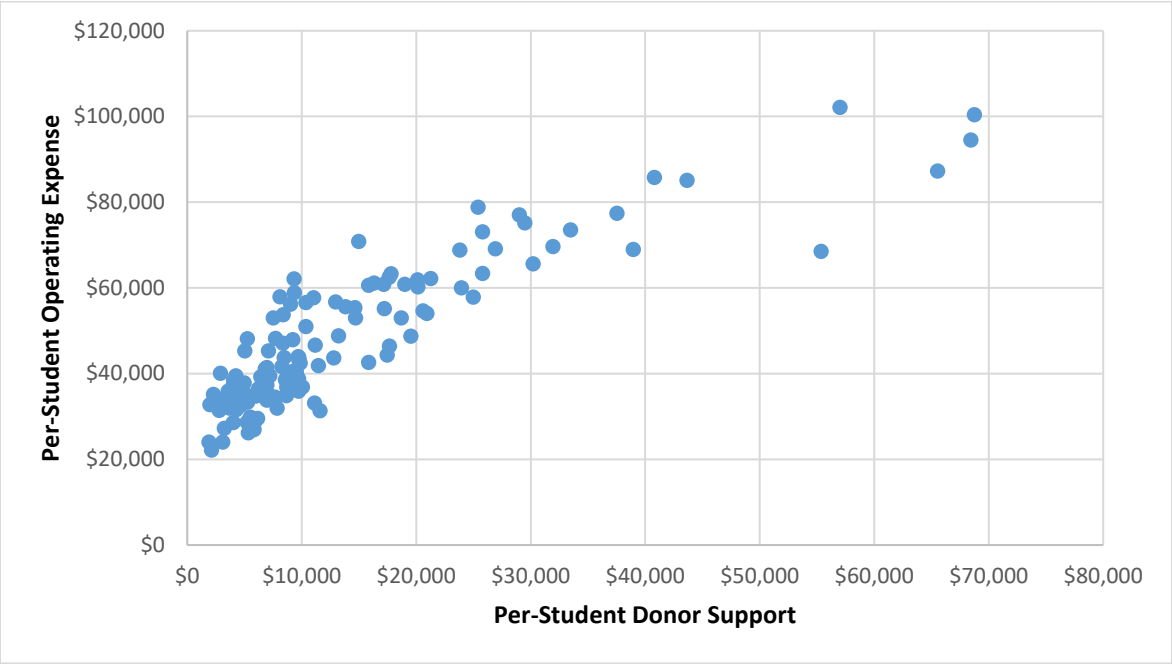
Figure 2
Per-Student Donor Support and Indices of Selectivity



It is also interesting to compare per-student donor support to per-student expenditures. As noted above, theoretically the schools with the greatest donor support could spend about the same as the schools with the least support, while charging much lower tuitions. But the data indicate that the per-student tuition revenue of the "rich" schools is similar to that of most other schools in the data set --- the rich schools use their donor support to spend much more per student than the other schools do. In fact, the correlation between my measure of per-student donor support and per-student operating expenditures is 0.87. Figure 3 presents a graphical representation of this relationship.

[11] Two colleges, for example, that had significantly higher indices of selectivity in 2015 than one would predict based only their levels of donor support are Barnard and Pitzer. Barnard is closely connected to Columbia University and Pitzer is part of the five-college Claremont Consortium which includes Pomona College, one of the wealthiest liberal arts colleges. These affiliations almost certainly make these colleges far more attractive to applicants than they would be as stand-alone colleges.

Figure 3
Donor Support per Student and Per-Student Expenditures



VI. Why Do the Colleges Offer Need-based Scholarships?

In the previous section, I explained how donor resources can "buy" prestige, but the explanation assumed that colleges charge the same tuition to all of their students. In reality, they do not. All of the colleges in my data set offer "need-based" scholarships to students from families that might be unable to pay the colleges' sticker prices.[12] In this section, I offer four rationales for this policy and I draw on these rationales to explain patterns across the schools in their use of the scholarships.

In examining need-based scholarships, my focus is only on the financial assistance provided by the colleges themselves, not that provided by any outside entities. From the perspective of the colleges, it makes no difference whether a student's family pays for the student's educa-

[12] There is little written about the history of need-based scholarships. Frederick Rudolf (p. 199, 1968) reports that Yale "…began in about 1830 to encourage the growth of charity or scholarship funds. To combat its reputation for wealth and snobbishness, Harvard, too, in 1852 launched a campaign for scholarship funds." But he provides no details on the extent of scholarships over time or their use by other colleges. Michael McPherson and Morton Schapiro (1998, pp. 107-8) include a brief discussion of need-based scholarships at a select group of private colleges and universities in the late 19th century.

tion or some outside provider of scholarships does. Either way, the school receives the same amount of money.

Colleges require students who apply for need-based financial aid to provide extensive family financial information. A school uses this to assess how much a family should be expected to pay. The school then offers admitted students a financial aid "package" that covers the gap, or part of the gap, between what the student can pay and the cost to attend the college. A typical package might consist of a scholarship (tuition discount), expected earnings from a campus job ("work study"), and expectations of loans the student can use for college.[13] Here, I focus on tuition discounts since the other two parts of the financial aid package have little effect on a college's finances.

As I noted earlier, the IPEDS data indicate the percentage of students with a tuition discount and the average value of that discount, but they do not distinguish between need-based discounts, merit-based discounts, and athletic scholarships.[14] To identify clearly the percentage of tuition discounts that are in the first two categories, I draw on data from the Common Data Set, which I discussed earlier. The CDS provides detailed information on tuition discounts, but only for entering first-year students. The IPEDS and CDS scholarship data, discussed below, are for students entering college in the fall of 2015.

One commonly cited indicator of a college's enrollment of students from lower-income families, that *is* in the IPEDS data, is the percentage of entering first-years with Pell grants. The federal government provides Pell Grants to students from low- and moderate-income households to help them pay for college. Students qualify for these grants based on their household incomes, the number of their siblings who are also in college, and other factors. In 2014, 75 percent of students with Pell Grants came from households with incomes of $40,000 or below and over 97 percent went to students from families with incomes under $70,000 (U.S. Department of Education, 2015). Foreign nationals, who are not permanent residents of the U.S., are not eligible for Pell grants, so a school might enroll a large percentage of lower-income foreign students and this would not be reflected in the Pell data.[15]

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[13] Phillip B. Levine (2014) provides a more detailed explanation of this process.

[14] An athletic scholarship requires a student to play a particular sport to receive the tuition discount. Only 14 of the 125 schools in my CDS data set provided athletic scholarships to entering students in 2015. Six of them offered more than 40 such scholarships: Furman (82 athletic scholarships), The College of Idaho (71), Davidson (63), University of Richmond (62), Lafayette (60), and Colgate (58).

[15] In the fall of 2015, across the colleges in my data set, the mean percentage of entering first year students who were "non-resident aliens" was 6.6 percent. The six schools with the highest percentages were Mount Holyoke (27%), Bryn Mawr (24%), Earlham (22%), Claremont McKenna (17%), Grinnell (15%), and Macalester (15%).

The second column of Table 5 shows the variation across the colleges in the percentage of entering students with Pell grants. The third column presents the percentage of entering first-year students with financial need, as determined by the colleges. This would include students from low-income families as well as, in many cases, students from upper-middle-income families who could not realistically be expected to pay $50,000 and more in annual tuition, room, and board. As suggested by the Table, the two indicators of the colleges' enrollments of low- and moderate-income students are highly correlated. In fact, the correlation coefficient is 0.82 for the 125 colleges in my data set.

Table 5
Indicators of Entering Students with Financial Need

Top 5 & Bottom 5 By Pell Grant	Percent Entering First-Years with Pell Grants (IPEDS)	Percent Entering First-Years with School-Determined Financial Need (CDS)
Spelman College	55	90.5%
Morehouse College	52	81.5%
Wells College	52	95.1%
Albright College	48	92.0%
Illinois College	47	87.4%
Mean	**23.1**	**65.3%**
Bates College	9	42.8%
Bucknell University	9	40.7%
Colby College	9	35.6%
Oberlin College	9	47.6%
Lafayette College	8	31.0%

Source: IPEDS and CDS

All the colleges in my data set offer need-based scholarships, but many of the schools do not provide aid packages that fully meet the assessed need of all their students. Some schools alter the components (grants versus loans) of an aid package, or the size of an aid package relative to a student's need, based on how much they want to attract a student. In addition, many of the colleges consider an applicant's financial need when making admissions decisions. Typically, "need-aware" colleges set limits on the percentage of students with financial need they will admit, but they commit to fully meet their entering students' assessed financial need. A minority of the schools have "need-blind" admissions policies, meaning that they admit U.S. students without regard to financial need and commit to fully meeting the need of all admitted students. Cynics note, however, that schools in this last category can still influence the percentage of low-

income students they enroll by tailoring their recruitment efforts to specific demographic categories and altering other admissions policies.[16]

Table 6 provides a snapshot of the need-based financial aid policies of the 5 schools with the highest percentage of entering students determined to have financial need and the 5 with the lowest percentages. As noted above, a typical financial aid package may include a scholarship (tuition discount), a campus job, and student-loan expectations. As shown in the Table, schools with the highest percentage of entering students with financial need often do not offer aid packages that fully meet the needs of those students. Schools with the lowest percentage of students with financial need generally do fully meet the needs of their entering students. In addition, the schools with high percentages of students with financial need offer smaller average need-based tuition discounts than do the schools with relatively small percentages of such students. Interestingly, as shown in the last column of the Table, since the comprehensive sticker prices of the former set of schools tend to be lower than the latter, the net amount that the average scholarship student is expected to pay using family resources, loans, and student employment is not so different across the two sets of schools.

[16] In 2006 Macalester College dropped its need-blind admissions policy in favor of a "need-aware" policy that admits a large share of the class on a need-blind basis but considers financial need for a final share. Since instituting the policy, the percentage of Macalester students receiving need-based scholarships has held fairly steady. The president of Macalester, Brian Rosenberg, argued that colleges' stated policies are less important than the results, "At the end of the day, the single most important thing is who you actually have on campus. If you have a need-blind policy, but three-quarters are full-pay students, are you really doing more to provide access than a situation that's need aware but has 80 percent to 90 percent of students who are receiving aid?" (*Inside Higher Ed*, July 7, 2016).

Table 6
Need-based Financial Aid for Entering Students

Top 5 & Bottom 5 By % with Need	Percent Entering First-Years with School-Determined Need	Percent Entering First-Years with Need Fully Met	Average Percentage of Student Need Met	Average Need-Based Scholarship (Tuition Discount)	Comprehensive Tuition, Fees, Room & Board	Gap to be Filled with Student Payment, Loans, & Work-Study
Wells College	95.1%	10.3%	82%	$29,886	$50,500	$20,614
Albright College	92.0%	8.9%	83%	$28,962	$50,620	$21,658
Spelman College	90.5%	8.6%	45%	$13,250	$38,751	$25,501
Centenary College of Louisiana	89.3%	12.8%	69%	$23,565	$46,250	$22,685
Alma College	89.0%	18.9%	72%	$24,110	$45,250	$21,140
Mean	**65.3%**	**52.6%**	**89.4%**	**$30,356**	**$54,307**	**$23,951**
Pitzer College	36.5%	100.0%	100%	$40,248	$63,880	$23,632
Colby College	35.6%	100.0%	100%	$44,014	$61,730	$17,716
Scripps College	35.3%	100.0%	100%	$37,042	$64,260	$27,218
Colgate University	34.4%	100.0%	100%	$43,023	$62,540	$19,517
Lafayette College	31.0%	90.5%	99%	$36,661	$61,680	$25,019

Source: CDS

Why, one might ask, do all the colleges offer need-based scholarships to a significant share of their students and, in some cases, to a large majority of their students? How could this be consistent with prestige-maximizing goals? A college's prestige is linked to the quality and quantity of its faculty, facilities, and extracurricular activities, and these factors are expensive. Enrolling students who pay a discounted tuition due to financial need forces a college to cut back on its spending relative to what it could spend if it were to replace these students with students paying full tuition.

One response to this puzzle is to argue that the colleges offer need-based scholarships because they are non-profit organizations with broad social missions that go beyond prestige-maximization. In the language of Gordon Winston (1999), non-profit colleges are more than "car dealers," they are also part "church." In their mission statements, liberal arts colleges often

claim that they "educate leaders from all backgrounds for society," they promote the "transformative power of education," and teach their students "to lead principled lives," or variations on such themes. The point is that they see themselves as doing more than just selling education for utilitarian purposes to those who can afford it, and they may be willing to trade off some prestige in the interest of broader social goals.

There is a second explanation for the prevalence of need-based scholarships that implies that such discounts may *not* come at the cost of prestige, and might even enhance prestige up to a point. The argument is that the general public believes that colleges have an obligation to ensure some minimally-acceptable percentage of students come from less-affluent households, and any school that does not meet this social expectation pays a cost in terms of its reputation.[17] If that cost is sufficiently high, even colleges that only care about prestige will strive to enroll an acceptable share of students with need-based scholarships. That is, if the share of need-based scholarship students at a college is below the socially acceptable threshold and if the reputational penalty is sufficiently steep, increasing the percentage of need-based scholarship students could enhance the college's prestige even if it forces reductions in per-student expenditures.

There is certainly evidence of pressure on colleges to enroll some minimally-acceptable threshold of less-affluent students. In most cases, this pressure takes the form of publicly admonishing schools that do not live up to someone's expectations in this regard, and lauding those that do. Since 2014, for example, the *New York Times* has published a "College Access Index" that ranks colleges according to their "commitment to economic diversity." The index is a weighted average of the share of entering students with Pell Grants, the graduation rate of those students, and the average prices that the colleges charge students from households making $30,000 to $75,000. Another example of this "name and shame" approach is a recent podcast by the popular social-science writer Malcolm Gladwell (2016) which was distributed over National Public Radio. In it, Gladwell drew an unfavorable contrast between the allegedly modest efforts of Bowdoin College to enroll need-based scholarship students and the more extensive efforts of Vassar College.

[17] In his article on the ethics of admissions, Ronald G. Ehrenberg (2017, p.2) claims that one reason private colleges and universities admit and provide financial aid to lower-income students is, "…because as nonprofits they are major beneficiaries of federal and state policies that reduce the federal and state income taxes that their donors pay and eliminate any taxation of their endowment earnings, provide exemptions for the institutions from paying property taxes on their buildings that are used for educational purposes, and allow them to borrow funds to construct educational facilities at lower tax-exempt interest rates. Because of all of these tax benefits, the public at large is subsidizing these institutions to the tunes of literally billions of dollars of lost tax revenue a year. The public's willingness to do so is presumably based upon the belief that the selective private academic institutions are yielding benefits to society as a whole." After this was written, the 2017 Tax Cuts and Jobs Act imposed a 1.4% tax on the endowment earnings of colleges and universities with more than 500 students and with endowments that exceed $500,000 per student.

To the extent that society pressures colleges to offer need-based scholarships, greater pressure is likely to be placed on colleges with significant donor support. Understandably, people find it more shameful for a college with a large per-student endowment to enroll fewer need-based scholarship students or provide stingier scholarships than one with modest donor support. Undoubtedly this is why the *New York Times* College Access Index reports each college's per-student endowment as well as the newspaper's measure of the college's commitment to lower-income students.

There is a third reason that colleges might use need-based scholarships to enroll less-affluent students. This reason is also consistent with the notion that colleges do so to enhance their prestige. The idea is that they can raise the average quality of their student body by displacing some full-pay students with need-based scholarship students. A hypothetical example illustrates the point.

Suppose, for simplicity, that half of the students in a region are from high-income (HI) families and half are from low-income (LI) families. Assume that the HI and LI students have roughly the same distributions in terms of the qualities that colleges desire. Both groups of students prefer the amenities that come with a high-spending college, but only the HI students can fully pay for these amenities. In this case, if a college must levy a uniform tuition, two colleges might serve the market. One would have a high tuition, high amenities, and HI students. The other would be a low-tuition low-amenity college serving LI students. If prestige depends on amenities in addition to student quality, the high-cost high-spending college would be more prestigious.

But what if the college that serves HI students announces that it will enroll LI students at a discounted tuition that attracts LI applicants? Given a pool of HI and LI applicants, suppose the college makes admissions decisions sequentially and begins by admitting the best HI applicants who pay the full tuition. As the school admits more and more HI students, it must begin to admit lower-quality HI students. At some point, the college may find that admitting a high-quality LI student, even at a lower tuition, does more for its prestige than would admitting a lower-quality HI student who pays the full tuition. This is because prestige comes from the quality of incoming students as well as college financial resources.

There are two implications of this third rationale for need-based scholarships. First, if it is the only motivation for enrolling LI students and the college trades off student quality with tuition revenue in its admissions decisions, the average quality of full-pay students in the college will be lower than the average quality of need-based scholarship students. Second, if a college has substantial donor support, the adverse effect on academic expenditures from enrolling scholarship students will be muted since tuition comprises a smaller share of the college's total revenue. In fact, a "rich" college might find it worthwhile to adopt a need-blind admissions policy to get the best students regardless of their ability to pay. Announcing such a policy could attract more low-income and high-income applicants, raising the average quality of entering students and the college's prestige. Low-income applicants would favor the college because it does not weigh their limited ability to pay in the admissions decision. High-income applicants, especially

the more gifted, might favor a college with such a policy due to the signaling effect --- people would assume that the college admitted them based on their merit, not their ability to pay.

If a college has no donor support, enrolling students at a discounted tuition means that part of the tuition payments of the full-pay students subsidizes the education of the scholarship students. Suppose, for example, that half the students in a college pay its $60,000 comprehensive sticker price and half receive scholarships and pay $30,000. In this case, if the college has no donor resources, it can spend $45,000 per student. The full-pay students are effectively subsidizing the scholarship students. They may be willing to do this if the scholarship students raise the perceived average quality of graduating students more than the constrained educational expenditures hurt it. That is, the full-pay students may be willing to pay $60,000 for $45,000 of educational services due to the signaling benefits. If there were no such benefits, they would prefer a school that excludes scholarship students and provides $60,000 of educational services for $60,000 in fees. This hypothetical example emphasizes that a college is able to make such internal transfers from full-pay students to scholarship students if the presence of the scholarship students brings sufficient benefits to the full-pay students. This constraint is relaxed in the case of a college with abundant donor resources. Such as school can enroll large percentages of scholarship students and still spend more on education services per student than even the full-pay students pay, effectively subsidizing even these students.[18]

How Does the Analysis Change for Less-Selective Colleges?

There is a fourth explanation for need-based scholarships that is also consistent with the notion that colleges set policies to maximize their prestige. This applies in the case where a school cannot fill all the seats it intends to fill with qualified students at the sticker price. I call such a college a "less-selective" college. In this case, selling some seats to lower-income students at a discount can provide revenue to improve the school's academic and extracurricular

[18] One might expect colleges that spend substantially more per student than their sticker prices to publicize this fact, and they do. On its website, for example, Williams College includes a link to a statement from its Provost, "We spend about $100,000 per year on every student. But the 'sticker' price --- what we charge for full tuition plus room and board --- totals a little more than $63,000." (https://magazine.williams.edu/2016/spring/feature/financial-aid-at-williams/, accessed 7/26/2017) Similarly, Amherst College states on its website, "It should be noted that the comprehensive fee covers only a portion of your educational expenses at Amherst. A year of education at the College actually costs approximately $99,000, but income from the endowment and from gifts and grants supplies the difference between that amount and the amount that students are charged." (https://www.amherst.edu/offices/financialaid/firstyear_transfer /costs amherst, accessed 7/26/2017). Not surprisingly, although more colleges in my data set have comprehensive sticker prices that exceed their per-student expenditures than the opposite case, I could find no example of a college that publicizes this fact about itself, i.e. that it makes a "profit" from full-pay students.

programs as long as the tuition paid by the scholarship students exceeds the marginal cost of educating them. This is likely to be true if the scholarship students don't require extreme discounts and if the school has unused physical space, such as empty dormitory rooms, empty classroom seats, and underutilized faculty and staff.

Prior to this point, I have not distinguished between a college's fixed and variable costs, but when enrollment falls below full-capacity it is essential to do so. A college's fixed expenses, which are associated with its installed capacity, include the expenses of essential personnel and facilities which cannot be cut as enrollment and tuition revenue falls. Other expenses, such as those for non-essential employees who do not have long-term contracts, can be cut in the short run if necessary, but doing so undermines the quality of a school's operations. Typical examples of such cuts include: maintenance of buildings and grounds; travel and coaches for sports teams; library acquisitions; dining facility hours of operation; support for student music, theater, and dance performances; student health counselors; and non-core courses and untenured faculty. Relatively small shortfalls in enrollments may force drastic cuts in such "discretionary" spending when fixed costs take a large share of the budget.

I argued earlier that a college's prestige is linked to its per-student expenditures because higher spending is reflected in the quality and quantity of the faculty and staff, academic and extracurricular programs, and facilities. But when a school is under-enrolled, per-student spending can be high simply because its fixed costs are high. Suppose a school is structured to accommodate 1,500 students but only enrolls 700. In this case, despite slashing discretionary spending, its costs per student may be very high because it can't cut its fixed costs, which are now spread across far fewer students. This school's high per-student expenditures do not reflect high-quality educational services. Rather, they reflect a deeply troubled college that can't cut costs to match declining enrollments. Thus, in the case of under-enrolled colleges, prestige is likely to be more closely associated with per-student variable (discretionary) expenditures than total per-student expenditures, for it is an increase in discretionary spending that signals an improvement from one year to the next in a college's academic programs and campus life.

When a college can't fill its seats with full-pay students, the college can gain revenue to enrich its academic and extracurricular programs if it fills the empty seats with students who pay a discounted tuition, assuming those students pay a tuition that exceeds the marginal cost of serving them. This marginal cost is likely to be far below the college's total per-student expenditure if much of the college's expenses are fixed costs and the college has significant spare capacity.

The colleges that are most likely to have trouble filling seats with qualified full-pay students will be those where per-student expenditure is well below the comprehensive sticker price, and where the full-pay students get little signaling benefit because the public does not perceive the average graduates of the college to be particularly high quality. From the perspective of full-pay students, these schools are not "good deals" and qualified full-pay students may go elsewhere. Thus, there can be a feedback effect when tuition-dependent colleges discount tuition for students with financial need. Doing so, forces a school to reduce per-student spending below the sticker price. If the gap becomes significant, this can make it difficult to attract full-pay students.

Rather than leave empty seats, the college may find it advantageous to fill them with more students paying discounted tuitions.

A hypothetical example illustrates this point. Suppose that a school has a $60,000 comprehensive sticker price, no donor resources, and no established reputation for producing high-quality graduates. It plans to admit half full-pay students and half need-based scholarship students who will pay $20,000. It expects to spend $40,000 per student. The problem is that it finds it cannot attract full-pay students who are willing to pay $60,000 for $40,000 of educational services.[19] But if it can fill the empty seats with other, less-needy, scholarship students who pay $30,000, the school could spend $25,000 per student.

If the school can't attract students who will pay $60,000 for $40,000 of educational services why would it be able to attract students who would pay $30,000 for $25,000 of educational services? First, between two students of similar quality, the one who can pay $60,000 will likely have more college choices than the one who can pay $30,000. Second, the implicit $5,000 transfer from the students paying $30,000 to those paying $20,000 is not glaringly large, and the school is unlikely to publicize its per-student spending. In fact, students could easily confuse the comprehensive sticker price ($60,000) for the value of the educational services they are buying. If so, all scholarship students, those paying $30,000 as well as those paying $20,000, will think that they are getting a good deal.

This hypothetical example answers one of my opening questions. How can some of the poorest schools afford to provide need-based scholarships to significantly larger percentages of their students than do schools with far greater donor resources? They can because they post comprehensive sticker prices that are notably higher than their per-student expenditures. They don't actually "lose" money enrolling a scholarship student who pays a discounted tuition unless that student pays less than what the school spends on the student's education.

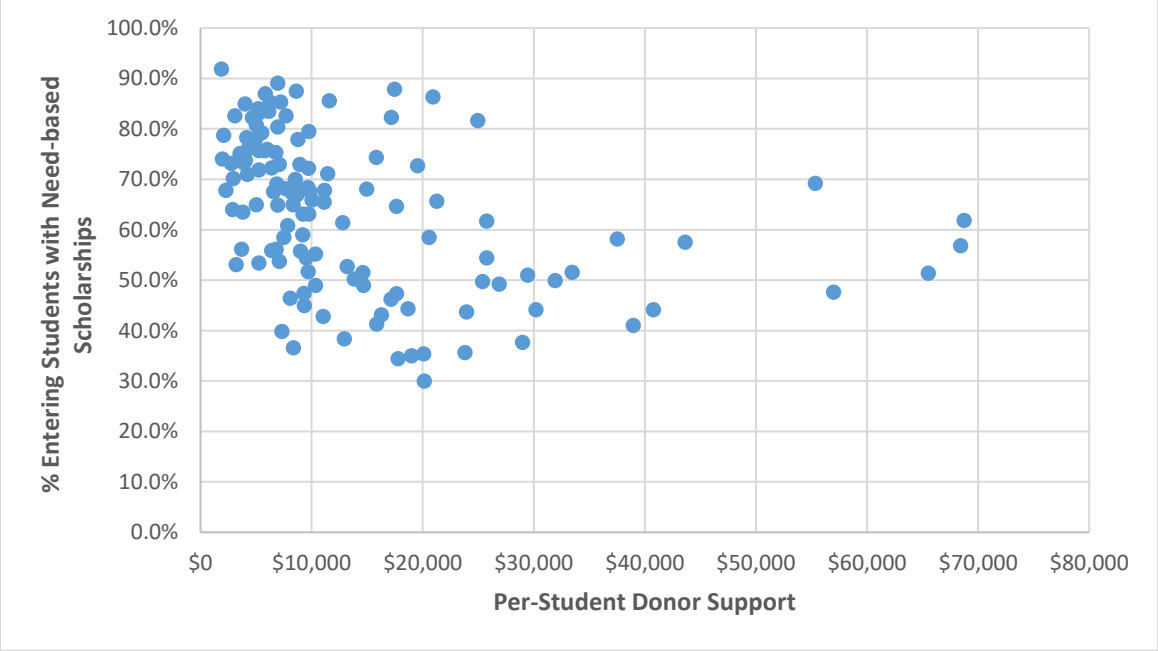
Of course, schools with low levels of donor support must raise sufficient revenue from tuition payments to provide reasonably strong educational programs. This can force such schools to offer tuition discounts that do not fully meet the needs of their less-affluent students. This is not a costless policy. The schools may lose the best applicants to other schools that offer more generous aid packages. They may enroll students who are distracted from their studies by financial pressures. But if a college desperately needs student revenue to maintain an adequate educational program, it may have to incur these costs.

[19] To be clear, people do not evaluate or choose among colleges based on the colleges' per-student expenditures. Most people have no idea what colleges spend, but the spending is reflected in the quality and quantity of the faculty, staff, facilities, and academic and extracurricular programs. In evaluating colleges on the basis of such characteristics, people are effectively evaluating them largely based on per-student expenditures.

Patterns in the Data and the Rationales for Need-based Scholarships

The patterns in the data are broadly consistent with these explanations for why colleges offer need-based scholarships. Figure 4 illustrates the relationship between the percentage of first-year students with need-based scholarships and my measure of per-student donor support. The "rich" schools, i.e. those with per-student donor support of $30,000 or more, provide need-based scholarships to between 40 and 70 percent of their entering students. The 40 percent lower bound on need-based scholarship students among the relatively rich colleges could reflect the notion that these colleges would incur substantial social opprobrium if they tried to enroll a smaller share of less-affluent students. It is also consistent with the idea that they can increase their reputation for high-quality graduates by devoting at least 40 percent of their seats to less-affluent students. Among the rich schools, however, there is no strong correlation between levels of donor support and the share of students with need-based scholarships. This may indicate that the values of colleges matter --- some schools simply place greater emphasis on reaching out to less-affluent students than others. Among the relatively poor colleges, those with per-student donor support below about $20,000, donor support is inversely related to the percentage of students with need-based scholarships. This is consistent with the hypothesis that these schools find it hard to attract full-pay applicants, and they fill seats with scholarship students. I do not show it with a graph, but almost all the schools with per-student donor support levels of $20,000 or more provide aid packages that fully meet the assessed needs of their students. This is not true for the schools with per-student donor support levels below $10,000. Typically, they provide aid packages that meet about 85% of their students' assessed needs.

Figure 4
Per-student Donor Support & Percentage Students with Need-based Scholarships



To illustrate how tuition-dependent colleges can afford to offer need-based scholarships to large percentages of their students, I compare colleges' comprehensive sticker prices to their per-student expenses. For simplicity, I call this gap the "sticker-price/spending gap," or "SPS gap" for short:

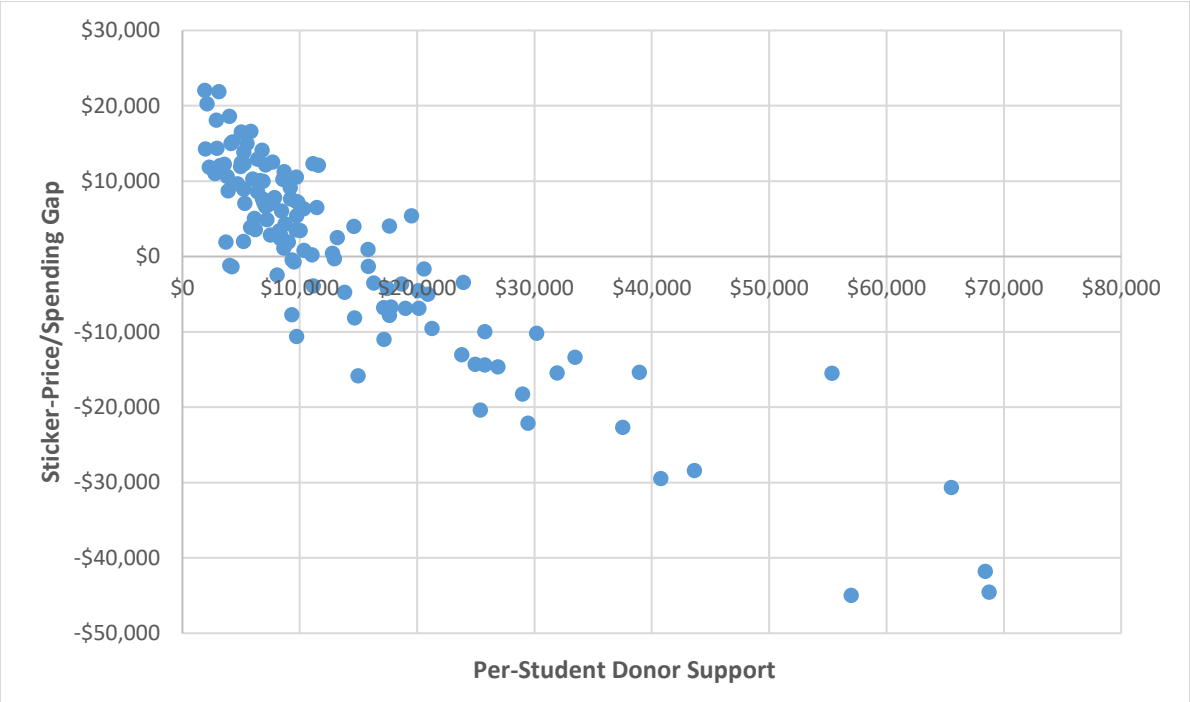
SPS gap = comprehensive sticker price – adjusted per-student operating expense

Since the comprehensive sticker price includes room and board in addition to tuition, in calculating the SPS gap I adjust colleges' per-student operating expenses to reflect what they would be if 100 percent of the students lived on campus.[20] In other words, the *adjusted* per-student operating expense is higher than a college's per-student operating expense to the extent that students live off campus. As show in Figure 5, colleges with high levels of donor support generally spend more per-student than they charge even their full-pay students. But colleges with relatively low levels of donor support generally spend less per student than they charge full-pay students. In this sense, a college with a positive SPS gap makes a "profit" when it enrolls a full-pay student since this student brings in more revenue than what the college spends per student.[21]

[20] In my data, the mean percentage of students living off campus is 13%, the minimum is 0%, and the maximum is 45%. To calculate the "adjusted" per-student operating expense, I divided a college's spending on "auxiliary enterprises," which is its spending in residence halls, food services, and college book stores, by the percentage of students living on campus. Using this number, I recalculated total operating expenses for each college.

[21] As discussed in Winston and Yen (1995), the true annual cost of replicating the colleges' services are certainly higher than their reported annual operating costs since their reported operating costs understate the costs of the colleges' facilities. Reported operating costs related to facilities include only maintenance costs, depreciation expenses, and the interest on the outstanding debt used to fund the construction or acquisition of the facilities. This excludes the opportunity cost of the net wealth tied up in a college's land and physical facilities.

Figure 5
Per-Student Donor Support & the Sticker-Price/Spending Gap



A positive SPS gap lowers the implicit cost of providing a need-based scholarship, or any other type of scholarship, to a student. Suppose a college has a $50,000 comprehensive sticker price and it spends $50,000 per student. If this college offers $20,000 scholarships to students with financial need, it will have to cut its spending or make other adjustments to balance its budget. But if the college has a $50,000 sticker price and spends $30,000 per student, it can offer $20,000 need-based scholarships to all enrolling students without cutting any operating expenses. This explains how many tuition-dependent colleges can afford to provide substantial need-based scholarships to large percentages of their students. These colleges tend to be those with sticker prices that exceed their per-student operating costs.

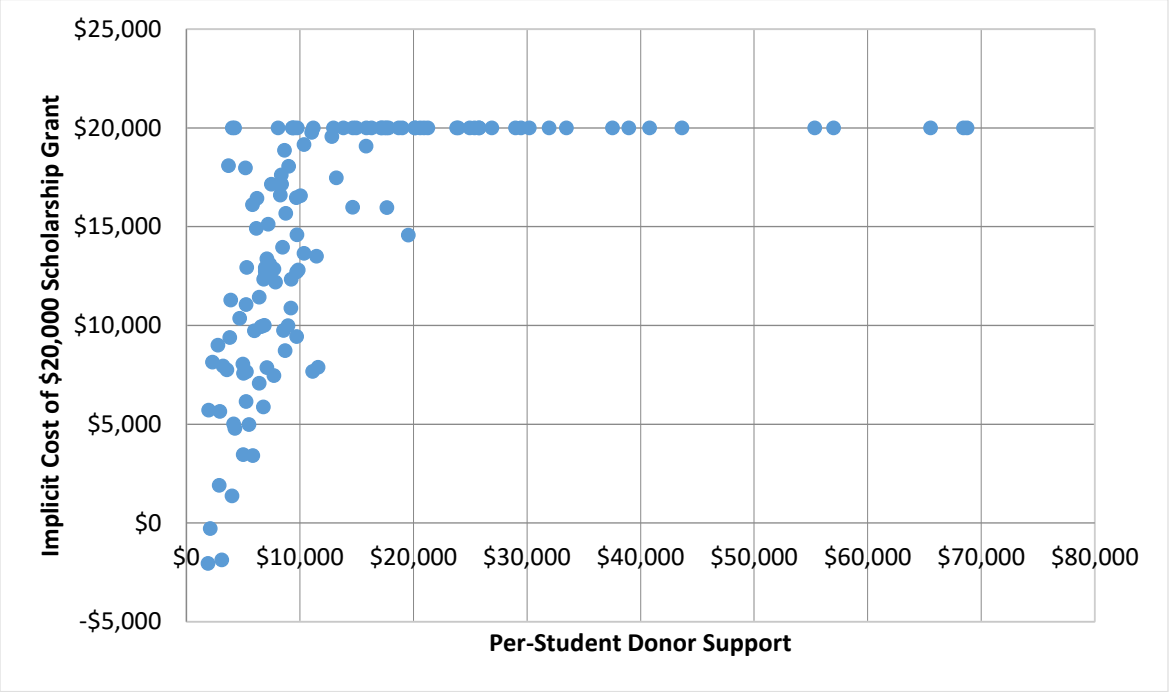
To reinforce this point, I define the implicit cost of a scholarship grant as the face value of the grant if the college's adjusted per-student operating cost equals or exceeds its comprehensive sticker price. But if the college posts a sticker price that exceeds its adjusted per-student operating cost (a positive SPS gap), the implicit scholarship cost is:

implicit scholarship cost = face value of scholarship grant – SPS gap

For example, if a college has a $50,000 comprehensive sticker price and spends $50,000 or more per student, the implicit cost of admitting a student with a $20,000 scholarship is $20,000. But if a college with a $50,000 sticker price spends $35,000 per-student, the implicit cost of providing a $20,000 scholarship is $5,000, since the scholarship student pays $30,000 for $35,000 of edu-

cational services. Using this definition, Figure 6 illustrates the relationship between the implicit cost to the colleges of providing a $20,000 need-based scholarship and their levels of per-student donor support. Most of the "poor" colleges can offer abundant need-based scholarships and still cover their operating costs because their sticker prices significantly exceed what they actually spend per student.

Figure 6
Per-Student Donor Support & Implicit Cost of $20,000 Scholarship Grant



VII. Why do Some, but not all, Selective Colleges Offer Merit Scholarships?

In addition to need-based scholarships, a large percentage of the colleges in my data set offer "merit" scholarships. These are tuition discounts for students with no demonstrated financial need, i.e. discounts offered to students who did not apply for financial aid or who applied, but were found not to need, financial aid.[22] Merit scholarships do not include athletic scholar-

[22] The distinction between need-based aid and merit aid is not always so clear cut. As noted earlier, for example, some schools alter the components (grants versus loans) of need-based aid packages, or the size of aid packages, based on how much they want particular students. There is a well-developed "enrollment management" industry that advises colleges and universities on how to optimize the design of their need-based and merit-aid policies. Charles T. Clotfelter (2017, pp. 154-163) describes typical enrollment management activities and Ronald G. Ehrenberg and Daniel R. Sherman (1984) provide an example of how these firms can use empirical models to optimize college aid policies.

ships, where an "athletic scholarship" is a price discount conditional on a student's participation in a specified team sport. That said, a school can decide almost anything qualifies a student for a merit discount: high scores on standardized tests, good grades in high school, the student's contribution to the racial or ethnic diversity of the school, the student's artistic or athletic abilities, etc. In this section, I explain how selective colleges, i.e. those colleges that could fill their seats with qualified full-pay students, can use merit scholarships to raise their prestige. Before doing so, however, I present an overview of the patterns in the data related to merit scholarships.

Table 7 illustrates a basic initial point --- not all schools have merit scholarships. In fact, the CDS data indicate that 13 of the 125 liberal arts colleges gave no merit scholarships in 2015. Another 9 provided very few or offered only very modest merit scholarships. As indicated in the fourth column of the table, the colleges that offer no, or insignificant, merit discounts tend to be more selective than average. Recall that the average index of selectivity across all 125 colleges is 36.

Table 7
Schools with No, or Insignificant, Merit Scholarships

	Percent Entering First-Years with Merit Scholarships	Average Amount of Merit Discount	Index of Selectivity
Amherst College	0.0%	$0	62.5
Barnard College	0.0%	$0	64.5
Bates College	0.0%	$0	60.0
Colgate University	0.0%	$0	52.5
Connecticut College	0.0%	$0	41.5
Hamilton College	0.0%	$0	55.0
Haverford College	0.0%	$0	58.0
Pomona College	0.0%	$0	69.0
Reed College	0.0%	$0	43.5
Spelman College	0.0%	$0	37.5
Vassar College	0.0%	$0	54.0
Wellesley College	0.0%	$0	56.5
Williams College	0.0%	$0	63.5
Colby College	0.4%	$500	53.5
Skidmore College	0.4%	$14,000	43.0
Franklin and Marshall College	0.7%	$2,375	47.0
Wesleyan University	0.8%	$48,282	56.5
Swarthmore College	1.0%	$45,700	65.0
College of the Holy Cross	1.2%	$45,080	46.5
Bard College	1.3%	$20,071	44.0
Pitzer College	2.3%	$5,000	67.0
Bowdoin College	2.6%	$1,000	67.5

Source: CDS

Although many of the most selective colleges do not have merit scholarships, some do. In fact, 12 of the 30 liberal arts schools with the highest indices of selectivity in the data set provide merit scholarships with average values of $10,000 or more to five percent or more of their entering students. But, as I discuss below, selective colleges use merit scholarships to increase their enrollments ("yield") of especially desired students. The fact that some schools with high indices of selectivity use merit scholarships could be an indication that the scholarships achieve their intended purpose. After all, a college's admissions yield is one of two components in my index of selectivity.[23]

Many colleges in the data make extensive use of merit scholarships. In fact, of the 125 colleges, 87 provide merit-based tuition discounts to ten percent or more of their entering students. Table 8 provides an overview of the use of merit-based and need-based tuition discounts for the ten colleges with the highest percentage of entering students with merit-based scholarships. Two points stand out. First, merit-based discounts can be quite significant both in terms of the percentage of students receiving them and in the magnitude of the tuition discount. Second, in nearly all cases, merit-based tuition discounts, whether measured by the percentage of the entering class receiving them or the average value of the discount, are notably smaller than need-based discounts.

Table 8
Colleges with the Highest Percentages Students Receiving Merit-Based Discounts

Top 10	% First-years with Merit-Based Scholarship	Average Merit Discount	% First-years with Need-Based Scholarship	Average Need-Based Grant
University of Puget Sound	42.1%	$13,755	56.1%	$24,168
Birmingham Southern College	40.6%	$21,525	39.8%	$6,901
Rhodes College	40.0%	$19,113	51.7%	$26,578
Denison University	39.9%	$22,114	58.4%	$36,053
Furman University	37.0%	$16,441	52.7%	$33,708
Illinois Wesleyan University	36.9%	$16,566	63.1%	$25,346
Centre College	35.5%	$18,619	61.4%	$27,338
The College of Wooster	35.3%	$21,747	63.1%	$30,163
Oberlin College	34.9%	$13,380	47.3%	$32,992
Southwestern University	34.0%	$19,801	65.4%	$27,629

Source: CDS

[23] Recall that the index of selectivity = (percent applicants rejected + yield)/2.

Finally, I have argued that many of the differences across the colleges are associated with differences in their levels of per-student donor support. Although I do not show it with a graph, merit aid is no exception. Only a small share of schools with donor support levels of $20,000 or more provide merit aid to more than ten percent of their students. A strong majority of those with donor support levels below $10,000 do, and many of these provide merit scholarships to 25% or more of their entering students.

With this background, it is time to ask: Why do colleges offer merit-based scholarships? The explanations I offer for their use are identical to two of those I offered in the case of need-based scholarships --- selective colleges offer merit scholarships to raise the average quality of their student body and less-selective colleges often use them to fill empty seats. Unlike the case of need-based scholarships, the colleges' broader social missions do not call on them to offer merit scholarships nor do social expectations pressure them to do so. [24]

Selective colleges, i.e. those that could fill their seats with reasonably qualified full-pay students, offer merit scholarships to students they would most like to attract and who they believe would be unlikely to enroll without the tuition discount. [25] The goal is to raise the yield among the admitted students in this category and increase the average quality of entering students, increasing the prestige of the school.[26] The downside to admitting a student with a merit scholarship in place of a full-pay student is that it reduces a school's revenue and forces it to cut spending, which is reflected in the quality or quantity of academic and extracurricular offerings, adversely affecting the college's prestige. A student with a merit scholarship could also replace

[24] In his recent book on how colleges and universities are affect by, and contribute to, socioeconomic inequities, Charles T. Clotfelter writes (2017, p. 163), "When … scholarships were calculated as a function of financial need, their use could arise out of either self-interest or charity, but in either case there could be little objection to the practice. However, when such price discrimination took the form of merit scholarships … there is little that is inherently virtuous in it."

[25] Rather than attracting high-merit students with tuition discounts, a college could offer above-normal amenities and education services to capture these students. A college could, for example, offer the students access to exclusive small seminars, field trips to research sites, prestigious internships, or rooms in special dormitories. Some colleges and universities take this approach, creating an "honors" program for selected students, and some offer both merit discounts and access to special amenities or educational services.

[26] The use of merit scholarships has grown dramatically since the 1980s. Undoubtedly this is partly due to the decline in transportation and communication costs over the past 50 years that led students, who previously would have attended a local college, to consider more distant colleges. Caroline M. Hoxby (2009) discusses how a nationally competitive market among colleges and universities for the best students evolved since the 1950s and how this affected the allocation of these students across higher education institutions.

a student with a need-based scholarship. In this case, there may be no adverse financial effect --- it depends on the relative tuition discounts. But the college could pay a reputational price if it creates a public perception that the college is not making an adequate effort to enroll less-affluent students. Clearly, these countervailing effects need to be balanced just as they were in the case of a college deciding whether to admit a high-quality, need-based scholarship student.

There is, however, a second cost to using merit scholarships that is presumably muted in the case of need-based scholarships. This is the risk of creating resentment among full-pay students who do not receive the discount.[27] Student resentment can undermine a school's efforts to attract good students in the future and can become a financial cost if the parents of resentful full-pay students refuse to make gifts to the school or if these students graduate as bitter alumni who refuse to make gifts in the future. Presumably, resentment is less likely to be a factor in the case of need-based scholarships because of broad social support for the notion that schools should enroll at least a minimally acceptable share of students from low- and moderate-income households. Moreover, assessments of financial need are based on extensive documentation and are somewhat standardized. Merit scholarships are more controversial, especially when the distinguishing characteristics between someone receiving the discount and someone who does not are minor or highly subjective. I may, for example, accept that my roommate receives a merit scholarship while I do not if I had been a "C" student in high school with mediocre SAT scores while he had been an "A" student and National Merit Scholar. But I might well feel resentment if I had been a "B+" student and he an "A-" student taking different classes in a different high school, or his merit scholarship is based on what I view to be somewhat dubious leadership skills.

A natural question to ask is: Do merit scholarships actually increase the admissions yield for the targeted students? The only reliable way to answer this question is with experimental methods. Amazingly, at least one college conducted such an experiment and the economist James Monks (2009) reported the results. In the fall of 2005, an unnamed "highly selective" college with about 3,000 students in the mid-Atlantic region, that had previously not had merit scholarships, began to offer a $7,000 merit scholarship. At the time, its comprehensive sticker price for entering first-years students was $40,510. To assess the effectiveness of the scholarship, the college offered the tuition discount to 224 randomly chosen students from among 538 of the highest-rated applicants who applied "regular decision." The other 314 top-rated applicants received no discount offer and comprised the control group. The yield for the merit scholarship group was 7.1% and the yield for the control group was 3.2%. The difference (3.9%) was statistically significant at a 5% level. In this sense, the merit scholarship worked to attract targeted students who would not have enrolled without the tuition discount.[28]

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[27] Schools do not usually reveal what students pay to attend. But students do talk among themselves. There are also websites where such information can be exchanged.

[28] Of course, a larger or differently-structured merit scholarship might have a bigger effect. In fact, Robert Avery and Caroline Hoxby (2004) found in their non-experimental study that students are more likely to be enticed to enroll if a scholarship has a name attached to it, such as the

But was the merit scholarship effective on a cost/benefit basis? Sixteen students enrolled with the discount but, based on the control group yield, about seven of these students would have enrolled anyway. The estimated net increment in highly-ranked students is nine students. The cost in lost tuition revenue was $112,000 (16 x $7,000) per year over four years, assuming all 16 students retained the scholarships for four years and their enrollments displaced other students who would have paid the school's comprehensive sticker price. It is impossible to say whether getting nine additional students with high merit has enough of a positive effect on student quality or school prestige to be worth this cost. There is also no way to calculate the possible resentment costs that might be associated with the policy.

Why don't all schools use merit discounts?

As noted earlier, almost 20 percent of the colleges in my data set have no, or insignificant, merit scholarships. Clearly, these schools believe that, for them, the costs associated with offering merit scholarships exceed the gain.[29] Most of these colleges are among the more selective, meaning that they have substantial excess demand for available seats and generally enroll high quality students. Thus, the gap in quality between the students they enroll and those students whom they would like to enroll, but who choose other schools, is likely to be small. Such a small gap implies that the gain in student quality from employing merit scholarships would be small and the resentment costs associated with offering discounts based on small distinctions in student characteristics could loom large. These schools might understandably decide that they would receive no net benefit from such scholarships. Merit scholarships may be an effective prestige-raising tool for somewhat less selective schools but not for the most selective.

If the most selective schools are less likely to offer merit scholarships, this also explains why colleges with generous donor support are less likely to offer merit scholarships. As noted above, donor resources are highly correlated with selectivity. But a few of the richest schools do provide merit scholarships. This should not be surprising. A college might have significant donor resources yet struggle to attract strong students due to an undesirable location, or some other

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John P. Caskey Merit Scholarship. They also found, not surprisingly, that students from high income families are less likely to respond to price discounts than other students.

[29] An alternative explanation is that a select group of colleges have reached an implicit agreement among themselves not to compete for students by using merit scholarships, i.e. they engage in implicit collusion. I do not, however, find this explanation convincing due to the difficulty of maintaining such collusion among numerous colleges, which would include the private universities that compete for students with the selective liberal arts colleges and which also do not offer merit scholarships. Appendix III provides background on a 1990s charge by the U.S. Justice Department that some colleges and universities were colluding around need-based scholarship offers.

factor. Tuition discounting to attract high-merit students by such a college has little downside other than possible resentment costs. The discounting reduces tuition revenue, but this has a modest effect on a college with abundant donor resources.

Why not a merit surcharge?

A natural question to ask is: If schools give tuition discounts to high-merit students why not apply a surcharge to low-merit students? A highly selective school could, for example, set aside five seats in its entering class for students who would normally not be accepted. The school would set lower admissions standards for these places and add a surcharge to the tuition for applicants. The rationale for such a policy is exactly the same as the rationale for merit-based discounts. The students who enroll via this policy would lower the average quality of the student body and the school's prestige but, at the same time, the additional revenue they supply would allow the school to increase its per-student spending, strengthening its academic program and prestige. The school could balance these effects to arrive at the optimum number of seats to set aside for low-merit students and the optimum surcharge to apply.

Why don't schools have such a policy? One answer is that if a school were to announce such a policy it could taint all of the students in the school. A low-merit student is more likely to pay the surcharge if he or she cannot be identified as having done so. But this means that employers and graduate schools might suspect any graduate of the college as having simply bought his or her admission. A second answer is that schools *do* have such a policy, but it is sufficiently subtle as to be mostly overlooked. First, if a college offers need-based discounts to 60 percent of its students and merit discounts to another 30 percent, one could view the ten percent that receive no discount as paying a low-merit surcharge. Second, it is commonly charged that the fund-raising offices of most of the selective colleges communicate with the admissions offices, and they flag applicants from families that have given significant amounts of money to the school or are in a position to do so in the future. Admissions standards for such applicants, it is said, are lower than those for traditional applicants (Golden, 2006). But any school that has such a policy does not publicize it, so no outsider can know how many students gain entrance via this channel, the size of the typical surcharge, or the degree to which colleges relax their traditional admissions standards.

VIII. Use of Merit Scholarships by Less-Selective Colleges

Many less-selective colleges use merit scholarships to fill seats that they cannot "sell" to qualified full-pay students. As in the case of need-based scholarships, a college's sticker-price/spending gap (SPS gap = comprehensive sticker price - adjusted per-student operating expense) is a good indicator of whether a school is likely to have trouble filling seats with full-pay students. I reiterate, however, a previous warning: other college attributes, such as a reputation for attracting good students, an attractive location, or a close affiliation with other good colleges, can offset the adverse effect of a large SPS gap.

Before developing these points, it is helpful to review some basic data on the five schools with the highest SPS gaps and the five with the lowest, and their use of merit scholarships.

These data are presented in Table 9. As shown in the Table, four of the five schools with the highest SPS gaps provide merit discounts to more than ten percent of their entering students. More strikingly, as shown in the last column, four of the five colleges with the largest SPS gaps provide either need-based or merit tuition discounts to nearly all their entering students. In the case of the five colleges with the smallest SPS gaps, they spend more per student than they charge even their full-pay students and they offer significant merit scholarships to none, or very few, of their students. Of course, it is these schools' relatively abundant donor resources that enable them to spend more per student than their comprehensive sticker prices while, at the same time, providing need-based tuition discounts to about half their students.

Table 9
Colleges with the Highest and Lowest Sticker-Price/Spending Gaps

Colleges with the 5 Highest & 5 Lowest SPS Gaps	SPS Gap: Sticker Price – Adjusted Per-Student Operating Expense	Percentage First-Years with Merit Scholarships	Average Merit Tuition Discount	% First-Years with Merit or Need-Based Scholarship
Moravian College	$26,189	12%	$16,214	95%
Albright College	$26,011	4%	$14,354	96%
Oglethorpe University	$23,687	19%	$20,818	97%
Hampshire College	$21,664	24%	$12,719	88%
Willamette College	$20,685	32%	$19,565	97%
Mean	**$4,617**	**17%**	**$15,576**	**81%**
Bowdoin College	-$25,928	3%	$1,000	47%
Swarthmore College	-$27,099	1%	$45,700	52%
Pomona College	-$36,667	0%	$0	57%
Amherst College	-$39,497	0%	$0	62%
Williams College	-$40,561	0%	$0	48%

Source: IPEDS and CDS

As explained above, a college can benefit if it fills empty seats with students who pay discounted tuitions, as long as the students pay more than the marginal cost of educating them.[30] This applies for students with merit scholarships as well as need-based scholarships. This explains why many less-selective colleges make extensive use of merit scholarships. If a school has empty seats and tries to fill them only with students with need-based scholarships, it is ignor-

[30] A college may also be able to fill empty seats by relaxing its usual admissions criterion for full-pay students, but this also has a cost since it lowers the average student quality and the associated prestige. Colleges will consider this trade-off in setting admissions standards, just as they consider trade-offs in the use of tuition discounts.

ing a large potential source of demand --- students who don't have financial need but who might enroll if offered a merit discount. Thus, merit scholarships enable an under-enrolled college to reach a wider range of students who might fill its seats, and it can likely enroll higher quality students on average than it would if it focused only on students with financial need. Moreover, as was suggested in Table 8, colleges' merit discounts are commonly smaller than their need-based discounts. For tuition-dependent institutions, filling a seat with a student receiving a $15,000 merit discount may be preferable to filling it with a student with a $30,000 need-based discount.

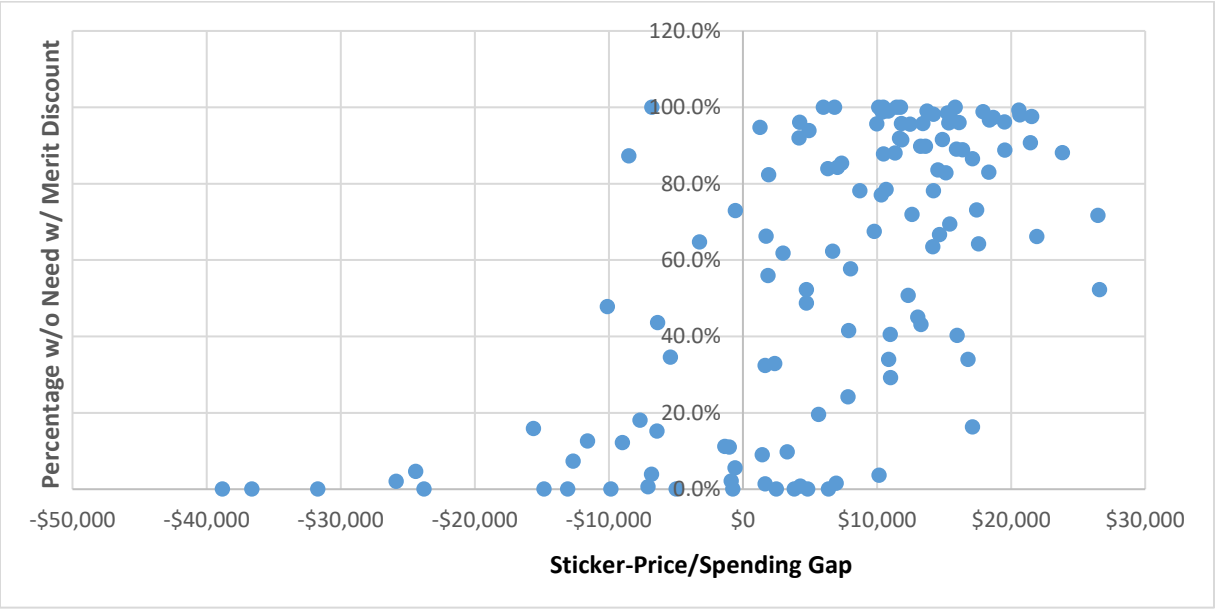
Colleges with large SPS gaps can provide merit scholarships at no effective cost to themselves. In fact, they can gain financially from filling seats with students on merit scholarships. Consider a hypothetical college that posts a $55,000 sticker price but cannot "sell" seats to qualified students at this this price. Suppose it fills most seats with need-based scholarship students who pay $20,000 to $30,000, enabling the college to spend $25,000 per student. If it can fill the remaining empty seats with students receiving $15,000 merit scholarships (they pay $40,000), this would enable the school to increase its per-student spending, enriching its academic and extracurricular programs. There is only a cost to filling a seat with a student on a merit scholarship if the student displaces a full-pay student or pays less than the school's marginal cost of educating that student.

This seat-filling rationale for the use of merit scholarships does not require the merit scholars to be higher quality than other enrolled students for the colleges to benefit. In fact, colleges may have an incentive to offer merit discounts to students who are not particularly meritorious. If a college facing financial pressures due to empty seats restricts its merit scholarship offers to its very best applicants, it might not fill the seats. The strongest applicants are likely to have the best outside opportunities and be least likely to be attracted by a scholarship offer. Almost inevitably, a college using merit scholarships to fill a significant number of empty seats will offer these scholarships to students who are not too different from its other students. If so, it may find it advantageous to offer merit scholarships to all students who do not have need-based scholarships. When only a small share of students pays the sticker price and they are not notably different from other students with merit discounts, a college may find itself defending an obviously capricious pricing system that creates substantial student resentment. One way to prevent this is to offer a standard merit discount to all accepted applicants who do not have need-based discounts. If a few applicants have patently higher levels of merit, the college can quietly offer them more generous merit scholarships than it offers typical students.

This account fits the patterns in the data. In the fall of 2015, 37 of the 125 schools in my data set provided tuition discounts to 98 percent or more of entering students. In effect, these colleges provided merit scholarships to any student who did not receive a need-based scholarship. The schools that made such extensive use of tuition discounts were disproportionately those with large sticker-price/spending gaps. Colleges in this category generally have relatively little donor support and enroll reasonably high percentages of students with need-based scholarships. This creates a sticker-price/spending (SPS) gap. As shown in Figure 7, colleges that provide merit scholarships to high percentages of their students who do not have need-based schol-

arships tend to have positive SPS gaps, often $10,000 or more. In examining Figure 7, however, keep in mind that just as a SPS gap can lead a college to offer merit scholarships, so too can merit scholarships create a SPS gap. For colleges that do not have endowment earnings and alumni gifts to make up the for lost tuition revenue, the more students who pay discounted tuitions, the greater must be the gap between the colleges' sticker prices and their per-student spending levels. This is just a restatement of the feedback effect discussed earlier. As a college with modest donor support provides more need-based or merit discounts, its per-student spending will fall below its sticker price. This makes it more difficult to attract students paying the sticker price, pressuring the college to fill empty seats with students who also pay a discount.

Figure 7
Percentage Students w/o Need-Based Scholarships Who Have Merit Scholarships Versus Sticker-Price/Spending Gap



Why Don't Colleges Cut Sticker Prices Rather than Offer Tuition Discounts to All?

As noted above, in nearly one-third of the colleges in my data set, almost no entering students pay the sticker price due to the near universal prevalence of need-based and merit scholarships. One naturally wonders: Why don't these schools simply lower the sticker price rather than provide so many tuition discounts? [31] The rationale is almost certainly a mixture of three

[31] In the fall of 2015, Rosemont College and Utica College, both small liberal arts colleges that are not in my data set, announced that they would significantly reduce their sticker prices and curtail student discounts. In Rosemont's case, it announced that it would cut its posted tuition

issues. First, students who are admitted to a college and notified that they qualify for a scholarship may feel wanted or honored, and they may think that they are "getting a good deal" since they are paying less than the sticker price. This could well increase the chances that they will enroll in that school. The students with merit scholarships may never realize that all admitted students without financial need were offered a similar discount and, even if they do discover this fact, they will likely discover it only after they are enrolled and on campus. Second, student applicants and others may take a school's sticker price as a signal of quality --- what is often called the "Chivas Regal" effect. Finding data on what students actually pay to attend a college and what a school spends per student takes some searching and sophistication, but colleges' sticker prices are readily available. Were a school to cut its sticker price significantly below the posted prices of the schools it competes with, or aspires to compete with, people might assume that its educational services are inferior. Third, the lack of transparency in what students pay to attend a college can give the college more pricing flexibility. Beyond giving colleges the ability to discount tuition based on how much they want particular students, it enables colleges to change tuitions from year to year without changing sticker prices. A college could, for example, raise the effective tuition from the previous year without changing the sticker price by reducing the average value of the tuition discounts it provides.

The downside to maintaining a sticker price that no one pays is that potential students may think that the sticker price is the true cost of attending and be discouraged from applying. In fact, a December 2011 survey of 1,461 college-bound students found that slightly more than half the students ruled out some college options based on the colleges' sticker prices (Hesel and Meade, 2012).[32] Clearly schools must trade off the potential for artificially high sticker prices to discourage applications against the potential benefits from a policy of extensive tuition discounting.

Do Merit Scholarships Come at the Cost of Need-based Scholarships?

Critics of merit scholarships, such as Stephen Burd (2014), argue that merit scholarships give price discounts to students with no financial need who are almost certain to attend some college. By discounting tuition for these students, Burd charges that the colleges can offer fewer or less generous scholarships to students unable to pay the sticker price. This may prevent many

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from $31,520 in 2015 to $18,500 in 2016, noting that the vast majority of its students did not pay the sticker price (http://money.cnn.com/2015/09/16/pf/college/rosemont-college-tuition-cut/).

[32] Since the fall of 2011, a federal law has required colleges receiving any federal funding to provide on their websites a net price calculator related to need-based financial aid. A student enters basic financial information about his or her family and the calculator provides an estimate of how much the school will actually charge that student to attend (Levine, 2014). For students without financial need, some school calculators include estimates with likely merit scholarships, but others do not.

such students from attending college at all, or leave them saddled with heavy student-loan burdens.

The charge that merit scholarships diminish the number and amount of need-based scholarships has a logical foundation. Suppose a college needs $50 million in revenue to operate at its desired scale and quality. If it could fill all its seats with full-pay students, it would obtain $60 million in revenue. This allows the college to reduce tuition for students from lower-income families by up to $10 million. But if it cuts tuition by $5 million for high-merit students without financial need, it could offer only $5 million in need-based scholarships.

There are, however, three important qualifications to this logic. First, a college that loses tuition revenue because it offers merit-based tuition discounts could respond by cutting its operating costs rather than reducing the number or size of need-based scholarships. How the colleges respond is an empirical question. Existing studies (Griffith, 2011, and Ehrenberg et al, 2006) find that merit scholarships are associated with some reduction in need-based scholarships, but they are far from definitive due to data limitations and methodological issues.[33] Second, when a less-selective college uses merit scholarships to fill empty seats, this can increase the college's revenue. This strengthens the colleges' educational programs and enables them to offer even deeper discounts to students from low-income households. Third, as noted above, many of the schools that offer extensive merit scholarships do so because their sticker prices substantially exceed what they spend per student. It is effectively costless for these schools to offer modest tuition discounts, whether for merit or financial need. Were these schools to reduce their sticker prices and eliminate merit scholarships, this would make almost no substantive change, other than pricing transparency. A hypothetical example clarifies this point. Suppose a school posts a $50,000 sticker price but spends $35,000 per student. Half of its students have $20,000 need-based scholarships and half have $10,000 merit scholarships, meaning that the students with financial need pay $30,000 for $35,000 of education and the students with merit scholarships pay $40,000. The college could cut its sticker price to $40,000, eliminate all merit scholarships, and cut its need-based scholarships to $10,000. Assuming it attracts the same cohort of students as it did previously, nothing would have changed. Under the new policy, students with financial need would pay $30,000 for $35,000 of education and the students without financial need would pay $40,000.

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[33] Amanda Griffith (2011) studies the effects of merit aid on the characteristics of the student body, school tuition, and school spending using data from 133 private colleges and universities from 1987-2005. None of these schools offered merit aid in 1987 but, by 2005, 93 of them had begun to do so. One of the strengths of her study is that she allows for the effects of merit aid to differ by the selectivity of the school. But a major limitation of her data is that she only has a binary variable to indicate the presence of merit aid, and no measure of the extent of merit aid. In addition, she does not control for the gap between the sticker price and per-student expenditures. Ronald G. Ehrenberg et al (2006) examine the effects of merit aid on the enrollment of Pell Grant recipients using data on tuition discounts for National Merit Scholars. This is interesting, but school-funded national merit scholarships are only a small subset of merit aid. In addition, this study does not allow the effects to vary by school selectivity or the gap between their sticker prices and per-student spending.

The bottom line is clear. The effect of merit scholarships on college spending and need-based scholarships is likely to differ across schools. In some schools, they might crowd out need-based scholarships or lead to more restrained operating expenditures. In other schools, they may enhance operating expenditures and need-based scholarships. And, in a third set of schools, they may have no effect on school spending or need-based scholarships. Empirically assessing the effect of merit scholarships for a diverse set of schools would be challenging.

IX. Conclusion

The business practices of private not-for-profit liberal arts colleges would strike many outside observers as peculiar. Why don't the colleges raise their prices when they have excess demand and need additional revenue to strengthen their academic programs? Why do they offer tuition discounts to some students? Why do some colleges offer tuition discounts to all of their students? In this paper, I have argued that these practices make sense if we assume that the colleges are trying to maximize their prestige, which is tied to the quality of the students they enroll and their per-student expenditures. I certainly would not argue that colleges have no goals other than prestige maximization. All colleges have their own histories and institutional values, and these lead them to undertake some initiatives without considering the impact on prestige. But if one seeks a theoretical framework that explains a wide range of colleges' core business practices, the prestige–maximization approach is compelling.

In my effort to illustrate how the business practices of liberal arts colleges fit into the prestige-maximization framework, I naturally omitted a range of details. For example, I portrayed colleges as setting their tuition policies to attract sufficient numbers of desirable students. They do this, but they also engage in extensive marketing efforts and can alter the content of their educational programs to attract students. In other words, they certainly have more tools at their disposal than just pricing policies. To facilitate the presentation of the theoretical framework, I also made clear distinctions that are not always clear in practice. I distinguished, for example, between need-based and merit scholarships when, in fact, schools often include a merit component to their need-based aid packages. I also distinguished between schools that use merit aid and need-based aid to enroll particular types of students versus those that use them to fill empty seats. In reality, some schools use them for both purposes at the same time.

In explaining the behavior of the colleges, I frequently noted the role of information imperfections and signaling. Recall two examples. College applicants care about a college's reputation for producing high-quality graduates because, if they attend and graduate from a college with such a reputation, people will initially assume that they too are high-quality graduates. A college may post a tuition that is higher than any of its students pay because people assume that a higher sticker price signals a higher quality education. I also argued that two different, but related, characteristics of colleges explain much of the differences in their policies. The first is a difference in donor resources, i.e. endowments and gifts to the colleges. The second is the gap between the comprehensive sticker prices of the colleges and their per-student expenditures. The former difference has been widely noted by other authors. The second has received far less attention, but it is especially important in explaining the policies of many less-selective colleges.

Some readers might be struck, as I am, that popular college guidebooks and guidance websites do not include data on colleges' per-student spending. This is odd. One would think that in comparing two colleges with similar sizes and missions, potential students would want to know how much the colleges spend on their students' education and supporting amenities. Notable differences in per-student expenditures are almost inevitably reflected in the quality and breadth of colleges' academic and extracurricular offerings. In addition, a student can use the information to help judge the value of the college experience he or she is buying. Crudely put, paying $50,000 for $30,000 of per-student expenditure is not as good a deal as paying $30,000 for $50,000 of expenditure.

The lack of attention to colleges' per-student expenditures can oversimplify judgments of their efforts to be accessible to low-income students. Suppose College A spends $25,000 per student and College B spends $50,000. College A enrolls 60 percent low-income students and requires them to pay $15,000 and College B enrolls 40 percent similarly low-income students and also requires them to pay $15,000. Which college is making a greater effort to be accessible to low-income students? If one only looks at what low-income students pay and the percentage of low-income students enrolled, clearly College A is making a greater effort to be accessible. But if one also considers the resources that the colleges put into their educational programs, the answer is less clear cut.

I might advocate that we give much greater prominence to colleges' per-student expenditures, except for one concern. Such transparency could harm the ability of colleges, outside of those in the richest subset, to offer need-based scholarships. Colleges with abundant donor resources can discount tuitions for less-affluent students and still spend more per student than they charge full-pay students. But when tuition-dependent colleges permit students with financial need to pay significantly less than the colleges spend per student, they must cover this shortfall with revenue from students who pay more than what the colleges spend per student. Full-pay students can potentially benefit from this implicit transfer if the scholarship students raise the average quality of the student body or if their presence enriches the educational program. In theory, the same would be true for implicit transfers to students receiving merit scholarships. But in choosing colleges, full-pay students may not appreciate this benefit or may underestimate it. If so, in a world in which colleges' per-student expenditures are prominent, colleges could be forced to set sticker prices that closely approximate these expenditures, severely limiting their ability to offer discounts to students from low-income households. This might be a case where society benefits from opacity.

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Appendix I

125 Liberal Arts Schools in the Data Set

Institution Name	State	Institution Name	State	Institution Name	State
Agnes Scott College	GA	Colby College	ME	Hanover College	IN
Albion College	MI	Colgate University	NY	Hartwick College	NY
Albright College	PA	College of Saint Benedict	MN	Harvey Mudd College	CA
Allegheny College	PA	College of the Holy Cross	MA	Haverford College	PA
Alma College	MI	Colorado College	CO	Hendrix College	AR
Amherst College	MA	Connecticut College	CT	Hobart William Smith Colleges	NY
Augustana College	IL	Cornell College	IA	Hope College	MI
Austin College	TX	Davidson College	NC	Illinois College	IL
Bard College	NY	Denison University	OH	Illinois Wesleyan University	IL
Barnard College	NY	DePauw University	IN	Juniata College	PA
Bates College	ME	Dickinson College	PA	Kalamazoo College	MI
Beloit College	WI	Earlham College	IN	Kenyon College	OH
Bennington College	VT	Eckerd College (1)	FL	Knox College	IL
Birmingham Southern College	AL	Emory & Henry College	VA	Lafayette College	PA
Bowdoin College	ME	Franklin and Marshall College	PA	Lawrence University	WI
Bryn Mawr College	PA	Furman University	SC	Luther College	IA
Bucknell University	PA	Gettysburg College	PA	Lycoming College	PA
Carleton College	MN	Gordon College	MA	Lyon College	AR
Centenary College of Louisiana	LA	Grinnell College	IA	Macalester College	MN
Central College	IA	Gustavus Adolphus College	MN	Millsaps College	MS
Centre College	KY	Hamilton College	NY	Moravian College	PA
Claremont McKenna College	CA	Hampden-Sydney College	VA	Morehouse College	GA
Coe College	IA	Hampshire College	MA	Mount Holyoke College	MA

Muhlenberg College	PA	Scripps College	CA	Ursinus College	PA
Oberlin College	OH	Sewanee-The University of the South	TN	Vassar College	NY
Occidental College	CA	Skidmore College	NY	Wabash College	IN
Oglethorpe University	GA	Smith College	MA	Warren Wilson College	NC
Ohio Wesleyan University	OH	Southwestern University	TX	Washington & Jefferson College	PA
Pitzer College	CA	Spelman College	GA	Washington and Lee University	VA
Pomona College	CA	St John's College	MD	Washington College	MD
Presbyterian College	SC	St Lawrence University	NY	Wellesley College	MA
Randolph College	VA	St Olaf College	MN	Wells College	NY
Randolph-Macon College	VA	Stonehill College	MA	Wesleyan University	CT
Reed College	OR	Susquehanna University	PA	Westmont College	CA
Rhodes College	TN	Swarthmore College	PA	Wheaton College (IL)	IL
Roanoke College	VA	The College of Idaho	ID	Wheaton College (MA)	MA
Saint Anselm College	NH	The College of Wooster	OH	Whitman College	WA
Saint Johns University	MN	Transylvania University	KY	Willamette University	OR
Saint Mary's College	IN	Trinity College	CT	Williams College(2)	MA
Saint Michael's College	VT	Union College	NY	Wisconsin Lutheran College	WI
Saint Vincent College	PA	University of Puget Sound	WA	Wittenberg University	OH
Sarah Lawrence College	NY	University of Richmond	VA	Wofford College	SC

Notes on data adjustments:

1. The CDS data indicates that more than 100% of the entering students at Eckerd College received tuition discounts. I reduced the number of merit scholarships to equate the percentage to 100%.

2. IPEDS reports that the average salary for instructional staff at Williams College in 2014/15 was $80,307, a 25% decline from the average for the previous year. This is clearly incorrect. In this study, I used an estimated average salary. The estimate assumes that it increased 3% from its 2013/14 level, an increase that is similar to that of peer institutions. IPEDS reports that unrestricted gifts to Williams College in 2014/15 totaled $131 million, an unrealistically high number. From the College's annual financial statements, available on the College's website, I determined the $131 million number is the sum of all unrestricted, unrestricted, and life income and

endowment gifts. Unrestricted gifts to the College were $22.7 million in 2014/15. I corrected the IPEDS data for this year and for the previous two years.

3. The IPEDS had missing data on the value of the endowments for several of the colleges. I was able to find this information in the colleges' annual financial reports.

4. In the CDS data, some of the colleges appear to include athletic scholarship in merit scholarships. In cases where this error was obvious, I corrected it.

Appendix II

An Overview of the Spending and Revenue Patterns of the 125 Colleges

In analyzing the business practices of the 125 colleges, a good starting point is to ask how they spend their money. Table A1 presents the big picture in terms of the average across the schools of their annual operating expenses by various categories. [34] Operating expenses include all wages, purchases of basic supplies, interest and depreciation.[35] The IPEDS database specifies the categories and asks the schools to allocate their expenses into the various pockets. The first category in the table, instructional expenses, is clear. The second category, auxiliary enterprises, mainly includes expenses associated with residence halls, food, services, and college-owned stores.[36] The third category, institutional support, includes general administrative expenses, legal and fiscal operations, human resources, administrative computing support, and community and alumni relations, including development and fundraising. Student services, the fourth category, includes expenses associated with the admissions, career counseling, and registrar offices as well as offices that focus on students' emotional and physical well-being and their intellectual, cultural, and social development outside of classrooms settings. The fifth category, academic support, includes expenses associated with libraries, museums and galleries, educational media services, academic computing services, and the administrative expenses of academic departments. The research category includes separately budgeted research projects which may be commissioned from outside or financed within the institution. Note that scholarships are not shown as a school expense in Table A1. This is because the IPEDS database treats them simply as a discount in the prices students pay, i.e. they are reflected in reduced revenue.

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[34] If a college spends money constructing a new building, that expense would not be an operating expense because it simply transforms assets and liabilities, i.e. it belongs in the capital budget. The construction of the building, for example, does not make the school any poorer or richer. If the school were to pay for the building using funds from its endowment, it simply exchanges one asset (cash or other financial assets) for another (the building). If the school issues debt to pay for the building, it adds a physical asset and an offsetting liability.

[35] As Gordon Winston (2000) points out, a school's operating expenses are not the true annual cost of replicating its services since they do not include an accurate assessment of the implicit annual cost of its buildings, land, and equipment. To estimate its true operating cost, he deducts from the reported operating costs the interest expenses related to the college's physical plant and the depreciation expenses. He replaces these with an estimate of what it would cost the school annually to rent the college's physical facilities. Winston argues that making such an adjustment would significantly raise the estimated operating costs of most colleges.

[36] The costs of health services for students and expenses related to student athletics can be included in either 'student services" or "auxiliary enterprises." IPEDS guidelines call for them to be included in "auxiliary enterprises" if the college charges a related fee that makes them "essentially self-supporting." Otherwise, they should be included in "student services."

Table A1
Operating Expenses by Functional Classification, 2014/15 FY

	Mean (in millions)	As Percentage Total
Instructional Expenses	$34.1	37.5%
Auxiliary Enterprises	$15.5	17.1%
Institutional Support	$15.5	17.1%
Student Services	$13.9	15.3%
Academic Support	$8.9	9.8%
Research	$0.8	0.9%
Other Expenses	$2.0	2.2%
Total Expenses	$90.8	100.0%

Source: IPEDS

Table A2, using the average values for the 125 colleges, presents a composite picture of where the colleges get the money they spend. In the table, the revenue from the tuition and fees is the revenue students actually pay, not the posted sticker prices. The second category, sales and services of auxiliary enterprises, mainly includes revenues that the colleges earn from the rental of dormitory rooms, sales of food on campus (meal plans, etc.), and college store sales. The third category, private gifts, includes unrestricted gifts and restricted gifts. Out of an average of $18.6 million in 2014/15 private giving, unrestricted private gifts averaged $6.4 million. Restricted gifts, which may or may not help meet operating expenses, made up the balance. If a restricted gift is made, for example, to fund the construction of a new building, this money adds to the net worth of the college but can't be used to pay salaries. If a restricted gift, however, enables the college to pay the salary of a newly endowed professorship, it could help meet operating expenses if the college names a professor already on the payroll to that position. The same is true for a restricted gift to fund a scholarship that would be awarded anyway. The fourth category, total investment return, includes all investment income (interest, dividends, rents and royalties and realized and unrealized capital gains) from a college's endowment and other earning assets. Reporting these earnings as school revenue is somewhat misleading. Most schools set aside only a fraction of the endowment earnings for use in the operating budget since the schools seek to maintain or even enhance the purchasing power of the endowment over the long-term. Finally, federal grants and contracts include funds received from federal agencies for specific research and training projects.

Table A2
Sources of School Revenues, 2014/15 FY

	Mean (in millions)	Percentage Total Revenue & Investment Income	Percentage Total Operating Expense
Tuition and Fees	$42.0	41%	46%
Sales & Services of Auxiliary Enterprises	$18.6	18%	20%
Total Private Gifts	$18.6	18%	
Total Investment Return	$17.5	17%	
Federal Grants & Contracts	$1.4	1%	
Other Revenue	$4.2	4%	
Total Revenues & Investment Return	$102.2	100%	
Total Operating Expense			$90.8

Source: IPEDS

There are two striking patterns in Table A2. First, tuition and student payments for room and board cover only about two-thirds of the typical school's operating cost. The average liberal arts college is heavily dependent on gifts and earnings from its endowment to close the financial gap.[37] The second striking pattern in the Table is that total revenues plus investment returns for the typical school substantially exceed its operating costs. In this sense, the school makes a profit. But this is misleading. As noted earlier, a substantial share of gifts to a school may be restricted so that they cannot be used to cover operating costs. In addition, the total investment return is volatile from year to year. Most schools try to take a rather steady, but moderately-increasing, dollar amount from their endowment to support their operating budgets while maintaining the real purchasing power of their endowments. A school might, for example, predict that its endowment will earn a 7 percent annual rate of return over the long run and predict that the annual inflation rate for its operating costs will average 2.5 percent. Thus, to keep its ratio of endowment to operating cost relatively constant over time, the school might decide to devote 4.5

[37] Note that operating expenses include depreciation expenses for the physical plant. In some sense this is a real cost since buildings do wear out or become obsolete despite maintenance efforts, but it is also not a cash expense in the year in which the depreciation is recognized. Prudent financial management requires that one recognize that the physical plant loses value over time as it ages, but that is just an accounting charge that a school could choose to ignore without triggering any short-run budget problems. In the long run, of course, if the school does not set aside fund to cover the depreciation, its physical plant would deteriorate and the school's net wealth would decline.

percent of its endowment to support the operating budget regardless of the returns of the endowment in any one year. Under such a policy, the school's IPEDS's data would show an operating profit in most years since the reported revenues includes endowment earnings that must be reinvested in the endowment to enable it to grow at the same rate as operating expenses.

Appendix III

Background on the Collusion Issue

From 1989 to 1991, the U.S. Department of Justice investigated 57 private non-profit colleges to determine if they were engaged in price-fixing (Reed and Shireman, 2008). At the time, numerous colleges participated in "overlap" groups where they met to exchange information on the financial status of students applying for need-based financial aid and to coordinate their assessments of how much families could afford to pay for college, what is known as the "expected family contribution." Without such an agreement, one school might seek to attract an especially desirable student by setting a very low expected family contribution and offering a needlessly generous scholarship. Other schools might follow, creating a bidding war. The net result could be that high-merit students from low- or moderate-income families might get more financial assistance than they need to attend to college while other students from such families might get less than they need. The overlap groups sought to prevent this by basing their scholarship offers only on the assessed financial need of admitted students, not the relative desirability of the students.

The Justice Department brought suit against the "Ivy Overlap Group," which included the 8 Ivy League schools and MIT. All the targeted schools, except MIT, quickly settled with the Department and ended the overlap meetings. MIT contested the Department's case but lost in district court. MIT appealed, and the appeals court ruled that the district court did not give sufficient weight to MIT's argument that the social and economic benefits of institutional cooperation outweighed any harm. Before the district court could issue a revised ruling, however, MIT reached a settlement with the Justice Department --- one that gave it more flexibility to cooperate with other institutions around financial aid than did the Department's settlements with the Ivy League schools. But since there was no final court ruling, the application of antitrust law to overlap group activities remained unclear.

In 1994, Congress passed a law (The Improving America's Schools Act of 1994, Public Law 103 382, section 568**)** that protected colleges that have "need-blind" admissions policies from antitrust charges if they participate in a group of schools that agree to take any one or combination of the following four actions: (1) Award aid only on the basis of demonstrated financial need, (2) Use common principles for need analysis, (3) Use a common aid application; or (4) Exchange family financial data with regard to students admitted to more than one school in the group. As of 2008, only one group of schools, known as the "568 Presidents' Group," was taking advantage of this exemption. As a matter of practice, the participating schools (about 24 colleges in 2015) only cooperate to develop a common methodology for assessing financial need. Apparently, part of the reason that more schools don't use the exemption is because it is unclear what exactly defines a "need-blind" admissions policy and the schools worry about potential legal risks if their admissions policies are determined not to be need-blind.