

8-1-2016

## In the Right Ballpark? Assessing the Accuracy of Net Price Calculators

Aaron M. Anthony

*University of Pittsburgh*, aaronanthony@pitt.edu

Lindsay C. Page

*University of Pittsburgh*, lpage@pitt.edu

Abigail Seldin

*ECMC*, aseldin@ecmc.org

Follow this and additional works at: <http://publications.nasfaa.org/jsfa>

 Part of the [Higher Education Commons](#), and the [Higher Education Administration Commons](#)

---

### Recommended Citation

Anthony, Aaron M.; Page, Lindsay C.; and Seldin, Abigail (2016) "In the Right Ballpark? Assessing the Accuracy of Net Price Calculators," *Journal of Student Financial Aid*: Vol. 46: Iss. 2, Article 3.

Available at: <http://publications.nasfaa.org/jsfa/vol46/iss2/3>

This Research Article is brought to you for free and open access by NASFAA Research Publications. It has been accepted for inclusion in Journal of Student Financial Aid by an authorized administrator of NASFAA Research Publications. For more information, please contact [jacob.gross@louisville.edu](mailto:jacob.gross@louisville.edu).

---

# In the Right Ballpark? Assessing the Accuracy of Net Price Calculators

## **Cover Page Footnote**

We are grateful to the National College Access Network for supporting this project and facilitating our connection to the several NCAN-member organizations which graciously provided data for this study. We additionally thank those organizations which provided student-level data for this study. We do not mention these organizations by name in order to protect the identities of the students and postsecondary institutions for which they provided data. We especially thank Diane Cheng and Alexandra Chewning for insightful feedback. All views and any errors are our own.

# In the Right Ballpark? Assessing the Accuracy of Net Price Calculators

By Aaron M. Anthony, Lindsay C. Page, and Abigail Seldin

*Large differences often exist between a college's sticker price and net price after accounting for financial aid. Net price calculators (NPCs) were designed to help students more accurately estimate their actual costs to attend a given college. This study assesses the accuracy of information provided by net price calculators. Specifically, we compare NPC estimates of financial aid to actual aid packages for a sample of low-income, first-time college students at seven postsecondary institutions which all utilize the federal template NPC. We find that NPC estimates of grant aid correlate highly with actual grant aid on average, but variation in individual financial aid packages among socioeconomically similar students can be substantial. We offer four recommendations. First, NPC aid estimates should include information on variability, and potentially, on sources of that variability. Second, a basic metric of academic merit such as SAT/ACT scores and GPA should be an optional addition to the federal template NPC. Third, institutions should update the data underlying their NPCs annually. Finally, we recommend that institutions use the "Explanations and Caveats" options on the federal NPC template to include additional information that may be helpful for students and families in anticipating their likely college aid and expenses. Our findings have implications for federal policy related to NPCs.*

**Keywords:** *net price calculator, financial aid, college affordability*

Issues of college cost and affordability have been the focus of popular and policy attention over the last many years, and for good reason. Unprecedented increases in tuition rates coupled with a stagnant economy lead many families to question the value of a college education. This is despite evidence that a college graduate with a bachelor's degree can expect to earn over \$800,000 more in lifetime earnings than a high school graduate *after* fully repaying loans (Daly & Bengali, 2014). Even against historic tuition increases, such figures indicate that a college education remains a sound investment.

Recognizing this value, the U.S. government provides billions of dollars in student financial aid annually, such that the majority of college students do not pay the full cost of attendance, or the sticker price, of their postsecondary institution. In 2013-14 the federal government provided \$48.9 billion in grant aid,<sup>1</sup> accounting for 40% of all grant aid. During the same time, the average undergraduate received \$8,080 (in 2013 dollars) in grant aid from all sources (College Board, 2014a).

In media coverage, however, the availability of need-based financial aid is dwarfed by rising tuition rates. This focus on rising "sticker prices" rather than trends in the out-of-pocket cost of college attendance may

---

*Aaron M. Anthony is a doctoral candidate in Administrative and Policy Studies at the University of Pittsburgh School of Education; Lindsay C. Page is an assistant professor of Research Methodology at the University of Pittsburgh School of Education and a research scientist at the Learning Research and Development Center at the University of Pittsburgh; Abigail Seldin is the vice president of Innovation and Project Management at ECMC Group and co-founder of College Abacus.*

lead many families to consider postsecondary education inaccessible. Families are especially vulnerable to misjudging college affordability if they lack a clear understanding of the differences between the sticker price of an institution and the actual expenses that they would incur to attend, given the financial aid for which their students would qualify. Indeed, research identifies several financial aid-related barriers to postsecondary enrollment and success, including a lack of information about financial aid (Bettinger et al, 2012; Hoxby & Avery, 2013; Hoxby & Turner, 2013); discrepancies between actual versus perceived college affordability (ACSFA, 2005); and the complexity of the financial aid process itself (ACSFA, 2005).

In light of such evidence, a 2008 amendment to the Higher Education Act (HEA) of 1965 called for the development of college Net Price Calculators (NPCs) as a tool to combat misunderstandings and increase transparency about college cost and financing. The legislation stipulates that every postsecondary institution receiving federal financial assistance include an NPC on its website by October of 2011. NPCs are intended to provide students and families with customized, institution-specific estimates of cost of attendance and grant aid. By subtracting estimated grant aid from the total cost of attendance, these figures allow students to obtain an estimated net price associated with specific colleges and universities.

While NPCs hold great promise for improving information about college costs, their recent introduction leaves open questions about the quality of information that they provide. A critical first-order question relates to the accuracy of their estimates of grant aid and college costs. Indeed, to be useful in guiding students to make informed decisions about college options, they need to provide reasonably accurate information about net costs. One area of concern is that institutions' NPCs may not reflect the most recent tuition and fees information available. For example, in the summer leading up to the 2015-16 academic year, two of the seven institutions included in this study were still presenting 2009-10 tuition and net price information as the basis for their calculations. From 2009 to 2014, the average net tuition and fees paid by in-state students at public four-year colleges and universities increased nearly 50%, from about \$2,030 to about \$3,030 (in 2014 dollars; College Board, 2014b). Given this substantial increase, outdated information may differ substantially from current cost and aid information. In response to these and other concerns, Representative Elijah Cummings of Maryland and Senator Al Franken of Minnesota introduced bipartisan legislation in the House and Senate to make technical improvements to NPCs, although the bills did not make it out of committee during the 113<sup>th</sup> session of Congress.<sup>2</sup> In this study, we examine the extent to which NPCs provide accurate estimates of grant-based financial aid when compared to actual grant aid awarded in students' financial aid packages.

Data for this investigation came from several partnering organizations which largely provide direct support to students in the process of college consideration, application, and transition. We limited our analysis to include only data for low-income students applying to four-year postsecondary institutions that use the federal NPC template. We gathered data on would-be first-time college students' financial aid award packages and compared these figures to NPC estimates of students' financial aid. Our analysis focuses on the differentials between actual and estimated grant aid from federal, state, local, and institutional sources.

To preview our results, we find that among students with an expected family contribution of zero, NPC estimates are identical within each respective institution, and on average, NPC grant aid estimates were very close to actual grant aid awarded. However, the purpose of NPCs is not to provide cost estimates that are accurate, *on average*; the purpose is to provide *individual* students with better information on college costs. We find actual levels of grant aid awarded can differ from the NPC estimate by several thousand dollars. We find that the greatest share of this difference is in the form of institution-specific grant aid, while federal and state grant aid is more predictable. In short, NPCs may help families with a ballpark estimate of their likely postsecondary expenses, but for many low-income families, the ballpark remains large, owing primarily to variation in grant aid provided by institutions themselves.

We structure the paper as follows: We review the relevant literature on college cost and on the impact of college-related information on student outcomes. We then discuss the legislative development of NPCs and a review of their early implementation. Later, we outline our methodological approach to assessing the accuracy of NPC estimates and describe our data sources and sample and present our key findings. Finally, we discuss the implications of our research for policy and future research.

## Literature Review

Research has documented several financial-aid related barriers to postsecondary enrollment and success (See Page & Scott-Clayton [2016] for a recent review). Two types of barriers are especially relevant to the development of NPCs. First, students, particularly those from low-income backgrounds, commonly lack an accurate understanding of higher education costs (ACSFA, 2005). For example, when surveyed, they overestimate current tuition and fee levels and underestimate financial aid dollars available through grant and loan programs (Ikenberry & Hartle, 1998; Horn, Chen, & Chapman, 2003; Avery & Kane, 2004). Popular media coverage regarding the rising cost of college fuels common misperceptions about the affordability of postsecondary education (ACSFA, 2005; Horn, Chen, & Chapman, 2003). Grodsky and Jones (2007) argued that inequalities in knowledge about college costs contribute to persistent gaps in postsecondary attainment. The authors found that parents from disadvantaged backgrounds are less able to estimate college costs, and when they do, they are more likely to overestimate the costs than their middle-class counterparts. Bettinger and colleagues (2012) found that families overestimate the cost of college by 300 percent, and Dunn and Oreopoulos (2013) reported that high school students are more likely to aspire to postsecondary education after receiving information about the costs and benefits of college.

Second, many students and families lack information about financial aid and the associated application process. Of course, students must know about the availability of financial aid in order to apply for it. Too often, however, students and their families lack such awareness. For example, a 2002 Harris Poll revealed that large shares of parents and young adults lacked an understanding that grant funds were available to assist in the financing of postsecondary education. Further, low-income families were even less likely than others to have such knowledge (Sallie May Fund, 2003, as cited by Bettinger et al., 2012). Even among top-performing students, those from low-income backgrounds often lack sufficient information about financial aid (Radford, 2013), and often do not apply to top colleges and universities, even when these would be their best financial choices, given the generous financial aid that such schools provide (Hoxby & Avery, 2013; Hoxby & Turner, 2013).

Given these barriers, a question is whether providing students and families with better information about college costs would serve to improve postsecondary decisions and outcomes for students. Two studies provided early evidence in response to this question. In North Carolina, the College Board (2012) collaborated in the development of a “College Is Affordable” brochure that was distributed to lower-income families with middle school students in North Carolina and aimed to educate families about college net price. Treatment and comparison families were then surveyed regarding their knowledge of postsecondary financing. Families receiving the brochure were more likely to report knowing the cost of attending college in North Carolina; agreeing that most students pay less than colleges’ list prices; and agreeing that students from low-income families could attend college at low to no cost.

Hoxby and Turner (2013) provided evidence on a more comprehensive campaign—Expanding College Opportunity, Comprehensive (ECO-C)—focused on providing high-achieving, low-income students semi-customized information about the college application process and colleges’ net costs as well as no-paperwork application fee waivers. The intervention led to increases in the rates at which students applied and were accepted to high-quality colleges and universities but did not lead to increases in college

enrollment overall. The intervention did not impact freshman year grades, implying that students were able to be equally competitive academically, even at higher quality postsecondary institutions.

A key point made by Hoxby and Avery (2013) is that for high-achieving students from low-income backgrounds, attending a higher-tier postsecondary institution would represent a better choice academically as well as financially, owing to the generosity of the need-based financial aid that these institutions provide to their students compared to the less-selective colleges and universities that these students more typically attend. Indeed, for these same students, Hoxby and Turner (2013) identified having a clear understanding of a college or university's net price as instrumental in selecting a better-matched school.

These studies suggest that high-achieving, low-income students and their families stand to benefit from improved access to college-related information on college financing in addition to other aspects of the college-going process. However, open questions remain about how net price information, and NPCs in particular, may impact the broader swath of students from low-income backgrounds who are not necessarily as high-achieving.

## History and Legislation

Federal legislation required the development of NPCs in the 2008 Higher Education Opportunity Act, the reauthorization of the Higher Education Act of 1965. One goal of the original act was to “provide financial assistance for students in postsecondary and higher education” (HEA, 1965). Specifically, Title IV of the act focused on student financial assistance and established the framework for need-based financial aid at colleges and universities. Building on this foundation, the 2008 reauthorization called for postsecondary institutions to increase transparency in college pricing (HEOA, 2008). In conjunction with the 2008 reauthorization, the U.S. Department of Education established the College Affordability and Transparency Center, and more recently, the College Scorecard websites<sup>3</sup>. On these websites, prospective college students can compare institutions by full cost reports (including tuition, housing costs, and fees), average net prices after accounting for aid, and other features, such as whether an institution is private or public, for-profit or not-for-profit, and a two- or four-year institution. NPCs are featured prominently on the site.

NPCs, as established by the HEOA, are designed to “help current and prospective students, families, and other consumers estimate the individual net price of an institution of higher education for a student” (HEOA, 2008). Prior to the introduction of NPCs, early, individualized estimates of financial aid were not available for many students, and students were not likely to receive financial aid award letters until after making important decisions about where to apply for admissions. The legislation mandated that by October 29, 2011, all postsecondary institutions benefiting from Title IV student aid programs must post a Net Price Calculator on their web site. NPCs use student households' financial and other information to estimate the total grant aid that a student would receive to attend a given institution and deduct that figure from the institution's full cost of attendance to estimate the student's net price of attendance. Cost of attendance includes not only tuition and fees, but also room and board and estimates for the costs associated with books, supplies, and transportation.

## NPC Varieties and Challenges

NPC legislation specifies that the amount of aid available “shall be calculated for the individual student as much as practicable” (HEOA, 2008). As institutions have different interpretations of and limitations for what is practicable, it follows that many NPC varieties exist. And while the U.S. Department of Education has developed a free calculator template,<sup>4</sup> there is no stipulation mandating that institutions use any

particular NPC, provided that the institution includes the minimum required elements.<sup>5</sup> As a result, though a substantial share of postsecondary institutions use the federal template, a number of alternative calculators exist that may rely on an expanded set of questions and data elements.<sup>6</sup> For reference, in Appendix A, we detail the data elements included in the federal template calculator as well as two additional NPCs, one created by Student Aid Services and the other by the College Board. These latter two are examples of NPCs created by third-party vendors, although additional vendors exist. Alternatively, institutions may design and implement their own NPCs. A comparison of the data elements included in Appendix A reveals variation in the extent of input information institutions choose to require using different NPC templates. Regarding the federal template calculator, it is important to note that it was designed with the goal of simplicity so that a variety of institutions could use it, including those that lacked the resources to invest in the development or purchase of a more complex NPC.<sup>7</sup>

Comparing across the different types of NPCs reveals important potential trade-offs between simplicity and accuracy. Students and families are more likely to use a calculator that relies on only a few pieces of information, as does the federal template, given that they are more likely to be able to provide the information required and less likely to be fatigued by the process of answering a battery of detailed financial questions. Whereas a series of detailed questions on family income, tax allowances, and investment assets comprise a large share of the user burden for more complex NPCs, the federal template streamlines income questions to just one: annual household income after taxes. This question is answerable with a list of options from “below \$30,000” to “above \$100,000” in \$10,000 ranges. Though imprecise, most students would be able to make a best-guess for this question. The remainder of the questions on the federal template NPC are simple to complete and pertain to the student’s dependency status, residency, and choice of on- or off-campus housing.

Nevertheless, the simplicity of the federal template presents several drawbacks. For example, the federal template NPC does not require measures of students’ academic achievement (such as GPA or SAT/ACT scores) and therefore cannot generate estimates that reflect variation in aid related to factors such as eligibility for merit-based scholarships. This is both relevant and important for those institutions that award merit-based grant aid. The federal template NPC is also limited in its capacity to capture the complexities of the cost of attendance at many institutions. For example, when schools enter their cost data, they provide only one cost of attendance figure for all full-time, first-time, degree-seeking undergraduates, which ignores potential variation between programs within the same institution. Additionally, by only considering a narrow set of student characteristics, the federal template generates a simple approximation of the EFC while other NPCs may reach a more exact measure of EFC by drawing on more extensive measures of family income and asset information. To further highlight that the federal template NPC results are estimates rather than exact figures, users must first agree to terms emphasizing this point before they can enter any information into the calculator.

Institutions using alternative calculators can customize their calculators to draw on more fine-grained information from students such as parents’ untaxed Social Security benefits, home equity, and trust equity. In these cases, an applicant may be discouraged by time and effort needed to find the information and abandon the process of obtaining a net price estimate. Because colleges and universities use different data elements and methodologies to obtain EFC and net price estimates, resulting estimates may vary in their accuracy. To assess the extent of this variance, Student Aid Services tested the federal template calculator’s EFC methodology on 145,000 actual students’ financial profiles and found that more than half of the students fell outside the correct Federal Methodology EFC range, with an average discrepancy of \$5,335 (Smith et al., 2011).

An early review of NPCs conducted by The Institute for College Access and Success (TICAS) reports that though universities have widely incorporated the NPC tools into their websites, significant improvements can be made in terms of the ease with which students and families can find, use, and

compare net price estimates (Cheng, 2012). For example, based on a sample of 50 institutions (including both two-year and four-year institutions and public, private, and for-profit institutions), the authors reported that NPCs are not visually prominent in nearly one-quarter of the schools sampled. Some schools had given their calculators different names, such as “Education Cost Calculator” and “Tuition Calculator,” and nearly a third provided links that would not help students find their NPCs, such as broken links or links to the college’s home page. Second, as discussed above, NPCs varied in terms of their ease of use with required question sets ranging from eight to more than 70. Next, though some NPCs were easy to understand and yielded comparable results, many others did not. Lack of comparability, in some instances, related to the fact that net price estimates were based on tuition figures that were outdated by one or several years. Given rising college costs, these outdated figures can be misleading. Adding to the confusion, some calculators included estimates of net costs after subtracting out student work-study and loans (as opposed to grant aid only), again resulting in misleading perceptions about the true cost of attending a given institution.

The TICAS report (Cheng, 2012) provides several suggestions for improving NPCs and their usage. It does not, however, investigate the accuracy of NPCs. As improvement efforts advance and calculators evolve, it is important to quantitatively measure the effects of these changes. One fundamental measurement of NPC effectiveness is the accuracy of the information that the calculators provide. In this study, we assess the accuracy of information provided by the federal template NPC. A focus on the federal template is important, given that it is the most widely used and arguably the most straightforward of the commonly used NPCs, requiring only basic information like household size and income.

Two research questions guided our analyses: First, to what extent do NPCs provide accurate estimates of net college costs? Second, where discrepancies between estimated and actual grant aid awarded exist, are these discrepancies more prevalent in certain sources of funding? Answers to these questions will shed light on how institutions can use NPCs to provide students and families with the best possible information about college cost and financial aid.

## Research Design

We focused our investigation on a comparison between estimates of financial aid generated by NPCs and the corresponding financial aid packages that students actually received from the colleges and universities to which they were admitted. To construct these comparisons, we gathered data from several nonprofit organizations that work to support students—predominantly those from low-income households or who would be first-generation college-goers—to apply, enroll and succeed in college.

Specifically, we collaborated with the National College Access Network (NCAN) to recruit NCAN partner organizations for this investigation. In total, 18 NCAN member organizations from across the United States signaled interest in participating. Of these 18 organizations, we filtered out those that either did not store the needed data elements or did not work with substantial numbers of students applying to institutions that use the federal NPC template. Ultimately, we identified four partner organizations that were able to provide the student-level data necessary for this investigation. From each organization, we gathered individual-level records of student and household information required by the federal NPC template. Second, we gathered records of students’ specific financial aid packages (i.e., their financial aid award letters).

### ***NPC Estimates***

To populate the federal template NPC, institutions report grant and scholarship information corresponding to different EFC ranges.<sup>8</sup> Specifically, institutions document the median amount of both need- and non-need-based grant and scholarship aid from federal, state, or local governments, as well as aid that the institution itself awarded to full-time, first-time students in each EFC range. To obtain a simplified approximation of student EFC and cost of attendance, the federal NPC template requires the following data elements: student's age, on- or off-campus living arrangement, in or out of state residency, marital status, dependent status, number of people living in the household, number of people from the household in college, and net household income after taxes. Of these data elements, variations in student's on- or off-campus living arrangement and state residency may correspond with different grant aid estimates within the same EFC range. For example, at some institutions, a student with an EFC of zero who is living on campus may receive more grant aid than a student with an EFC of zero who is living off campus. Every partnering organization included in our study kept records of EFC, and all students associated with a particular institution were in-state residents. Only one partnering organization did not maintain records of students' on- or off-campus living arrangement. Nevertheless, the organization confirmed that the great majority of sampled students (and students served by their organization historically) would be living on campus upon successful transition to college. Together, the data available allowed for an accurate appraisal of NPC grant aid estimates for the students in our sample.<sup>9</sup>

We used the relevant online NPCs to obtain net price estimates for the institution(s) to which each student had been admitted. In addition to an inclusive cost estimate, NPCs provide an estimate of total grant aid. The estimated total grant aid is subtracted from the estimated total cost of attendance to reach the estimated net price. Finally, we recorded the academic years on which the net price estimate calculations were based.

### ***Student Financial Aid Award Information***

The second major source of data was student-level financial aid award information. Whereas NPCs present estimates of grant aid, financial aid award letters provide actual grant aid figures. We collected data on would-be first-time college students' financial aid award packages, as reported in the financial aid award letters from the institutions to which they had been admitted. This information included federal, state, and institution-specific grant, loan, work study, and scholarship awards. Because the federal template NPC focuses on grant aid and does not estimate loan or work-study aid, we focused our analysis on a comparison of grant aid awards and estimates.

### ***Analytic Sample***

In our analyses, we focused particularly on students with an EFC of zero as reported on student aid reports generated after submission of the Free Application for Federal Student Aid (FAFSA). This analytic decision was motivated by the idea that low-income students may be particularly sensitive to information on college cost and have been shown to be less likely to be aware of differences in college pricing (e.g., Grodsky & Jones, 2007). Therefore, from a policy standpoint, we should have an interest in focusing on accuracy of cost information for this subset of students, in particular; thus, all results pertain to students with an EFC of zero.<sup>10</sup> In total, the partnering organizations provided the needed individual-level data for 265 students with zero EFCs. These students were from eight unique four-year institutions. For three of these institutions, our partners collected data for two consecutive first-year cohorts, resulting in 11 unique institution-school year cohorts. We do not identify the postsecondary institutions included here, as our focus is on the NPC as a tool rather than on the specific institutions for which we were able to obtain data.<sup>11</sup> In tables and figures, we use letters in place of institution names and present separate cohorts within the same institution as, for

example, B1 and B2. Seven of the institutions are public and one is private. A recognized limitation of this investigation is that our sample was one of convenience and our findings may therefore suffer from a lack of generalizability. Nevertheless, to the degree that the students in our sample are similar to other low-income students and the colleges are similar to other colleges, our results provide suggestive evidence about the accuracy of the aid estimates provided by the federal template NPC.

### ***Grant and Differentials***

Having obtained an institution-specific estimated and actual grant aid amount for each student, we then calculated student-institution-level grant aid differentials. These differentials are a simple difference between the amount of grant aid predicted for the student by the NPC and the amount of grant aid offered in the financial aid award letter. The grant aid differential is positive when the actual grant aid is greater than the estimate and negative when less than the estimate. We also calculated percentage differentials by dividing the actual grant aid by the NPC estimated grant aid and scaling by 100.

Positive grant aid differentials may be benign, as they indicate students who received more generous financial aid than the NPC would suggest, but a positive differential may also influence who decides to apply and enroll at those schools. Underestimated grant aid may, however, deter a student from applying to an institution presumed to be unaffordable. A negative grant aid differential may mean that some families could have mistakenly assessed their abilities to finance their student's schooling at a particular institution.

## **Results**

We first examine the accuracy of NPC-estimated grant aid in comparison to students' actual grant aid awards. In Table 1, we present results on this comparison for students, organized by institution and cohort. Within institution-cohort groupings, sample sizes ranged from 6 to 46. We ordered institutions from largest to smallest in terms of NPC-estimated grant aid.

Within institution-cohort groupings, each student in our analytic sample was a dependent, full-time, first-time student living in the same state as the institution he or she attends. For these students, there was no variation in NPC-estimated grant aid because NPC-estimated grant aid corresponds with EFC within institution cohort and student profile groupings. We report NPC-estimated grant aid for each institution-cohort grouping of students in column 3 of Table 1. Across all institution cohorts, the mean NPC estimated grant aid was \$12,129, and the mean actual grant aid was \$11,267. Estimated grant aid ranged from \$7,990 at Institution H, a public, non-competitive institution in the Midwest, to \$24,267 at Institution A, a private, highly competitive institution in the South. As would be expected, there is substantial variation in total grant aid across institutions, owing to the variation in total cost of attendance.

In examining actual grant aid amounts (Table 1, column 4), average grant aid ranged from \$8,507 at Institution F, a public, non-competitive institution in the Midwest to \$23,847 at Institution A. We observe a strong relationship between the average level of grant aid and its corresponding estimate ( $r = .78$ ).

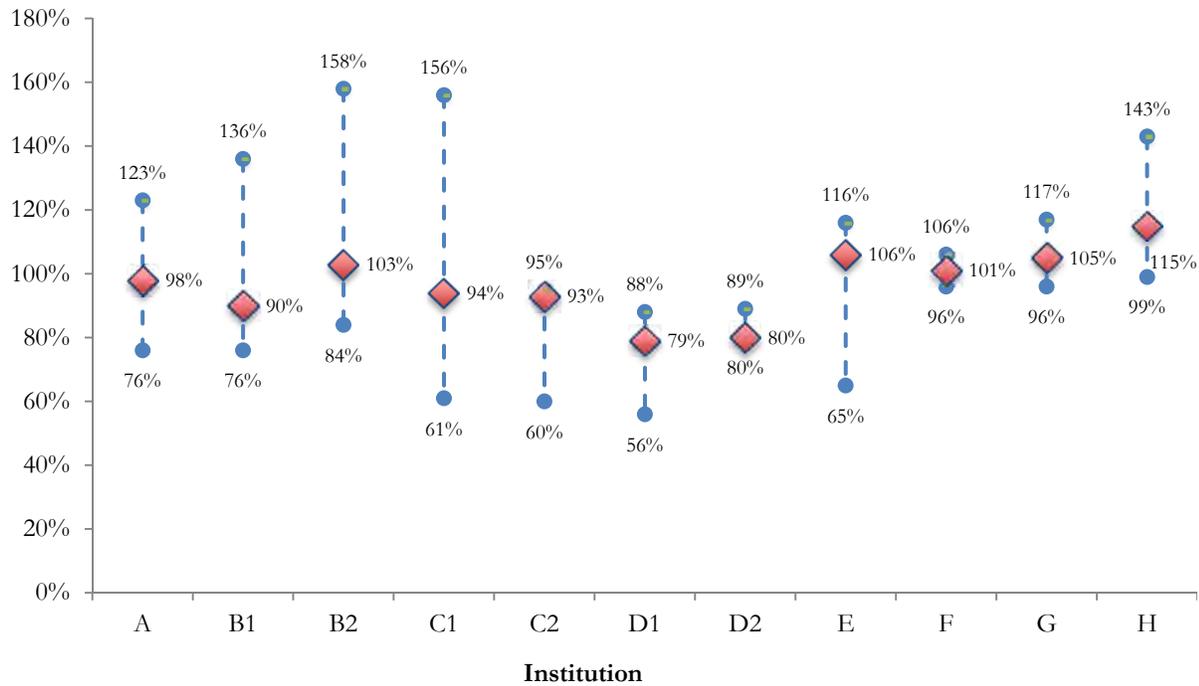
In column 5, we present the simple difference between the NPC estimated level of grant aid and the average actual level of grant aid for students in the sample. Across all institutions, the mean differential was -\$862 with a standard deviation of \$2,270. Differences ranged from a low of \$114 to a high of nearly \$2,500.

**Table 1. Summary Statistics of Grant Aid and NPC Estimates**

| Institution Cohort | <i>N</i> | NPC-estimated Grant Aid | Actual Grant Aid ( <i>SD</i> ) | Grant Aid Differential Mean [Min, Max] | Actual Aid as Percentage of NPC Estimate (Min, Max) |
|--------------------|----------|-------------------------|--------------------------------|--|---|
| A                  | 6        | \$24,267                | \$23,847<br>(3,778)            | -\$420<br>[-5,926, 5,608]              | 98%<br>[76, 123]                                    |
| B1                 | 34       | \$15,940                | \$14,322<br>(3,186)            | -\$1,618<br>[-3,900, 5,784]            | 90%<br>[76, 136]                                    |
| B2                 | 20       | \$15,940                | \$16,404<br>(3,569)            | \$464<br>[-2,630, 9,214]               | 103%<br>[84, 158]                                   |
| C1                 | 26       | \$12,500                | \$11,710<br>(2,966)            | -\$790<br>[-4,855, 6,973]              | 94%<br>[61, 156]                                    |
| C2                 | 34       | \$12,500                | \$11,571<br>(1,026)            | -\$929<br>[-4,970, -670]               | 93%<br>[60, 95]                                     |
| D1                 | 28       | \$11,750                | \$9,284<br>(647)               | -\$2,466<br>[-5,205, -1,355]           | 79%<br>[56, 88]                                     |
| D2                 | 46       | \$11,750                | \$9,443<br>(203)               | -\$2,307<br>[-2,350, -1,350]           | 80%<br>[80, 89]                                     |
| E                  | 13       | \$8,810                 | \$9,330<br>(1,105)             | \$520<br>[-3,115, 1,373]               | 106%<br>[65, 116]                                   |
| F                  | 11       | \$8,393                 | \$8,507<br>(407)               | \$114<br>[-333, 467]                   | 101%<br>[96, 106]                                   |
| G                  | 20       | \$8,289                 | \$8,679<br>(338)               | \$390<br>[-347, 1,403]                 | 105%<br>[96, 117]                                   |
| H                  | 27       | \$7,990                 | \$9,152<br>(972)               | \$1,162<br>[-68, 3,432]                | 115%<br>[99, 143]                                   |

From these results, we conclude that the institutions in our study range substantially in the accuracy of their NPCs *for this particular sample of low-income students*. However, a limitation of our sample is that it is a sample of convenience; the students in our sample are not necessarily representative of all students—low-income or otherwise—admitted to the institutions examined here. Further, we are not able to observe important details such as whether students completed the financial aid application process in a timely manner. As some states award grant aid on a first-come, first-served basis until funding runs out, the timing of a student’s application can be critical.<sup>12</sup> Therefore, our findings offer suggestive evidence about the accuracy of the NPCs included in our study, but we caution against drawing conclusions about the overall average accuracy of NPCs.

What is worth noting, however, is the wide variation in actual grant aid within each institution-cohort group of students, even among students that are homogenous in terms of economic status (as measured by the EFC), dependency status, residency, and housing choice. We report the range of the grant aid differential in brackets in column 5 of Table 1. At Institution C1, for example, grant aid ranged from nearly \$5,000 *less* than the NPC estimated grant aid to almost \$7,000 in excess. At Institution A, where the average and estimated grant aid differed by only a few hundred dollars, we observe a similar spread in actual aid across students. Of the institutions included in our examination, more than half had grant aid award ranges of more than \$4,000. In Figure 1, we offer a second metric for comparison: actual aid as a percentage of the NPC estimate.



**Figure 1. Actual grant aid as a percentage of NPC estimated aid by institution cohort.**

For some institutions, there was a tight correspondence between actual and estimated aid for all students examined (e.g., institutions D2 and F). At the most extreme, actual aid ranged from 61% to 156% of the NPC estimate within a single institution (institution C1). Critically, even at this most extreme end of variability, in no cases did grant aid differentials exceed the range between net price and sticker price. In other words, even at their most inaccurate points, NPC estimates still present a more accurate picture of college expense than do sticker prices.

In Table 2, we further disaggregate grant aid into federal, state, and institutional sources to better understand the sizeable variations in grant aid awarded to students who are socioeconomically similar.

For each aid source, we report the average and standard deviation of award amount as well as the corresponding minimum and maximum. Figure 2 presents only the standard deviations portion of this table to illustrate trends in aid variance by source. Federal aid includes Federal Pell Grants and Federal Supplemental Educational Opportunity Grants; state aid includes statewide need- and merit-based awards; and institutional grants are those awarded by the particular colleges and universities in our sample.

On financial aid award letters, institutional grants typically are designated as residence life, presidents', or deans' scholarships. The results in Table 2 indicate generally consistent and predictable grant funding at the federal and state levels. In contrast, we observe substantially greater variability in grant funding at the institutional level. Finally, in Figure 3, we illustrate the strong, positive relationship between the generosity of institutional grant aid, on average, and the variation in institutional grant aid across students in our sample.

This figure reveals that the level of institutional aid that a student in our sample might expect is less certain for those institutions that have more generous aid, on average.

**Table 2. Grant Aid by Source**

| Institution Cohort | N  | Federal Aid        |                | State Aid        |                | Institution Aid     |                 |
|--------------------|----|--------------------|----------------|------------------|----------------|---------------------|-----------------|
|                    |    | Mean (SD)          | [Min, Max]     | Mean (SD)        | [Min, Max]     | Mean (SD)           | [Min, Max]      |
| A                  | 6  | \$6,022<br>(900)   | [4,480, 6,730] | \$4,560<br>(651) | [3,250, 4,876] | \$13,187<br>(4,119) | [7,000, 18,270] |
| B1                 | 34 | \$6,033<br>(69)    | [5,645, 6,045] | \$1,165<br>(206) | [0, 1,200]     | \$7,124<br>(3,216)  | [4,795, 14,479] |
| B2                 | 20 | \$6,130<br>(0)     | [6,130, 6,130] | \$1,700<br>(0)   | [1,700, 1,700] | \$8,574<br>(3,569)  | [5,480, 17,324] |
| C1                 | 26 | \$5,845<br>(0)     | [5,844, 5,846] | \$796<br>(293)   | [0, 900]       | \$5,069<br>(2,840)  | [1,800, 12,728] |
| C2                 | 34 | \$5,924<br>(34)    | [5,730, 5,930] | \$900<br>(0)     | [900, 900]     | \$4,747<br>(1,027)  | [700, 5,000]    |
| D1                 | 28 | \$5,815<br>(262)   | [4,695, 6,545] | \$825<br>(227)   | [0, 900]       | \$2,644<br>(688)    | [0, 4,300]      |
| D2                 | 46 | \$5,927<br>(22)    | [5,780, 5,930] | \$3,413<br>(361) | [1,470, 4,440] | \$103<br>(352)      | [0, 2,000]      |
| E                  | 13 | \$5,802<br>(1,234) | [1,695, 6,154] | \$992<br>(525)   | [0, 2,400]     | \$2,535<br>(605)    | [1,038, 4,000]  |
| F                  | 11 | \$6,166<br>(418)   | [5,730, 6,530] | \$2,341<br>(32)  | [2,330, 2,436] | \$0<br>(0)          | --              |
| G                  | 20 | \$6,285<br>(330)   | [5,730, 6,480] | \$2,343<br>(269) | [2,212, 2,962] | \$50<br>(224)       | [0, 1,000]      |
| H                  | 27 | \$6,293<br>(372)   | [5,730, 6,530] | \$2,192<br>(0)   | [2,192, 2,192] | \$667<br>(985)      | [0, 3,500]      |

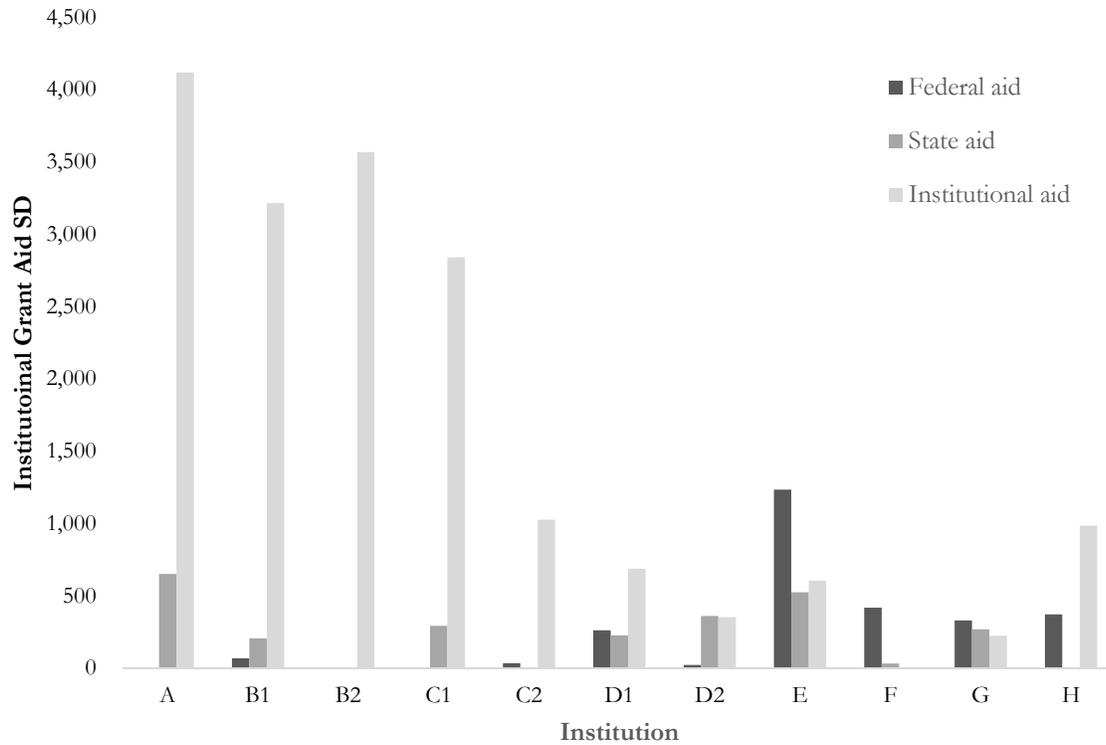


Figure 2. Standard deviation of grant aid by source and institution-cohort group.

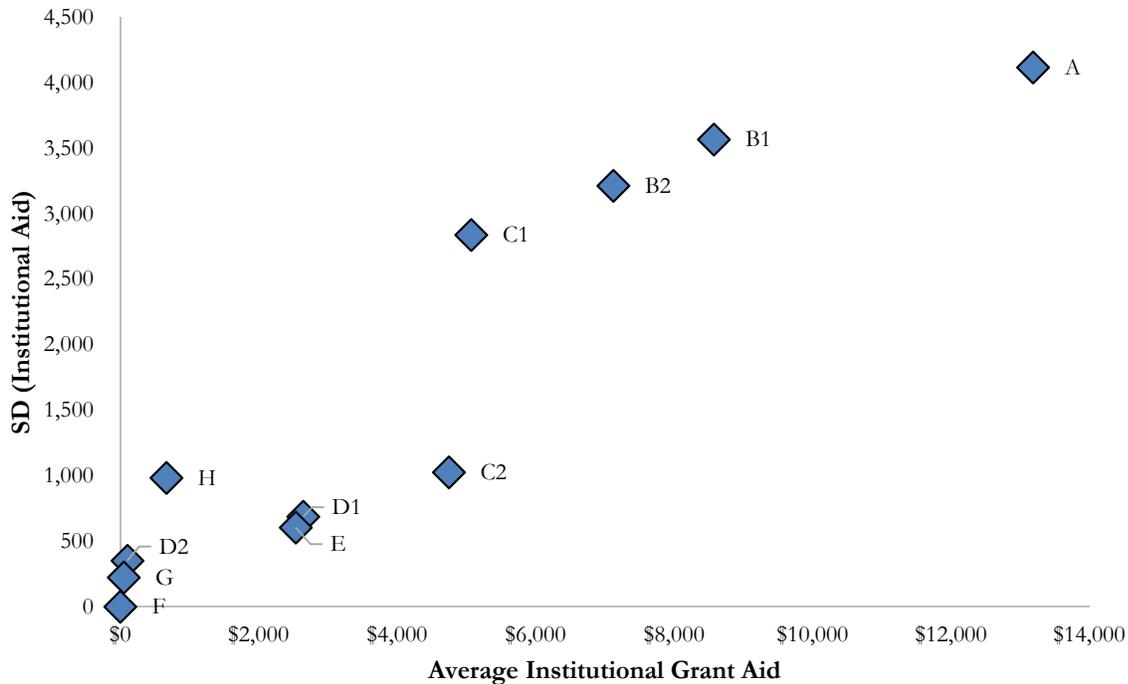


Figure 3. Standard deviation of institutional aid by average level of institutional aid by institution-cohort group.

## Discussion

The goal of this investigation is to assess the extent to which net price calculators provide accurate information to students about the likely costs that they will face to attend a given institution. To assess accuracy, we gathered data on students across seven different institutions in the United States that use the federal template NPC. We focused entirely on students from low-income backgrounds with an EFC of zero. Even within this sample of students with similar economic circumstances, we observe surprising variation in the level of grant aid actually awarded to students and, therefore, in the out-of-pocket expenses that students would face to attend the same institution. The non-representative nature of our sample limits conclusions about the accuracy of NPC estimates, broadly speaking. Our results nevertheless provide a proof of concept that even among students with similar economic profiles, NPC estimates can differ substantially from actual financial aid, in some cases overstating and in other cases understating the level of grant aid that a particular institution eventually awards a student.

What are the sources of the discrepancy? Grant funding from state and federal sources are relatively consistent. At the federal level, for example, such consistency is not surprising, given that all of these students would qualify for the means-tested Federal Pell Grant. Instead, much of the variability in grant aid received by students of the same financial means within the same institution is due to variability in the grant aid awarded by the institution itself.

Based on the financial aid award letters we examined, institutions awarded many of their institution-specific grants on the basis of merit, academic or otherwise, based on strict criteria, such as SAT /ACT and/or GPA thresholds. Institutions distributed need-based sources of funding on a first-come, first-served basis, such that later applicants may have missed out on funding. We are not surprised by this type of variation in awarding institutional grant aid, given that many colleges and universities use merit-based institutional grants, in particular, to attract students with specific characteristics to their campuses. Nevertheless, such sources of funding can clearly contribute to substantial differences between estimated and actual levels of grant funding if not factored into the net-price calculations.

In addition, while we are limited in our ability to investigate this point, given that we have data from only seven unique postsecondary institutions in our sample, another potential source of discrepancy in the information provided by NPCs is stale data. In the summer of 2015, two of the seven institutions in our study were still presenting cost information from the 2009-10 school year. As the mandate went into effect in October of 2011, these institutions likely have never updated their cost information since their initial posting. With the costs of postsecondary education changing on an annual basis, the information provided by NPCs should keep pace.

Despite the inaccuracies that we detected, it is important to state emphatically that we do not intend for our results to serve as an indictment of the federal template NPC. Rather, we hope that these results will help to guide further improvement of tools that provide information to students and families on the true costs of college attendance. Importantly, the families who may benefit most from the use of an NPC may be those whose access to the tool is via a gatekeeper such as a counselor or other college advising practitioner. Improved accuracy may increase the likelihood of practitioners sanctioning the use of NPCs, and better information on accuracy may help these practitioners improve in their ability to inform the expectations of the students with whom they work.

Improved accuracy, however, should not be the sole concern for future NPC research. We suggest that every effort to improve NPC accuracy also be tempered with a consideration for NPC simplicity. Indeed, a more complex NPC may produce more accurate estimates of grant aid by drawing on more detailed

personal information; however, if NPCs are to improve college transparency for most students, they should not recreate the same complexities that first spurred their implementation.

A benefit of the federal template NPC is that users are required to provide a minimal amount of household and other information in order to obtain an estimate of college cost. This is an important feature of the federal template, as NPCs that require many additional data elements not typically at students' or even parents' fingertips run the risk of not being used due to complexity. Nevertheless, for net price calculators to be useful in helping students understand the true costs of attending a particular postsecondary institution, it is imperative that they provide a reasonably accurate picture of cost.

Looking to the future NPC research agenda, it will be important to learn more about NPC variation among similar students across an expansive range of institutions and student profiles. A key policy objective will be to maximally improve accuracy of estimates while minimally increasing the burden of using the tools themselves.

### **Implications for Policy and Practice**

We offer four key recommendations informed by our examination. First, information on median aid that NPCs currently provide should be accompanied by information on variability, and potentially, on sources of that variability in grant aid. Second, a basic metric of academic merit, such as SAT/ACT scores and GPA be should added to the data requested on the federal template NPC to allow institutions to account for merit-based grant aid, where relevant. Third, institutions should update the data underlying their NPCs on a yearly basis. And fourth, institutions should take advantage of the opportunity to provide additional explanations and caveats regarding their estimates of cost and aid figures.

Interestingly, most of these recommendations were considered prior to implementing the NPC component of the 2008 amendments to the Higher Education Opportunity Act. In January 2009, the Integrated Postsecondary Education Data System (IPEDS) assembled a Technical Review Panel (TRP) consisting of 58 individuals representing the federal and state governments, postsecondary institutions, data users, and others to provide input concerning the development of the federal template NPC (IPEDS, 2009). Notes from this meeting demonstrate that the TRP anticipated certain aspects of these recommendations before launching the federal template NPC in 2011. Now after nearly five years of use, we can better assess which of these elements merit further consideration.

An important question, however, given that many of our recommendations are not new, is why the TRP recommendations have not led to changes in institutional practice. A first barrier is communication. Simply put, colleges and universities may have little knowledge of these recommendations. While IPEDS TRP notes are publicly available online, with such passive distribution institutions may lack awareness of the suggestions included. Second, given the resource constraints that postsecondary institutions face, most may understandably be focused on meeting minimum compliance standards. If so, they are unlikely to implement any individualized variations of the federal template NPC without a formal policy directive to do so.

#### ***Information on Variance in Aid***

The federal template NPC takes measures to emphasize that its results are only estimates of anticipated costs after grant aid, but it does not provide an indication of how widely those estimates may vary. The TRP addressed this concern directly: "The panel suggested that estimated grant aid and estimated net price be provided as a range (rounded to thousands); and that NCES [National Center for Education Statistics]

provide guidance on the appropriate size of the range” (IPEDS, 2009). By receiving results as a likely range of aid level, users might be inclined to more appropriately interpret their results as approximations rather than exact predictions. Moreover, particularly in the case of institutional aid, net price calculators could include information on the types of institutional aid awarded to some students as well as on the procedures and priority deadlines for financial aid application.

Displaying grant aid ranges would require a change to the design of the template itself, but there is an option for institutions to provide additional explanations on the output screen. Without the additional hurdle of drafting a new NPC template, it would be relatively simple for schools to input a brief statement about aid ranges as well as types and amounts of additional institutional aid and the criteria that students must meet to access this aid. Such statements may help students to better anticipate and plan for deviations in institutional aid on their actual award packages.

### ***Metric of Merit Aid***

The federal template NPC should allow institutions the option to request a metric of academic merit. As defined in the Higher Education Opportunity Act of 2008, the grant aid components of net price include both need-based and merit-based grant aid. The language in the TRP report corresponds with that of the legislation and makes several mentions of both need- and merit-based grants. Nonetheless, the federal template does not require students to input indicators of academic or other merit. This is despite the fact that at many institutions’ admitted students are automatically eligible for merit-based grant aid based on meeting minimum merit thresholds. If the federal template NPC included one or two fundamental measures of academic achievement, such as SAT/ACT scores and GPAs, they may be better able to account for variation in institutional grant aid.

Additional data points on the federal template would require a policy decision by the U.S. Department of Education and would place a burden on schools to complete a cost matrix for an expanded student profile. With many financial aid offices facing resource constraints, this suggestion carries the greatest burden to implementation. However, accounting for such differences in merit aid would likely lead to more accurate NPC results.

### ***Updating Cost Data***

Institutions should update the data underlying their NPCs on a regular basis, particularly when they increase their tuition levels and other costs of attendance or make modifications to their available institutional grants. Work in the behavioral economics literature suggests that even small changes in cost can impact students’ decision making regarding postsecondary education (e.g., Castleman & Page, 2014; Hurwitz et al., 2016; Pallais, 2015). If students’ college application decisions are based on outdated, inaccurate information, they may be less willing or able to follow through when it comes time to pay the tuition bill. The U.S. Department of Education advises, but does not currently require, colleges to update their calculators on an annual basis. The Net Price Calculator Improvement Act, introduced by Senators Al Franken and Chuck Grassley, went further by including the stipulation that calculators be populated with data from not earlier than two academic years prior to the most recent academic year.

Despite previous legislative efforts, keeping cost information up to date does not require legislative action. Schools are already required to provide an annual cost information submission to the Student Financial Aid component of the Department of Education’s Integrated Postsecondary Education Data System (IPEDS), so it would appear to be a reasonable expectation that NPC cost information is also kept up to date.

### *Using “Explanations and Caveats” Options*

Finally, the federal template NPC allows institutions to include in the “explanation and caveats” section additional information that may be helpful for students and families in anticipating their likely college aid and expenses. However, based on our investigations to date, it appears that many schools do not take advantage of the option to provide additional information. Institutions should consider making greater use of this option. By default, institutions must report information on the percentage of first-time, full-time students receiving grant aid in this section. In addition, they have the option to include up to three explanations or caveats.

The percentage of students receiving grant aid is a particularly valuable detail, especially for more risk-averse students and families who might otherwise be skeptical of their likelihood to receive aid. If prospective students understand that a substantial share of students within an institution receive grant aid, they may be more inclined to follow through with important financial aid application tasks.

Beyond this piece of information, including additional detail is not required. Nevertheless, institutions could use this aspect of the federal template NPC to share with students and families important information such as (1) characteristics of students to whom estimates may not apply (e.g., undocumented students, students participating in ROTC); (2) next steps in the financial aid application process, including state and/or institutional priority filing deadlines; (3) further information regarding potential variation in financial aid packages around the NPC estimate and drivers of that variation; and/or (4) drivers of variation in the total cost of attendance, such as variation in student fees by major. Finally, institutions might include guidance and caveats for making comparisons in financial aid packages across institutions.

## **Conclusion**

Based on this research, we conclude with recommendations specific to college financial aid administrators, high school counselors, and others involved in helping students and families through college admissions. First, we recommend referring students and families to schools’ NPCs, despite potential inaccuracies. On average, NPCs establish a better starting point for assessing college affordability than sticker prices do. And while this point may be obvious for financial aid professionals, it is not nearly as obvious for many families. Second, we recommend that financial aid administrators become aware of the range of NPCs that exist and consider trade-offs between accuracy and simplicity. And third, we recommend that institutions take advantage of the opportunities to provide students and families with additional explanations about their financial aid and cost calculations. Overall, NPCs are a useful component of a college counselor’s tool kit, but it is important to understand how they work and to know their limitations.

To conclude, NPCs were designed to help students and families more easily reach an estimate of the actual costs to attend college and to understand sources of financial aid that are available. By accounting for likely grant aid based largely on the student’s household income, the federal template NPC can provide a quick and simple estimate of net college cost. As a tool for estimation, net price calculators are undoubtedly a move in the right direction. The NPCs that we examined through this study rely on a minimal level of information and provide families with a ballpark estimate of college costs that is much closer than the 300% overestimate reported by Bettinger and colleagues (2012). Nevertheless, our findings here indicate that for the lowest-income students, this ballpark may remain large. These findings call for potentially simple augmentations to the federal NPC to further improve the information that it can provide to help students and families understand the true costs of college.

### **Nexus: Connecting Research to Practice**

- The federal template NPC allows students and families to quickly and easily reach relatively accurate estimates of average grant aid for students with similar economic characteristics. Nevertheless, individual financial aid packages can differ substantially from these estimates.
- Institutions can take relatively simple steps to help students and families understand and anticipate these differences.
- The federal template NPC includes an “explanations and caveats” section that appears underutilized by institutions. This component of the template provides an opportunity to communicate with students and families about variability in actual financial aid packages as well as about important steps in the financial aid process, such as meeting priority FAFSA filing deadlines.
- Institutional sticker prices and net prices can change substantially from year to year. Accordingly, institutions should update the data underlying their NPC estimates annually.
- Grant aid includes both need-based aid and merit-based aid. The federal template NPC can be improved by allowing institutions to request indicators of academic merit eligibility such as SAT/ACT scores or GPA. In lieu of changes to the federal template itself, institutions can include information about their specific merit-aid-eligibility thresholds to help students better anticipate their potential to qualify for merit-based aid.

### ***Endnotes***

<sup>1</sup> Federal grants include Pell Grants, Federal Supplemental Educational Opportunity Grant (FSEOG), Leveraging Educational Assistance Partnership (LEAP), Academic Competitiveness Grants, Science and Mathematics Access to Retain Talent (SMART) Grants, Veterans and Military, and other grants.

<sup>2</sup> H.R. 3694 and S. 2281, respectively. Representatives Hinojosa (D-TX15), Issa (R-CA49), and Miller (D-CA11). S. 2281 cosponsored H.R. 3694, introduced in December 2013. and Senators Grassley (R-IA) and Kaine (D-VA) cosponsored S. 2281, introduced in May 2014.

<sup>3</sup> See <http://collegecost.ed.gov/catc/> and [collegescorecard.ed.gov](http://collegescorecard.ed.gov) for more information.

<sup>4</sup> For more information on the federal NPC template, see <http://nces.ed.gov/ipeds/netpricecalculator/>

<sup>5</sup> Input elements must include those that allow for an estimate of the student’s Expected Family Contribution (EFC). These elements include household income, number in family, and student dependency status. Output elements must include estimates of total cost of attendance; tuition and fees; room and board; books and supplies; other expenses; total grant aid; and net price. Additional output requirements include the percentage of the first-time, full-time student cohort receiving grant aid and caveats or disclaimers associated with the estimates provided.

<sup>6</sup> For more information about alternative NPCs, see, for example, the NPC created by The College Board at <http://netpricecalculator.collegeboard.org/> and the NPC created by Cegment (formerly Student Aid Services) at <http://www.cegment.com/personal-affordability-calculator/#prettyPhoto>

<sup>7</sup> Because NPC estimates are based on a matrix combining a student's Expected Family Contribution (EFC) and living arrangements, it is important to note differences in methodologies to calculate EFC. The limited questions of the federal template NPC are an abbreviated version of the federal methodology EFC calculation. However, many private colleges and universities use what is known as the Institutional Methodology. Because the formulas calculate EFC differently, the same student may have a different EFC under each methodology.

<sup>8</sup> EFC ranges (in USD) include: 0; 1-1,000; 1,001-2500; 2,501-5,000; 5,001-7,500; 7,501-10,000; 10,001-12,500; 12,501-15,000; 15,001-20,000; 20,001-30,000; 30,001-40,000; unknown.

<sup>9</sup> We nevertheless assessed the potential sensitivity of our results to student living arrangements. Where first-year students have the option to live off campus, we calculated NPC estimates for both housing conditions (on- or off-campus) and assigned students to the NPC estimate that most closely matched their actual awards. We found that though NPC estimates are especially sensitive to housing arrangements at three schools in our sample, the off-campus NPCs were a closer match to actual aid in a very small number of cases ( $n=14$ ), and our main conclusions were largely unchanged. See Figure A1 in the appendix for a summary of the results of this sensitivity check.

<sup>10</sup> Unfortunately, we do not have information on other demographic/achievement characteristics of the students included in our sample.

<sup>11</sup> See Table A2 in the appendix for more information on the institutions in our study.

<sup>12</sup> In these data, we lack information on the submission dates of students' FAFSAs. Submission dates could be especially critical to financial aid awards because each of the schools in our sample has a priority FAFSA submission deadline that students must meet in order to be considered for maximum aid. Applications received after the priority deadlines are considered only on the availability of funds.

### ***Acknowledgements***

We are grateful to the National College Access Network for supporting this project and facilitating our connection to the several NCAN-member organizations that graciously provided data for this study. We additionally thank those organizations that provided student-level data for this study. We do not mention these organizations by name in order to protect the identities of the students and postsecondary institutions for which they provided data. We especially thank Diane Cheng and Alexandra Chewning for insightful feedback. All views and any errors are our own.

## References

- Advisory Committee on Student Financial Assistance. (2005). *The student aid gauntlet: Making access to college simple and certain. Final Report of the Special Study of Simplification of Need Analysis and Application for Title IV Aid.* Washington, D.C.: U.S. Department of Education.
- Avery, C., & Kane, T. J. (2004). *Student perceptions of college opportunities: The Boston COACH program.* University of Chicago Press.
- Bettinger, E., Long, B. T., Oreopoulos, P., & Sanbonmatsu, L. (2012) The role of application assistance and information in college decisions: Results from the H&R Block FAFSA experiment. *Quarterly Journal of Economics.* 127(3).
- Castleman, B. L., & Page, L. C. (2014). *Summer melt: Supporting low-income students through the transition to college.* Cambridge, MA: Harvard Education Press.
- Cheng, D., (2012). Adding it all up 2012: Are college net price calculators easy to find, use, and compare? Retrieved March 02, 2014, from [http://www.ticas.org/files/pub/Adding\\_It\\_All\\_Up\\_2012.pdf](http://www.ticas.org/files/pub/Adding_It_All_Up_2012.pdf)
- College Board. (2012). College is affordable: A pilot study.” *The College Board Advocacy & Policy Center and the College Foundation of North Carolina.* Retrieved October 18, 2014, from <http://www.advocacy.collegeboard.org//sites/default/files/college-is-affordable-summary-9-6-12-final.pdf>
- College Board. (2014a). Trends in student aid 2014. *Trends in Higher Education.* Retrieved 21 May, 15 from <http://trends.collegeboard.org/sites/default/files/2014-trends-student-aid-final-web.pdf>
- College Board. (2014b). Tuition and fee and room and board charges over time, 1973-74 through 2013-14, selected years. Retrieved July 18, 2014, from <https://trends.collegeboard.org/college-pricing/figures-tables/tuition-and-fee-and-room-and-board-charges-over-time-1973-74-through-2013-14-selected-years>
- Daly, M. C., & Bengali, L. (2014, May 5). Is it still worth going to college? *Economic Research.* Retrieved May 29, 2014, from <http://www.frbsf.org/economic-research/publications/economic-letter/2014/may/is-college-worth-it-education-tuition-wages/>
- Dunn, R., & Oreopoulos, P. (2013). Information and college access: Evidence from a randomized field experiment. *The Scandinavian Journal of Economics*, 115(1), 3-26. doi:10.1111/j.1467-9442.2012.01742.x
- Grodsky, E., & Jones, M. T. (2007). Real and imagined barriers to college entry: Perceptions of cost. *Social Science Research* 36(2): 745–766.
- Higher Education Act of 1965, Pub. L. 89-329, 79 Stat. 1219, codified as amended at 20 U.S.C § 1001 et seq.
- Higher Education Opportunity Act of 2008, Pub. L. 110-315, 122 Stat. 3078, codified as amended at 20 U.S.C § 1001 et seq.
- Horn, L. J., Chen, X., & Chapman, C. (2003). *Getting ready to pay for college: What students and their parents know about the cost of college tuition and what they are doing to find out.* National Center for Education Statistics Report No. 2003030. Washington, D.C.: National Center for Education Statistics.

- Hoxby, C., & Avery, C. (2013). The missing “one-offs”: The hidden supply of high-achieving, low-income students. *Brookings Papers on Economic Activity*, 31.
- Hoxby, C., & Turner, S. (2013). Expanding college opportunities for high-achieving, low-income students. *SIEPR Discussion Paper No. 12-014*.
- Hurwitz, M., Mbekeani, P. P., Nipson, M. M., & Page, L. C. (2016) Surprising ripple effects: How changing the SAT score sending policy for low-income students impacts college access and success. Working paper. Available at: <http://ssrn.com/abstract=2725693>
- Ikenberry, S. O., & Hartle, T. W. (1998). *Too little knowledge is a dangerous thing: What the public thinks about paying for college*. Washington, DC, American Council on Education.
- Integrated Postsecondary Education Data System. (2009). *Requirements of Higher Education Opportunity Act: Multi-year tuition calculator and net price calculator template* (Technical Review Panel No. 26). Retrieved from [edsurveys.rti.org/IPEDS\\_TRP](https://edsurveys.rti.org/IPEDS_TRP)
- Lusardi, A. (2015). Financial literacy: Do people know the ABCs of finance? *Public Understanding of Science*, 24(3), 260-271.
- National Association for College Admission Counseling. (2015). *Survey of admission officers on federal regulations*. Retrieved from [www.nacacnet.org](http://www.nacacnet.org).
- Page, L. C., & Scott-Clayton, J. (2016). Improving college access in the United States: Barriers and policy responses. *Economics of Education Review*, 51, 4-22.
- Pallais, A. (2015). Small differences that matter: Mistakes in applying to college. *Journal of Labor Economics*, 33(2):493-520.
- Radford, A. W. (2013). *Top student, top school? How social class shapes where valedictorians go to college*. University of Chicago Press.
- Smith, B., Frechette, C., Childress, D., & Alexander, M. (2011). *Meeting the federal Net Price Calculator mandate*. Retrieved from Student Aid Services website: <http://www.studentaidservices.com/mandatewhitepaper.pdf>

**Appendix.**

**Table A1. Data Elements Included in Selected Net Price Calculator Templates**

| Data Element  | Federal<br>Template | College<br>Board | Cegment |
|---|---------------------|------------------|---------|
| <i>Input Information</i>  |                     |                  |         |
| Agree to terms  | X                   |                  | X       |
| Plan to apply for aid   | X                   |                  |         |
| Age   | X                   | X                | X       |
| State residency   | X                   | X                | X       |
| Student marital status  | X                   | X                | X       |
| Student dependents  | X                   | X                | X       |
| Household size  | X                   | X                | X       |
| Number of household in college  | X                   |                  | X       |
| Household income after taxes  | X                   |                  |         |
| First name  |                     | X                |         |
| Current grade   |                     | X                | X       |
| On-/off-campus living   |                     | X                | X       |
| Status at institution (just looking, requested info, applied, admitted) |                     | X                |         |
| Orphan or ward of court   |                     | X                | X       |
| Citizenship   |                     | X                | X       |
| Ethnicity   |                     | X                |         |
| High school GPA   |                     | X                | X       |
| High school class rank  |                     | X                |         |
| Combined reading and math SAT score                                     |                     | X                | X       |
| Composite ACT score   |                     | X                | X       |
| National Merit Aid finalist   |                     | X                |         |
| Anticipated major   |                     | X                |         |
| Legacy at institution (parent or step-parent alumni association member) |                     | X                |         |
| Intention of parents to apply for federal education loans               |                     | X                |         |
| Gender  |                     | X                |         |
| First-year or transfer student  |                     | X                |         |
| AGI (only if filed 1040EZ or 1040A)                                     |                     |                  |         |
| Student name  |                     | X                | X       |
| Student address   |                     |                  | X       |

*continued on next page*

**Appendix—Continued.****Table A1—Continued. Data Elements Included in Selected Net Price Calculator Templates**

| <b>Data Element</b>  | <b>Federal<br/>Template</b> | <b>College<br/>Board</b> | <b>Segment</b> |
|--|-----------------------------|--------------------------|----------------|
| Student email  |                             |                          | X              |
| Student phone  |                             |                          | X              |
| In armed forces  |                             |                          | X              |
| Veteran of armed forces  |                             |                          | X              |
| Child of active veteran service member   |                             |                          | X              |
| At age 13, was student ward of court or parents were deceased  |                             |                          | X              |
| Form completer relation to student   |                             |                          | X              |
| Anticipated year of HS graduation (notice of estimates for future graduation dates)                                    |                             |                          | X              |
| Parent or guardian employed at institution   |                             |                          | X              |
| SAT reading  |                             |                          | X              |
| SAT math   |                             |                          | X              |
| ACT composite  |                             | X                        | X              |
| Participation in Governors Honors Academy  |                             |                          | X              |
| Valedictorian  |                             |                          | X              |
| Mother's income  |                             | X                        | X              |
| Father's income  |                             | X                        | X              |
| Additional income  |                             | X                        | X              |
| Amount of other taxable income   |                             | X                        | X              |
| Amount of income losses  |                             | X                        | X              |
| Amount of untaxed income   |                             | X                        | X              |
| Total value of parent's assets   |                             | X                        | X              |
| Parent marital status  |                             | X                        | X              |
| Age of older parent  |                             | X                        | X              |
| Parents' state of residence  |                             | X                        |                |
| Federal income tax form filed by parents for most recent tax year (1040, 1040A, 1040EZ, other, did not file, not sure) |                             |                          |                |
| Number of siblings   |                             | X                        |                |
| Age of siblings  |                             | X                        |                |
| Wages, salaries, and tips (parents)  |                             | X                        |                |
| Parent 1 income  |                             | X                        | X              |

*continued on next page*

**Appendix—Continued.**

**Table A1—Continued. Data Elements Included in Selected Net Price Calculator Templates**

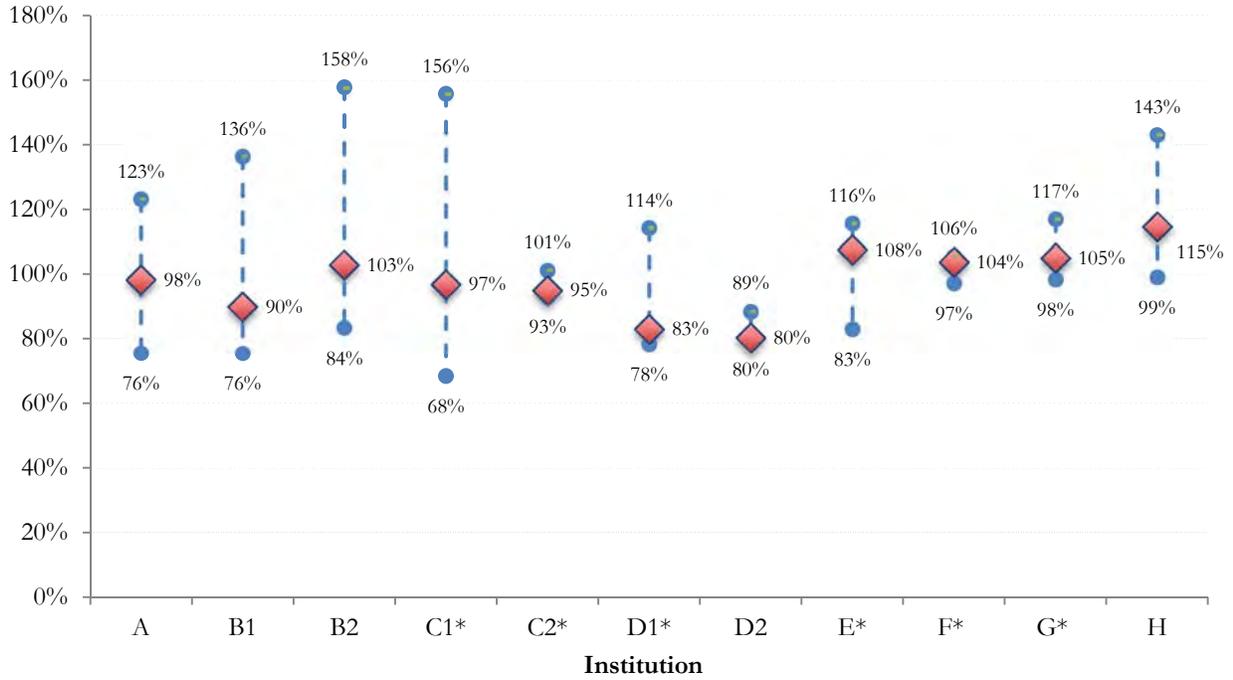
| Data Element  | Federal<br>Template | College<br>Board | Cegment |
|---|---------------------|------------------|---------|
| Parent 2 income   |                     | X                | X       |
| Total interest and dividend income (parents)  |                     | X                | X       |
| Business income or losses (parents)   |                     | X                | X       |
| Other taxable income or losses (parents)  |                     | X                | X       |
| Parents' total income adjustments (parents)   |                     | X                | X       |
| Amount reported in education tax credits (parents)  |                     | X                |         |
| Amount received in tax credits and benefits (parents)   |                     | X                |         |
| Amount contributed to non-taxable retirement plans and/or received in untaxed income and benefits (parents) |                     | X                |         |
| Amount claimed in itemized deductions (parents)   |                     | X                |         |
| Number of exemptions claimed (parents)  |                     | X                |         |
| Current amount in cash, savings, and checking (parents)   |                     | X                | X       |
| Current value of investments, not including retirement (parents)  |                     | X                | X       |
| Amount owed on investments (parents)  |                     | X                |         |
| Business ownership (parents)  |                     | X                |         |
| Farm ownership (parents)  |                     | X                |         |
| Real estate other than home, business, or farm (parents)  |                     | X                |         |
| Earnings from work (student)  |                     | X                | X       |
| Interest and dividend income (student)  |                     | X                | X       |
| Untaxed income and benefits (student)   |                     | X                | X       |
| Amount in cash, savings, checking, and investments, not including retirement (student)                      |                     | X                | X       |
| Business or farm ownership (student)  |                     | X                |         |
| Equity in real estate other than home, business, or farm (student)  |                     | X                |         |
| Value of trusts of which student is beneficiary   |                     | X                |         |
| Parent home ownership   |                     | X                |         |
| Value of home   |                     | X                |         |
| Amount owed on home   |                     | X                |         |
| Purchase price of home  |                     | X                |         |
| Year of home purchase   |                     | X                |         |
| Total elementary, junior high, and high school tuition parents paid or expect to pay for all dependents     |                     | X                |         |
| Option to save data for future comparisons  |                     | X                |         |

*continued on next page*

**Appendix—Continued.****Table A1—Continued. Data Elements Included in Selected Net Price Calculator Templates**

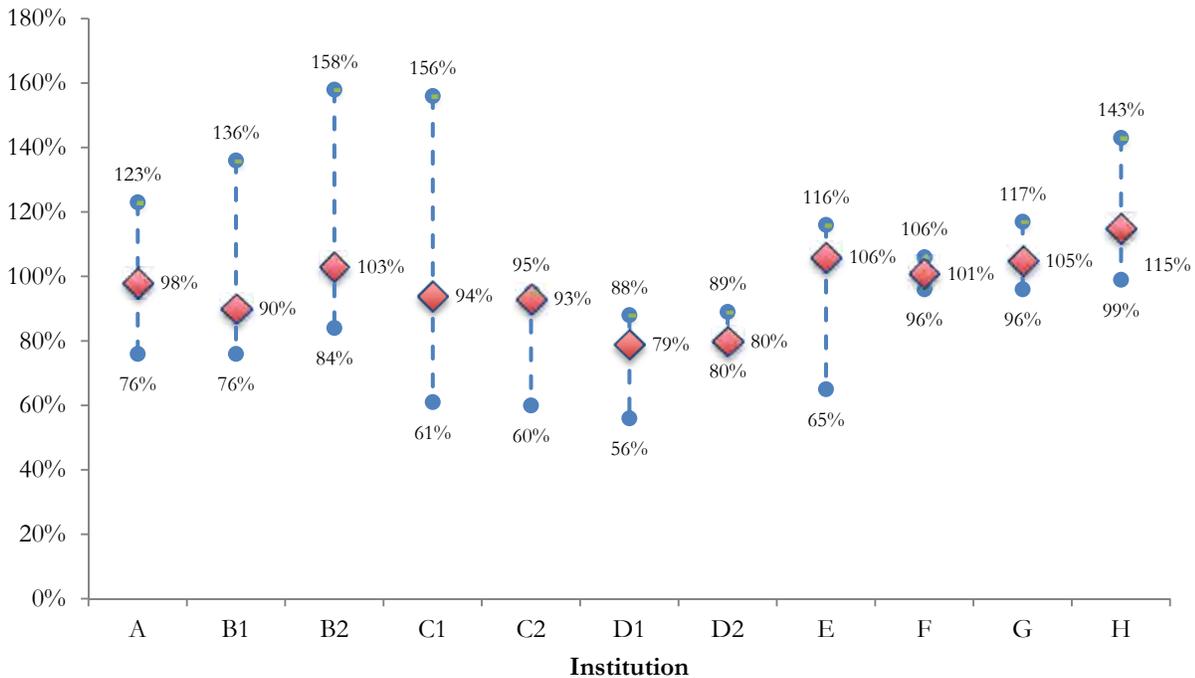
| Data Element   | Federal<br>Template | College<br>Board | Segment |
|--|---------------------|------------------|---------|
| <i>Output Information</i>                              |                     |                  |         |
| Estimated tuition and fees                             | X                   | X                | X       |
| Estimated room and board charges                       | X                   | X                | X       |
| Estimated cost of books and supplies                   | X                   | X                | X       |
| Estimated “other expenses”                             | X                   |                  | X       |
| Estimated personal expenses                            |                     | X                |         |
| Estimated transportation expenses                      |                     | X                |         |
| Estimated total cost of attendance                     | X                   | X                | X       |
| Estimated total grant aid                              | X                   | X                | X       |
| Estimated Federal Pell Grant aid                       |                     | X                |         |
| Estimated federal grant                                |                     | X                |         |
| Estimated institutional grant                          |                     | X                |         |
| Estimated student loan                                 |                     | X                |         |
| Estimated student work-study                           |                     | X                |         |
| Estimated total self help                              |                     | X                |         |
| Year of data   | X                   |                  | X       |
| Expected family contribution                           |                     | X                |         |
| Expected parent contribution                           |                     | X                |         |
| Expected student contribution                          |                     | X                |         |
| Estimated remaining cost                               |                     | X                |         |
| Student resources worksheet                            |                     | X                |         |
| Student next steps guide                               |                     | X                |         |
| Clarification of grants and loans                      | X                   |                  |         |
| Percentage of students receiving grant/scholarship aid | X                   |                  | X       |
| Estimated state grant                                  |                     | X                | X       |
| Institutional merit scholarship                        |                     | X                | X       |
| FSEOG  |                     | X                |         |
| Estimated eligibility for other aid programs           |                     |                  | X       |
| Estimated Stafford subsidized loan amount              |                     |                  | X       |
| Estimated Stafford unsubsidized loan amount            |                     |                  | X       |
| Estimated PLUS loan amount                             |                     |                  | X       |

Appendix—Continued.



\* Indicates revised accuracy figures

**Figure A1. Actual grant aid as a percentage of NPC estimated aid by institution cohort, using NPC estimate for on- or off-campus housing that best matches actual aid awarded.** For reference, *Figure 1*, with values presuming all students to be living on campus, is copied below.



**Appendix—Continued.**

**Table A2. Description of Institutions Included in Sample**

| <b>Institution</b> | <b>Region</b> | <b>Sector</b> | <b>Undergraduate Enrollment</b> | <b>Selectivity</b> |
|--------------------|---------------|---------------|---------------------------------|--------------------|
| A                  | South         | Private       | 10,000-15,000                   | Highly competitive |
| B                  | Northeast     | Public        | 20-000-25,000                   | Highly competitive |
| C                  | Northeast     | Public        | 7,500-10,000                    | Competitive        |
| D                  | Northeast     | Public        | Under 5,000                     | Competitive        |
| E                  | Northeast     | Public        | 5,000-7,500                     | Competitive        |
| F                  | Midwest       | Public        | 5,000-7,500                     | Competitive        |
| G                  | Midwest       | Public        | 10,000-15,000                   | Less competitive   |
| H                  | Midwest       | Public        | 10,000-15,000                   | Competitive        |