College Board Advocacy & Policy Center
Research Brief
June 2012

How Does Institutional Grant Aid Impact College Choice?

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Summary Notes

- For a student with a family income of less than $50,000 per year, an additional $1,000 in institutional grant aid increases the probability that the student will choose that aid-granting college over his or her other choices by 3 percentage points.
- Among the subset of students with family incomes of less than $200,000 per year, those from wealthier families are less sensitive to institutional grant aid in the college-choice process.
- Low-income students often have unmet financial need, and the dissolution of federal aid programs such as the Pell Grant would increase the likelihood that these students would decline admission offers from the colleges they would have preferred if finances were a nonissue.

During the 2010-11 academic year, American postsecondary institutions awarded approximately $29.7 billion in institutional grant aid to undergraduate students. This grant aid, originating from colleges' and universities' coffers, comprised 32 percent of the total grant aid awarded to undergraduate students and, aside from the $34.8 billion in Pell Grants, was the largest source of grant aid.[1]

Although the motivations and award criteria underlying institutional grant aid differ across postsecondary institutions, the two most common rationales for this investment are to increase college access through affordability and to offer attractive prices with the intent of luring students away from competing institutions. Despite this sizeable commitment to institutional grant aid, a consensus has yet to be reached on the impact of this aid on student enrollment behavior. The small body of compelling literature broaching this issue has generated some conflicting results, suggesting the need for additional research on this topic.[2]

Rather than just focusing on the *correlation* between institutional grant aid and enrollment behavior, this study endeavors to identify the *causal* effect of institutional grant aid on college enrollment behavior. The distinction between these two relationships is subtle, yet extremely important. Many attributes of a college influence a student's decision on where to enroll, such as prestige, location and success of sports teams (to name just a few). Any relationship between these factors and institutional grant aid has the potential to obscure the true causal impact of institutional grant aid on college choice.

1 See Baum and Payea (2011).

2 See Van der Klaauw (2002); Avery and Hoxby (2003); Linsenmeier, Rosen and Rouse (2006) and Monks (2009).

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Research Questions

1. By how much does institutional grant aid impact college choice across the spectrum of parental income? Specifically, is the impact of grant aid greater for applicants with lower parental incomes?

2. Does the influence of institutional grant aid on student college choice differ by underrepresented minority status?

3. Is the influence of institutional grant aid on student college choice related to college selectivity?

Data & Methodology

This study uses admission and financial aid data for students planning to attend college in the fall of 2009 from 30 anonymous, highly selective postsecondary institutions, with substantial applicant overlap. These data originate from the institutions themselves, rather than from student surveys, so misrepresentation of student choice sets or financial aid packages is nonexistent as a research contaminant.

The primary focus of this study is student choice, so the sample is limited to students with demonstrated financial need who were admitted to at least two of the sampled institutions. This sample restriction results in the inclusion of 6,306 students with a total of 18,047 admission offers. Among these students, the average combined math and critical reading SAT® score is 1445, 32 percent are members of an underrepresented minority (URM) group, the average annual parental income is approximately $131,302, and the average institutional grant aid award is $24,585, which equates to slightly less than half of the college's listed tuition, fees and room and board.[3]

- 6,306 students with 18,047 admission offers
- Average SAT score of 1445
- 32 percent African American, Latino/Hispanic and Native American
- Average parental income of $131,302
- Average institutional grant aid package of $24,585

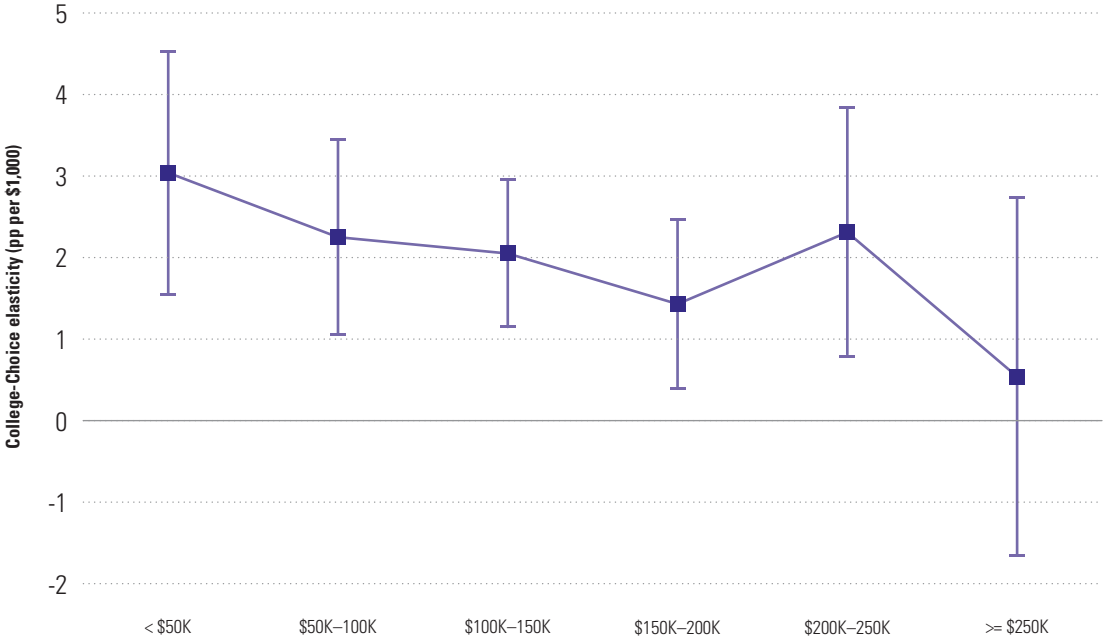
Academically exceptional high school students tend to apply to a narrow set of highly competitive colleges. Aggressive application behavior among highly talented students results in thousands of students with multiple admission offers at a similar set of highly selective colleges. It is this similarity in college choice sets that drives the methodology from which conclusions are drawn, and one that also has been harnessed by other researchers to examine the impact of college selectivity on students' labor market outcomes.[4]

Obtaining a causal estimate of the institutional grant aid's impact on college choice would be simple if grant aid were awarded randomly to students. However, many factors enter into the allocation of

3 Underrepresented minorities include African American, Latino/Hispanic, and Native American students.

4 See Dale and Krueger (2002, 2011).

Figure 1: College-Choice Elasticity by Parental Income Group



Note: Data are from the 18,047 acceptances for college entry in the fall of 2009 received by 6,306 students at the 30 sampled colleges. The upper and lower hash marks represent the upper and lower bounds on the 95 percent confidence intervals, respectively.

institutional grant aid to students, such as parental income, the wealth and aid-granting capacities of the institutions themselves, and the relative desirability of the student as perceived by the college. Any simple statistical analysis, such as predicting the probability that the student chooses an institution based on that institution's grant aid package, is likely to misrepresent the causal impact of institutional grant aid on college choice, generating biased results. In this study, bias has been removed, thus exposing the causal impact of institutional grant aid on college choice.[5]

Results

I first examine the increase in probability that a student will choose a particular sampled college over his or her other choices (within the sample) if that college offered him or her an additional $1,000 in institutional grant aid. This increase in college-choice probability caused by an increase of $1,000 in institutional grant aid is referred to as the *college-choice elasticity*.

College-Choice Elasticity

The increase in the probability of choosing a particular sampled college caused by an increase of $1,000 in institutional grant aid.

5 An instrumental variable approach is used to identify the causal relationship between institutional grant aid and students' college choice. The details of this approach appear in the Technical Appendix.

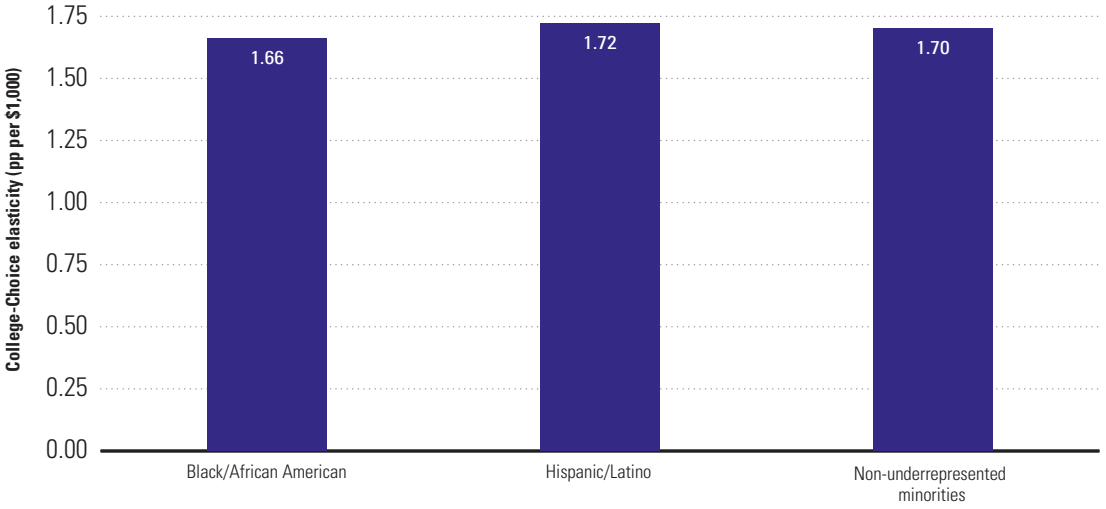
Figure 1 illustrates the college-choice elasticity across the range of parental incomes displayed in $50,000 intervals. The squares represent the estimated college-choice elasticity values in each of the income categories. For the lowest-income students, with parental incomes of less than $50,000 per year, the estimated college-choice elasticity is 3.04, meaning that an additional $1,000 of institutional grant aid at the typical sampled college increases the probability that these students will choose that sampled college by 3.04 percentage points.

The key feature revealed in Figure 1 is that, with the exception of the highest income category, the lower hash marks remain above zero, confirming that these estimates are significantly greater than zero. Another notable finding illustrated by Figure 1 is that college-choice elasticity tends to decrease with parental income, at least up to $200,000. This decrease is statistically significant. Among the higher-income students, the college-choice elasticity appears to vacillate. One possible explanation for this vacillation is that relatively small sample sizes in these higher income categories result in imprecise estimates, as conveyed by the larger confidence intervals.

Students from lower-income families tend to be substantially more sensitive to institutional grant aid in the college-choice process.

Figure 2 reveals that the college-choice elasticity estimates are nearly identical between underrepresented minority (URM) students and non-URM students. This means that URM students, even after accounting for student-level characteristics that are highly correlated with URM status, such as family income, do not react differently than non-URM students to institutional grant aid.

Figure 2: College-Choice Elasticity by Underrepresented Minority Status



Note: Data are from the 18,047 acceptances for college entry in the fall of 2009 received by 6,306 students at the 30 sampled colleges. Too few Native Americans exist in the sample to obtain a reliable estimate for this subgroup. Non-underrepresented minorities include Asian Americans and white Americans.

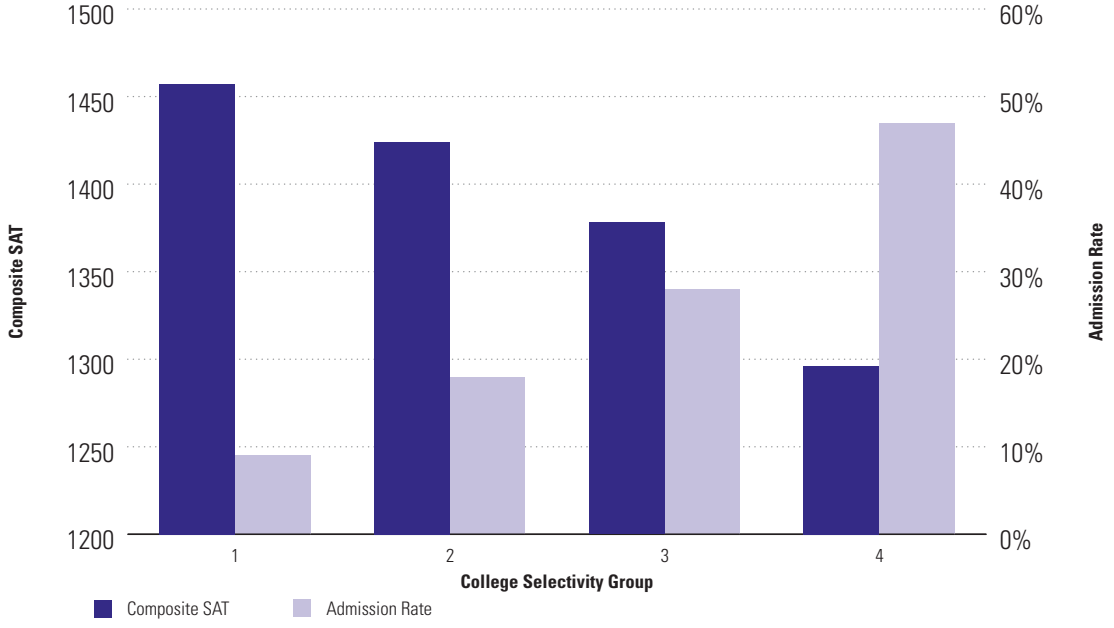
College-choice elasticity is unrelated to student race/ethnicity.

The results presented in this brief were obtained using colleges that are not representative of the typical American postsecondary institution. Most notably, they have more stringent entrance requirements and larger expenditures per student than the typical American postsecondary institution. Because of the marked differences between these institutions and the typical American postsecondary institution, the results of this study may not be generalizable to colleges not included in this study's sample. To rule out this hypothesis, I harness the variation in selectivity that exists within the sampled colleges. After grouping colleges with similar admission criteria and student body characteristics, I then estimate the college-choice elasticity within each group.

Among the sampled colleges, four groups of schools emerge with similar selectivity. The average SAT scores and admission rates for these four groups are illustrated in Figure 3. Group 1 is the most selective group, with an average composite SAT score of nearly 1460 and an average admission rate of roughly 9 percent. The schools in Group 4 admit nearly 50 percent of applicants, and the typical student enrolled in a Group 4 school has an average composite SAT score of less than 1300.

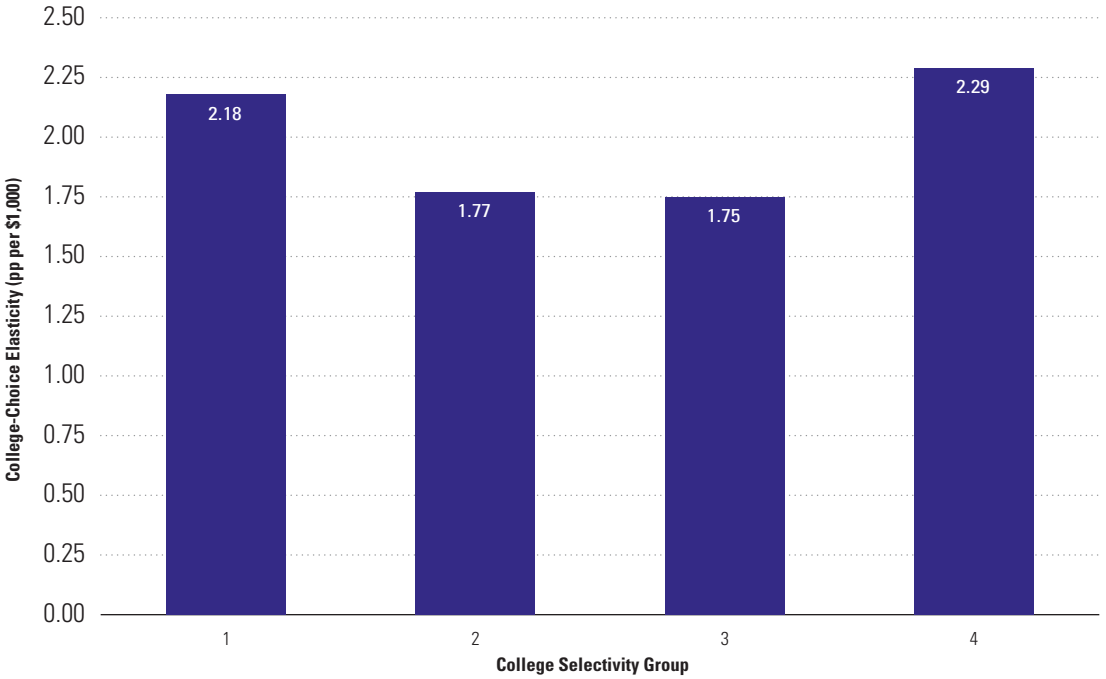
Figure 4 reveals no clear relationship between college-choice elasticity and college selectivity group, and the minor differences that do exist are not statistically

Figure 3: Admission Rates and Composite SAT Scores, by College Selectivity Group



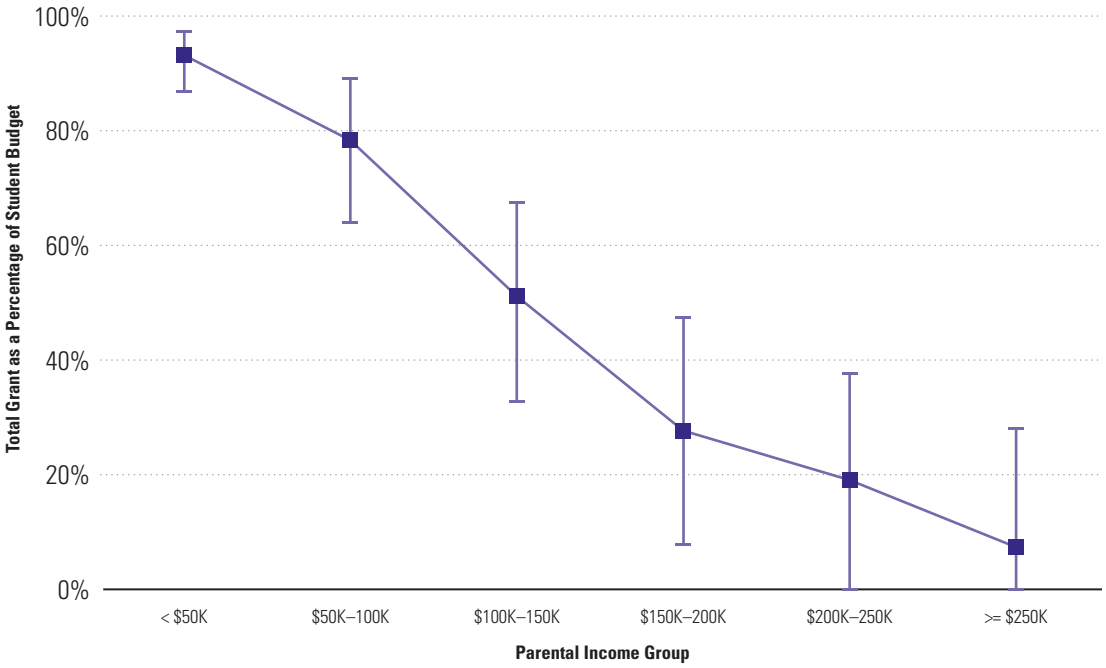
Note: Data represent the average school-level composite SAT scores and admission rates for *all* matriculants at the sampled colleges. The composite SAT represents the sum of the math and critical reading sections of the SAT.

Figure 4: College-Choice Elasticity by College Selectivity



Note: Data are from the 18,047 acceptances for college entry in the fall of 2009 received by 6,306 students at the 30 sampled colleges.

Figure 5: Total Grant as a Percentage of Student Budget, by Parental Income Group



Note: Data are from the 18,047 acceptances for college entry in the fall of 2009 received by 6,306 students at the 30 sampled colleges. Total grants represent the sum of all federal grants, institutional grants, state grants, and private grants. The lower and upper hash marks in this figure represent the 25th and 75th percentiles, respectively. The middle square represents the 50th percentile. Student budget represents the sum of tuition, fees, and room and board.

significant. Although this evidence is not conclusive, it is consistent with the general hypothesis that college-choice elasticity is similar for academically diverse students.

College-choice elasticity appears to be unrelated to the college's selectivity.

Policy Implications

The sampled colleges are uncharacteristically generous with respect to institutional grant aid, yet the total cost of attendance, which generally exceeds $50,000, would be prohibitively high in the absence of generous financial aid programs. Figure 5 demonstrates that, for the poorest subset of students, total grant aid covers more than 90 percent of the total annual student budget. Even students with annual parental incomes between $100,000 and $150,000 are typically expected to pay only about half of the listed tuition, fees, and room and board.

Despite the ample grant aid packages received by lower-income students, they remain more sensitive to institutional grant aid in the college-choice process than their higher-income peers. This strongly suggests that unmet financial need remains among these students, despite the generosity of these institutions. Reduction of federal grant aid programs, such as the Pell Grant, has the potential to increase out-of-pocket costs for the subset of lower-income students who are most sensitive to institutional grant aid in the college-choice process. As a result, college costs, rather than fit between student and college, could increasingly influence college enrollment choices. The ramifications for lower-income students resulting from a drop in grant aid is challenging to predict, yet a bad fit between student and college has the potential to adversely impact other important outcomes, such as student retention, performance, and graduation.

A second important policy implication from this research relates to the distribution of need-based grant aid versus non-need-based (merit) institutional grant aid. In general, merit aid is dispersed to lure academically desirable students, who often fail to qualify for need-based aid, away from competitor institutions. In theory, this type of institutional grant aid should increase the fraction of admitted students who matriculate (yield). Evidence offered in Figure 1 illustrates that higher-income students (>=$250,000 per year) are comparatively less responsive to institutional grant aid than their lower-income peers (<$50,000 per year). Such a finding implies that merit aid does little to accomplish any institutional goals of increasing yield. Moreover, non-responsiveness to institutional grant aid among higher-income students suggests that colleges may be awarding more money than is necessary to enroll these students. This potential misallocation of resources benefits neither the institution nor the lower-income students whose financial need remains unmet. By redirecting institutional grant aid to lower-income students, colleges can achieve the dual goals of increasing student yield and relieving the financial strain incurred by lower-income students.

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Technical Appendix

An instrumental variable approach was used in these analyses, exploiting the home equity considered in the financial aid allocation process by colleges as the instrument. Although a student's actual home equity, defined as the difference between the family's home value and the remaining mortgage on the home, is constant across all institutions to which the student is admitted, the home equity considered for grant aid allocation purposes often differs markedly across sampled colleges. Some consider all of a family's home equity, some have adopted formulas capping home equity at various income thresholds, and some do not consider home equity at all. For a specific student, each college assigns a unique value to this variable in accordance with its financial aid policies, which appear random despite the fact that the actual home equity for that student is constant across his college-choice set. This instrumental variable carves out the variation in institutional grant aid that is random with respect to college choice — the outcome.

Student and college fixed effects were also included in this instrumental variable approach. This allowed me to capitalize on the variation in financial aid offers to a single student after controlling for the college-level characteristics that are constant across all students. Finally, I controlled for legacy status and distance between the college and the student. Controlling for these two student characteristics does not alter the college-choice elasticity estimates in this report. Such student characteristics that vary across colleges within the student's choice set should be unrelated to home equity considered and, therefore, would not be expected to impact any of these college-choice elasticity estimates.

An instrumental variables strategy was used to fit the following statistical models for applicant *i* at college *j*. The basic model for estimating the overall college-choice elasticity is presented below.

$$(1)\ 1^{st}\ stage:\ INSTGRANT_{ij} = \omega' S_i + \gamma' C_j + \delta_1 HEC_{ij} + \rho_1 LEG_{ij} + \rho_2 DIST_{ij} + \varepsilon_{ij}$$

$$(2)\ 2^{nd}\ stage:\ CHOICE_{ij} = \tau' S_i + \theta' C_j + \beta_1 \hat{INSTGRANT}_{ij} + \eta_1 LEG_{ij} + \eta_2 DIST_{ij} + \mu_{ij}$$

In equation (1), student *i*'s institutional grant aid package $(INSTGRANT)_{ij}$ from college *j* is regressed on the instrument, home equity considered (*HEC*), controlling for the fixed effects of college (*C*), the fixed effects of student (*S*), legacy status (*LEG*) and the distance between applicant *i* and college *j* (*DIST*). In equation (*2*), student *i*'s choice of whether or not to attend college *j* (*CHOICE*) is regressed on the predicted institutional grant aid from the 1st stage equation, controlling for these same variables. Regression parameter β_1 represents the unbiased impact of institutional grant aid on college choice.

Concluding that differences in college-choice elasticity exist across the six income categories requires a post hoc test to identify whether the regression parameters associated with each of the categories are jointly equal. A rejection of the hypothesis that all parameters are equal allows for the identification of trends such as the negative relationship between choice elasticity and family income among the subset of sampled students with family incomes of less than $200,000 per year.

About the Author

Michael Hurwitz is an associate policy research scientist in the College Board Advocacy & Policy Center. He holds a doctorate in quantitative policy analysis in education and conducts research on college admission and financial aid. The research highlighted in this brief is based upon a larger project that is published in *Educational Evaluation and Policy Analysis* (DOI: 10.3102/0162373712448957). The full research paper is available from the journal or author upon request at **mhurwitz@collegeboard.org**.

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