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Research Brief
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Can Applying to More Colleges Increase Enrollment Rates?

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Summary Notes

- Low-socioeconomic-status students and low GPA and SAT® students apply to relatively few colleges and, at the same time, have low enrollment rates.
- Increasing the number of college applications from one to two can increase a student's probability of enrolling at a four-year college by 40 percent, and increasing the number of applications from two to three can increase a student's probability of enrollment by 10 percent.
- Policymakers and higher education practitioners can increase college enrollment among traditionally underrepresented students by encouraging students to submit more applications and by developing approaches to assist these students in the application process.

Increasing college enrollment is a major policy goal in the United States. Consequently, policymakers and researchers are interested in new and effective methods to achieve this goal and have recently turned their attention to the college application process as a means of boosting college enrollment.[1]

Despite this recent attention, even students strongly considering college enrollment, as evidenced by submitting at least one college application, do not always end up enrolling. In fact, approximately 25 percent of students who apply to four-year colleges do not enroll in one.[2] Over half of the applicants who do not enroll are admitted to at least one four-year college. How might we effectively increase college enrollment rates for these students? The goal of this research brief is to highlight new causal evidence on how the number of colleges to which students apply affects their college enrollment decisions.

As exhibited in Figure 1, there exists a positive relationship between the number of colleges to which high school students apply and their probability of four-year college enrollment. Only 44 percent of students applying to one four-year college ultimately enroll. Comparatively, 70 and 80 percent of students applying to two and three colleges, respectively, end up enrolling. This positive relation continues as the number of college applications submitted grows.

There are at least two theoretical reasons that a student's application behavior affects college enrollment. First, applying

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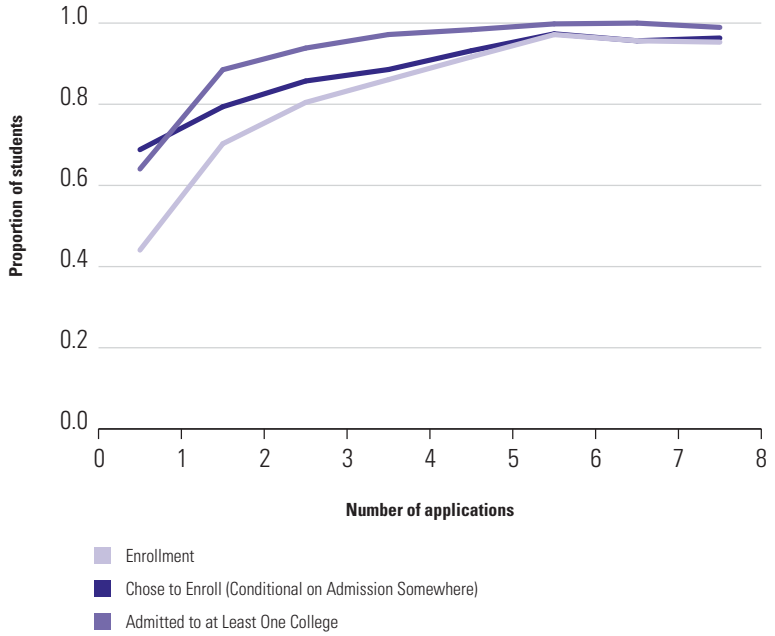
1 Bettinger et al. (2009) show that simplifying the FAFSA can increase financial aid received and college enrollment. Avery and Kane (2004) demonstrate that high school students often lack information on tuition, financial aid and the admission process.

2 See Avery and Kane (2004). Also, this analysis confirms that statistic using data from 2004 but excluding students who used early admission or applied after graduating high school. It also excludes colleges that are open enrollment or for-profit.

Figure 1: Proportion of Students Admitted and Enrolling in Four-Year Colleges by Number of Applications



Note: Data from the nationally representative Educational Longitudinal Study. The sample includes students who in 2004 apply to at least one four-year non-open enrollment college while still in high school and without early admission. Number of applications is top-coded at eight.

to more colleges positively influences the probability of being admitted by a college. Figure 1 indicates that students applying to one, two and three colleges are admitted by at least one four-year institution 64, 89 and 94 percent of the time, respectively. Simply increasing the number of applications submitted can reduce the probability that students find themselves without a four-year college option.

Second, there is uncertainty around the quality of the match between the student and an admitting college. Match quality may be a function of financial factors, such as the generosity of grants received, work-study offers or loans, all of which are unknown or known imprecisely at the time of application. Additionally, students may have never seen the campuses or may be lacking information about their potential college experience, such as available programs of study, the colleges' reputations or social activities. It is also possible that a student's enrollment decision is influenced by friends' decisions. All of this uncertainty at the application stage influences choices available and decisions made at the enrollment stage. Hence, submitting a larger number of applications increases the probability of having a good match in the enrollment stage. Figure 1 shows the proportion of students who enroll, conditional on being admitted by at least one college. Figure 1 indicates that only 69 percent of the students who apply to one college (and are admitted) choose to

enroll. This proportion increases to 79 and 86 percent for students who submit two and three applications, respectively, and slowly but steadily increases to 97 percent for those submitting six applications.

Research Questions

1. How do student characteristics relate to the number of applications submitted?
2. How does applying to more colleges affect enrollment?
3. Why does applying to more colleges affect enrollment?

Data & Methodology

The data are from the Education Longitudinal Study, which is a nationally representative National Center for Education Statistics survey of high school students that follows their transition into college. This study examines a subsample of approximately 5,970 U.S. students who, in 2004, applied to at least one four-year bachelor degree–granting college through the standard admission process directly out of high school.

The data include students' demographics and academic achievements in high school as well as information on parents' education, income and occupation, and information on the high schools the students attend. Most important, the data include the list of colleges to which each student applies, whether the student is admitted and where the student enrolls.

- Approximately 5,970 students, with a combined 18,850 four-year college applications
- 89% of students are admitted to a four-year college; 75% enroll
- 22% are African American or Latino/ Hispanic
- 45% would be first generation college students

Several methodologies are used to fully understand the relation between college applications and enrollment. A common starting point is to use regression analysis. This method can be used to estimate the correlation between the number of submitted applications and the probability of enrolling in a four-year college, accounting for a variety of student, parent and high school characteristics. However, using regression to estimate the impact of the number of applications submitted does not necessarily uncover the *causal effect* of applications on enrollment. For example, students who are likely to enroll in four-year colleges may also be likely to submit more applications simply because they are more motivated. Hence, more applications may not necessarily *cause* an increased probability of enrolling; rather, motivation is the cause. The methodology used in this analysis circumvents this obstacle of estimating the causal effect of the number of applications.[3]

3 I use an instrumental variable approach to identify a causal estimate. The instrument employed is the adoption rate of the Common Application for colleges within a 300-kilometer radius of a student's home. This random variation in the relative number of Common Application colleges near a student's home impacts student enrollment in a four-year college only through the increased number of applications attributable to the Common Application's simplicity. More details on the instrument and all specifications are provided in the technical appendix.

Results

How do student characteristics relate to the number of applications submitted?

On average, the highest-SES-quartile students apply to one more college than the lower quartiles.

In the data set used for these analyses, students apply to an average of 3.16 colleges. However, students in the highest SES quartile apply to approximately one more college than students in the lowest quartile.[4]

Average Number of Applications	
Overall	3.16
SES quartile 1 (lowest)	2.67
SES quartile 2	2.62
SES quartile 3	2.89
SES quartile 4 (highest)	3.70

This average, on its own, does not convey the marked variation in the number of applications submitted by the students in this sample. The variation in the number of applications submitted is shown in Figure 2. Although the modal number of applications is two, the fraction of students who apply to one and three colleges is comparable to the fraction who apply to two. Beyond three applications, there is a steady rate of decline in the fraction of students in each category, with a few applicants in the sample submitting as many as 18 college applications.

4 This table presents unconditional means, and the difference between the highest SES quartile and the other quartiles is statistically significant. This statistical difference remains when conditioning on student characteristics.

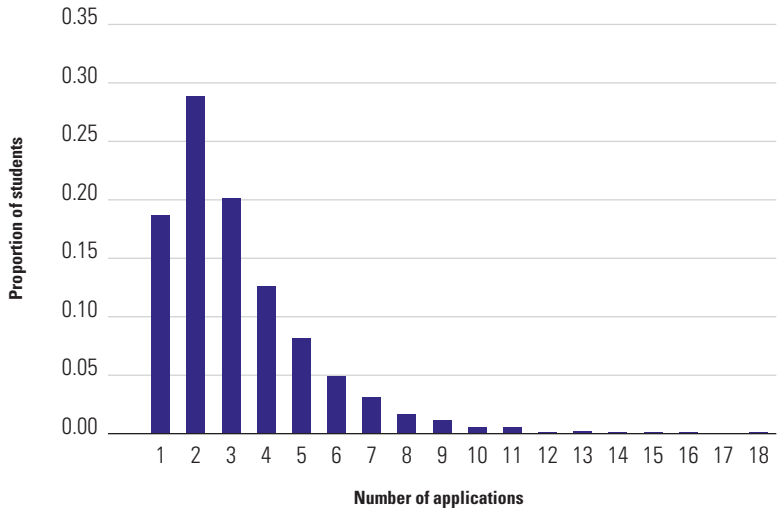
After accounting for select student characteristics, men apply to fewer colleges than women, and Asian and African American students apply to more colleges than their white counterparts (results not shown). Finally, high-achieving students, as measured by grades, course selection and standardized tests, apply to many colleges.

How does applying to more colleges affect enrollment?

Increasing the number of college applications from one to two can increase a student's probability of enrolling at a four-year college by 40%, and increasing the number of applications from two to three can increase a student's probability of enrollment by 10%.

Using causal methods, I find that, on average, one additional application causes a student's probability of enrollment to increase by 4.7 percent. However, this does not mean that applying to more colleges always increases enrollment. Most of this effect is concentrated among students applying to very few colleges. Increasing the number of applications from one to two causes a student's probability of enrollment to increase by 40 percent (or a 12 percentage point increase from 45 to 63 percent). Similarly, increasing the number of applications from two to three causes a student's probability of enrollment to increase by 10 percent (from 72 to 79.5 percent). There is no strong evidence that adding a fourth application (or more) increases a studen t's probability of enrollment, relative to the third application.

Figure 2: Distribution of Number of Colleges Applied



Note: Data from the nationally representative Educational Longitudinal Study. The sample includes students who in 2004 apply to at least one four-year non-open enrollment college while still in high school and without early admission.

Why does applying to more colleges affect enrollment?

Students who apply to four-year colleges do not enroll for both financial and non-financial reasons.

As previously mentioned, applying to more colleges increases the probability of being admitted to at least one college; however, the results of this analysis reveal that this is not the whole story. Even students that are admitted to at least one college are more likely to enroll when sending out more applications. This implies that an important driving force in student enrollment is not merely getting into a college but whether the college is a good match for the student.

What are some potential reasons that applying to more colleges can increase the probability of finding a good match between student and college? This analysis finds that more applications increase enrollment probability through both financial and non-financial mechanisms. Among applicants who choose not to continue with any postsecondary schooling, students sending two or three applications are less likely than students sending one application to cite financial reasons for hindering their path to college. Also, for applicants who did enroll in a four-year college, the probability of choosing a college because of its program of study and reputation increases with number of applications submitted. This evidence is consistent with more applications leading to more non-financial benefits to the student and, consequently, a greater likelihood of enrollment.

Policy Implications

These results have important policy implications. First, policymakers are now equipped with an additional tool to increase college enrollment rates. The strong, causal relation between college applications and enrollment established here provides a solid foundation for utilizing this tool. Second, the effects of increased college applications are concentrated in a traditionally underrepresented segment of the population. Third, this is not a result about students going from zero to one college application, but rather from one to two applications or two to three applications. Not only is this an overlooked group of students but, because they already express interest in attending college by engaging in the application process, they are a sensible group to target with appropriate policy incentives or initiatives.

If increasing college applications is a tool policymakers want to use to increase enrollment, there are two questions to address: How can this be accomplished? What are the consequences? A relatively simple "small-scale" approach to encouraging the submission of more college applications is to provide information on the college application process well in advance of application deadlines. That is, getting students to apply to more colleges may involve informing guidance counselors, parents, college counselors or the students themselves about the benefits of numerous applications. This small "nudge" to apply to more colleges can yield powerful results. [5]

On the other hand, broad "large-scale" initiatives can coexist with "small-scale", grassroots-type programs. An example of such a large-scale initiative might include a national movement in which more colleges adopt a common application or simplify their existing applications. Numerous other countries, including the United Kingdom, only require a single college application. Another potential "large-scale" initiative involves incentivizing students to submit more applications through financial incentives for low-income students, such as fee waivers. In many instances, low-income students receive application fee waivers, and modest compensation for application completion might provide the thrust necessary for students contemplating the submission of additional applications.

Beyond subsidization and application simplification, initiatives that provide students with direct assistance in completing applications are likely to stimulate college enrollment. This type of policy is already under way in North Carolina with College Application Week in which students, especially first-generation students and students with no pre-existing intentions to apply to college, receive help with their applications. There is even talk of College Application Week taking place on a national scale.[6]

The consequences of more college applications may be negative if a policy encourages too many applications. An unintended consequence could include elevated screening costs for college

5 See Thaler and Sunstein (2008).

6 http://xapceo.blogspot.com/2011/05/why-national-college-application-week.html.

admission offices, which would ultimately increase application complexity and paradoxically disadvantage lower-SES students. Therefore, any policy should be implemented strategically and target the intended audience: students who are only applying to one or two colleges and have a low probability of enrollment.

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Technical Appendix

Main Specification

The regression equation underlying the analysis is given by:

$$enrolls_i = \alpha N_i + X_i\beta + \varepsilon_i$$

where $enrolls_i$ equals one if student *i* enrolls in a four-year college and equals zero otherwise, N_i is the number of applications student *i* sends, X_i is a vector of controls including SES quartile, sex and race, as well as some high school achievement variables (GPA, number of AP® courses, standardized math and reading scores, SAT® scores and a binary variable indicating whether he or she plays a sport), and ε_i is a student-specific error term that is assumed to be independent and normally distributed. Some specifications also control for characteristics of the high school (number of guidance counselors, students and teachers, public or private, urbanicity, percentage of students with free lunch, percentage of minorities, and number of colleges within 300 km of the student's home) and parents (education, native language and marital status).

Instrumental Variables

As of 2004, the Common Application is a consortium of approximately 250 colleges that accept a standardized application but still require individual (varying) application fees. The instrument is the adoption rate of the Common Application at four-year colleges and universities within 300 km of a student's home:

$$\frac{\#\text{ Common Application colleges within 300 km of student's home}}{\#\text{ colleges within 300 km of student's home}}$$

For this instrument to be valid, it must satisfy the relevance condition and exclusion restriction. It is relevant because there is substantial evidence that students apply (and enroll) to colleges near their home, and the Common Application lowers the non-financial cost of filling out an application, which unambiguously increases the number of applications, all else constant.[7] Liu et al. (2007) find that colleges joining the Common Application consortium receive between a 5.7 and 7 percent increase in applications and attribute it to the decrease in opportunity time cost of completing an application. Also, 300 km is used because that is approximately the mean distance between a student and institutions to which they apply in the data. It assumes that students are likely to apply to colleges within a few-hour radius, in terms of driving distance, of their home. The sensitivity of the distance is tested.

The exclusion restriction for the instrument relies on the exogeneity of students' homes relative to the adoption rate of Common Application colleges. Assuming students' locations relative to any college, not just Common Application colleges, is exogenous is a fairly naive assumption. However, the only observable pattern on location of colleges adopting the Common Application is the popularity in the eastern half of the country. In 2004, Common Application colleges are located in 38 different states. Massachusetts, Pennsylvania and New York have the

7 In this sample, all else equal, students enroll in schools closer to home. See Card (1993) and Long (2004) for more examples.

largest number of Common Application colleges, and California and Ohio are also substantial, but the remaining colleges are well dispersed. Sensitivity to the inclusion of these major states is tested.

The dispersion of Common Application colleges implies that the adoption rate is likely to satisfy the exclusion restriction. One potential violation of the restriction is if likely college enrollees live in high adoption rate areas. This is difficult to rule out, but given the fairly large radius, the variation in adoption rates does not rely on those who live next to these college areas, but on those who are within driving distance and are likely to be aware of the Common Application college's existence.

About the Author
Jonathan Smith is an associate policy research scientist at the College Board Advocacy & Policy Center. He holds a Ph.D. in economics and conducts research on student-college match. The research highlighted in this Research Brief is based upon a larger project, of which the working paper version is available from the author upon request at **jsmith@collegeboard.org**.

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