Percent Plans, Automatic Admissions, and College Enrollment Outcomes

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Abstract

In 1997, the Texas Legislature passed House Bill 588 – also known as the Texas Top Ten Percent Law – guaranteeing automatic admission to all state-funded universities for Texas students in the top ten percent of their high school class. Automatic admissions policies remain controversial, and the effects of these policies on college enrollment and choice remain unclear. Using regression discontinuity methods and data on 6 cohorts of graduates from a large urban school district, we examine the effect of eligibility for automatic admission on college enrollment and persistence. We find that the Top Ten Percent Law does have a substantial impact on enrollment at Texas flagship universities and increases the total number of semesters enrolled at a flagship university four years after high school graduation. This increase in flagship enrollment appears to displace enrollment in private or out-of-state universities, and we find no effect on college enrollment overall or on the quality of college attended. We find evidence of effects on flagship enrollment for both white and minority students. However, these effects are concentrated in schools that send large (relative to the district) fractions of graduates to college, suggesting that automatic admissions may have little effect on the outcomes of students in the most disadvantaged schools.

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1. Introduction

Recent research (Hoekstra, 2009; Andrews et al., 2012) suggests that there may be large economic returns to attending highly-selective universities. As a consequence, the process by which students are admitted to these institutions has garnered considerable attention from policymakers, researchers and members of the public. Concerns about fairness and equity have been particularly salient. Universities have sought to increase the diversity of their student body through "affirmative action" policies that grant preferences in admissions decisions to members of racial and ethnic minorities that have traditionally been under-represented at selective universities. However, the legality of these policies has been challenged, and a 1996 decision by the U.S. 5th Circuit Court in *Hopwood v. Texas* banned the use of race in college admissions decisions.[1]

In response to this decision, the state of Texas passed the "Top Ten Percent Plan" in 1997 that guaranteed admission to any public university to students in the top decile of their high school class. The goal of this law was to maintain racial, economic and geographic diversity at the state's flagship universities, since it ensures that the same proportion of students are eligible for admission to any public university irrespective of how disadvantaged the students served by a particular school happen to be. Two other states (California and Florida) soon followed suit and adopted similar policies.[2] Despite being explicitly race-neutral, "percent plans" remain very controversial. Critics contend that the law is unfair to students at more competitive high schools who may be denied admission in favor of students with worse academic credentials (such as college entrance exam scores) but who are admitted by virtue of being in the top ten percent (TTP) at a less competitive high school. University administrators also contend that too many students are admitted under the automatic admission policy, thereby forcing them to turn down better-qualified applicants.[3] To address these concerns, the Texas law was changed so that, beginning with the fall 2011 entering class, the University of Texas-Austin could cap the share of enrollees admitted under the automatic admissions rule to 75 percent.

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[1] The 2003 Supreme Court ruling in *Grutter v Bollinger* upheld a policy of race-based application considerations at the University of Michigan, and after that decision the University of Texas reinstated some racial preferences in admission for students outside of the top ten percent. The Supreme Court is currently scheduled to reconsider the legality of racial preferences in college admissions in the case of *Fisher v. University of Texas at Austin*.

[2] Florida grants automatic admission to students in the top 20 percent of their high school class to the University of Florida system, and automatic admission to the University of California system is available to students in the top 4 percent of their class (Horn and Flores, 2003)

[3] Another possible criticism of the TTP Law is that encourages a form of gaming whereby students seek out less competitive high schools in order to get into the TTP (Cullen, Long and Reback, 2011).

Of course, the relevance of the claims made both in favor and against percent plans depends on whether and for whom eligibility for automatic admission actually affects college enrollment and choice. In this paper, we examine this question by estimating the causal effect of being eligible for automatic admission on the college enrollment and college choice outcomes of several cohorts of high school students from a large urban school district in Texas. To carry out this analysis, we created a database that links detailed high school records from district administrative data to college enrollment information from the National Student Clearinghouse (NSC) database. To account for the fact that students in the top class rank decile would have better college outcomes even without the automatic admission policy, we use a regression discontinuity design that compares the outcomes of students on either side of the top ten percent class rank cutoff.

Our approach has several important strengths. First, our data are drawn from students in a large urban school district that has traditionally sent few students to the state's leading universities and to college in general. This study sheds light on whether automatic college admission affects college outcomes for a potentially under-served population. Second, we use administrative data on college enrollment from the National Student Clearinghouse, which allows us to consider a wider set of outcomes than just flagship enrollment and does not suffer from misreporting error present in survey data. In particular, we can assess whether flagship enrollment induced by being in the TTP of one's class displaces enrollment at other institutions. This is also the first study on the TTP Law that we are aware of that examines longer-run college persistence measures. Third, we are able to compute class rank at various points throughout high school, including the end of 11^{th} grade, which is the key point for determining membership in the top ten percent for the purposes of applying to the state's flagship universities. In contrast, the only other study using this type of approach (Niu and Tienda, 2010) uses class rank measured at the end of 12^{th} grade, which is after students would have applied to college. Our results suggest this difference may be important.

Our preliminary findings suggest that the TTP Law does have a substantial impact on enrollment at Texas flagship universities for students in a large urban district. Our results suggest that eligibility for automatic admissions leads to substitution away from private or out-of-state colleges rather than lower-ranked public institutions. On net, we do not find evidence of an effect on the likelihood of enrolling in college or on enrollment at a four-year college. We also find some evidence indicative of important heterogeneity. The estimated effects on flagship attendance are twice as large for white students as they are for minority students, and there are no effects for low-income students. We also find no evidence of an effect of automatic admission in high schools that traditionally send relatively few students to four-year colleges. In ongoing work, we are examining the effect of automatic admission on other measures of college quality students attend, as well as on measures of college persistence and attainment.

The paper is organized as follows. Section 2 reviews existing research on the TTP Law and provides some background on how the law works. Section 3 presents the conceptual framework for our study, and Section 4 discusses the data on high school achievement and college enrollment and provides descriptive statistics for students by TTP status. Section 5 describes our regression discontinuity strategy. Results are presented in Section 6. Section 7 concludes.

2. Background and Existing Research

The economic and societal benefits of college education are well-known (Kane and Rouse, 1995; Currie and Moretti, 2003). These benefits tend to be especially large at the most selective universities, as demonstrated by a recent study which showed that earnings are up to 20 percent higher as a consequence of attending the "flagship" university (Hoekstra, 2009). Who gains access to college, and in particular, to the most elite universities, is thus a central question for higher education policymakers in Texas and throughout the nation. Typically, universities select students on the basis of academic achievement as measured by standardized test scores and high school grades. Given that more advantaged students tend to have stronger academic credentials (Kane, 1998), a consequence of this system is that other students are placed at a serious disadvantage in the college admissions process. The lower enrollment rates of disadvantaged students are argued to result in a lack of diversity at selective campuses.

The assumed purpose of the TTP rule is to ensure diversity at four-year (competitive) public universities in the absence of more explicit race-based affirmative action policies. It is therefore important to understand how automatic admissions policies compare to race-based affirmative action in creating diverse college campuses. In a simulation of SAT score report submissions, Long (2004) finds that minority students in Texas and California would be much less likely to apply to top-tier colleges under the automatic admissions policies. On the other hand, Bucks (2004) finds that the number of minorities at the University of Texas at Austin (UT) was roughly restored by the law, while minority enrollment remains somewhat lower at Texas A&M (TAMU) relative to rates under affirmative action. Tienda, Alon and Niu (2008) find that the perceived increases in diversity at UT under the TTP Law are largely driven by an increase in the enrollment rates of Asian students, while enrollment rates of Blacks and Hispanics declined.

There are a number of explanations for the TTP Law's minimal effects on Black and Hispanic enrollment. Niu, Sullivan and Tienda (2006) find that Black and Hispanic students are less likely to be ranked in the TTP, particularly in schools with high minority populations. Even among students in the top decile, minorities and graduates from poor schools are less likely to choose selective institutions as their most preferred school (Niu, Tienda & Cortes, 2006). In addition, there are a number of students who may be uninformed of the law. In a recent survey of Texas seniors, Hispanic students were significantly less likely to report that they know "a lot" about the TTP Law, a pattern that holds even among TTP students with a preference to attend a four-year university (Niu, Sullivan & Tienda, 2006). Financial constraints are also likely to play a role, though there are no studies to date that look at the potential that unmet financial need is deterring TTP students from enrolling at the Texas flagships. To address these financial issues, UT and TAMU created scholarship programs directed to some of the highest need schools, but for students who do not attend a targeted school, are not well-informed about the scholarships, or are not chosen to receive a scholarship through the application process, unmet financial need is likely to remain a significant issue. Even for those students who receive the scholarships, there still might be unmet financial need and there may be other colleges (e.g. private colleges) that offer more attractive financial aid packages.

Despite extensive research on the effects of the TTP Law on overall enrollment rates, solid empirical evidence on how automatic admissions affects individual enrollment decisions is limited. This is likely due to the lack of student-level data with the necessary class rank information needed to conduct such an analysis. One exception is a study by Niu and Tienda (2010) that uses a similar research design to that which we use here and survey data linked to administrative records on class rank at graduation. Overall they do not find statistically significant estimates of effects on flagship enrollment, although they do find positive effects for Hispanics and those attending "typical" high schools. Our paper adds to Niu and Tienda's research in several important ways. With multiple cohorts of data and exact grade point average (GPA) calculations from district course-taking data, the estimates of the law's effect on college enrollment are more precise. In addition, the inclusion of more recent years of data allows us to determine whether the effects of the TTP Law have shifted over time. Second, we consider a broader set of measures that allow us to consider what any flagship enrollment induced by the TTP displaces and also whether there effects on longer-run measures of college persistence. Third, our data allows us to estimate the effect of the law on a key population of interest – students in a large urban district with traditionally low college enrollment and a large number of low-income and minority students. Finally, we use a measure of class rank at the end of 11^{th} grade, the time when the class rank most commonly reported on college applications is determined.

3. Institutional Details

The TTP Law was instituted in 1997 in response to *Hopwood v. Texas*, a case that banned the use affirmative action in college application decisions. Rather than using explicit race-based considerations in application decisions, the TTP Law states that students who are ranked in the TTP of their class must be granted automatic admission to the public Texas college of their choice. The state grants flexibility to districts in how they choose to calculate GPA and class rank. However, to receive automatic admission, students must provide a transcript along with their application that verifies their class rank falls within the TTP. Students must also take either the SAT or the ACT, although for students in the TTP of their high school class, these tests are not used for admissions decisions.

For students who are not in the TTP of their high school class, admissions decisions are based on the usual factors including GPA and class rank, admissions test scores, and non-academic factors such as personal statements and extracurricular activities. Following the *Grutter v. Bollinger* decision in 2003 (which covers most of our study period), the University of Texas reinstated race-conscious affirmative action. Studies (CITES) that have examined the transition between the pre- and post-*Hopwood* admissions regimes indicate that the Texas flagships did provide racial minorities preferential treatment in admissions decisions prior to the *Hopwood* decision and that this ended after the ban on affirmative action went into place. However, there is relatively little research examining whether racial preferences were fully restored to pre-*Hopwood* levels following the *Grutter* decision.

A key consideration for our study is how class rank is defined for the purposes of determining eligibility for automatic admissions. The way in which class rank is calculated could vary across schools as state law does not specify how this is to be done. Moreover, both absolute class rank and the number of students used to determine percentile class rank are not constant over time. The relevant class rank for determining eligibility for automatic admissions is the one used at the time of application to college, which might vary across students.

To better understand the process by which the relevant class rank for determining automatic admissions was calculated, we contacted counselors at each of the high schools in the district we examine as well as a representative from the district's central office. Under the student information system used in the district during our study period, class ranks were calculated centrally. Both class rank and the total number of students enrolled were calculated at the end of each semester and given to the Student Records office, which then distributed transcripts to high school campuses.[4]

A related issue is that both absolute class rank and the number of students used to determine percentile class rank are not constant over time. The relevant class rank for determining eligibility for automatic admissions is the one used at the time of application to college, which might vary across students. Although students can choose when to apply to college, the applications to the University of Texas system are due December 1st, and applications to TAMU are due in the middle of January. At the same time, first semester high school grades are not released in the district until late January or early February. With senior grades not available in time for application to flagship colleges, most students will be accepted to colleges under the TTP Law according to GPA and class rank measured at the end of 11th grade. We confirmed with high school counselors in the district that 11th grade class rank was most likely to be reported on applications to four-year universities, especially for the flagships which have relatively early application deadlines.

4. How Eligibility for Automatic Admissions Can Affect Student Outcomes

In the college enrollment process, three distinct decisions take place: students determine which colleges they will apply to, colleges determine which students they will accept among the pool of applicants, and students must determine which college to enroll at (if any) among the colleges they are accepted to. Automatic admissions policies could potentially affect enrollment and college choice through any of these three processes (Card and Krueger, 2005).

If all students at the TTP cutoff would likely be admitted even without the TTP Law, and if acceptance rates for students just outside of the TTP are also high, then automatic admissions might have little "bite" and have minimal effects on student outcomes. In fact, some research suggests that this may have been the case prior to the adoption of the TTP law (CITES). However, this reasoning ignores fails to account for the increase in applications to the flagship universities since the TTP Law went into effect. Today the percentage of acceptances to UT and TAMU accounted for by TTP students increased from 36 percent to 61 percent, and the recent efforts of UT to cap the percentage

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4 In contrast, other districts allow individual schools to calculate class rank, potentially using different algorithms to determine absolute class rank and the denominator for calculating percentile rank. In fact, our study district recently decentralized class rank calculations and now the individual high schools do it themselves.

of enrollees who are accepted under the TTP Law provides further evidence that Texas flagships would be unlikely to accept all top decile applicants in the absence of the law. Moreover, some research shows that the TTP law expanded the set of high schools that have students that apply to the flagship universities (Long, Saenz and Tienda, 2010). If students from these schools have lower college entrance exam scores (and other credentials) than did the typical pre-TTP Law applicant, the admissions patterns from the period before the adoption of TTP Law might not reflect the importance of automatic admissions to current applicants. This is especially important for our study district, which has much lower college-sending rates than is typical in Texas.

Eligibility for automatic admissions could also increase the likelihood of applying to a particular school. A number of studies find that as race-based affirmative action policies were eliminated, the decrease in probability of acceptance for minority students led to lower application rates to competitive colleges, even among those with relatively high probabilities of acceptance (Arcidiacono, 2001; Long, 2004; Brown and Hirschman, 2006). By increasing the probability of acceptance to 100 percent for students who are ranked in the top of their class, automatic admission policies should increase the number of applications from TTP students. Even if being in the TTP does not actually increase the probability of acceptance conditional on applying, the TTP Law makes the admissions guarantee explicit, and this alone could change application behavior if students would not be aware that they had a very high probability of being accepted without the highly visible TTP Law (Long, Saenz, and Tienda, 2010).

Automatic admission could make it more likely that an admitted student attends a particular university. Because of the admissions guarantee, students might be induced to seek out financial aid opportunities earlier and more intensively than they would without the admissions guarantee. In addition, scholarship programs like the Longhorn and Century Scholarship programs (established by UT and TAMU, respectively) target students who are in the TTP of their high school class and who attend schools with large concentrations of economically disadvantaged students. The offer of automatic admission may also serve to make students feel welcome at a particular university, which could also increase enrollment conditional on acceptance.

In addition to considering the ways in which automatic admission could affect enrollment and college choice, it is also important to think of how these effects could vary across student subgroups. One of the primary purposes of the TTP Law was to ensure diversity at college campuses, particularly in Texas flagships were African American and Hispanic students have historically been under-represented and that accept students from a relatively small number of high schools throughout Texas (Long, Saenz and Tienda, 2010). Ex ante, though, it is not clear whether effects of automatic admissions would be larger or smaller for students from more disadvantaged backgrounds. On one hand, minority students in the district tend to be concentrated in the high schools that have lower college-sending rates and lower academic achievement in general. Since these students may have difficulty being admitted without automatic admissions, effects on outcomes like flagship enrollment might be larger for them. On the other hand, factors such as credit constraints and lack of information could mitigate the effects of automatic admission for minority students and students from schools with lower college-sending rates. These considerations motivate our analysis of the effects by race and also by whether a student attends a high school that traditionally sends few students to college.

5. Data and Descriptive Statistics

5.1 Data

This paper uses data from a large urban school district in Texas. We focus on graduates from the 2002 through 2007 graduating cohorts. Data files include administrative data on student demographics and high school membership, semester course files with grades, high school exit exam scores, and graduation information. Full student-level data are available beginning in 1999, allowing us to follow all students in our sample throughout high school. District files are supplemented with college data from the National Student Clearinghouse (NSC), a non-profit organization that is now the nation's leading source for postsecondary degree and enrollment verification. Files are linked using social security numbers and state identifiers.

Our data do not include a class rank measure, and we construct it from the district student-level data. As noted above, during our study period the class rank included on a student's transcript is calculated centrally by the district, and we follow the procedure used by the district to determine the absolute and percentile rank. First, we compute cumulative GPA at a given time using grades received in courses taken up to that point. These data come from course enrollment files that include course numbers and titles for each course in which a student is enrolled, the grade earned, and course entry and withdrawal dates (where applicable).[5] Second, students are ranked within a school on the basis of cumulative GPA to determine absolute class rank at a particular time. Finally, the percentile class rank is calculated as the ratio of absolute class rank to the number of students in

[5] In the district, class rank is based on weighted GPA, with regular courses receiving a weight of 4 for an "A" and advanced-courses receiving a weight of 5 for an "A". Grades from "local credit only" courses and courses that students withdrew from are not included in the GPA calculations.

a school with a valid cumulative GPA. As described above, the class rank relevant for automatic admissions to UT-Austin and Texas A&M is the rank at the end of 11th grade. Therefore, we use this measure in our analysis.

The research design we use depends crucially on having accurate measures of percentile class rank at the end of 11th grade. This information is not maintained by the district, but we are in the process of obtaining information on cumulative GPA's listed on final transcripts for a subset of the years of our study period. Although this is not the class rank measure we use in the analysis, it will still be useful to compare our calculated GPA and class rank to the information on actual transcripts to see how closely our computed measure is to the "official" measure.[6]

NSC data includes semester-level observations for each NSC-reporting institution that a student attends, including date of enrollment and completion, level of enrollment (e.g. part-time, full-time). More than 92 percent of higher education institutions in the United States report to the NSC. We construct several outcomes using the NSC data. First, we look at short-run college enrollment and choice measures, focusing on the fall following graduation. The NSC data is supplemented with IPEDs data to identify competitiveness (based on Barron's ranking), selectivity (defined as the percent of applicants admitted), public or private funding structure, and state in which the college is located. Next, we look at persistence measures including year-by-year enrollment up to four years after high school graduation, total semesters enrolled in college four years after graduation, and transferring to a more (or less) selective college.

The final data source used includes SAT and ACT on attempts and scores. Most four-year colleges require students to take the SAT or ACT as part of the application process. In addition, Even though TTP students are not accepted based on college exam scores, they still must submit documentation indicating that fulfilled the requirement. Data for all three exams is available from 2004 through 2011. Since these data are not available for all cohorts in our study, we do not use this

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[6] We were able to compare by hand graduation GPA and class rank for one cohort of graduates in one district high school. Our estimated ranks were almost identical to the ranks kept on file at the school. Ranks differed slightly for students who had entered the district sometime after the start of high school, because high school grades prior to entering the district are included in campus GPA calculations, but are not available in district course enrollment files. To the degree that these late-entering students affect our class percentile ranks, our estimates of the effect on enrollment will be underestimated. However, these students represent a relatively small portion of all graduates, particularly those at the top of the GPA distribution. Although this validation was only done for a subset of schools and students in our analysis, we think this lends support to the validity of our class rank measure because class rank is calculated centrally by the district throughout our study period and for all schools.

as a control variable in the analysis, but we do show college entrance exam taking rates in descriptive statistics.

The sample used in the analysis consists of students who graduated from a district high school between 2002 and 2008. We limit the analysis to graduates because the district only obtained college enrollment data from NSC for high school graduates. One concern with doing so is that it might impart selection bias if TTP status at the end of 11th grade affects the probability of graduation. However as we discuss below, there is no evidence for this type of effect. We also exclude students who did not have valid GPA's at the end of 11th grade (for instance, students who transfer into the district in 12th grade) since our empirical strategy relies on using 11th grade percentile class rank as the running variable in the regression discontinuity estimation. Our final sample includes 17,057 students across the 7 cohorts.

5.2 Descriptive Statistics

Table 1 provides descriptive statistics for our analysis sample by TTP status. We also show results stratified by whether a student attended a school with a higher or lower college-sending rate among its graduates. The results indicate that TTP students are more likely to be white and female, and are less likely to be economically disadvantaged. As expected, TTP students are higher performing across all measures of academic achievement. Students in the TTP are more likely to graduate with a recommended or distinguished diploma, take a college entrance exam, and have much higher exit exam scores. These patterns are found in both types of high schools, although higher college-sending schools serve students from higher socioeconomic backgrounds and have much better academic achievement.

TTP students have substantially higher college-going rates than students outside the TTP. Overall, almost 60 percent of students in the TTP attend college in the fall following graduation compared to only 26 percent among students in the bottom 90 percent. These differences are especially stark for flagship university enrollment, with 21 percent of TTP students attending a flagship (or about one-in-three students who enroll in college) compared to only 1 percent from among the bottom 90 percent. However, sizable differences also exist for enrollment at private and out-of-state institutions, which suggests that the causal effect of being in the TTP on flagship enrollment is at most only a portion of the raw difference in flagship enrollment for TTP and non-TTP students.

Two other patterns bear mentioning. First, only 10 percent of TTP students in the lower-sending high schools enroll in a flagship, compared to almost 30 percent in the higher-sending schools. This difference motivates our examination of heterogeneity in the effects of being in the TTP between these types of high schools. Second, college-sending rates overall in the district are low. Statewide during our study period, the percent of high school graduates enrolled in college in the fall following graduation ranged from 52 to 56 percent (THECB, 2010), but only 30 percent of graduates in this district enroll in college. Even in the high schools that send large numbers of students to college relative to the district overall, only 37 percent of graduates enroll in college.

6. Methods

6.1 Research Design

The goal of this paper is to estimate the effect of being eligible for automatic admission to the Texas public universities via membership in the top decile of one's high school class. The empirical challenge we face stems from the differences between TTP students and those with lower class rank, some of which are documented in Table 1. To credibly estimate the effect of being in the TTP, we use an approach that mimics randomly assigning placement into the TTP. Specifically, we employ a regression discontinuity research design that relies on comparisons between students whose class rank is just above or below the 90^{th} percentile. As demonstrated by Lee (2008), as long as students cannot exert complete control over their *exact* class rank (i.e., there is some randomness in class rank at the point when students apply to college), whether a student falls just above or below the TTP class rank threshold is "as good as" random, and students on either side of the threshold should be similar in all respects other than one being in the top decile and the other not.

To formalize these ideas considering the following model for some outcome, Y_i (e.g., enrollment in a Texas flagship university):

$$(1) \qquad Y_i = \theta TTP_i + f(CR_i) + X_i\beta + e_i$$

Where CR_i is the ranking of student i her high school class (measured as the fraction of students ranked above student i), TTP_i is an indicator variable equal to 1 if a student is in the TTP of her class (i.e., $T_i = 1(CR_i<.10)$), X_i is a vector of observable covariates, and e_i is a random disturbance term. The function $f(\cdot)$ is a flexible function of class rank that captures the relationship between the outcome and class rank away from the ten percent cutoff.

The key assumption underlying our approach is that falling just above or below the ten percent cutoff is not systematically related to other factors that affect the outcomes of interest (i.e., e_i). The primary threat to the research design is that students manipulate their class rank in order to just get above the ten percent cutoff.[7] While students may alter the mix of courses they take and petition for better grades in order to increase their chances of being in the top decile of their class, course performance is at least somewhat uncertain and students are unlikely to have perfect information about exactly what their classmate's GPA will be. This makes it unlikely that students can manipulate their *exact* class rank with the precision necessary to undermine our empirical strategy.

In addition to being credible on a priori grounds, the assumptions underlying the research design can be tested by examining baseline covariates and examining whether they "trend smoothly" through the ten percent cutoff (Lee, 2008; Imbens and Lemieux, 2008) and whether the distribution of class rank is discontinuous at the ten percent cutoff. Below we show evidence consistent with the identification assumptions we make. We also report results from specifications that include controls for baseline covariates, which should improve the precision of the estimates and have little effect on the point estimates if the controls are "balanced" on either side of the cutoff.

6.2 Estimation

Obtaining consistent estimates of the discontinuity in a given outcome depends crucially on modeling f(.) in Equation 1 appropriately. We follow the suggestion of Imbens and Lemieux (2008) and Imbens and Kalyanaraman (2009) and use local linear regression in a bandwidth around the TTP cutoff, where the slopes are allowed to differ for students below and above the 90th percentile cutoff.[8] To assess the sensitivity of bandwidth choice, we report estimates from three different specifications. The first two are OLS local linear regression models with a bandwidth of either 10 or 5 percentile ranking points. The third is the estimator proposed by Imbens and Kalyanaraman (2009; henceforth IK) that uses weighted local linear regression and a data-driven bandwidth choice.

To further assess which specification is most trustworthy for a given outcome, we also present graphical evidence showing the regression fit and local means. The degree to which the regression fit "tracks" the local means near the cut point is informative about whether the estimated

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7 The other main way the research design could be undermined is if school officials manipulate the calculation of class rank to increase the number of its students eligible for automatic admissions via the TTP plan. However, as described above, during our study period class rank was calculated at the district central office using an automated procedure, so we do not think this type of gaming was empirically important during the time covered by our analysis.

8 Because the range of percentile class rank values above the 90th percentile cutoff is relatively small, we do not report estimates from "global polynomial" models that use the complete range of class rank and control for a polynomial in class rank.

discontinuity is being driven by misspecification of f(.). If the regression fit tracks the underlying data well, then it provides reassurance that the estimated discontinuities are reliable.

5.3 Interpretation

Our approach is designed to produce internally valid estimates of the effect of being in the top decile. As noted above, any effects could be operating by changing the likelihood of applying to a particular university, the probability of acceptance conditional on application, or the probability of enrollment conditional on acceptance. We are not able to distinguish from among these mechanisms since we only observe enrollment outcomes and not application nor admissions decisions. Thus, our estimates should be thought as the reduced-form effect of barely being in the TTP at a time when state law guaranteed automatic admission for students in the top decile of their high school class.

While eligibility for automatic admission to the Texas public universities is the most noteworthy consequence of being in the TTP, as described above, the policy in place in Texas during this time included outreach efforts that targeted students in the TTP, especially at schools that serve large number of disadvantaged students and where students are eligible to apply for Longhorn or Century scholarships. This outreach may have had independent effects on college enrollment by, for instance, increasing information about college. As a result, our results should be interpreted as estimates of the combined effect of automatic admission and the accompanying outreach efforts that are part of the Texas TTP Law.[9]

In addition, as with any regression discontinuity design, our estimates are "local" to the cutoff; specifically, they capture a weighted average of individual-level effects where the weights are a function of the probability of being at the ten percent cutoff (Lee, 2008). In this case, the effect near the cutoff has considerable policy relevance. This is because the controversy surrounding the TTP Law largely stems from the perception that the law lets "under-qualified" students gain admission to the most selective universities, and our estimates shed light on the students for whom this claim is most relevant. Moreover, our results are informative about the likely consequences of a change in the automatic admissions cutoff, such as that which went into effect at UT Austin in the fall of 2011.

7. Results

[9] There may be other benefits to being in the TTP not related to the Texas TTP plan. For instance, some scholarships may be offered to students if they are in the TTP of their class. During our study period Texas had no such statewide policy and we do not know of any other examples at the main schools attended by students in our sample. Nonetheless, if there are such effects, then our estimates capture the "reduced form" effect of the TTP policy provisions and any other benefits of being in the TTP.

7.1 Tests of the Identification Assumptions

As described in the preceding section, the assumptions underlying our research design can be tested by examining whether baseline covariates exhibit discontinuous changes at the ten percent cutoff. Table 2 demonstrates that discontinuity estimates for the baseline covariates are generally small in magnitude and only one estimate is statistically significant (reading, in the bandwidth of 10 specification), and there are no covariates for which we found statistically significant discontinuities across all specifications.[10] As a summary measure of all of the covariates, we predicted the probability of 4-year college enrollment as a function of baseline covariates, which places most weight on covariates which are relevant predictors of the college enrollment outcomes of interest. The estimated discontinuities in this variable are small and statistically insignificant. A fact confirmed by the visual evidence in Figure 1.

A second test of the identification assumption is to examine whether the distribution of class rank is continuous at the cut point (McCrary, 2008). Among all students for whom we observe an end of 11th grade class rank, the distribution of class rank is uniformly distributed by construction (at least within a school). However, the distribution of class rank is not uniform in the sample we use for the analysis because we exclude students who do not graduate. If graduation is affected end of 11th grade TTP status, our research design would be threatened. Such an effect would manifest itself in a discontinuity in the distribution of class rank at the TTP cutoff. In contrast, Figure 2 reveals no indication of any discontinuity in the distribution of class rank at the TTP cutoff.

7.2 Effects on College Enrollment and Choice

Table 3 presents the estimates of the effect of being in the TTP on college enrollment and college choice outcomes. As mentioned previously, all of these outcomes refer to enrollment in the fall following graduation from high school. The results indicate that membership in the TTP does increase flagship enrollment. The estimates range from about 6 percentage points in the model with a bandwidth of 10 to 16.5 percentage points in the IK specification, which uses a very narrow bandwidth. This variability indicates the magnitude of the effect is somewhat sensitive to the model specification. This is consistent with Figure 3, which shows the regression fit and local averages (in bins 1 percentile point wide). There is strong visual evidence of a discontinuity in the flagship

[10] Further support for the view that the estimate for the reading exit exam score is not indicative of manipulation of the class rank variable can be found by looking at math scores. If students were systematically sorting around the cutoff, then we would expect to see estimated discontinuities having the same sign in both exit exam subjects. Instead, the estimates for math and reading have opposite signs in two out of three specifications.

enrollment rate, but the magnitude does depend on the bandwidth. We then examine which of the two flagships drives this effect. The results in Table 3 and Figure 3 indicate that most of the effect on flagship enrollment from being in the TTP is due to an increase in the probability of attending UT-Austin, as the estimates for Texas A&M are smaller in magnitude and not statistically significant.

Three other points about the flagship enrollment results are worth noting. First, the estimates are not sensitive to the inclusion of baseline covariates, which provides reassurance that there is no manipulation in the class rank measure that is driving the results. Second, the fact that we find a discontinuity in flagship enrollment suggests that measurement error in our class rank measure might be minimal. This is because even small amounts of error in either the GPA calculation or the count of students included in the denominator could wipe out any discontinuity that exists at the actual TTP cutoff when using the noisy class rank measure (Pei, 2011).[11] Third, the effects are large in magnitude. Only about 9 percent of students who barely miss being in the TTP enroll in a flagship, so even the smallest point estimates imply being in the TTP increases the likelihood of flagship enrollment by 66 percent.

One possibility is that the increase in flagship attendance reflects an increase in the probability of enrolling in 4-year college. However, the estimates in Table 3 offer little indication that this is the case. Across all specifications, the largest point estimate is 3 percentage points, in the specification with the most precise estimates (bandwidth of 10 controlling for baseline covariates), we can rule out effects larger than about 3 percentage points. These estimates are consistent with the lack of a discontinuity in the probability of 4-year college enrollment at the TTP cutoff as seen in the lower-right panel of Figure 3.

If TTP status increases the probability of flagship enrollment but does not affect the likelihood of enrolling in college, an important question is what types of institutions are displaced by the flagship enrollment induced by being in the TTP? One possibility is that students who would go to a flagship if they barely make it into the TTP would go to a lower-ranked public university if they barely missed it. We find little evidence of this type of displacement, as we see no discontinuity in the probability of attending a public non-flagship at the TTP cutoff. The estimates in Table 3 from the models with a bandwidth of 10 and 5 are very close to zero. The estimates from the IK estimator are negative and larger in magnitude, but imprecisely estimated due to the very narrow

[11] Two recent papers (Pei, 2011; Hullegie and Klein, 2010) propose methods to account for measurement error in the running variable in RD designs. Unfortunately we cannot use these in our application because they require actual treatment status (in our case, TTP status) to be observed. The measure of TTP status used in the analysis is based on the observed (potentially noisy) class rank measure.

bandwidth (1.95 percentile ranking points). We also do not find evidence that TTP affects enrollment in any college, suggesting that it does not increase community college enrollment either, but this to be expected since these schools admit anyone with a high school degree.

We do find some evidence that being in the TTP displaces enrollment at private or out-of-state. The upper-right panel of Figure 4 shows that enrollment in these institutions trends downward with class rank, but that it appears to jump up at the TTP cutoff. The estimates in Table 3 are all negative, although they are sensitive to the specification and choice of bandwidth, and are not always statistically significant. When examining enrollment in private and out-of-state enrollment separately, the estimates in Table 3 suggest that any displacement seems to be operating through a reduction in private college enrollment since the estimates for out-of-state enrollment are small and not statistically significant.

Finally, we examined whether TTP status affects measures of college "quality". This is important, because the controversy surrounding the TTP Law centers on whether less-qualified TTP students crowd out more-qualified students from other high schools who just missed being in the TTP. If these rejected students wind up going to lower-quality colleges, then it would support the view that the TTP Law harms them. We considered two proxies for college quality. The first is the probability of enrolling in a college ranked by Barron's as either a "highly" or "most" competitive institution.[12] As seen in the lower-left panel of Figure 4, there is not clear visual evidence of a sharp change at the TTP cutoff for this outcome. The point estimates in Table 3 are not statistically significant, but the magnitudes are sensitive to the choice of bandwidth. With a wider bandwidth, the estimates are very close to zero (and fairly precise), but with narrower bandwidths the estimates are larger in magnitude. Next, we use a continuous measure of selectivity defined as the fraction of applicants to a college who were admitted (so that a lower value of the measure indicates a more selective institution).[13] The lower-right panel of Figure 4 shows that selectivity is strongly related to class rank, but that there is no discontinuous change in average college selectivity at the TTP cutoff. The point estimates in Table 3 are small in magnitude and statistically insignificant.

7.3 Effects on College Persistence

We now turn to outcomes that characterize student persistence in college. Figure 5 shows flagship enrollment by class rank in years 2-4 following high school graduation as well as total

[12] UT-Austin and Texas A&M are ranked as "highly competitive" along with 7 other colleges in Texas (of these only UT-Dallas is a public university). Rice University is the only university in Texas ranked as "most competitive".

[13] Students who did not enroll in college are assigned a value of 1for selectivity.

semesters spent in a flagship 4 years after graduation. For enrollment in years 2-4, it appears flagship enrollment may be higher just to the left of the TTP cutoff, although the magnitude of any discontinuity is smaller than it is for year 1 enrollment (Figure 3). This is confirmed in Table 4, where the point estimates are about half as large as they are for year 1 flagship enrollment, and only statistically significant (for year 2 and 3) in the IK specification. The average of total semesters spent in a flagship does appear to change discontinuously at the TTP cutoff. The estimates in Table 3 are positive and statistically significant with the bandwidth of 10 and in the IK specification. The magnitude of the estimates is about 4 to 5 times larger than the effect on year 1 flagship enrollment in Table 3. In contrast if the year 1 enrollment effect were persistent throughout the following four years, the effect on total semesters at a flagship would be about 8 times as large as the year 1 enrollment effect. This is consistent with the positive but smaller flagship enrollment effects in years 2-4.

Figure 6 shows results for enrollment in private or out-of-state schools. For year-by-year enrollment and especially for total semesters, there is some indication of a jump up at the TTP cutoff (indicating that students in the TTP are less likely to be enrolled or have fewer semesters in private or out-of-state colleges. The point estimates in Table 4 for a bandwidth of 10 are negative and statistically significant for all four outcomes, and the estimates for the IK specification are similar in magnitude but because the bandwidth is so small, are imprecisely estimated. However, the estimates from the model with a bandwidth of 5 are smaller in magnitude and not statistically significant, although they are still negative. Overall, these results suggest that being in the TTP may lead to persistent displacement of private or out-of-state enrollment, although the estimates are somewhat sensitive to the regression specification. Figure 7 shows similar graphs for enrollment in any 4-year college. The visual evidence does not suggest that there is any effect of being in the TTP on either year-by-year enrollment nor on total semesters enrolled in college. The point estimates in Table 4 again exhibit sensitivity to the specification, but are never statistically significant and are not consistently positive or negative.

Given that we find that the effect on flagship enrollment declines over time, an important question is whether this is being driven by students admitted under the TTP dropping out at a higher rate than other students. For instance, it may be that students admitted because of TTP are not able to do well in the rigorous academic environment of the flagship universities.[14] To

[14] Such an effect could be consistent with the claim made by some that under-qualified students admitted via preferential treatment (in this case automatic admission by virtue of the TTP Law) might be "mismatched" to

investigate this possibility, we examined whether being in the TTP affected the likelihood of transferring to a more (or less) selective institution (measured by the Barron's competitive admissions ratings) and the probability of dropping out of college.[15] The evidence in Figure 8 provides no indication of any effects on these outcomes, which is consistent with the point estimates in Table 3.

7.4 Subgroup Analyses

Table 5a shows estimates by race, and indicate that for both whites and nonwhites, TTP status increases flagship enrollment. In fact, the estimates for whites are larger than they are for nonwhites, although we cannot reject the hypothesis of equal effects. This finding stands in contrast to Niu and Tienda (2010) who only find evidence of effects of being in the TTP for Hispanics, but not for whites or African Americans. For the other outcomes, we do not find strong evidence of heterogeneity by race.

Table 5b shows that the effect of eligibility for automatic admissions is strongest among students from high schools that have higher college-sending rates. The estimated effect on flagship enrollment is about 10 percentage points in the bandwidth of 10 and 5 specifications, and is 25 percentage points in the IK specification. Similarly, we see sizable negative effects on private or out-of-state enrollment and positive effects on the number of semesters enrolled at a flagship university. In contrast, we find little evidence of effects in the lower college-sending schools. The estimated effects on flagship enrollment are small and statistically insignificant. Although there is a negative effect on private or out-of-state enrollment, the estimates are small in magnitude and statistically insignificant in the narrower bandwidth specifications. When interpreting these results, it is important to remember that even the higher college-sending high schools in the district have relatively low college-sending rates relative to the state as a whole. Nonetheless, these results indicate that eligibility for automatic admissions may have little effect on college enrollment and choice for the most disadvantaged urban high schools.

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an institution that is too demanding and that they would have worse outcomes than they would have had they enrolled in a less demanding institution (see Arcidiacono et al., 2011; Hinrichs, 2012; and Rothstein and Yoon, 2008 for a discussion and evidence on the "mismatch hypothesis"). However we do not interpret our findings as evidence on the "mismatch hypothesis" because we do not find evidence that TTP status affects the selectivity of the colleges students attend.

[15] These outcomes are defined in terms of enrollment status in the second year following high school graduation. Students enrolled in the second year following graduation but who were not enrolled in college in the fall following graduation are counted as transferring up. Similarly students who were enrolled but then dropped out by the second year are counted as transferring down (as well as dropouts). Students who never enrolled are not counted as dropouts.

8. Conclusion

The TTP Law and automatic admissions policies in other states present an alternative to race-conscious affirmative action policies in a climate where there is significant debate over the legality and fairness of more explicit race-based affirmative action. Even still, they are quite controversial since some perceive them as giving unfair advantage to arguably less-qualified students who attend less competitive high schools.

In this paper, we estimated the impact of barely being in the top decile of one's high school class on college enrollment and choice outcomes using data from a large urban school district in Texas. We used regression discontinuity methods to allow us to isolate the causal impact of being eligible for automatic admissions by comparing the outcomes of students who just made the cutoff for the TTP and those who just missed the cutoff. Our findings provide evidence that membership in the TTP at the end of 11th grade, the point at which the class rank that is reported on most applications to selective colleges is determined, does affect college choice decisions. In particular, students barely above the TTP cutoff are more likely to attend flagship universities than are those who just miss the cutoff, and that after four years, enroll in more cumulative semesters at flagship universities. Our results also suggest that eligibility for automatic admissions to the flagship universities displaces attendance at private or out-of-state institutions. The net effect on college enrollment or four-year college enrollment and attainment is small and statistically insignificant. Moreover, we do not find effects on college "quality" as measured by Barron's rankings or the percent of applicant who are admitted to a particular school. Taken together, these results suggests that students who miss the TTP cutoff still are able to attend "good" colleges even if they do not attend flagship universities.

When we examine whether these effects vary by policy-relevant subgroups, we find that these effects are present for both whites and nonwhites. However, the effects are strongest in schools that send a large (relative to the district) percent of its graduates to college. This suggests that eligibility for automatic admissions may not have much effect on the outcomes of students in the most disadvantaged schools.

When considering these findings two important factors are important to keep in mind. First, our estimates are based on data for only one district in Texas. However, since it serves large numbers of lower-income and minority students, one of the TTP Law's main intended beneficiaries, our results still have considerable policy significance. However, our findings cannot speak to the effects of the TTP Law on enrollment at competitive universities for graduates from other districts across the state, in particular for students in affluent districts and high schools. Nonetheless, the fact that students in our study district likely face larger barriers to enrolling in high-quality colleges suggest that our finding that being in the TTP does not appreciably improve the average selectivity of the college students attend may also be true in higher-income districts. Second, due to the research design we use, the estimates pertain only to students with class ranks that fall close to the TTP cutoff. This is also a policy relevant subgroup, as they are the ones who stand to gain the most from automatic admissions since they likely have the weakest credentials of students in the TTP. These results are also informative about the students likely to be affected from small changes in the automatic admissions cutoff such as the one that UT-Austin instituted in 2011. Finally, our study focuses on comparing students who are and are not eligible for automatic admission in a regime where all students are subject to the TTP law, our estimates are not directly informative about the effect of having a TTP policy.

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Figure 1: Probability of 4-Year College Enrollment Predicted Using Baseline Covariates by End of 11th Grade Class Rank

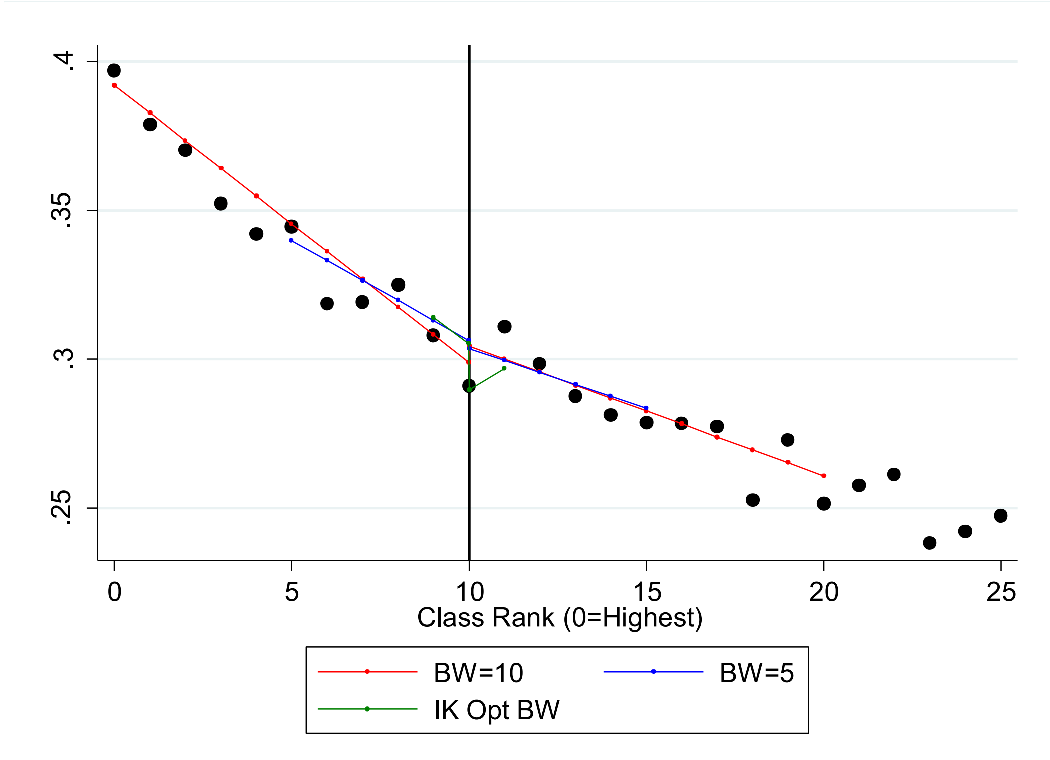

Figure 2: Distribution of Class Rank at end of 11th Grade, 2002-2007 High School Graduates

Figure 3: Flagship and 4-Year College Enrollment by End of 11th Grade Class Rank

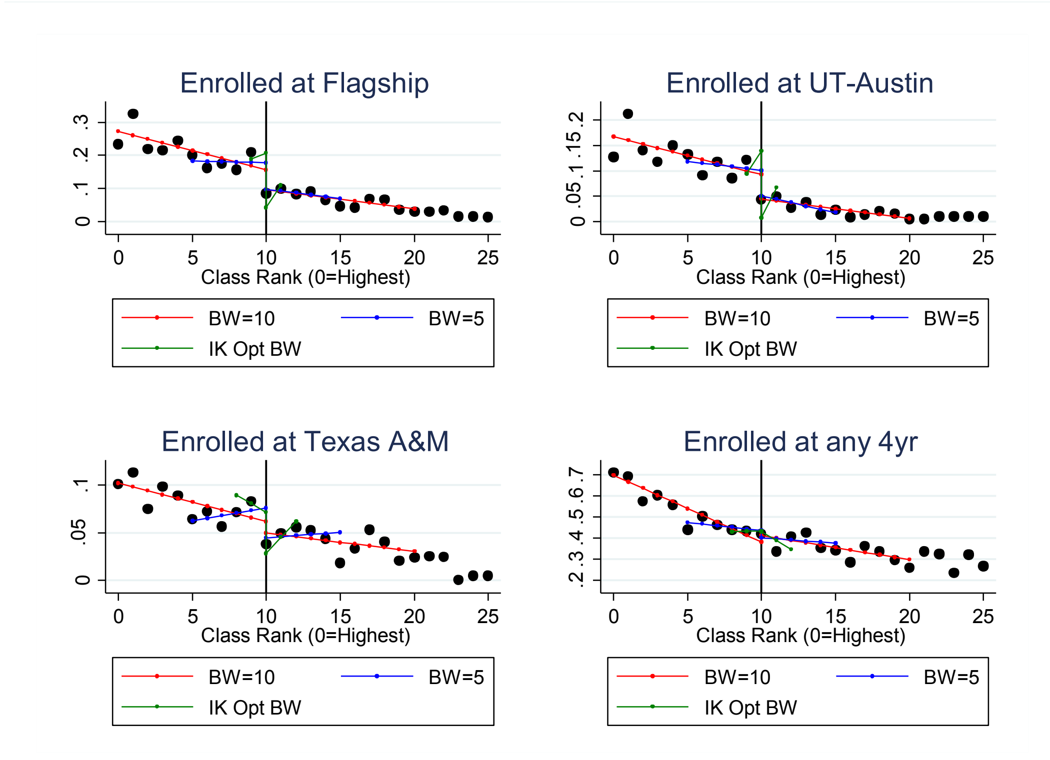

Figure 4: Non-Flagship Enrollment and College Quality by End of 11th Grade Class Rank

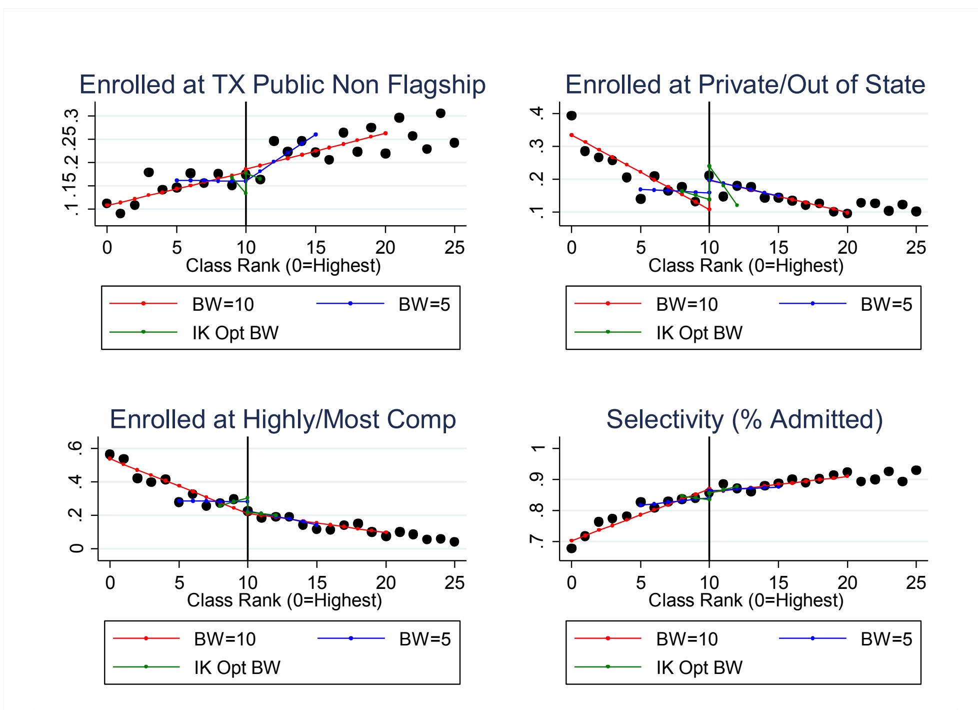

Figure 5: Flagship Enrollment through Year 4 after HS Graduation by End of 11th Grade Class Rank

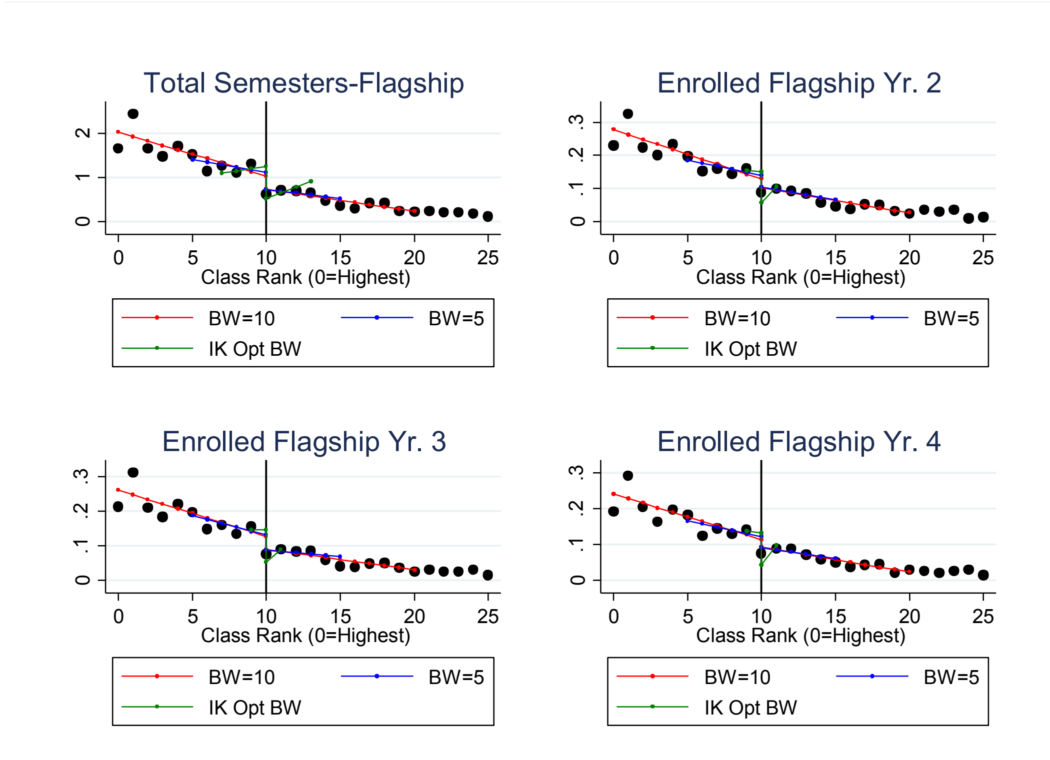

Figure 6: Private or Out-of-State Enrollment through Year 4 after HS Graduation by End of 11th Grade Class Rank

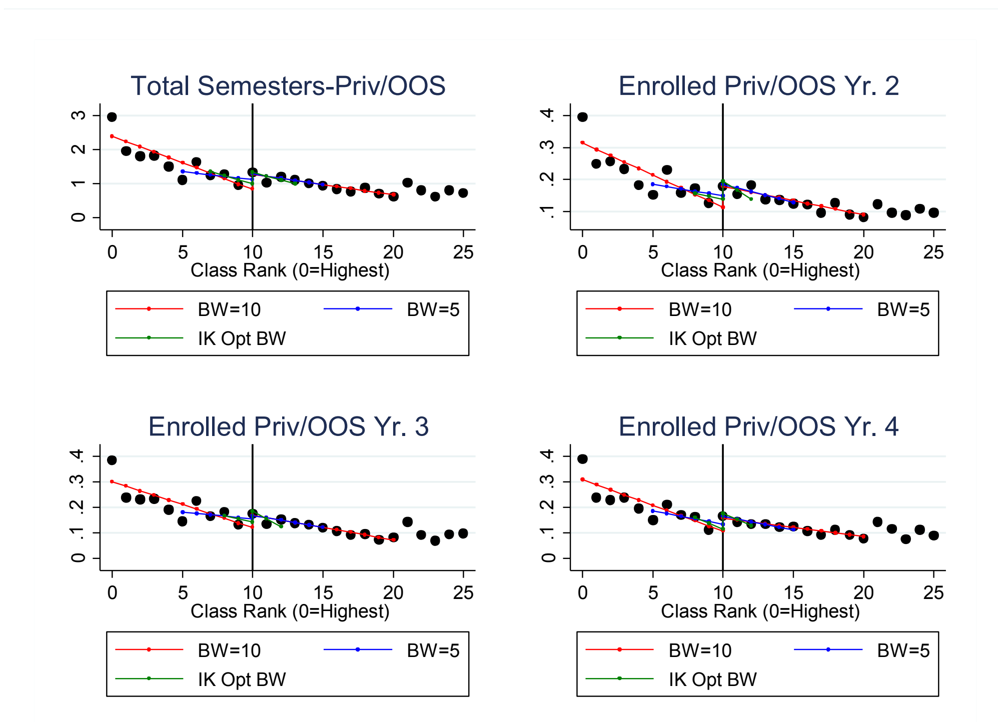

Figure 7: 4-Year College Enrollment through Year 4 after HS Graduation by End of 11th Grade Class Rank

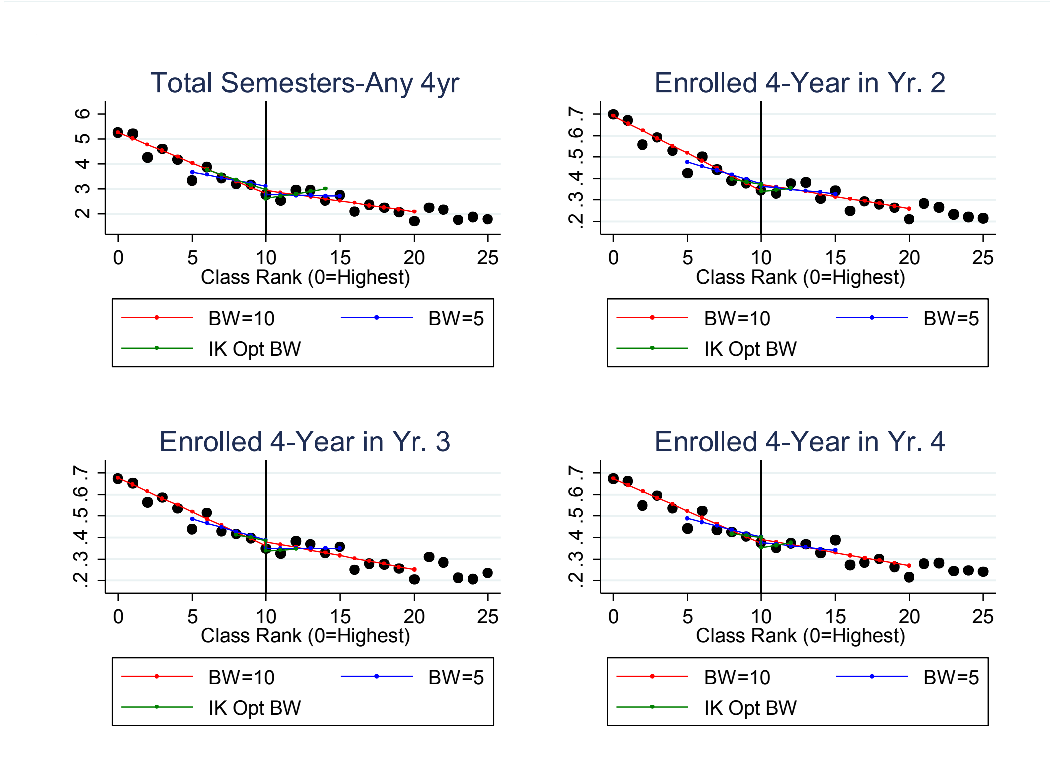

Figure 8: Transfer and Dropout by End of 11th Grade Class Rank

Table 1: Descriptive Statistics

	All High Schools			High Schools by 4 Yr. College Enrollment			
				High Enrolling		Low Enrolling	
	All	Top 10%	Non-Top 10%	Top 10%	Non-Top 10%	Top 10%	Non-Top 10%
Demographics							
Male	0.48	0.33	0.50	0.35	0.51	0.28	0.49
White	0.27	0.43	0.25	0.60	0.35	0.16	0.08
Black	0.29	0.18	0.31	0.21	0.39	0.13	0.18
Hispanic	0.41	0.30	0.43	0.09	0.24	0.65	0.73
Econ. Disadvantaged	0.54	0.41	0.56	0.21	0.42	0.74	0.78
Limited Eng. Proficiency	0.13	0.07	0.14	0.02	0.07	0.15	0.24
Special Education	0.10	0.01	0.12	0.01	0.12	0.01	0.12
High School Record							
11th Grade GPA	2.95	4.18	2.77	4.28	2.82	4.01	2.70
Fall 12th GradeGPA	2.99	4.18	2.82	4.29	2.87	4.00	2.73
GPA at Graduation	2.99	4.18	2.82	4.29	2.87	3.99	2.74
Recommended Diploma	0.67	0.76	0.66	0.67	0.66	0.89	0.66
Distinguished Diploma	0.04	0.22	0.01	0.31	0.02	0.08	0.00
Math exit exam z-score	0.23	1.01	0.12	1.08	0.21	0.91	-0.03
Reading exit exam z-score	0.22	0.78	0.14	0.81	0.21	0.73	0.02
Took SAT or ACT	0.31	0.55	0.28	0.58	0.33	0.50	0.20
College Outcomes (Year following Graduation)							
Enrolled in College	0.30	0.58	0.26	0.69	0.33	0.40	0.15
Enrolled in 4 Yr. College	0.20	0.54	0.16	0.66	0.22	0.34	0.06
Enrolled Private School	0.05	0.13	0.03	0.14	0.05	0.12	0.01
Enrolled Out of State	0.04	0.09	0.03	0.13	0.04	0.03	0.01
Enrolled Most/Highly Competitive	0.08	0.37	0.04	0.47	0.06	0.21	0.01
Enrolled at UT Austin	0.02	0.13	0.00	0.17	0.01	0.06	0.00
Enrolled at Texas A&M	0.02	0.08	0.01	0.11	0.01	0.04	0.00
Enrolled at a Flagship	0.04	0.21	0.01	0.28	0.02	0.10	0.00
Admission rate (not enrolled=100%)	0.93	0.79	0.95	0.73	0.94	0.88	0.98
Admission rate (drop not enrolled)	0.66	0.60	0.69	0.59	0.69	0.63	0.70
College Persistence (within 4 years)							
Total Semesters at Flagship	0.28	1.52	0.11	2.08	0.16	0.62	0.01
Total Semesters at 4yr.	1.39	4.03	1.02	4.97	1.44	2.50	0.33
Sample Size	17057	2101	14956	1302	9266	799	5690

Table 2: Discontinuities in Baseline Covariates

Covariate	bw=10	bw=5	I&K opt. bw
E(Enroll 4Yr College | X)	-0.005	0.003	0.016
	(0.010)	(0.014)	(0.026)
Male	-0.022	0.046	0.058
	(0.030)	(0.041)	(0.064)
Economically Disadvantaged	-0.001	0.029	-0.052
	(0.031)	(0.043)	(0.067)
African American	0.013	0.021	-0.052
	(0.025)	(0.035)	(0.070)
White	-0.002	0.009	0.084
	(0.030)	(0.043)	(0.067)
Other Ethnicity	0.000	0.023	-0.041
	(0.027)	(0.039)	(0.071)
Limited English Proficiency	0.025	0.003	0.029
	(0.018)	(0.026)	(0.043)
Special Education	0.002	0.001	0.000
	(0.008)	(0.011)	(0.015)
Reading Exit Exam Z-score	-0.089*	-0.046	-0.053
	(0.038)	(0.055)	(0.081)
Math Exit Exam Z-score	-0.045	0.036	0.006
	(0.043)	(0.060)	(0.092)
Missing Math Exit Exam	0.022	0.021	0.060
	(0.018)	(0.025)	(0.039)
Missing Reading Exit Exam	0.018	0.005	0.056
	(0.018)	(0.025)	(0.039)
Graduation cohort	-0.057	-0.049	-0.042
	(0.106)	(0.149)	(0.186)

Table 3: Effect of Being in Top 10% at end of 11th Grade on College Enrollment and Choice

Enrolled in Flagship	0.060**	0.059**	0.081**	0.074**	0.165**	0.145**
	(0.021)	(0.020)	(0.029)	(0.028)	(0.053)	(0.047)
Enrolled UT Austin	0.049**	0.048**	0.050*	0.045*	0.131**	0.114**
	(0.016)	(0.016)	(0.023)	(0.022)	(0.045)	(0.042)
Enrolled Texas A&M	0.012	0.012	0.032	0.030	0.044	0.039
	(0.015)	(0.014)	(0.020)	(0.020)	(0.031)	(0.029)
Enrolled Public Non-Flagship	-0.006	-0.002	-0.000	0.002	-0.044	-0.034
	(0.024)	(0.023)	(0.033)	(0.032)	(0.056)	(0.050)
Enrolled Private or Out-of-State	-0.089**	-0.085**	-0.039	-0.041	-0.101	-0.105*
	(0.024)	(0.023)	(0.033)	(0.032)	(0.055)	(0.051)
Enrolled Out-of-State	-0.019	-0.019	-0.005	-0.005	-0.015	-0.023
	(0.015)	(0.015)	(0.021)	(0.021)	(0.036)	(0.035)
Enrolled Private	-0.070**	-0.067**	-0.034	-0.036	-0.087	-0.084
	(0.019)	(0.019)	(0.027)	(0.027)	(0.050)	(0.046)
Enrolled 4 Year	-0.031	-0.024	0.034	0.026	0.004	-0.006
	(0.030)	(0.027)	(0.043)	(0.038)	(0.067)	(0.054)
Enrolled any College	-0.035	-0.029	0.041	0.035	0.027	0.012
	(0.031)	(0.028)	(0.044)	(0.039)	(0.070)	(0.059)
Enrolled Highly or Most Competitive College	-0.006	-0.004	0.064	0.055	0.100	0.073
	(0.027)	(0.024)	(0.039)	(0.033)	(0.062)	(0.051)
Selectivity (% Admitted)	0.011	0.009	-0.023	-0.020	-0.021	-0.013
	(0.012)	(0.011)	(0.017)	(0.015)	(0.030)	(0.024)
Bandwidth	10	10	5	5	IK opt bw	IK opt bw
Baseline covariates?	No	Yes	No	Yes	No	Yes

Note: Outcomes refer to enrollment and choice in the semester following high school graduation. N for bw=10 is 4,197; bw=5 is 2110. Robust standard errors in parentheses. **, * denote statistically significant estimate at the 1% and 5% level, respectively.

Table 4: Effect of Being in Top 10% at end of 11th Grade on Persistence Outcomes

Enrolled Flagship in: Year 2	0.027	0.025	0.035	0.030	0.096*	0.075
	(0.020)	(0.019)	(0.028)	(0.026)	(0.047)	(0.041)
Year 3	0.037	0.035	0.043	0.038	0.094*	0.076
	(0.020)	(0.019)	(0.027)	(0.025)	(0.046)	(0.040)
Year 4	0.021	0.020	0.031	0.026	0.088	0.072
	(0.019)	(0.018)	(0.027)	(0.025)	(0.046)	(0.040)
Enrolled Priv/OOS in: Year	-0.065**	-0.062**	-0.035	-0.036	-0.056	-0.060
	(0.023)	(0.022)	(0.032)	(0.030)	(0.053)	(0.049)
Year 3	-0.049*	-0.046*	-0.012	-0.011	-0.044	-0.048
	(0.023)	(0.022)	(0.032)	(0.030)	(0.052)	(0.047)
Year 4	-0.052*	-0.049*	-0.031	-0.033	-0.060	-0.065
	(0.022)	(0.021)	(0.031)	(0.029)	(0.050)	(0.045)
Enrolled in 4-Yr: Year 2	-0.030	-0.025	0.012	0.006	0.034	0.026
	(0.030)	(0.026)	(0.042)	(0.035)	(0.063)	(0.051)
Year 3	-0.018	-0.015	0.039	0.035	0.047	0.040
	(0.030)	(0.026)	(0.042)	(0.036)	(0.063)	(0.051)
Year 4	-0.020	-0.015	0.024	0.020	0.046	0.037
	(0.030)	(0.026)	(0.042)	(0.036)	(0.065)	(0.054)
Transfer to More Selective School	-0.001	-0.000	-0.032	-0.031	0.002	0.011
	(0.016)	(0.016)	(0.023)	(0.022)	(0.036)	(0.031)
Transfer to Less Selective School	0.007	0.009	0.013	0.011	-0.053	-0.053
	(0.018)	(0.018)	(0.026)	(0.026)	(0.045)	(0.043)
Dropped Out (=0 if did not enroll)	-0.006	-0.005	-0.002	-0.003	-0.075	-0.077
	(0.016)	(0.016)	(0.023)	(0.023)	(0.043)	(0.042)
Total Semesters: Flagship	0.298*	0.286*	0.392	0.350	0.725**	0.605*
	(0.150)	(0.141)	(0.208)	(0.192)	(0.274)	(0.243)
Total Semester: 4 Year	-0.129	-0.090	0.332	0.295	0.342	0.280
	(0.210)	(0.175)	(0.296)	(0.241)	(0.357)	(0.280)
Total Semesters: Highly or Most Competitive	-0.099	-0.089	0.309	0.254	0.391	0.296
	(0.197)	(0.168)	(0.278)	(0.233)	(0.324)	(0.262)
Total Semesters: Private or Out-of-State	-0.440**	-0.416**	-0.165	-0.167	-0.342	-0.365
	(0.165)	(0.156)	(0.229)	(0.217)	(0.299)	(0.274)
Bandwidth	10	10	5	5	IK opt bw	IK opt bw
Baseline covariates?	No	Yes	No	Yes	No	Yes

Note: Outcomes refer to enrollment and choice in the semester following high school graduation. N for bw=10 is 4,197; bw=5 is 2110. Robust standard errors in parentheses. **, * denote statistically significant estimate at the 1% and 5% level, respectively.

Table 5a: Effect of Being in Top 10% at end of 11th Grade by Race

			Whites			
Enrolled in Flagship	0.094*	0.087*	0.103	0.083	0.322**	0.263**
	(0.042)	(0.041)	(0.060)	(0.059)	(0.101)	(0.093)
Enrolled Private or Out-of-State	-0.079	-0.073	-0.026	-0.019	-0.150	-0.131
	(0.043)	(0.042)	(0.060)	(0.059)	(0.097)	(0.091)
Enrolled 4 Year	0.022	0.024	0.095	0.082	0.114	0.071
	(0.048)	(0.044)	(0.069)	(0.063)	(0.102)	(0.085)
Transfer to More Selective School	-0.006	-0.003	-0.039	-0.040	0.049	0.048
	(0.027)	(0.027)	(0.038)	(0.037)	(0.047)	(0.046)
Transfer to Less Selective School	0.000	0.003	0.027	0.029	0.056	0.044
	(0.027)	(0.027)	(0.039)	(0.039)	(0.060)	(0.059)
Dropped Out (=0 if did not enroll)	-0.005	-0.004	0.019	0.023	0.064	0.057
	(0.024)	(0.024)	(0.036)	(0.035)	(0.058)	(0.057)
Total Semesters: Flagship	0.502	0.471	0.493	0.377	1.098*	0.931*
	(0.304)	(0.298)	(0.434)	(0.425)	(0.511)	(0.475)
Total Semester: 4 Year	0.132	0.185	0.642	0.602	0.738	0.723
	(0.344)	(0.307)	(0.499)	(0.436)	(0.603)	(0.504)
Total Semesters: Private or Out-of-State	-0.387	-0.362	-0.091	-0.063	-0.262	-0.140
	(0.314)	(0.306)	(0.447)	(0.440)	(0.528)	(0.494)
			Nonwhites			
Enrolled in Flagship	0.035	0.036	0.060*	0.061*	0.053	0.052
	(0.020)	(0.019)	(0.026)	(0.025)	(0.040)	(0.038)
Enrolled Private or Out-of-State	-0.096**	-0.091**	-0.049	-0.050	-0.088	-0.067
	(0.027)	(0.026)	(0.037)	(0.036)	(0.061)	(0.055)
Enrolled 4 Year	-0.070	-0.060	-0.009	-0.014	-0.127	-0.101
	(0.037)	(0.034)	(0.051)	(0.047)	(0.089)	(0.075)
Transfer to More Selective School	0.000	0.002	-0.027	-0.024	-0.030	-0.033
	(0.020)	(0.020)	(0.028)	(0.028)	(0.046)	(0.041)
Transfer to Less Selective School	0.010	0.014	0.006	0.001	-0.092	-0.117*
	(0.024)	(0.024)	(0.035)	(0.034)	(0.057)	(0.054)
Dropped Out (=0 if did not enroll)	-0.007	-0.005	-0.015	-0.018	-0.119*	-0.139**
	(0.022)	(0.021)	(0.031)	(0.031)	(0.049)	(0.047)
Total Semesters: Flagship	0.144	0.149	0.289	0.311	0.185	0.239
	(0.133)	(0.128)	(0.172)	(0.164)	(0.208)	(0.179)
Total Semester: 4 Year	-0.345	-0.297	0.107	0.098	-0.088	-0.055
	(0.237)	(0.211)	(0.324)	(0.285)	(0.399)	(0.331)
Total Semesters: Private or Out-of-State	-0.493**	-0.455**	-0.231	-0.227	-0.406	-0.403
	(0.174)	(0.166)	(0.233)	(0.227)	(0.290)	(0.267)
Bandwidth	10	10	5	5	IK opt bw	IK opt bw
Baseline covariates?	No	Yes	No	Yes	No	Yes

Note: Outcomes refer to enrollment and choice in the semester following high school graduation. N for bw=10 is 1686 for whites and 2511 for nonwhites; bw=5 is 832 for whites and 1278 for nonwhites. Robust standard errors in parentheses. **, * denote statistically significant estimate at the 1% and 5% level, respectively.

Table 5b: Effect of Being in Top 10% at end of 11th Grade by HS College-Sending Level

	High College-Sending High School					
Enrolled in Flagship	0.096**	0.097**	0.113**	0.105*	0.254**	0.213**
	(0.031)	(0.030)	(0.044)	(0.042)	(0.075)	(0.069)
Enrolled Private or Out-of-State	-0.080*	-0.077*	-0.047	-0.048	-0.144	-0.147
	(0.033)	(0.032)	(0.046)	(0.045)	(0.083)	(0.077)
Enrolled 4 Year	0.014	0.020	0.059	0.047	0.048	0.046
	(0.039)	(0.037)	(0.055)	(0.052)	(0.079)	(0.071)
Transfer to More Selective School	-0.011	-0.010	-0.045	-0.037	-0.007	0.001
	(0.020)	(0.020)	(0.027)	(0.027)	(0.033)	(0.032)
Transfer to Less Selective School	0.023	0.024	0.025	0.025	0.002	0.010
	(0.023)	(0.023)	(0.035)	(0.034)	(0.055)	(0.052)
Dropped Out (=0 if did not enroll)	0.001	0.002	-0.005	-0.004	-0.046	-0.048
	(0.021)	(0.020)	(0.030)	(0.030)	(0.053)	(0.051)
Total Semesters: Flagship	0.501*	0.509*	0.568	0.510	0.872*	0.733*
	(0.224)	(0.216)	(0.314)	(0.300)	(0.368)	(0.344)
Total Semester: 4 Year	0.102	0.141	0.488	0.449	0.479	0.482
	(0.271)	(0.244)	(0.385)	(0.343)	(0.453)	(0.396)
Total Semesters: Private or Out-of-State	-0.454	-0.435	-0.330	-0.332	-0.546	-0.526
	(0.240)	(0.232)	(0.337)	(0.326)	(0.398)	(0.371)
	Low College-Sending High School					
Enrolled in Flagship	-0.001	-0.001	0.024	0.026	0.025	0.017
	(0.020)	(0.020)	(0.025)	(0.024)	(0.026)	(0.025)
Enrolled Private or Out-of-State	-0.104**	-0.098**	-0.028	-0.032	-0.026	-0.024
	(0.028)	(0.028)	(0.039)	(0.040)	(0.058)	(0.055)
Enrolled 4 Year	-0.108**	-0.092*	-0.015	-0.010	-0.067	-0.073
	(0.039)	(0.038)	(0.053)	(0.051)	(0.074)	(0.068)
Transfer to More Selective School	0.016	0.018	-0.009	-0.005	0.028	0.055
	(0.028)	(0.027)	(0.040)	(0.039)	(0.076)	(0.055)
Transfer to Less Selective School	-0.020	-0.015	-0.007	-0.005	-0.070	-0.091
	(0.029)	(0.029)	(0.040)	(0.039)	(0.056)	(0.048)
Dropped Out (=0 if did not enroll)	-0.018	-0.015	0.001	0.003	-0.078	-0.094*
	(0.026)	(0.026)	(0.037)	(0.036)	(0.056)	(0.046)
Total Semesters: Flagship	-0.054	-0.052	0.078	0.099	0.141	0.160
	(0.117)	(0.118)	(0.134)	(0.132)	(0.102)	(0.114)
Total Semester: 4 Year	-0.543*	-0.421	0.025	0.077	0.041	0.063
	(0.239)	(0.231)	(0.308)	(0.302)	(0.382)	(0.370)
Total Semesters: Private or Out-of-State	-0.435**	-0.369*	0.081	0.066	0.055	0.052
	(0.163)	(0.162)	(0.207)	(0.216)	(0.256)	(0.257)
Bandwidth	10	10	5	5	IK opt bw	IK opt bw
Baseline covariates?	No	Yes	No	Yes	No	Yes

Note: Outcomes refer to enrollment and choice in the semester following high school graduation. N for bw=10 is 2584 for higher college-sending high schools and 1613 for lower college-sending high schools; bw=5 is 1304 for higher-sending high schools and 806 for lower-sending high schools. Robust standard errors in parentheses. **, * denote statistically significant estimate at the 1% and 5% level, respectively.