

Race, income, and enrollment patterns in highly selective colleges, 1982-2004

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Executive Summary

Where a student attends college has become increasingly important in the last few decades. As education has grown significantly more important in the labor market, competition among students for access to the most selective colleges and universities has grown as well. In this brief we examine patterns of enrollment, by race and family income, in the most selective colleges and universities. We also simulate racial and socioeconomic patterns of admission to selective colleges under several types of “race-blind” admissions policies, including policies like the Top Ten Percent admissions policy currently in use in Texas and a similar policy in California. For the analyses in this study, we rely on data from three national longitudinal studies of students in the high school classes of 1982, 1992, and 2004. We find:

- Black and Hispanic students are dramatically underrepresented in the most selective colleges, even after controlling for family income. The probability of enrolling in a highly selective college is five times greater for white students than black students. Even after controlling for income, white students are two to three times as likely as black students to gain admission to highly selective colleges. These racial disparities appear to have grown in the last 30 years. Because the racial disparity in selective college admissions persists even after controlling for income, income-based admissions practices will not eliminate the racial disparities.
- We find that low- and middle-income students are likewise extremely underrepresented in the most selective colleges. Students from top income quintile families are seven to eight times more likely to enroll in a highly selective college than students from bottom quintile families. This disparity appears to have grown over time, as more and more seats in highly selective schools have been occupied by students from high income families.
- If selective colleges admitted solely on the basis of whether students were in the top ten percent of students *in their state*, the racial and socioeconomic diversity of these schools would decline substantially. If all selective colleges admitted solely on the basis of class rank *within high schools*, the diversity of their collective student bodies might increase very modestly, but would still be far from representative of the population, particularly with regard to black students. This suggests that rules like the Texas Top Ten Percent rule are insufficient to create meaningfully diverse student bodies at selective state universities. In other words, these “top ten percent” strategies are not, by themselves, effective methods of creating diverse student bodies at the most selective colleges and universities.

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Introduction: The Value of a College Degree

In the United States, the economic returns to a college education are significant and impressive. A college degree leads to greater upward economic mobility, higher lifetime income, better employment rates, higher levels of personal saving, improved health, a greater ability to pass down cultural capital to future generations, and a longer life (Douglass, 2009). In 2008, the median income among full-time workers with a bachelor's degree was \$55,700; the median income among high school graduates with no college degree and employed full-time was only \$33,800 (Baum, Ma, and Payea, 2010), reflecting a college degree wage premium of 65%. This wage premium is now the highest among OECD countries (Douglass, 2009). Earning a college degree pays off for all population groups: the college wage premium is large for both men and women and for all racial groups (Baum, Ma, & Payea, 2010). Moreover, the annual earnings premium for a college graduate has roughly doubled since the 1970s (Autor, 2010; Baum, Ma, & Payea, 2010; Zumeta 2011).¹

Attending one of the most selective colleges provides even larger benefits for students. While *in general* higher education provides real and impressive economic benefits for U.S. adults, the U.S. higher education system is enormously diverse and highly stratified. Not all college degrees are the same; nor do all provide the same economic returns. Often conceptualized as a pyramid, the U.S. higher education system consists of many low-status, broad-access institutions at the bottom and fewer high-status, narrow-access universities at the top. Students who attend the few elite schools at the top of the hierarchy enjoy larger tuition subsidies, disproportionately extensive resources, and more focused faculty attention (Hoxby, 2009).

Not surprisingly, the economic benefits (such as future earnings) of attending more selective schools are impressive. A number of sophisticated studies have examined the relationship between college selectivity and future earnings. These studies, employing techniques for estimating causal relationships such as instrumental variables (e.g. Long, 2007), matching (e.g. Dale and Krueger, 2001; Black and Smith, 2004), and regression discontinuity (e.g. Hoekstra, 2009), have all found similar results: students who attend higher quality colleges have better labor market outcomes.

The potential for these substantial benefits are not lost on students. As college enrollment rates have grown, *where* (as opposed to *if*) a student attends college has become increasingly important. Over the past forty years, students have become more willing to travel long distances to

¹ Although the apparent wage premium associated with a college degree is large, one might worry that it is a biased estimate of the true effect of earning a college degree, because those who earn a degree may have been the kind of people who would have earned more than those who do not, even if they had not earned a degree. Researchers have dealt with these selection biases using statistical techniques such as instrumental variables, matching, and exploitation of supply-side shocks (e.g. Carneiro, Heckman and Vytlačil, 2011). Studies using these methods have generally arrived at the same conclusion: holding all else equal, earning a college degree leads to significantly higher wages.

go to good schools and less willing to attend schools that they perceive as being poorly resourced or having less academically-able peers (Hoxby, 2009). As competition for the few seats at these colleges has intensified, students at elite schools are increasingly surrounded by peers with higher achievement, most of who come from affluent, highly-educated families living in high-income neighborhoods.

These social network connections and the increasing prestige of elite schools mean that in addition to economic benefits, students attending highly selective schools also experience disproportionate increases in social and cultural capital. Elite graduate schools and top financial, consulting, and law firms recruit almost exclusively at highly selective colleges; likewise, evaluators at elite firms routinely use school prestige as a key factor when screening resumes (Rivera, 2009). Indeed, nearly half of all Fortune 500 CEOs have degrees from one of thirteen schools, twelve of which are highly selective (Wecker, 2012).

Affirmative Action and Admission to Highly Selective Schools

Historically, minority students have attended elite schools in disproportionately small numbers. This underrepresentation is partly due to patterns of segregation and legacies of discrimination and partly due to lack of access to social networks and high quality primary and secondary education. Given the substantial benefit that comes from attending one of these top schools and the historically low rates of minority student enrollment, policymakers and educators have devoted significant thought and attention to remedying these disparities. Over the past half century, a number of elite public universities and leading private universities have instituted admissions policies that attempt to create diverse classes and counter the effects of decades of discrimination. For example, Texas and California both guarantee admission to their state universities (the UC system in California; the UT system in Texas) to students who rank above a certain percentile (above the 90th percentile in Texas; above the 91st percentile in California) in their high school class.² Because of enduring patterns of residential and school segregation, these policies may yield moderately diverse undergraduate classes.³

Like state policymakers, the courts, too, have given much attention to which students are admitted to the most selective colleges. Several US Supreme Court cases in the past four decades have ruled on the issue of affirmative action, often recognizing the need for pro-active policies to achieve racial diversity on college campuses. The 1978 *Regents of the University of California v.*

² The admissions policies differ in Texas and California in an important way. In Texas, admission is guaranteed for those ranked by GPA in the top 10% of *their high school*; in California, admission is guaranteed for those in the top 9% of their high schools based on GPA or the top 9% of *the state* on an index that is a weighted average of GPA and SAT/ACT scores.

³ The extent to which such “Top Ten Percent” policies yield more diverse classes than an admissions policy based solely on academic performance, without regard for what high school one attends, depends on the level of school segregation and the size of the white/minority achievement gap. If there were no school segregation, a policy that admitted the top 10% of students from each high school would be expected to yield a pool of students with the same demographic characteristics as a policy that did not take high schools into account (because the within-school pools of students would be racially similar in every school). If there were complete school segregation (if each school were racially homogenous), then a top 10% policy would yield a pool of students that would have the same racial composition as that of the population as a whole. Thus, the more between-school segregation the greater the impact of a “Top Ten Percent” admissions policy on the diversity of undergraduate classes at selective colleges.

Bakke ruling declared that race could be used as one criterion in college admissions decisions: affirmative action is constitutional, but strict quotas are not.⁴ The 2003 *Grutter v. Bollinger* ruling similarly supported the use of holistic race-conscious admissions processes that favor underrepresented minority groups.⁵

The cases have had direct effects in state university systems. After the *Grutter* decision, officials in Texas started using race as a factor in determining admissions for those not in the top 10 percent of their high school class because they realized that particular programs within the UT system were still not adequately diverse even under the Top Ten Percent rule. This practice has now been challenged in the *Fisher v. University of Texas at Austin* case.⁶

Underlying the debate regarding affirmative action are several important trends. First, the wage premium for a college degree has risen sharply in the last several decades, as noted above. As the returns to educational attainment have grown, so too has competition for spots at the most selective colleges and universities (Alon and Tienda, 2007). Second, income inequality has grown substantially in the last 3 decades (Piketty and Saez, 2003). When income inequality rises at the same time as competition for scarce spots at selective colleges, a predictable result is that access to selective colleges becomes more strongly correlated with income. Indeed, a number of studies show that income and socioeconomic status have grown more strongly correlated with academic achievement, college completion, and access to selective colleges (Alon 2009; Astin and Oseguera, 2004; Bailey and Dynarski, 2011; Bastedo and Jaquette, 2011; Belley and Lochner, 2007; Karen, 2002; Reardon, 2011). Third, racial achievement gaps and income disparities have narrowed only modestly in the last several decades. Racial achievement gaps narrowed substantially in the 1970s and 1980s, but have narrowed only slightly since the late 1980s. Racial income disparities are roughly the same today as they were 40 years ago (indeed, by some measures the black-white income disparity is slightly larger today than 40 years ago; see Isaacs, 2007). This lack of progress in narrowing racial disparities in income or academic achievement, coupled with the rising significance of income in education success, suggests that black-white disparities in access to the most selective colleges and universities may be growing.

Focus of this Policy Brief

Our aim in this policy brief is to provide background evidence for the discussion of affirmative action admissions policies at highly selective colleges and universities.

First, we describe the racial and socioeconomic composition of highly-selective colleges and universities. We compare the composition of these most selective schools to less-selective four-year colleges and universities and to two-year colleges. We then investigate the extent to which racial differences in enrollment rates at selective colleges can be explained by racial differences in family income. Family income has become an increasingly important determinant of academic achievement (Reardon, 2011); because of this, and because of the rising cost of college enrollment, family income has likewise become an increasingly important determinant of college enrollment (Bailey and Dynarski, 2011; Belley and Lochner 2007). Thus, racial differences in income may help explain racial differences in enrollment in highly selective colleges. We investigate these issues

⁴ *Regents of the University of California v. Bakke*, 438 U.S. 265 (1978)

⁵ *Grutter v. Bollinger*, 539 U.S. 306 (2003)

⁶ *Fisher v. University of Texas at Austin*, 631 F.3d 213 (5th Cir. 2011).

using data from a nationally representative sample of students who graduated from high school in 2004, the year after the *Grutter* decision.

Second, we examine the extent to which racial differences in enrollment in highly selective colleges have changed in the last 30 years. Using data from three nationally-representative samples of students—from the high school classes of 1982, 1992, and 2004—we compare the racial and socioeconomic patterns of enrollment in highly selective colleges and universities over time. We are interested in determining whether substantial progress has been made in equalizing enrollment patterns over time.

Third, while the Texas Top Ten Percent plan left Black and Hispanic students underrepresented relative to pre-*Hopwood* levels (Long and Tienda, 2008), we explore the extent to which admissions policies like those in Texas and California can produce more diverse patterns of undergraduate enrollment at highly-selective state universities across the country. Using nationally-representative data on high school seniors, we conduct a set of simple simulations, first assuming that the top-scoring 10% of students in each high school were admitted to highly selective state universities (similar to current policies in California and Texas), and then assuming that the top 10% in each state were admitted to these universities (this policy is similar to one aspect of California's policy). Finally we simulate what a college undergraduate class would look like if a Ten Percent Rule were applied to the top 10% of students in the entire country. We compare the diversity of the student populations admitted under these different policies to the diversity of the overall student population as well as to the diversity of the students enrolled in highly selective state universities. These (admittedly crude) simulations enable us to examine the potential of admissions policies like the Texas Top Ten Percent rule to achieve, on their own, diverse undergraduate enrollments in selective colleges and universities.

We focus on these highly selective institutions for two reasons. First, understanding enrollment patterns at these schools is important because of the disproportionate returns to attendance at selective schools discussed above. Second, it is at these schools where affirmative action appears to play the largest role in admissions decisions (Alon and Tienda 2007)

Data

We use data from three longitudinal studies conducted by the National Center for Education Statistics (NCES): High School and Beyond (HS&B, the high school class of 1982); the National Education Longitudinal Study of 1988 (NELS:88, the high school class of 1992); and the Education Longitudinal Study of 2002 (ELS:2002, the high school class of 2004). Each of these studies includes a nationally representative sample of tenth grade students whose educational outcomes were tracked for 2-8 years after high school.⁷ Student surveys included questions about family life, college application behavior, study habits, educational expectations, scholastic achievement and college enrollment. High school and college transcripts, teacher and administrator reports, standardized test scores and parent reports supplement the students' own accounts.

We use ratings of the selectivity of colleges and universities from Barron's Profiles of American Colleges⁸ to identify highly selective colleges and universities. Barron's rates the

⁷ For comparability across studies, we focus on cohorts of students enrolled in school in 10th grade in 1980, 1990, and 2002 (who were scheduled to graduate from high school in 1982, 1992, and 2004).

⁸ <http://www.barronspac.com/>.

selectivity of all four-year colleges on a scale from 1-7, where 1 is the most selective and 6 is the least selective (schools with a ranking of 7 are specialty schools with different admissions criteria; we exclude these schools from our analysis). These ratings are based on the high school GPAs, high school class ranks, and SAT/ACT scores of enrolled students, as well as on the proportion of applicants admitted. We classify colleges with a Barron's ranking of 1 ("most competitive") or 2 ("highly competitive") as "highly selective." This category includes most elite public universities (the list of all "highly selective" schools is in Appendix A); these are the schools whose admissions policies are, or would be, affected by changes to affirmative action rules. In 2004, the highly selective colleges and universities had median SAT scores of at least 575, admitted fewer than 50% of applicants, and enrolled students with median GPAs of about 3.5 and in the top 35% of their high school classes. In 2004, 171 colleges held this ranking. About seven percent of 2004 high school graduates attended selective colleges; this number was 7.5% in 1992 and 5.3% in 1982.⁹ When identifying the selectivity of the college a student attended, we include only students who attended college within twelve-months of their high school graduation. For students who attended more than one school in this time, we use the school they attended for the longest period of time in our analyses.¹⁰

Results

Who Enrolls in Selective Colleges and Universities?

The high school class of 2004 was 60% white, 14.5% black, 16% Hispanic, 4% Asian, 1% Native American; and 4.5% multiracial or other.¹¹ Based on the ELS data, we can categorize students in the class of 2004 as falling into one of nine educational destination categories as of Fall 2004 (the Fall after they should have graduated from high school): not graduated from high school (11%); high school graduate, but not enrolled in college (20%); enrolled in a less than 4-year college (30%); or enrolled in one of six categories of 4-year college (39%). Roughly one-sixth of those enrolled in a four-year college (6.4% of all students) were enrolled in a school classified by Barron's as "most competitive" (2.4% of all students) or "highly competitive" (4.0% of all students).

Figure 1 displays the racial composition of each of these nine categories of post-secondary educational destinations. In Figure 1, the width of each bar represents the proportion of the 10th grade cohort who are in each of the nine educational destinations in the year after they should have graduated from high school. The shading of the bars represents the racial composition of the population in each of the educational destinations. In general, white and Asian students are overrepresented in four-year colleges relative to their proportions in the total high school cohort, and particularly in the most selective categories of four-year colleges. Conversely, black and

⁹ The number of students enrolling in highly selective schools is generally increasing over time. However, the high school graduating class in 1992 was small relative to earlier or later cohorts (because the mid-1970s birth cohorts were smaller than those during the Baby Boom or the Baby Boom echo cohorts). As a result, students in this cohort faced easier a generally less competitive college admissions environment, and a higher percentage of them attended elite schools.

¹⁰ Although Barron's rankings have changed over time, we use the 2004 rankings so that the group of colleges is constant over time. Our results are generally unchanged if we use a varying group of colleges. See Appendix Table A for a list of colleges considered "most competitive" or "highly competitive" in 1982, 1992, and 2004).

¹¹ These percentages reflect the composition of students enrolled in 10th grade in Spring of 2002, and so exclude students who dropped out of school prior to Spring of 10th grade.

Hispanic students are substantially underrepresented in highly selective four-year colleges.¹² Table A1 in the appendix shows the proportion of each racial group enrolled in highly selective colleges. The racial composition of the combined top two categories (those that we consider “highly selective” schools) is 72.5% white, 12% Asian, 7% Hispanic, 3.5% black, less than 0.5% Native American, and 5% multiracial or other. Thus, **even with affirmative action policies in place in many universities, white students are five times as likely to enroll in a highly selective college as black students and almost three times as likely as Hispanic students.**¹³

Figure 1

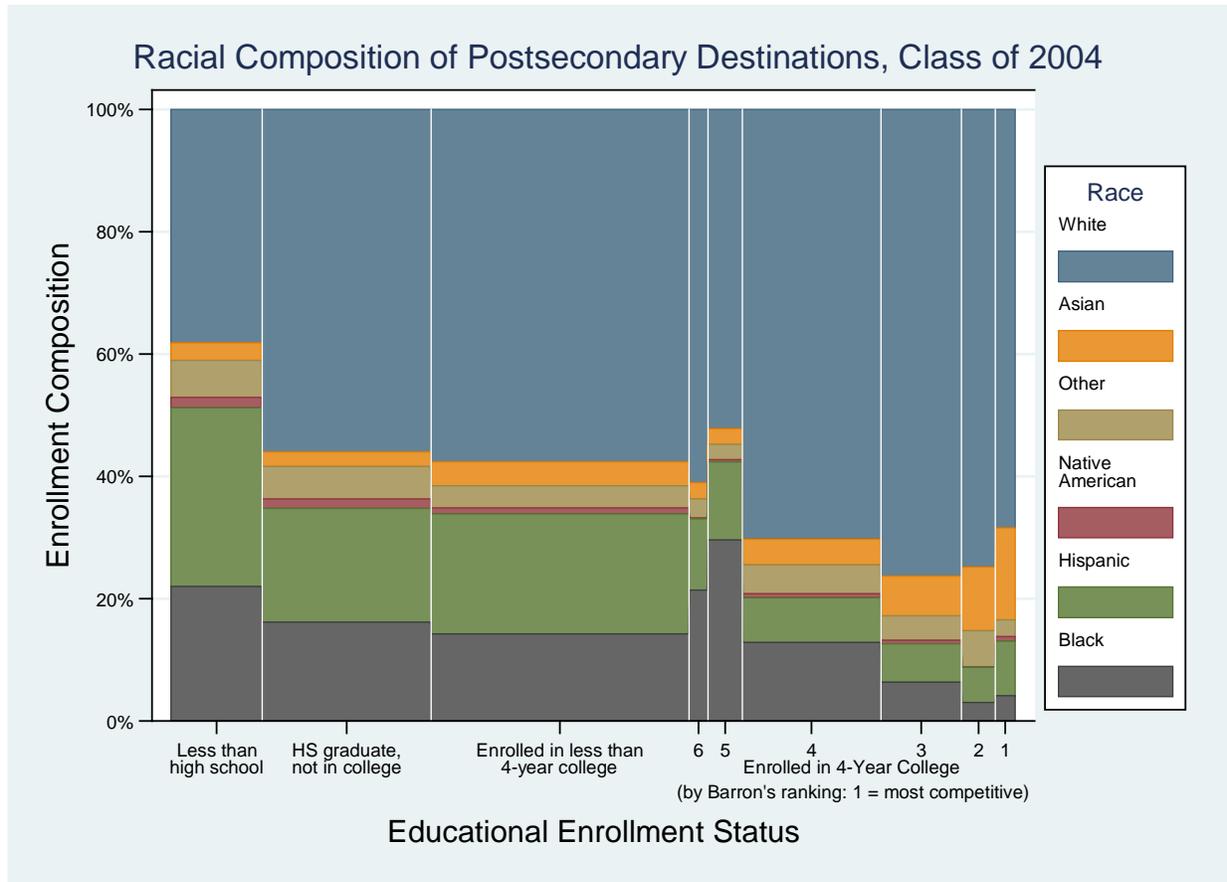


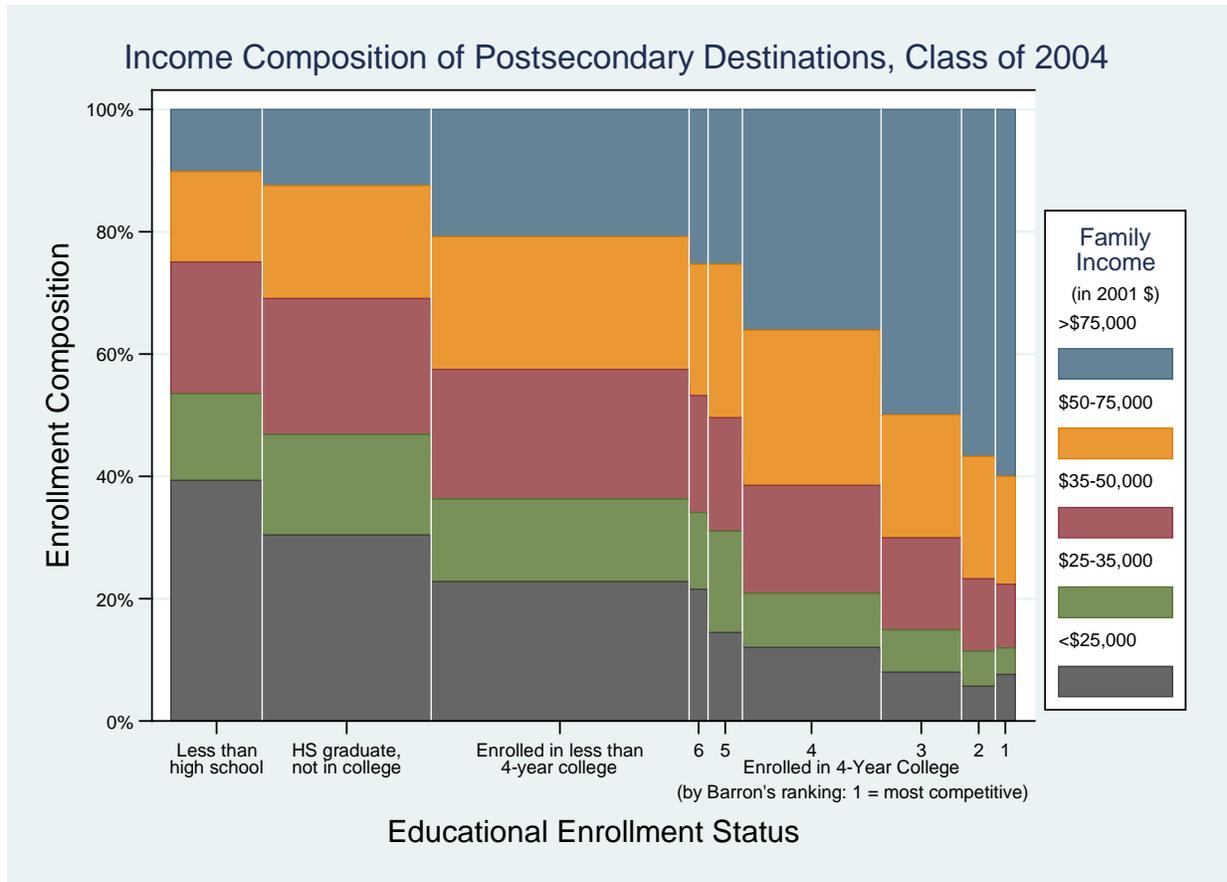
Figure 2 displays the family income composition of each educational destination. Here it is evident that low-income students are substantially underrepresented in four-year colleges, and particularly in the highly selective colleges. Although 21% of students came from families with annual incomes below \$25,000 (in 2001 dollars, equal to \$32,441 in 2012 dollars), only 6.3% of

¹² Note that the high proportion of black students in the least competitive set of four-year colleges (the category 5 and 6 schools) is largely due to the fact that many historically black colleges and universities (HBCUs) fall in these two categories. Indeed, 45% of all HBCUs fell into these categories in 2004.

¹³ We compute this as follows: The proportion of all white students who enrolled in highly selective schools is $0.725 \cdot 0.064 / 0.60 = 0.077$, five times the proportion of all black students who enrolled in highly selective schools ($0.034 \cdot 0.064 / 0.145 = 0.015$) and almost three times the proportion of all Hispanic students who enrolled in such schools ($0.070 \cdot 0.064 / 0.16 = 0.028$).

students in the two most highly selective categories came from such families. Conversely, 58% of students in the highly selective schools came from families with incomes over \$75,000 (or \$97,324 in 2012 dollars), despite the fact that only 26% of the families in the population had incomes that high. These differences imply that in 2004 **a student from a family with income in the top quarter of the income distribution** (income over \$75,000 in 2001) **had a seven to eight times greater chance of enrolling in a highly selective college than a student from a low-income family** (income less than \$25,000 in 2001).¹⁴

Figure 2



Interestingly, the most selective colleges and universities (those in the very top Barron's category) have slightly more diverse student bodies—with respect to both income and race—than the second category of schools. This is likely a result of the fact that the most selective colleges value diversity and can successfully compete with the slightly less selective colleges for the most skilled minority students. Other than the most elite universities, few schools offer need-blind admissions and guarantee students a financial aid package that covers the gap between the cost of college and what families can afford. These elite schools are therefore very competitive in bidding

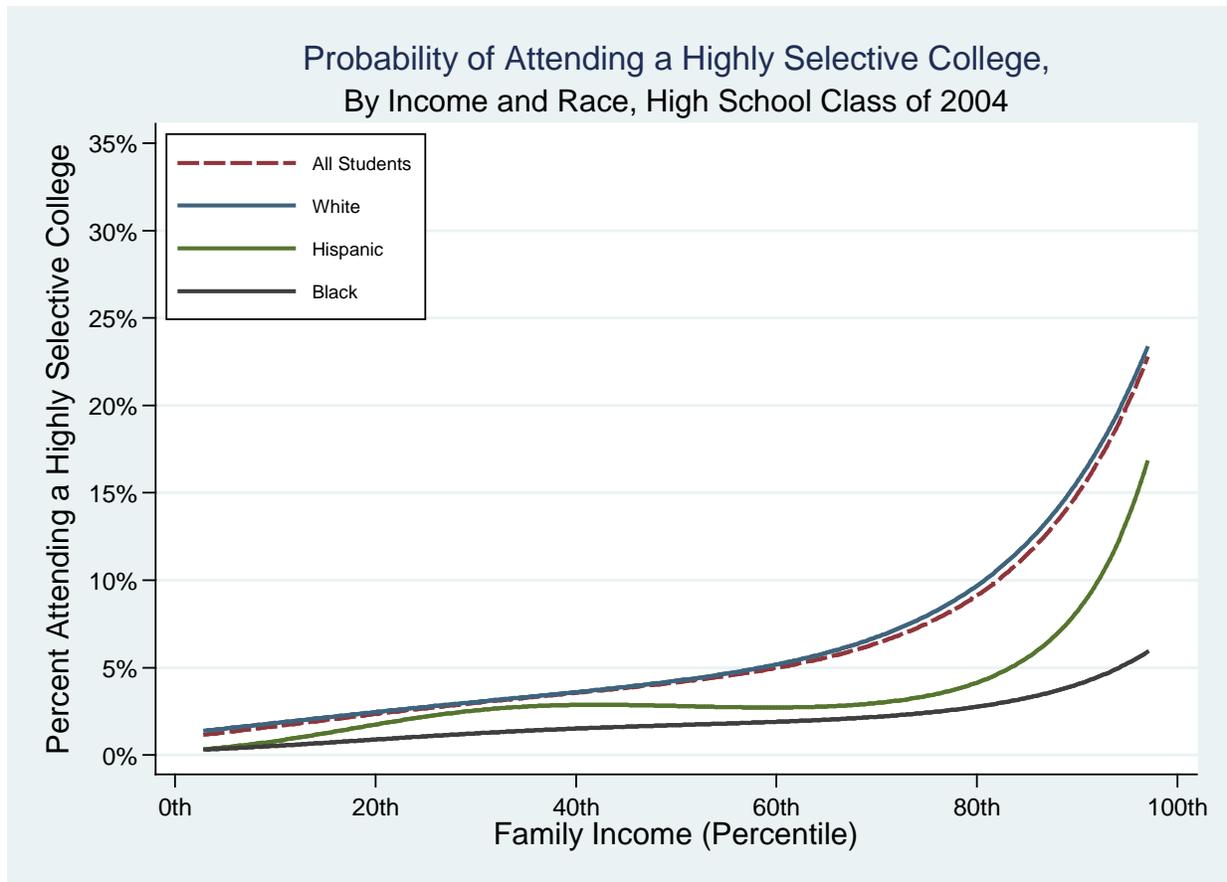
¹⁴ We compute this as follows: The proportion of all high-income students who enrolled in highly selective schools is $0.58 \cdot 0.064 / 0.26 = 0.14$, seven and a half times the proportion of all low-income students who enrolled in such schools ($0.063 \cdot 0.064 / 0.21 = 0.019$).

for highly qualified low-income students.

Can Racial Differences in Selective College Enrollment Be Explained By Income Differences?

Even controlling for income, black and Hispanic students are significantly less likely to attend the most selective colleges than white students. Figure 3 shows the proportion of white, black, and Hispanic students of a given income percentile who enrolled in highly selective schools in 2004. For the high school class of 2004, white students, particularly those with incomes above the median, were significantly more likely than their black peers from similar economic backgrounds to enroll in highly selective colleges. At any income level, two to three times as many white students as black students enrolled in selective colleges and universities. This difference is even stronger for students in the top income quintile, where the white enrollment rate is roughly four times the black rate. The white-Hispanic difference in enrollment in highly selective colleges is also large, though not as large as the black-white difference.¹⁵ Figure 3 clearly indicates that **racial/ethnic differences in income do not fully account for differences in access to highly selective colleges and universities.**

Figure 3



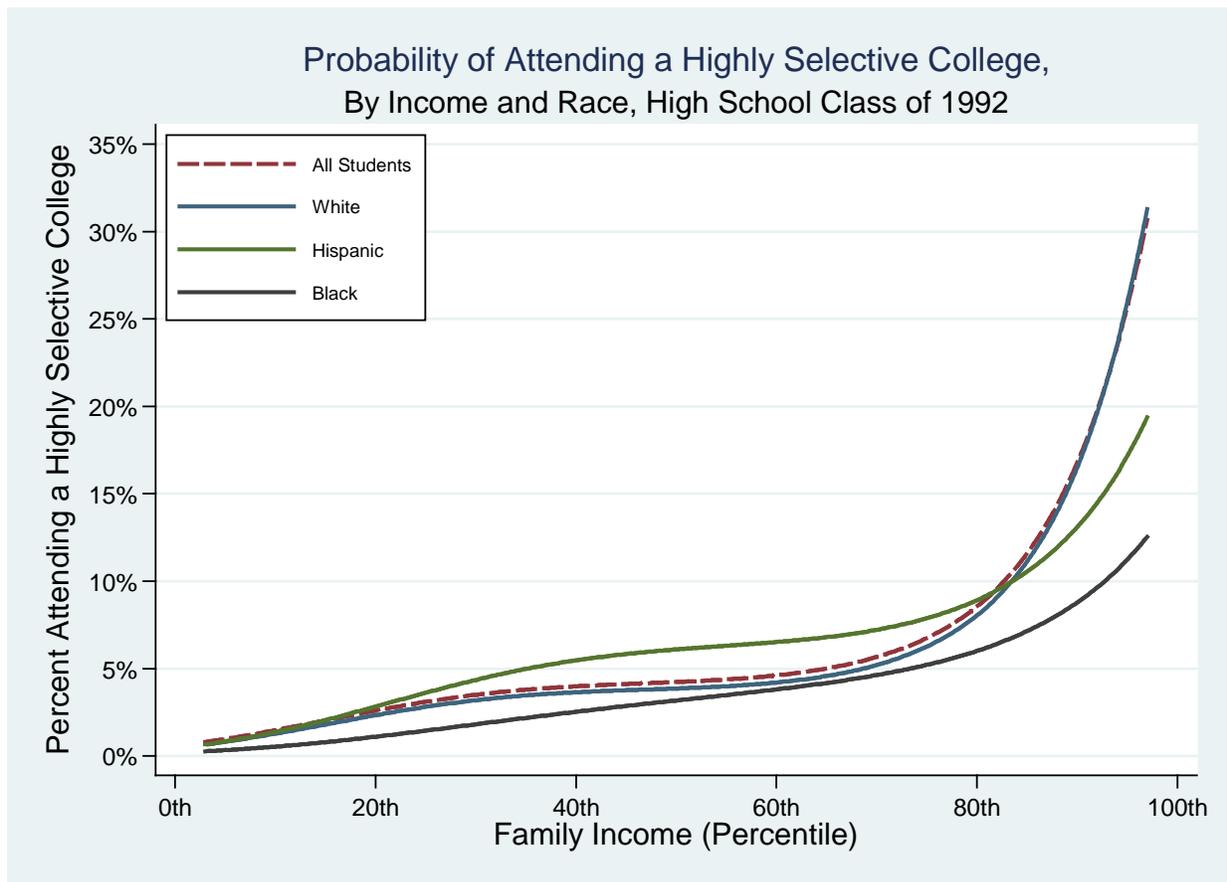
¹⁵ Note that the black-white differences in enrollment are statistically significant for students at all income levels; Hispanic white differences are statistically significant only between the 50th and 90th income percentiles.

How Have Racial and Socioeconomic Patterns of Selective College Enrollment Changed Over Time?

Both income and race have become more strongly associated with enrollment in highly selective colleges in the last 30 years. Table A1 (Appendix) shows that the student bodies of highly selective schools in 1982 were 5.6% black, 6.0% Hispanic, and 3.5% Asian. By 2004, only 3.4% of students in these colleges were black, 6.9% were Hispanic, and 12.1% were Asian. **In 1982, white students were two and a half times more likely than black students to enroll in selective colleges; by 2004, white students were five times more likely than black students to enroll in such schools.** Black students were therefore substantially more underrepresented in highly selective schools in 2004 than they were 20 years earlier.

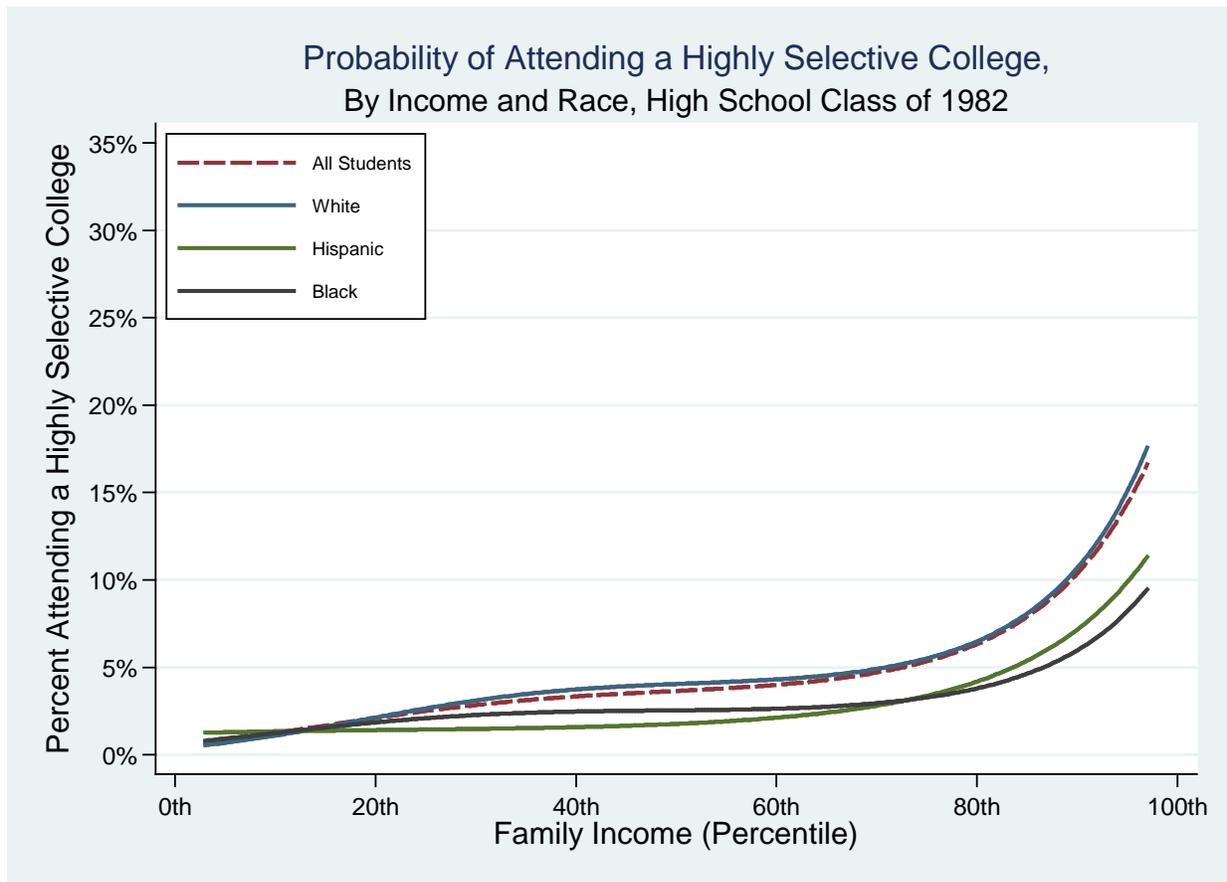
The trend of increasing underrepresentation of minority students, particularly black students, is evident even after controlling for family income. Figures 4 and 5 display the same data as Figure 3, but for two early cohorts of high school students; those in 10th grade in 1980 and in 1990 (the high school classes of 1982 and 1992). In Figure 4, we see similar patterns for the high school class of 1992. For this cohort, the overall rates are a bit higher because the class of 1992 was smaller, so relatively more spots were available at the most selective schools. In contrast to the class of 2004, there was relatively little racial/ethnic difference in 1992 in access to highly selective colleges among students with the same family income. Moreover, the differences in enrollment rates in Figure 4 are not statistically significant.

Figure 4



In the class of 1982 (see Figure 5), whites had an advantage relative to black and Hispanic students in access to highly selective colleges and universities, though our analysis (not shown here) suggests that these differences were statistically significant only for student from families with above the median family incomes. The racial differences in enrollment rates are somewhat smaller than in the 2004 cohort, and the association between income and access to highly selective colleges is not as strong. The black-white differences in enrollment rates are statistically significant only for incomes about the 75th percentile, while the Hispanic-white differences are significant only among students between the 20th and 60th percentiles.

Figure 5



These figures illustrate that both income and race have become more strongly associated with enrollment in selective schools from the early 1980s to the early 2000s. The racial differences were particularly small for the 1992 cohort, possibly because there were more seats available in selective schools for that cohort, relative to the size of the cohort, than in earlier or later years. The growing relationship between income and selective college enrollment is probably partly a result of (1) rising income inequality, (2) rapid tuition growth, (3) the widening income achievement gap, and (4) an increasing awareness of the importance of education and the returns to selectivity, which has led to greater competition for spots at these schools. This growing competition disadvantages those without economic resources and other sources of social capital that help with

getting into college, such as peer networks and “legacy” status.

Importantly, **the growing racial enrollment disparities evident in Figures 3-5 are not a result of widening academic achievement disparities between white students and black and Hispanic students.** Indeed, the black-white achievement gap among high-achieving students (i.e., the difference between the 90th percentile of the black test score distribution and the 90th percentile of the white distribution) narrowed from the class of 1982 to the class of 1992 and continued to narrow, albeit very slowly, from 1992 to 2004 (Reardon, 2011; see detail in Appendix Figures A4-A7 below). Rather, the growing racial enrollment disparities may be the result of declines in the use or effectiveness of existing affirmative action admission policies (Grotsky and Kalogrides, 2008) and/or a result of increased reliance on test scores over other measures of academic preparation (Alon and Tienda, 2007).

Affirmative Action Alternatives

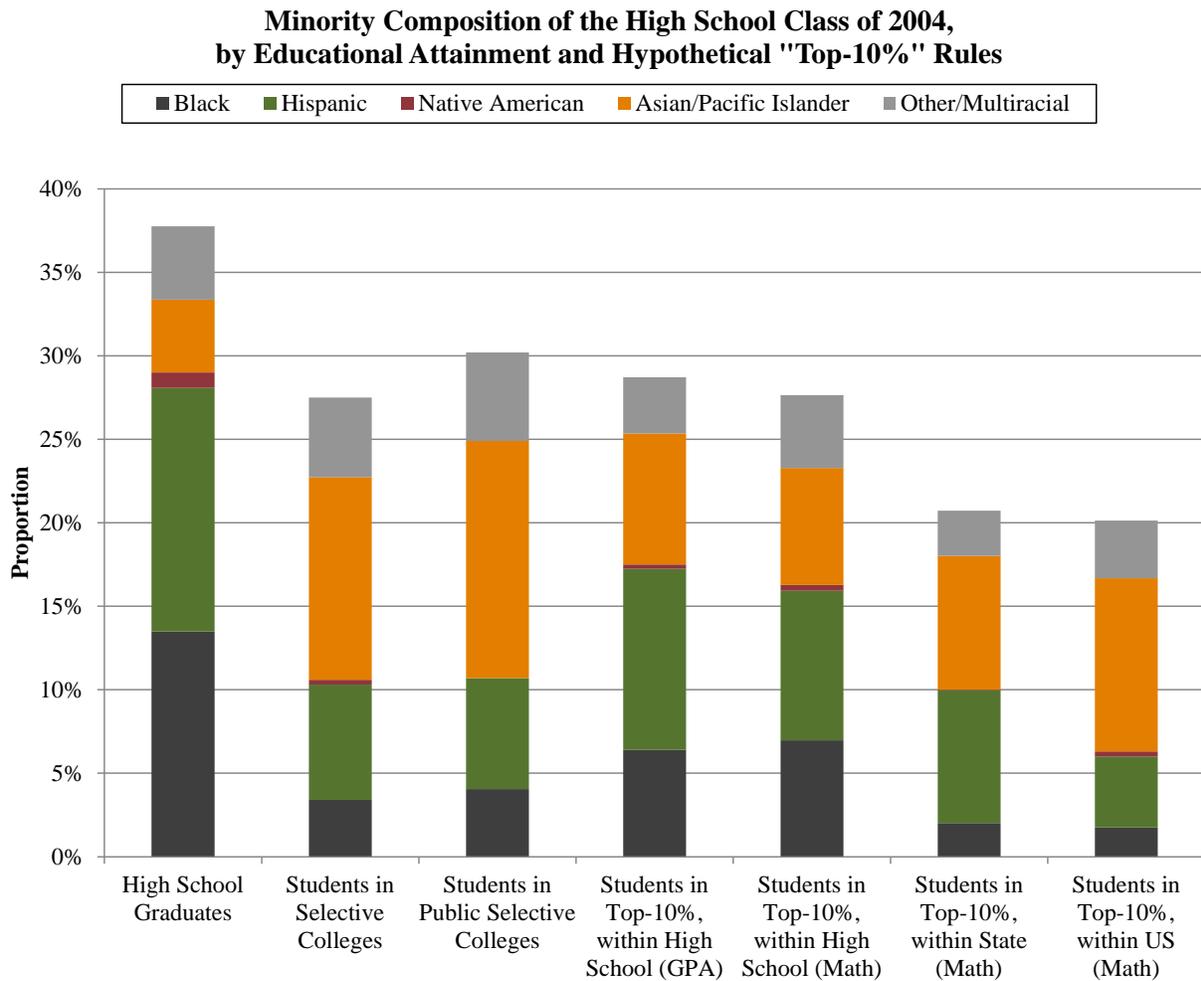
We next look at the feasibility of reducing racial disparities in higher education without using race-based affirmative action policies. We model our approach on that of California and Texas, each of which uses a system that guarantees admission to their respective university system to students who fall in some top percentage of their high school class—top 9% in California and top 10% in Texas. In what follows, we look at the racial and income composition of a hypothetical college-admission population constructed from applying various “Top Ten Percent” rules to our sample of students. Specifically, we consider three possible Top Ten Percent rules. First, we “admit” to highly-selective colleges all students who fall in the top 10% of their high school classes according to their honors-weighted academic GPA. This most closely approximates the policies in California and Texas. We repeat this scenario using instead scores from a standardized math assessment administered to all students in our sample in 12th grade. We use this variation because GPAs are not comparable for students from different schools, and we want to demonstrate that the test scores and GPAs produced similar results. Because they do, we then used math test scores for our second and third rules. Here we admitted students not from the top 10% of their high schools, but from the top 10% of their states and the entire country, respectively.

It is important to note that by admitting the top 10% of students (whether within schools, states, or nationally) these rules admit more than the 6.4% of students who are actually enrolled in the most selective college and universities. Unless students would enroll in the same proportions at which they were admitted, our ten percent *admission* rules likely overestimate the proportion of minority and low-income students who would *enroll* in selective colleges under such policies. Among those admitted to highly selective colleges, minority and low-income students are less likely than white or high-income students to enroll in these schools, because they often do not receive sufficient financial aid (e.g. Avery and Hoxby, 2004). As a result, our estimates of the distribution of students who would be admitted under different “ten percent” rules should be considered an upper bound (perhaps an unrealistically high upper bound) of the proportion of students who would enroll in highly selective colleges under such rules.

Figure 6 shows the racial composition of all high school graduates in the class of 2004, the composition of those graduates who went to any selective college, those who went to *public* selective colleges, and the compositions of hypothetical college classes if they enrolled the top ten percent of students under our different simulated Top Ten Percent rules.

A within-high school Top Ten Percent rule would not, by itself, increase minority enrollment in highly-selective colleges. Figure 6 shows that a within-high school Top Ten Percent rule would admit an undergraduate college class with a higher percentage of both black (6.5%) and Hispanic (11%) students than in the real-world population of students in public selective colleges and universities (where roughly 3.5% of students are black and 7% are Hispanic). Neither the real world public selective college population nor our hypothetical within-high school Top Ten Percent population comes close to approximating the racial composition of all high school graduates either in terms of the proportion of black (14.5%) or Hispanic (16%) students. Moreover, as we note above, the racial composition of the *enrolled* population of students would likely be quite different than that of the *admitted* population. Indeed, more sophisticated simulations that take into account enrollment processes show that a Top Ten Percent rule would lead to a 10% decrease in the proportion of black and Hispanic students enrolled in highly-selective colleges and universities (Bastedo and Jaquette, 2011; Howell, 2010).

Figure 6



The within-state and within-US Top Ten Percent rules do not fare any better than the

within-high school rule at achieving diversity comparable to the national population of high school graduates. Each of these rules identifies a population of high school seniors that is much less racially diverse than the 2004 population of students at the most selective colleges. Both rules yield populations that include only 2% black students, far fewer than the 3.5% currently enrolled in highly selective schools. The within-state rule yields a population that is 8% Hispanic; the within-country rule yields a population that is only 4% Hispanic.

Note that the within-US Top Ten Percent rule population identifies the population of students that would be admitted to highly selective schools if only academic factors were used in admissions. The fact that the population of students enrolled in public selective colleges is notably more diverse than this scenario indicates that the practices these schools currently employ in making their admissions decisions are successful in producing a student body more diverse than one based on academic achievement alone.

Figure 7

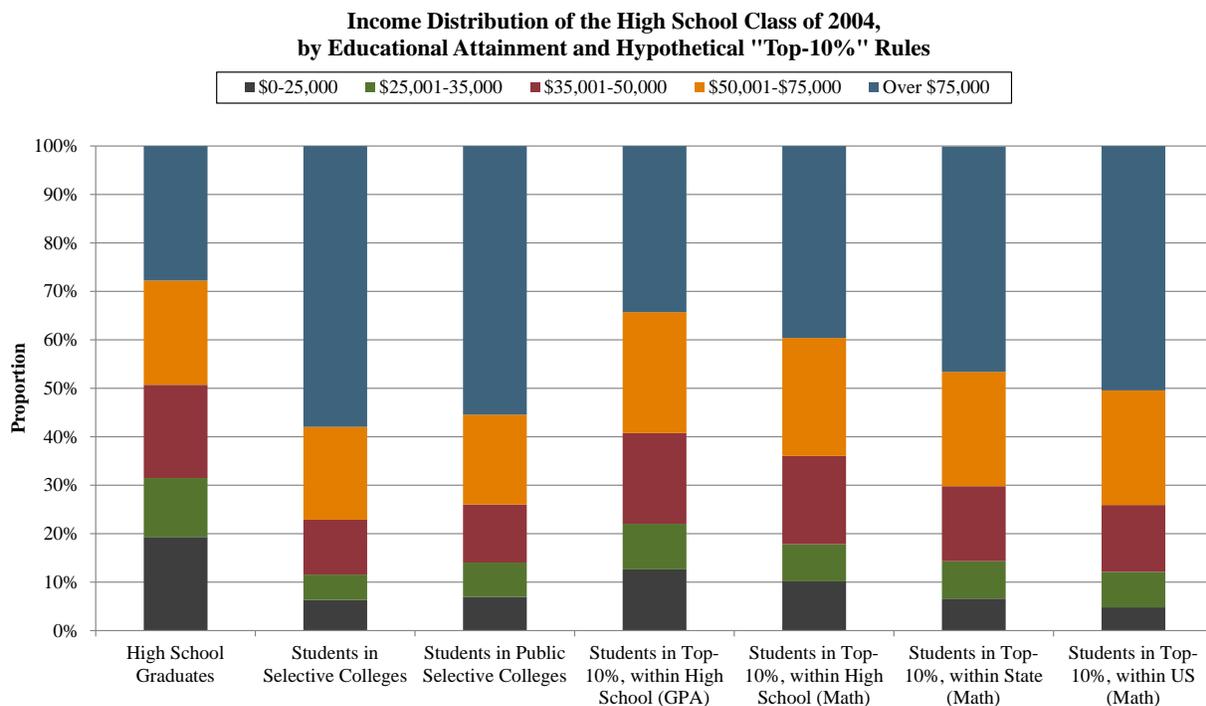


Figure 7 gives the income distribution of the same groups described in Figure 6. The within-high school Top Ten Percent rule comes closest to approximating the income distribution of all high school graduates. It contains, for example 34% students from families earning over \$75,000 a year and 13% from families earning \$25,000 or less, relative to 28% and 19% in the population of all high school graduates. Under all three rules, the top two income groups were over-represented relative to the population of all high school graduates, and the bottom three income groups were underrepresented. This over-and under-representation is most apparent under the within-US Top Ten Percent rule, but even this disparity was not as dramatic as the over-and under-representation in the real population of public selective college enrollees. Thus, our

three Top Ten Percent rules are somewhat more effective at alleviating income disparities in college attendance than racial ones.

Conclusion

Black and Hispanic students remain substantially underrepresented at the most highly selective colleges and universities. As recently as 2004, one year after the *Grutter* decision, white students were five times as likely as black students to enroll in a highly selective college and almost three times as likely as Hispanic students. These differences are not fully—or even largely—accounted for by income differences between black and white families. In the upper half of the income distribution, white students were three to four times as likely as black students with the same income, and twice as likely as Hispanic students. The racial disparities in enrollment at highly selective colleges grew larger from 1982 to 2004. Although we do not have more recent, comparable data, there is little reason to think that these patterns have improved dramatically in the last eight years.

Low-income students, regardless of race, are also significantly underrepresented in highly selective colleges and universities. Almost three-fifths (58%) of the students in these universities come from families in the top quartile of the income distribution while only 6 percent come from families in the bottom quartile of the income distribution. The strength of the association between family income and access to the most selective schools is particularly strong among white students. Moreover, this association has been growing over the last 30 years.

Our simple simulations show that admissions policies like the Texas Top Ten Percent rule can produce pools of *admitted* undergraduates that are moderately more racially and socioeconomically diverse than the current population of students *enrolled* in highly-selective schools. However, such policies alone are unlikely to increase the proportion of black and Hispanic and low-income students enrolled in highly-selective colleges; economic constraints and the preferences of some minority students for racially diverse colleges lead to racial differences in enrollment rates among those admitted to highly selective schools. Indeed, Bastedo and Jaquette (2011) conduct a similar analysis and find that purely merit-based admissions would do little to improve low-income student enrollment in selective colleges (Bastedo and Jaquette, 2011). Likewise, Howell's (2010) more sophisticated simulation models suggest that Top Ten Percent rules would, in the absence of race-conscious affirmative action policies, lead to a 10% reduction in the proportion of black and Hispanic students attending highly-selective colleges and universities.

Certainly one reason that minority and low-income students are underrepresented in the most selective colleges and universities is that black, Hispanic, and low-income students are underrepresented among the pool of students with very high levels of academic achievement. In fact, growing reliance on SAT and ACT scores by the most selective colleges may be one reason why these schools (particularly selective private schools) have increasingly needed to give minority students an admissions boost to achieve a diverse student body (Alon and Tienda 2007). The reasons for the white/minority and high/low-income achievement gaps are complex, however, and beyond the scope of this brief to address. The key point for our purposes here is that the growing racial disparity in access to the most selective colleges and universities cannot be attributed to a widening racial gap in academic preparation, because racial achievement gaps have narrowed in the last four decades (albeit only very slowly in the last two decades). All else being equal, we

would expect these narrowing achievement gaps to lead to a corresponding narrowing of the racial enrollment gaps in highly-selective colleges and university, but the data do not show such a trend. That is, the growing racial enrollment gap must be driven by changes in college application/admission/enrollment processes, not by changes in the relative academic preparation of white and minority students. Changes in who applies to college, which colleges they apply to, how colleges determine whom to admit (including if and how they use race and race-related factors in admissions decisions), and where students decide to enroll (which depends in part on tuition costs and the availability of financial aid, as well as on students' perceptions of how well colleges' academic offerings and social climate fits their needs) all may play a part in the increasing underrepresentation of black and Hispanic students at the most selective colleges and universities. These college decision processes, as well as the persistent racial and socioeconomic achievement gaps, must change if highly-selective colleges and universities are to enroll more diverse classes of students.

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Appendix A: Highly Selective Colleges, using Barron's 2004 Rankings

Agnes Scott College	Hampshire College	SUNY at Binghamton
Amherst College	Harvard University	SUNY at Geneseo
Austin College	Harvey Mudd College	Swarthmore College
Babson College	Haverford College	Syracuse University
Bard College	Hillsdale College	Texas A & M University
Barnard College	Hobart William Smith Colleges	The College of New Jersey
Bates College	Illinois Institute of Technology	The College of Wooster
Beloit College	Illinois Wesleyan University	The University of Texas at Austin
Bennington College	Ithaca College	The University of Texas at Dallas
Boston College	Jewish Theological Seminary of America	Trinity College
Boston University	Johns Hopkins University	Trinity University
Bowdoin College	<i>Kalamazoo College</i>	Truman State University
Brandeis University	Kenyon College	Tufts University
Brigham Young University	Kettering University	Tulane University of Louisiana
Brown University	Lafayette College	<i>Union College</i>
Bryn Mawr College	Lawrence University	United States Air Force Academy
Bucknell University	Lehigh University	United States Coast Guard Academy
California Institute of Technology	Loyola College in Maryland	United States Merchant Marine Academy
Carleton College	Macalester College	United States Military Academy
Carnegie Mellon University	Massachusetts Institute of Technology	United States Naval Academy
Case Western Reserve University	Miami University-Oxford	University of California-Berkeley
Centre College	Middlebury College	University of California-Irvine
Claremont McKenna College	Missouri University of Sci and Tech	University of California-Los Angeles
Clemson University	<i>Mount Holyoke College</i>	University of California-San Diego
Colby College	Muhlenberg College	University of Chicago
Colgate University	New College of Florida	University of Delaware
College of Charleston	New York University	University of Florida
<i>College of the Holy Cross</i>	Northeastern University	University of Illinois at Urbana-Champaign
College of William and Mary	Northwestern University	University of Mary Washington
Colorado College	Oberlin College	University of Maryland-College Park
Colorado School of Mines	<i>Occidental College</i>	University of Miami
Columbia University	Pennsylvania State University	University of Michigan-Ann Arbor
Connecticut College	Pitzer College	University of North Carolina at Chapel Hill
Cooper Union	Pomona College	University of Notre Dame
Cornell University	Princeton University	University of Pennsylvania
Dartmouth College	Providence College	University of Pittsburgh
Davidson College	Reed College	University of Puget Sound
Denison University	Rensselaer Polytechnic Institute	University of Richmond
DePauw University	Rhodes College	University of Rochester
Dickinson College	Rice University	University of San Diego
Duke University	Rose-Hulman Institute of Technology	University of Southern California
Emerson College	Rutgers University-New Brunswick	University of Virginia-Main Campus
Emory University	Santa Clara University	Vanderbilt University
Fairfield University	Sarah Lawrence College	Vassar College
Florida State University	<i>Scripps College</i>	Villanova University
Fordham University	Sewanee: The University of the South	Wake Forest University
Franklin and Marshall College	Skidmore College	Washington and Lee University
Furman University	Smith College	Washington University in St Louis
George Washington University	Southern Methodist University	Webb Institute
Georgetown University	Southwestern University	Wellesley College
Georgia Institute of Technology	<i>St John's College</i>	Wesleyan University
Gettysburg College	St. Olaf College	Wheaton College
Gonzaga University	Stanford University	Whitman College
Goucher College	Stevens Institute of Technology	Williams College
Grinnell College	Stonehill College	Wofford College
Grove City College	Stony Brook University	<i>Worcester Polytechnic Institute</i>
Hamilton College	SUNY at Albany	Yale University

Note: Schools in **bold** were ranked as highly selective in 1992. Schools in *italics* were ranked as highly selective in 1982.

Technical Appendix: Data Sources, Methods, and Supporting Data

Data

The data we rely on in this brief come from three NCES longitudinal data sets: High School and Beyond (HS&B, high school class of 1982), National Education Longitudinal Study of 1988 (NELS:88, the high school class of 1992), and the Education Longitudinal Study of 2002 (ELS:2002, the high school class of 2004). In each cohort, we limited the sample to students who had non-zero panel weights for the first survey through the survey that followed college enrollment (roughly age 16 to 24). These were PANELWT3 (base year through follow-up three for HS&B); F1F3PNWT (first follow-up through follow up three for NELS); F2BYWT (base year through follow-up two for ELS). That is, we used students who had data from all relevant surveys and who were present in their respective surveys in tenth grade and employed the NCES provided weights to create a nationally representative sample from these students.

We also limited the sample to students who were not missing race, income, or college enrollment data. Because NCES imputed missing data in the ELS sample, no students in this cohort had missing income or race data. For the NELS sample, this resulted in omitting 4.16% of students. Due to a high number of students with missing data from the HS&B cohort (22.4%), we used multiple imputation to impute any missing income data. We used five imputations and imputed tenth-grade family income categories for those with missing income data. This income category was imputed using information from income measured in other survey rounds, the education level of the each of the students' parents, a tenth-grade socioeconomic status index, tenth grade HS&B composite assessment scores, academic GPA, whether the student lived in an urban, suburban, or rural environment, private high school attendance, gender, race, college enrollment, the Barron's ranking of college enrollment, and the panel weight. The reported results for HS&B represent the means over the five imputed datasets.

We included a continuous measure of parental income percentile for each of the students. Because the parental income was measured categorically in each of the data sets (seven in HS&B, 15 in NELS and 13 in ELS), we cannot identify student's exact income or their exact point in the income distribution. To account for this, we gave each student the midpoint of his/her income category. For example, if a student was in income category 9 in NELS and that category included 10% of the sample, from the 23rd to 33rd percentile, each student in that group would be given an income percentile of 28.

Barron's Rankings

We used the Barron's Rankings to create our list of highly selective colleges. These ratings are included in the restricted-access NCES data that we use here (Schmidt, 2009). Barron's ranks colleges using ten categories: Most Competitive, Highly Competitive +, Highly Competitive, Very Competitive +, Very Competitive, Competitive +, Competitive, Less Competitive, Noncompetitive, and Special (1, 2+, 2, 3+, 3, 4+, 4, 5, 6, and 7). For the purposes of this brief, we combined all "plus" categories into their base category, leaving us with seven rankings. We considered any school in the top two categories (Most Competitive and Highly Competitive) to be "highly selective." We omit students enrolled in category 7 ("Special") colleges from Figures 1 and 2, because there are too few students in such schools (less than 0.5 percent of all 10th grade students) and because these schools

do not fit well into the ordered rankings of college selectivity.

To create a constant group of highly selective colleges, we used the Barron's 2004 rankings. That is, we considered any school ranked 1 or 2 in 2004 to be "highly selective" no matter what year the student attended. This allows for comparisons across cohorts based on an unchanging group of schools. Using the 2004 rankings, there are 171 colleges considered "highly selective."

Proportion of students enrolled in highly selective colleges, by race

Figure A1 shows the estimated proportion of students enrolled in highly selective colleges and universities, by year and race. The right-hand panel of the table shows the enrollment ratio of each group to whites. So for example, in 2004, 1.49 percent of black students and 7.71 percent of white students enrolled in highly selective colleges and universities, a ratio of $\frac{1.49}{7.71} = 0.19$, meaning that black students were one-fifth as likely as white students to enroll in highly selective colleges in 2004. The top panel reports the enrollment proportions using the 2004 Barron's rankings; the bottom panel uses the Barron's rankings specific to each high school graduation year (1982 for HS&B; 1992 for NELS; 2004 for ELS). Although the total proportions of students enrolled in the highly selective colleges varies depending which Barron's rankings are used (because the 2004

Table A1: Proportion of Students Enrolled in Highly Selective Colleges and Universities, by Race, 1982-2004

Study	Racial Composition of Highly Selective Colleges			Proportion of Group Enrolled in Highly Selective Colleges			Enrollment Rate, Relative to White Students		
	HS&B	NELS	ELS	HS&B	NELS	ELS	HS&B	NELS	ELS
High School Class	1982	1992	2004	1982	1992	2004	1982	1992	2004
Using Barron's College Selectivity Rankings from 2004									
White	84.3	78.2	72.5	5.33	7.27	7.71	1.00	1.00	1.00
Black	5.6	4.5	3.4	2.11	2.25	1.49	0.40	0.31	0.19
Hispanic	6.0	6.6	6.9	2.13	4.16	2.77	0.40	0.57	0.36
Asian	3.5	10.5	12.1	14.25	18.66	18.28	2.67	2.57	2.37
Native American	0.3	0.2	0.3	1.29	1.01	1.81	0.24	0.14	0.23
Other/Multiracial	0.4	--	4.8	--	--	6.81	--	--	0.88
Total	100.0	100.0	100.0	4.59	6.62	6.37	0.86	0.91	0.83
Using Barron's College Selectivity Rankings from HS Graduation Year									
White	86.7	78.6	72.5	2.19	4.64	7.71	1.00	1.00	1.00
Black	5.2	4.4	3.4	0.79	1.39	1.49	0.36	0.30	0.19
Hispanic	3.9	5.8	6.9	0.55	2.31	2.77	0.25	0.50	0.36
Asian	3.8	11.2	12.1	6.10	12.60	18.28	2.79	2.72	2.37
Native American	0.5	0.1	0.3	0.87	0.28	1.81	0.40	0.06	0.23
Other/Multiracial	0.0	--	4.8	--	--	6.81	--	--	0.88
Total	100.0	100.0	100.0	1.84	4.20	6.37	0.84	0.91	0.83

Source: Authors' calculations from HS&B, NELS, and ELS studies. Highly selective colleges are those in Barron's "most competitive" and "highly competitive categories."

rankings include more schools in the highly selective category than the earlier rankings), the racial enrollment ratios do not vary much between the different sets of rankings.

Constructing Figures 3-5

Figures 3-5 represent a student's estimated probability of attending a highly selective school, by race and income. These curves are estimated using a logit model with a cubic function of income (where students are assigned the income percentile corresponding to the midpoint of their income category, as described above). Figures A1-A3 below present the raw percentages of students in each income category who enrolled in highly selective colleges, as well as the fitted cubic curves estimated from the logit models. In Figures 3-5, we plot the fitted curve from the 3rd to the 97th percentiles to avoid overfitting the curves in the regions where the data are sparse.

Figure A1

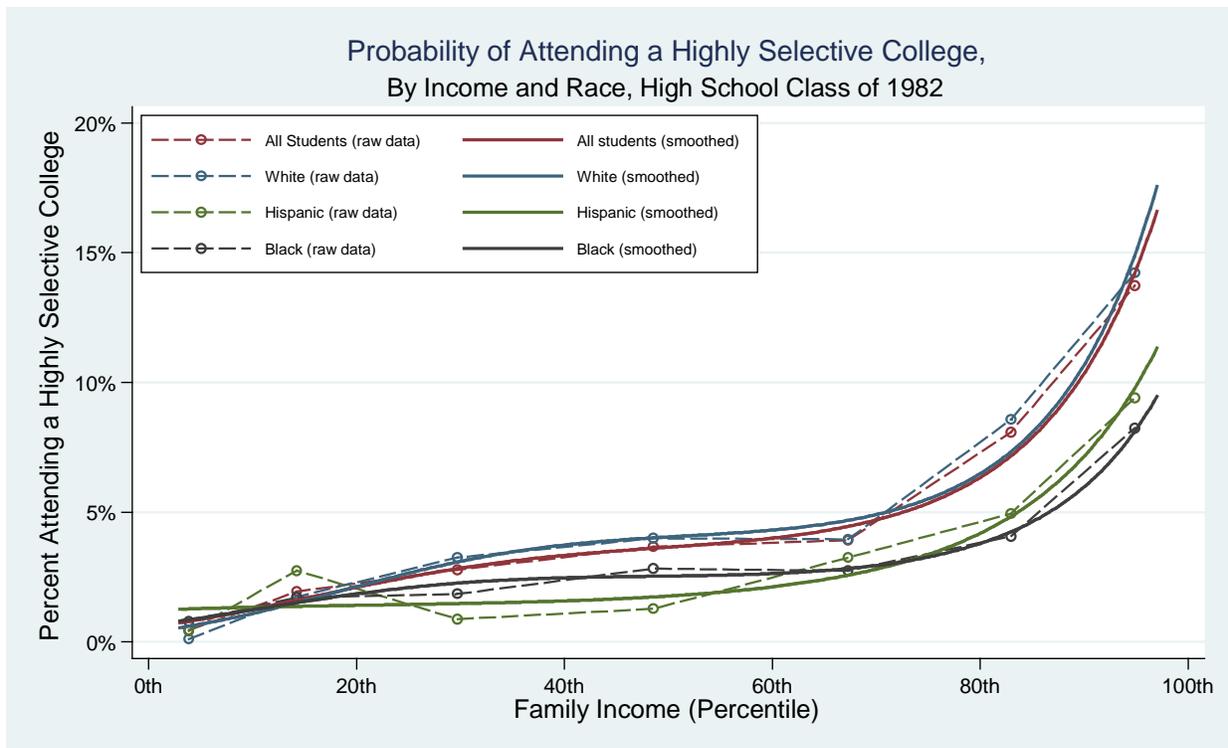


Figure A2

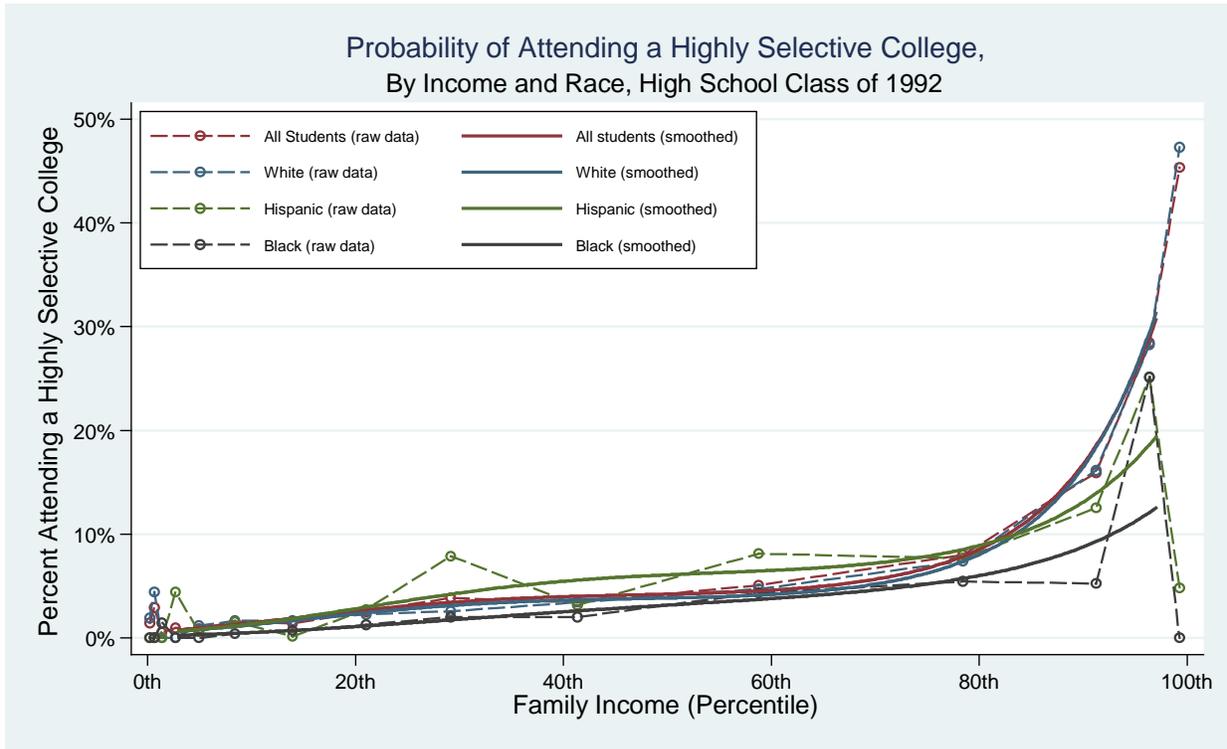
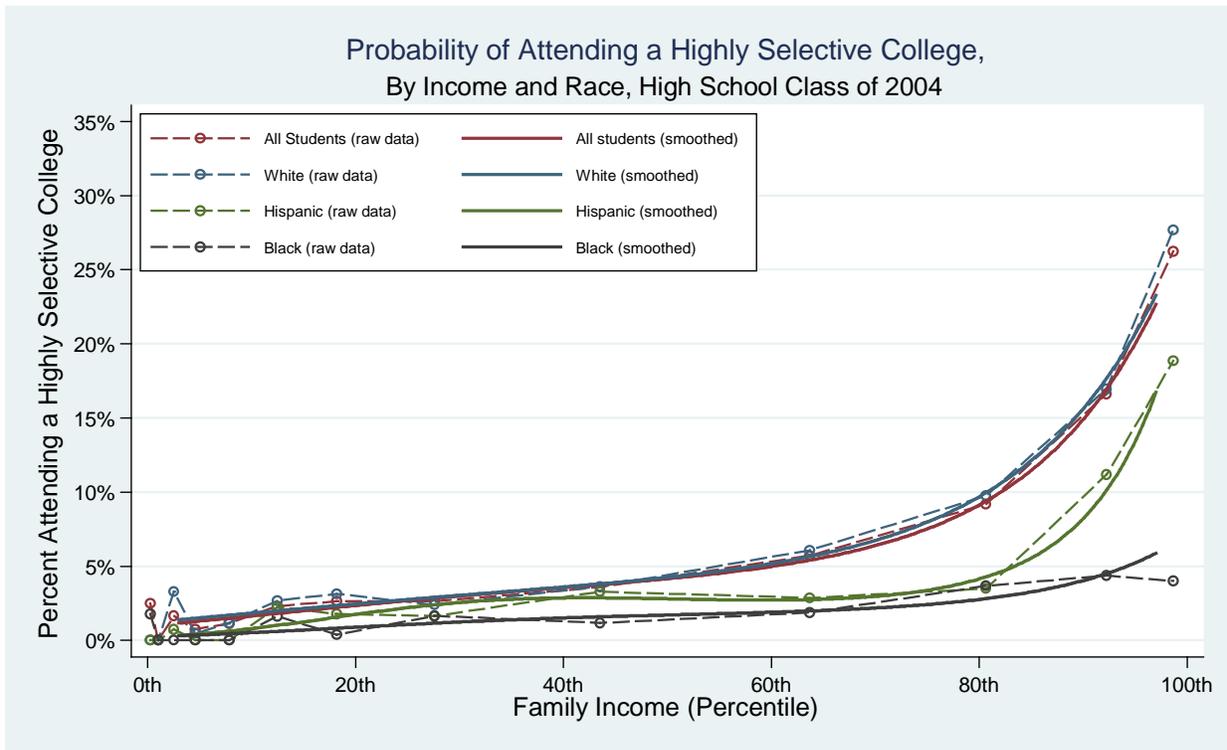


Figure A3



Trends in Achievement Gaps Among High-Achieving Students

The NAEP data explorer (<http://nces.ed.gov/nationsreportcard/naepdata/>) provides information on the 90th percentile of the national NAEP test score distribution, by race, for each year, grade/age, and test subject of the NAEP administration. We use these data to construct Figures A4-A7, which show the trends in the white-black and white-Hispanic achievement gaps (measured in NAEP scale score points) between the 90th percentiles of each group's test score distribution. Because the most selective colleges admit students primarily from the very high end of the achievement distribution, these 90th-percentile test score gaps are the most relevant gaps for examining the extent to which changes in the test score patterns might account for changes in selective college enrollment patterns.

In Figures A4-A7, we plot the trends against the expected high school graduation year of each cohort, rather than by the testing year (e.g., 4th graders tested in 1996 and 8th graders tested in 2000 are assigned a high school graduation year of 2004 in constructing these figures). This makes clearer how the gaps vary across cohorts of students rather than across testing years.

Figure A4

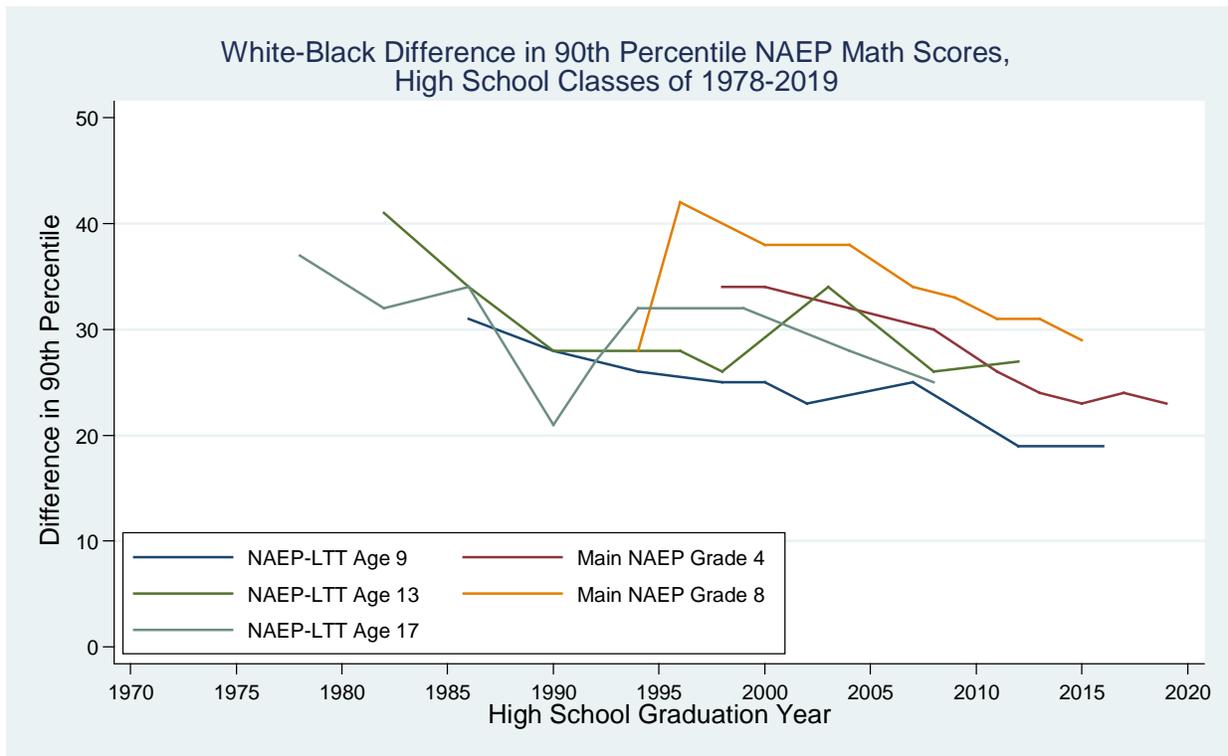


Figure A5

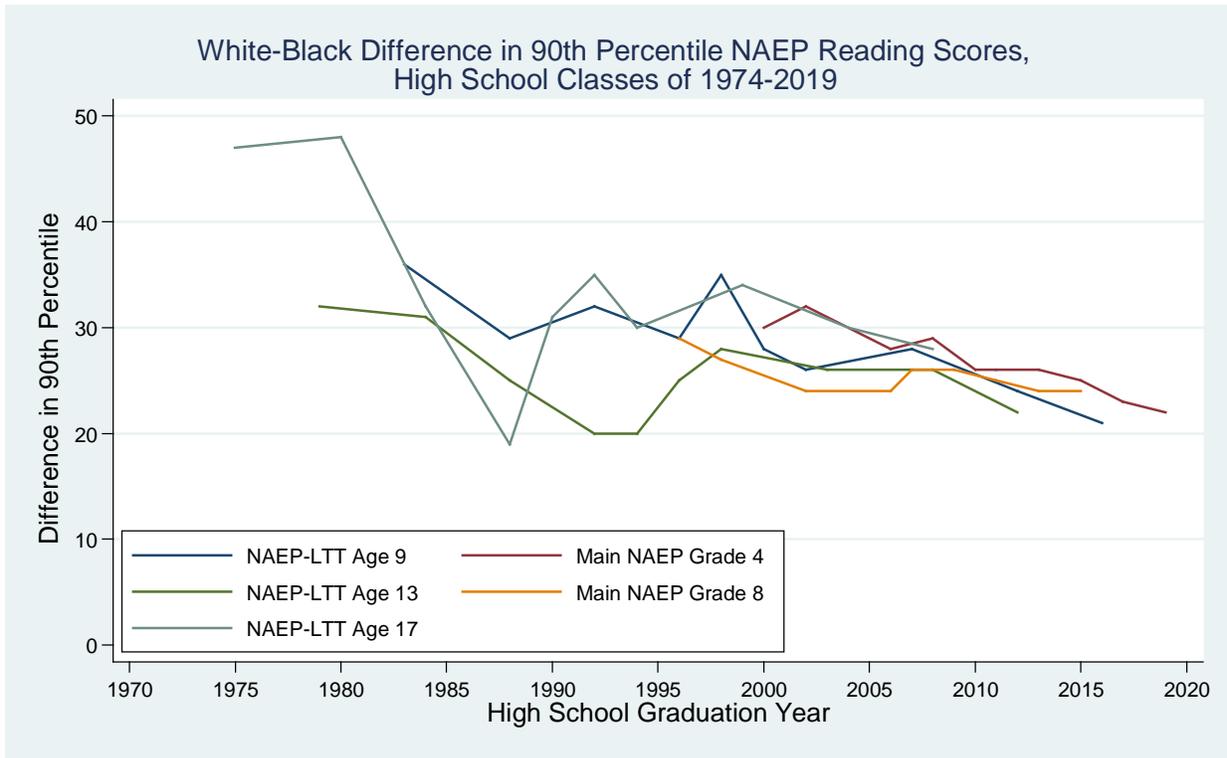


Figure A6

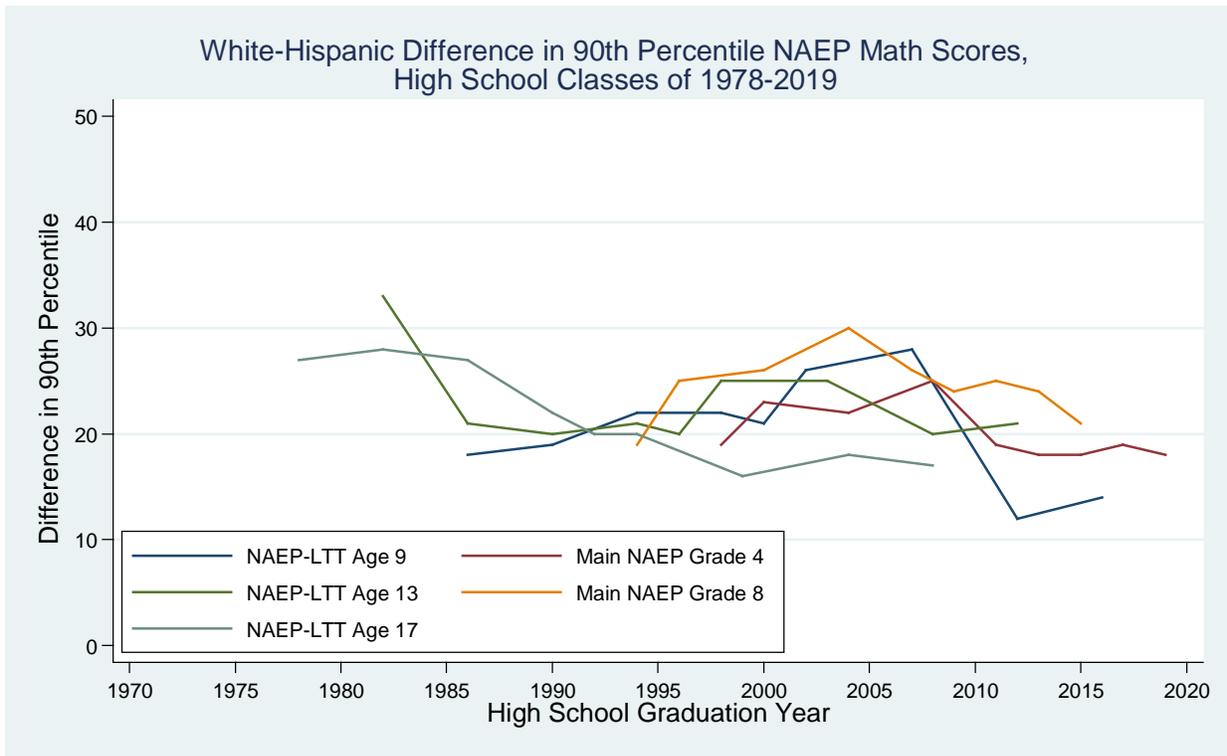
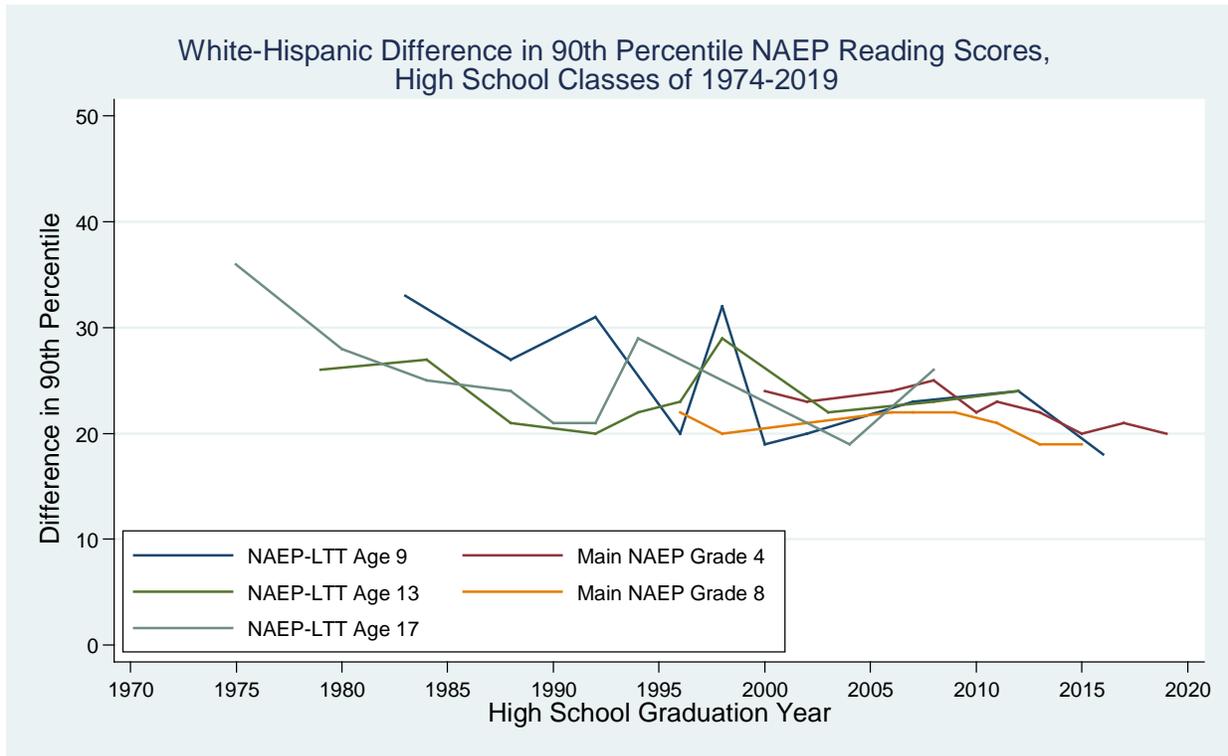


Figure A7



Constructing Figures 6-7

Figures 6 and 7 give the hypothetical composition of cohorts of college students created using different Top Ten Percent Rules. Figure 6 gives these compositions based on race for students whose race was known. Students' placements in the top 10 % of their high school or state were determined by finding their place in the implied distribution of GPAs or math test scores in that high school or state. To determine this we first calculated the mean and standard deviation of all of GPA and test scores for all of the students in the sample in a given high school or state, we then calculated what percentile of a normal distribution with this mean and standard deviation these students would fall in. If students were in the 90th percentile or higher, they were considered part of the top 10 % of their high school or state. For the national top 10% rule we simply took the top 10% of students by test score in our nationally representative sample.