Race and College Admissions: An Alternative to Affirmative Action?

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Abstract

During the late 1990s, several states eliminated affirmative action admissions policies at their public colleges. Some of these states substituted a program that grants admission to the top-x percent of each high school's graduating class. These new programs were instituted in efforts to restore minority college enrollments to their prior levels. This paper finds that the preferences given to minority applicants under affirmative action are large and that minority enrollment in top-tier institutions would fall substantially after eliminating these preferences. However, there are not sufficient numbers of minorities in the top-x percent of their high school for the expected recovery from an x-percent program to be very large. Furthermore, most minority beneficiaries would have been accepted by state universities without the program. As a result, x-percent programs are unable to replace traditional affirmative action and maintain the share of minority students.

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1. Introduction

The use of affirmative action in college and university admissions has been controversial since its inception in the 1960s. Despite the landmark 1978 Supreme Court decision, *The Regents of the University of California v. Bakke*, which allowed for the use of race-based preferences, affirmative action admissions policies have been under continual legal and political assault. Recently, several states have ended affirmative action admissions policies. In 1995, the University of California's Board of Regents voted to eliminate all campus affirmative action programs based on race or sex. California's Proposition 209, which passed in 1996, reinforced the UC Regents' resolution by banning race-based preferences in public education, employment, and contracting. The state of Washington followed with a similar voter-enacted ban in 1998. Recent court challenges to affirmative action in admissions have been pursued in Texas, Georgia, and Michigan. In response to the decision in *Hopwood v. Texas*, the state of Texas ended the use of racial preferences at state schools beginning in the fall of 1997. Following these policy changes, minority enrollment at the flagship schools in several of these states plummeted and legislators and college administrators sought a method to boost these declining enrollments.

As an alternative, some states instituted what are known as "top-x percent" programs. These programs guarantee admission to a public college to students who graduate in the top-x percent of their high school.[1] The first such program was instituted in Texas in 1997. Governor George W. Bush helped enact a plan that guarantees university admittance for high school students who are in the top-ten percent of their class. In 1999, the UC Regents approved a policy backed by Governor Gray Davis, which guarantees admission to one of the UC schools to the top-four percent of graduates in each high school, provided that the student completes specified coursework. Finally, in 2000 Florida's Governor, Jeb Bush, obtained approval for his "One Florida" plan, which simultaneously bans race

[1] Throughout this text, I will often use the term "college" to refer both to colleges and universities.

and gender preferences in college admissions and promises that students who graduate in the top-twenty percent of their high school class and complete a college preparatory curriculum will get into at least one of the ten state universities.

These plans have been promoted as potential alternatives to affirmative action. The implicit goal of the Texas, California, and Florida proposals is to create college campuses whose racial and ethnic composition matches the state's composition.[2] It has been assumed that these programs will achieve diversity largely due to the degree of segregation in the public high schools. For example, suppose that high schools were completely segregated. Then, by necessity, the composition of the top-x percent of these segregated high schools would match the racial and ethnic composition of the state's high school students. However, though highly segregated, high schools are not completely segregated. Therefore, it is not necessarily the case that the composition of the top-x percent mirrors the composition of the overall student body. Nonetheless, some believe that these programs could restore minority shares of enrollment to their prior levels. In particular, the press has highlighted the Texas program as restoring minority undergraduate enrollment in Texas public colleges.[3] However, other efforts to recruit minority students may be the actual cause of this apparent rebound.

The goal of this paper is to assess the potential efficacy of these x-percent programs as a substitute for traditional affirmative action policies. Can these programs succeed in maintaining the share of minority enrollment achieved in public universities under affirmative action? The answer to this question is an important public policy concern, because access to top public colleges can improve admittees' life prospects and quality of life. For example, there is clearly a wage premium associated with college attendance; estimates of the premium for each additional year of education range from

[2] For example, University of California Regent, Ward Connerly, stated, "I believe the inherent defect in the 10 percent of Texas and the 20 percent of Florida is that they are designed as a surrogate for race. These systems and explicit race-preference systems are a distinction without a difference and because their genesis is, in fact, the seed of 'diversity,' they inevitably will have to be tinkered with in order to maintain the diversity mix that the political establishment deems appropriate." (Connerly, 2000).

[3] For example, see Wilgoren (1999) and Steinberg (2000).

four to ten percent. This wage premium has increased over recent decades and was a primary source of increasing income inequality in the 1980s (Ashenfelter and Rouse, 1999). Furthermore, the quality of the institution to which minority students have access has impact on their lives as well. Bowen and Bok (1998) conclude that minorities receive a greater premium for attending a top-tier school than white students.[4] Kane (1998) finds that attending a more selective college is associated with higher graduation rates and higher earnings for both minority and non-minority students. He also finds that the gains associated with attending a more selective college are higher for those with lower test scores. Finally, the quality of higher education may affect the recipient's non-economic outcomes such as the likelihood of divorce (Bowen and Bok, 1998).

This paper explores how the combination of the elimination of affirmative action programs and the institution of x-percent programs affect minority access to public colleges. Section 2 presents the conceptual framework for the simulation and Section 3 reviews the data used. Section 4 presents the regression results and simulation of the effect of dropping affirmative action at public colleges. I show that the preferences given to minority students in admissions are large and exist at both top-tier and lower-tier schools. Eliminating affirmative action widens the gap between the quality of colleges attended by minority and non-minority students. Section 5 demonstrates that instituting x-percent programs does little to offset the reductions in minority shares. Effectively, there are not enough minorities in the top-x percent of their high school for the program to maintain minority enrollment shares. Furthermore, most minorities who are in the top-x percent continue to be accepted after the elimination of affirmative action. Thus, the top-x percent programs cannot greatly enhance their prospects.

[4] They cite several studies (Loury and Garman (1995), Daniel, Black, and Smith (1997), Brewer, Eide, and Ehrenberg (1996) and Behrman et. al. (1996)) that show that the economic returns to higher education are higher for students attending more selective colleges and universities.

2 Conceptual Framework

The Texas top-ten percent program, which began in 1997, has the longest history and thus may provide insight into the effectiveness of top-x percent programs generally. However, in addition to instituting this program, other programs were simultaneously instituted which could have affected minority enrollments. For example, "Longhorn Opportunity Scholarships" were established and funded by University of Texas alumni, to provide full tuition, room and board, for students who are in the top-ten percent and who come from specified underrepresented high schools (Ball, 2000). These scholarships would undoubtedly have their own effect on the enrollment decisions of minority recipients. Similarly, the University of Texas at Austin and Texas A&M University began allocating scholarships to students who had overcome adversities (Selingo, 1999a). Additionally, after *Hopwood*, several neighboring states increased their recruitment of Texas minority students, which may have lured some students away from Texas colleges (Selingo, 1999b). Thus, it is difficult to distinguish the effect of the Texas top-ten percent program from other concurrent events.

Rather than use the Texas experience, this paper simulates the elimination of affirmative action and the institution a top-x percent program for a nationally representative sample of 1992 high school seniors. First, I estimate the degree of preference received by minority college applicants. The parameters from this estimation are then used to predict what would have happened to these students' applications if race-based preferences were eliminated. I then look at the new distribution of students across colleges of varying quality, by race and ethnicity. Second, based on the student's transcript, the student is simulated to receive automatic admittance if he or she is in the top-x percent of their high school class. After simulating the top-x percent program, I then evaluate whether the program restores minority shares to their levels before the removal of affirmative action.

This paper is a partial equilibrium analysis, which focuses on the change in the student's admissions holding student behavior constant. For example, the simulation holds the students'

applications constant. The removal of affirmative action may lead to a shift of minority applications to lower-tiered institutions. By holding applications constant, this analysis shows how opportunities would change if students continued to behave as they did prior to the elimination of affirmative action. This paper likely understates the response once changes in applications are incorporated.[5] Also, this paper does not consider the incentives for talented students to transfer to poorer quality schools to gain admission through the x-percent program. Finally, the simulation does not account for the effects that x-percent programs could have on high school students' effort and competitiveness.

Second, this paper does not look at changes in enrollment or persistence, but focuses on changes in the student's opportunity set. The paper does not consider the changes in the student's enrollment decisions conditional on acceptance. For example, it is well known that elite black students are less likely to enroll conditional on acceptance, as these students are recruited by many institutions (Bowen and Bok, 1998; Conrad, 1999). The elimination of affirmative action could change these yield rates. Furthermore, this paper does not estimate changes in financial aid that could affect enrollment.

3 Data

Data are taken from the National Education Longitudinal Study (NELS). NELS sampled around 24 students from approximately 1,000 public and private eighth grade schools throughout the nation.[6] Data on these students were collected in 1988, 1990, 1992, 1994, and 2000, beginning in the 8th grade. Nearly 15,000 students were available in the 1994 third follow-up. These data include high school transcripts, SAT and ACT scores, and demographic information. Additionally, the data include the first and second choice colleges to which the student applied and whether the student was accepted,

[5] Note, however, that even after race-based preferences are eliminated at public colleges, based on subsequently discussed regression results, I predict that 95 percent of the underrepresented minorities who were initially accepted will still be accepted at one of their top two colleges. Thus, there is not a substantial need to change their applications.

as well as the college where the student enrolled. Table 1 lists the descriptive statistics for this sample. Of the students in the third follow-up, 6,342 applied to a four-year college. The colleges, to which these students applied, are ranked by the college's median freshman SAT score. The rank of the college could be determined for 6,247 of these students. 22 percent of the remaining applicants have missing data on whether they were accepted to their "best" college (defined below). Additionally, another eight percent have missing data for the right-hand side variables that are used in the subsequent regressions. The sensitivity of the results to the missing data is tested.

While it would be preferable to have information on all of the colleges where these students applied, NELS only provides information on the student's top-two college choices. This limitation in the data is not as extreme as it might seem. I have estimated that 63 percent applied to only one or two schools and the average student submitted 2.56 applications.[7] Nonetheless, for high-ability students, who tend to apply to more institutions, these data are less comprehensive.

Most of the analysis is focused on the effect of race-based preferences on the highest-quality college to which the student applies. Based on data from the Barron's Profiles of American Colleges, colleges are ranked by an index that combines the median SAT and median ACT of their freshman class, where available.[8] For students who apply to more than one college, the student's "best" college is defined as the one with the higher rank.[9] Note that underrepresented minorities send a higher fraction of their applications to low-ranked schools. For example, Table 1 shows that the average rank of the best college for underrepresented minorities is 977, compared to 1,034 for white and Asian-

[6] The 1988 base year sample was constructed using a two-stage, stratified approach. In the first stage, schools were chosen on the basis of size and whether they were private or public. In the second-stage, 24 students were randomly sampled and an additional 2 to 3 Hispanic and Asian-American students were added.

[7] The students were asked, "To how many postsecondary schools have you applied?," and given the following choices: none, one, two to four, five or more. 39 percent of these students reported applying to only one college and only 14 percent applied to more than four colleges. The estimates in the text are achieved by assuming a geometric distribution. Using earlier data from the National Longitudinal Study of 1972, Venti and Wise (1982) find that approximately 63 percent applied to only 1 school, 21 percent applied to two schools, and 16 percent applied to three or more.

[8] For some colleges, medians are estimated by the fraction of students who are within categorical ranges (e.g., percentage with ACT score less than 21, 21 to 23, etc.). A small number of colleges were given the average rank of schools in their Barrons-defined selectivity tier. Of course, this is only one potential measure of college quality.

American students. Table 1 also shows that underrepresented minority applications are a much larger share of the applications sent to bottom-quintile colleges.

4 Minority Advantage Under Affirmative Action

Before simulating the rebound effect of the x-percent programs, it is first necessary to evaluate the magnitude of the preference given under affirmative action. A school's admissions policy can be thought of as a transformation of the student's application into a numerical rating of the applicant. For example, the University of Michigan (UM) explicitly awards a certain number of points for the student's academic record, test scores, and other factors, including the race / ethnicity of the applicant. Table 2 contains the elements of the UM scoring system. In the UM scoring system, being an underrepresented racial or ethnic minority adds the equivalent of one point to the student's high school grade point average. The model that I develop in this paper will identify the average scoring system used nationally.

If the acceptance-rejection decisions of a national sample of colleges are regressed on a matrix of student, high school, and college characteristics, the coefficients that result from this regression can be thought of as the weights that the average college places on each respective characteristic. I estimate such a model where the college is assumed to place weights on the various factors that might be observable in the student's application. A college values these characteristics according to the following formula:

$$(1) \qquad s^*_{ij} = \boldsymbol{x}_i\beta + \boldsymbol{c}_j\delta + \boldsymbol{z}_{ij}\gamma + \varepsilon_{ij}$$

where, s^* is the unobserved score of applicant i for college j, $\boldsymbol{x}$ represents a vector of student-specific characteristics, $\boldsymbol{c}$ represents a vector of characteristics of the college, and $\boldsymbol{z}$ represents a vector of interactions of the student's and the college's characteristics.

[9] This college rank ranged from a high of 1,400 (California Institute of Technology) to a low of 622 (Livingstone College, NC).

The vector $\boldsymbol{x}$ includes the following student and high school-level characteristics: grade point average, test scores, and dummy variables for underrepresented minority (URM), female, taker of an advanced placement course, athlete, student government participant, one parent with college experience, parents married, high-income and low-income family, census regions, private high school, urban high school, and rural high school.

The student's grade point average is computed for the core courses of English, math, science, and social studies. The student's test score variable is an average of the student's SAT and SAT-equivalent ACT scores. If the student did not take the SAT or ACT tests, the student's SAT/ACT index is imputed based on the student's standardized scores on math and reading tests taken in the 8^{th}, 10^{th}, and 12^{th} grades.[10] Underrepresented minority is defined to include Hispanics, blacks, and Native Americans.[11] In an alternate specification, the URM dummy is replaced with separate dummies for each race/ethnicity group, excluding whites. Parent's college experience is included since the college may give a preference to admitting the children of their graduates ("legacies") and the parent's college experience could be correlated with unobservable characteristics of their child. Finally, parent's income is included in the specification because some colleges do not maintain "need-blind" admissions and others give a preference to low-income students.

Different types of colleges will give students with the same $\boldsymbol{x}$ vector a different score. For example, a high-quality college will rate a student lower than a low-quality college. Vector $\boldsymbol{c}$ contains the "rank" of the college as measured by the median SAT scores of their freshman students and a dummy variable for private colleges and universities. Vector $\boldsymbol{z}$ includes a dummy variable for in-state applicants and this is interacted with the private college dummy. In some specifications, vector $\boldsymbol{z}$ will include interactions of the URM dummy with the college's rank.

[10] Of the 6,342 NELS students who applied to a four-year college, 4,654 had an SAT or ACT score.
[11] For the remainder of the paper, the white, black, Asian-American, and Native American race/ethnicity groups are defined to be exclusive of Hispanic students.

A student's probability of acceptance rises with his score, s^*_{ij}. Assume that s^* is normalized such that students with $s^* > 0$ are accepted. Further assuming that the error term, ε, is distributed normally with mean zero and variance one yields the probit model. The probability of admission, a, is given by the following:

(2) $\Pr(a_{ij}=1) = \text{Prob}[s^*_{ij} > 0] = \Phi[\boldsymbol{x}_i\beta + \boldsymbol{c}_j\delta + \boldsymbol{z}_{ij}\gamma]$

where Φ is notation for the standard normal distribution.

The coefficients for Equation 2 are first estimated for all four-year colleges. Then in Section 4.2, I explore possible heterogeneity in the degree of affirmative action based on the college's quality and type and on the student's ability.

One might be concerned that omitted variables could bias the results. For example, it could be that the essays and recommendations of minorities are better or worse than other observably similar students. Admissions officers could be admitting students whose essays reflect achievement in the face of adversity and this characteristic could be correlated with race. If this is the case, the coefficients may over- or understate the degree of race-based preferences (Kane, 1998). Similarly, if there are other criteria which colleges use to rate their applicants that are correlated with race, then the finding of a race preference will be spurious. It is hoped that the inclusion of the various elements in the $\boldsymbol{x}$ vector will minimize this effect. Also, there is a general perception that the SAT and ACT test are biased against minority students. In response, college administrators may inflate minority test scores to remove the perceived bias. To the extent that this is done, the effect would appear to be a preference given to minority applicants where none is given from the perspective of the college admissions committee. However, a ban on affirmative action policies would take this discretion away from the college administrators.

The simulations, which are discussed in Section 4.5, assume that the coefficients in Equation 2 reflect the true preference given to underrepresented minority applicants. It is assumed that colleges

will respond to a ban on affirmative action by setting the preference weight on URM (and the interaction of URM with other variables) to zero while not changing any other element of their scoring system. For the second part of the experiment, an x-percent program will be instituted where automatic admission (i.e., a_{ij}=1) will be given for all public college applicants who are in the top-x percent of their high school class. All other students will be processed through the regular admission system.

4.1 Regression Results

Table 3 lists the results of the regression with each race/ethnicity group listed separately. This and all subsequent regressions are weighted, and Huber/White standard errors are used to account for correlation in errors of applications at particular universities.[12] First, note that the coefficients on black and Hispanic are both positive and significant. This result suggests that black and Hispanic students have a higher chance of being accepted than white students with similar characteristics. For the average student, being black instead of white would raise the probability of acceptance to the student's best college by 8.4 percentage points, while being Hispanic rather than white would raise the probability of acceptance by 5.8 percentage points.[13] These preferences are large. For example, being black would raise the likelihood of acceptance by the equivalent of a 254-point increase on the SAT or two-thirds of a point increase in grade point average. Finally, note that the coefficient on Asian-American is negative, but insignificant.

I estimate the effect of race on the likelihood of admission by setting the coefficient on the race variable to zero. This procedure assumes that the colleges would keep their weights on all of the other factors unchanged, but would simply eliminate the advantage given to underrepresented minorities. The results imply that eliminating affirmative action admissions would reduce the

[12] The regressions are weighted by the NELS variable "f3f2pnwt," which scales the 1994 NELS students to the national population of 1992 high school students.

number of black students who are accepted to their best college choice by 12.8 percent. A similar 7.7 percent reduction is found for Hispanic students. Blacks and Hispanics comprise 15.8 percent of the students who were accepted at their best choice. Without race-based preferences, this share would drop to 14.1 percent.[14] It is important to note that these results pool campuses using affirmative action with those that did not. Thus, the effects will be larger at colleges that use affirmative action.[15]

These results are consistent, in general, with prior research, which has found that that large preferences are given, particularly by elite institutions. For example, Bowen and Bok (1998) find that under a race-neutral policy, the probability of admission for black applicants to the top-tier colleges in their study would fall to 13 percent (as compared with 1989 acceptance rates of 42 percent for black applicants and 25 percent for white applicants).[16] They note that the actual experience at UC Berkeley was similar. In 1997, when race-sensitive admissions were used at UC Berkeley, admission rates were 48.5 percent for blacks and 29.9 percent for whites. In the following year, the admissions rates for blacks fell to 15.6 percent and rose for whites to 30.3 percent.

Kane (1998) finds similar results. He uses the approach that is taken in this paper, estimating the magnitude of affirmative action by regressing the college's acceptance-rejection decision on the student's characteristics, including race. Kane uses this technique to study students who applied in the early 1980s. He finds that college admission rates for blacks, controlling for high school grades, SAT test scores, and personal characteristics, are only substantially higher for the top quintile of colleges. The magnitude of this preference is fairly large; black applicants receive a preference that is

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[13] While the coefficient on black is greater than the coefficient on Hispanic, the hypothesis that the coefficients are the same cannot be rejected.

[14] These results are robust to a specification that combines underrepresented minorities into a single dummy variable. Underrepresented minorities would face a 10.2 percent reduction in the number accepted at their best choice college. Underrepresented minorities comprise 16.4 percent of the students who were accepted at their best choice. Without race-based preferences, this share would drop to 14.7 percent.

[15] There are no comprehensive listings of which colleges use affirmative action. A survey in the mid 1980s found that 41 percent of private and 46 percent of public colleges reported giving some preference to minority students in admissions (Klitgaard, 1985).

[16] To form this estimate, they simulate the acceptance-rejection decision that would have occurred if the colleges only used grades or SAT scores.

equivalent to an increase of two-thirds of a point in high school grade point average or 400 points on the SAT at top-quintile colleges. As a result, he finds that minority representation at these colleges would be very low without consideration of race and ethnicity in admissions.

However, the literature is not uniform on this finding. Based on their study of 1972 high school students, Venti and Wise (1982) find a positive but insignificant preference for minority applicants. Using debatable exclusion restrictions, they simultaneously estimate the student's application decisions and the college's acceptance decision. They argue that these decisions may need to be evaluated simultaneously to control for selection effects that could bias the coefficients in the admission regression. For example, suppose a student has an unobservable variable that increases her likelihood of applying to a top-tier college and increases her likelihood of acceptance. If this unobservable variable is correlated with the student's race it would bias the findings of a study that ignored the selection effect. However, the potential direction of this bias is not obvious. In Section 4.3, I show that selection effects do not substantially change the findings of a large preference for minority applicants.

4.2 Heterogeneity in the Degree of Affirmative Action in Admissions

The prior section produced one estimate of the magnitude of affirmative action for all applicants. In this section, I explore three possible types of heterogeneity in degree of affirmative action used. It will be shown that race-based preferences are larger at higher-tier institutions, but are present at lower-tier colleges, and that there is no evidence of heterogeneity by student quality and between public and private colleges.

Prior literature finds that race-based preferences are used most heavily by top-tier institutions. To analyze differences between higher- and lower-quality colleges, I split colleges into five quintiles with

equal shares of enrollment.[17] Students are assigned to the quintile of their best college choice. If only top-tier institutions are using race-based preferences, then one should observe that the coefficient on URM is positive and significant only for top-tier institutions. Table 4 presents the results focusing on the URM coefficient.[18] The coefficient on underrepresented minority is only significant (at the five-percent level) for students who apply to top-quintile colleges. Furthermore, the implied percentage reduction in number of underrepresented minorities accepted is highest for top-quintile colleges. In the top-quintile, the number of underrepresented minorities accepted to their best choice would fall 21.3 percent.[19]

While it appears that race-based preferences are stronger at top-quintile colleges, the coefficient on underrepresented minority is positive at all quintiles. The sample sizes may be too small to conclusively reject the hypothesis that the coefficients differ from zero at lower-tiered colleges. To test this hypothesis, I pool the sample of four-year college applicants and include interactions between URM and a set of dummy variables for college quintiles 2 through 5.[20] The results of this regression are shown in Table 5. Note that the interactions of URM with dummy variables for each quintile, while negative, are insignificant. This result indicates that there is not a significant difference between the preferences given at top-tier versus lower-tiered colleges. The coefficients on URM and the interaction terms are jointly significant for each quintile. In fact, by summing the coefficients, Table 5 shows that there is a significant preference being given at four of the five quintiles (at the ten-percent level), including the lowest quintile.

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[17] Kane (1998) uses a similar approach.

[18] Note that the sample size for each quintile falls. There are two reasons for this occurrence. First, the divisions between each quintile are defined by aggregate enrollment in each college. However, top-quintile schools receive (and reject) more applications. Thus, the top-quintile sub-sample includes more applicants than each of the lower-quintile sub-samples. Second, since these results are presented for the student's best choice, it is less likely that the student's best choice will be a low-quintile college.

[19] The number of blacks and Hispanics accepted to their best choice would fall 29.9 percent and 12.6 percent, respectively, at top-quintile colleges. The coefficient on black is significant, while the coefficient on Hispanic is not. A test that the coefficients are the same can be marginally rejected (p=0.07).

[20] In these regressions, a set of dummy variables for quintiles 2 through 5 was added to the $\boldsymbol{c}$ vector.

The bottom panel of Table 5 shows the results of a specification that includes an interaction of URM with the college's rank index. The results imply that the preference given to underrepresented minorities are indeed larger at higher ranked colleges, as the interaction coefficient is significant. Nonetheless, the coefficients imply that a positive preference is given for colleges whose median SAT score is greater than 756, which was the case for 1,181 of the 1,202 four-year colleges to which NELS students applied. Thus, race-based preferences appear to be given all along the spectrum, even at colleges with low degrees of selectivity.[21]

The results so far have combined public and private colleges. However, there may be differences between the degrees of race-based preferences used by these two types of institutions. I test whether private colleges are using a different degree of preference for underrepresented minorities by interacting URM and private college. The results, not shown, suggest that, on average, both public and private colleges grant significant race-based preferences, with perhaps less preference at private colleges. However, the difference in the degree of preference given is not significant.

Finally, I test whether there is heterogeneity in race-based preferences as a function of the student's academic ability. Are race-based preferences only given to strong candidates, or are they predominately given to weaker students? I divide the applicants into quintiles based on the applicant's scores on standardized tests given in the 8^{th}, 10^{th}, and 12^{th} grades. I then test whether there was a significant interaction between race-based preferences and the student's academic quintile. I find that there is no significant difference between the degree of affirmative action given to top-quintile and lower-quintile students. In fact, significant preferences are being given to 1^{st}, 3^{rd}, and 4^{th} quintile students. Therefore, it appears that preference is given to both strong and weak underrepresented minorities. Other tests were performed, including interactions of URM with the

[21] A 95 percent confidence interval around the sum of the two coefficients reveals that there is a significant positive preference given by colleges whose median SAT score is greater than 905, which was the case for 765 of the 1,202 four-year colleges to which NELS students applied.

SAT/ACT index, core grade point average, and standardized test score. In none of these specifications was the interaction term significant. Therefore, no evidence exists to show heterogeneity in the degree of preference given as a function of the students' academic quality. This result is consistent with the findings presented in Table 5 that demonstrated that significant preferences are given at lower-tiered institutions (who generally receive applications from lower-tiered students).

4.3 Do Selection Effects Drive the Results?

Selection could affect the results in several ways. First, students select the quality of the college to which their applications are submitted rather than randomly submitting their applications. Second, students who choose not to apply to college are omitted from the regressions. Third, students whose applications are missing data on the admission-rejection decision of the college or right-hand side variables are omitted.

Typically, an instrument is used to predict the first-stage selection decision to control for selection effects. However, it is difficult to find variables that predict the student's application decision that do not also affect the college's acceptance-rejection decision. As an alternative, I evaluate the direction and importance of each potential bias. In general, I find that the selection effects are likely to be small and perhaps lead to an underestimate of the degree of affirmative action.

First, consider the student's choice of the quality of the college to which he applies. If there is an omitted variable that is correlated with the decision to apply to a high-quality college, the college's admission decision, and the student's race, then one may observe a positive preference given to race that is spurious. In effect, there is reason for concern that top-quintile colleges are only receiving applications from those underrepresented minority students who are unobservably better than the white and Asian-American students who apply to the same college. To test whether this is a matter of concern, I regress the rank of the student's best college on the elements in the $\boldsymbol{x}$ vector:

(3) $q_i = \mathbf{x}_i\omega + \varepsilon_{3i}$

where q is the quality rank of the student's best college.

Suppose that controlling for academic and other characteristics, underrepresented minority students are predicted to apply to lower-quality colleges. Then, when one observes two students who apply to the same college who only differ in race, one would be concerned that the minority student has an unobserved characteristic that enhanced her likelihood to apply and may enhance the college's decision to accept the student. However, the results of this regression demonstrate the opposite pattern. Underrepresented minorities are predicted to apply to colleges that are nine points higher than the colleges to which otherwise similar white or Asian-American students would apply. This difference is significant.[22] Therefore, if anything, one might be concerned that the previous results *underestimate* the magnitude of affirmative action in admissions. That is, since underrepresented minority students are predicted to apply to higher-quality colleges, *ceteris paribus*, we should be concerned that the white students who apply to high-quality colleges may have an unobservable characteristic that enhances their likelihood of admission and hides the degree of actual affirmative action preference. However, this effect is likely to be small as a nine-point increase in q is small relative to the standard deviation in q, which is 127.

A similar technique is applied to the application decision. The probability that a student will apply to a four-year college is predicted as a function of $\mathbf{x}$.

(4) $\Pr(b_i=1) = \Phi[\mathbf{x}_i\lambda]$

where b is a dummy variable indicating whether the student applied to a four-year college.

Using the same logic as above, one would be concerned if underrepresented minority students have a lower probability of applying controlling for academic and other factors. If this were true,

[22] However, there appears to be some heterogeneity between racial and ethnic groups. Hispanics and Asian-Americans are predicted to apply to colleges that have a median freshman SAT score that is 25 and 42 points higher, respectively, than the colleges to which white students apply. These differences are statistically significant. The coefficient on black is positive, but insignificant.

then the underrepresented minorities who do apply may have an unobserved characteristic that enhanced their likelihood to apply and may enhance the college's decision to accept the student.

Again, however, the results of this regression demonstrate the opposite pattern. Underrepresented minorities are, *ceteris paribus*, significantly more likely to apply to college.[23] For the mean student, being an underrepresented minority raises the probability of applying to college from 38 to 50 percent. Thus, a white student who does apply may have some favorable characteristic that increases her likelihood of admission.

Finally, the probability of having missing data, which eliminates the student from the regression, is predicted as a function of $\boldsymbol{x}$ (excluding grade point average and the SAT/ACT test score index as these right-hand-side variables may be missing). The results show that being an underrepresented minority significantly increases the likelihood of having missing data. For the mean student, being an underrepresented minority raises the probability of having missing data from 27 to 34 percent. However, it is unclear in which direction missing data would bias the results. While it may seam reasonable to believe that students with missing data have unobservable characteristics that would be viewed unfavorably by admissions committees, the reverse may in fact be true. For example, grade point average, test scores, and having an advanced placement credit were all positive, significant predictors of having missing left-hand side data. Thus, it is difficult to estimate the impact of the missing data.

As a final test of the selection effects, I employ a Heckman two-stage probit regression. The first stage predicts the likelihood of being observed in the second-stage, while the second stage predicts the likelihood of acceptance controlling for the combined selection effects. A student is observed in the second-stage if they applied to a four-year college and have non-missing data. The first-stage regression uses $\boldsymbol{x}$ as the predictor of being observed in the second-stage. Thus, the results of this two-

[23] Controlling for academic and other factors, blacks, Hispanics, and Asian-Americans are all significantly more likely than white students to apply to college.

stage model will not be able to separate selection effects from non-linearities in the admissions equation. This strong functional form assumption limits the strength of these findings. However, the results show nearly no change in the coefficient on underrepresented minority. While the coefficient on underrepresented minority was 0.37, in Table 4, the results of the two-stage model produce a coefficient of 0.40 (with a 0.10 standard deviation). Additionally, the correlation between the error terms in the two stages was insignificant, which suggests that these selection effects may not bias the results. In the remainder of the paper, where I simulate affirmative action, I use the results presented in the bottom panel of Table 5 that ignore the selection effects.

4.4 Is There Enough Affirmative Action to Produce Proportionate Representation?

At the advent of affirmative action in the mid-1960s, proportionate representation was the predominant goal for admissions programs (Ball, 2000). Suppose that one wanted to have proportionate representation of underrepresented minorities at colleges of various levels of quality. How much preference would colleges need to give? Given the lower rate of college attendance of minority students, it would be impossible for all colleges to simultaneously enroll classes that were precisely similar to the race / ethnicity distribution of high school populations. In 1992, 19.6 percent of all four-year college applicants were underrepresented minorities (as opposed to 27.1 percent of all high school students). However, suppose one wished to distribute the current underrepresented minority applicants evenly across campuses of varying quality. There may be two barriers to accomplishing this goal. First, minority students may not be applying to top-tier colleges in great enough numbers. From Table 1, it is clear that underrepresented minorities are vastly overrepresented in applications to bottom quintile colleges. Second, even if minority students applied in equal rates to all tiers, they may not receive enough preference to produce a proportionate number of acceptances. In this section, I estimate the degree of preference that would need to be

given if minority applicants spread their applications evenly across campuses of varying selectivity, and I compare this to the preferences actually given.

Suppose that top-quintile schools exclusively enrolled those students whose grades were in the top quintile. The 80th percentile grade point average in core courses among students who applied to a four-year college was 2.97 for underrepresented minorities, while it was 3.46 for white and Asian-American applicants. Thus, in order to produce proportionate representation, top-quintile colleges would need to boost the grade point averages of underrepresented minorities by approximately 17 percent. Slightly higher boosts, ranging from 21 to 28 percent, would need to be used by lower-quintile colleges as well. Similar advantages would need to be given if the colleges based their admissions solely on SAT / ACT scores.

This advantage can be compared to the actual advantage given to the "marginal" accepted student. The "marginal" admit could be defined in many ways. The accepted student with the lowest grade point average or SAT / ACT score could be used as a definition. However, some students will be accepted for non-academic reasons (athletics, child of a donor, etc.). As an alternative, I define the "marginal" admit as the 20th percentile admitted student by grade point average and test score. If institutions are not giving a preference to marginally admitted students, one should expect that the 20th percentile admitted underrepresented minority would look similar to the 20th percentile admitted white or Asian-American student. This is not the case. At each quintile of colleges, the 20th percentile admitted white or Asian-American student has higher grade point averages and higher test scores. This result suggests colleges at all quality levels use lower minimum academic standards in admitting underrepresented minorities at all college quality levels. This result confirms the earlier findings.

The actual advantage that is given to underrepresented minorities ranges from 8 to 24 percent for grade point average and 13 to 23 percent for test scores. These advantages are nearly in the range that would be needed to produce proportional representation across colleges of varying quality. This

finding suggests that the lack of actual proportionate representation that is observed (with underrepresented minorities, on average, attending lower-quality colleges) is not the result of a lack of effort on the part of admissions committees, but rather a lack of an adequate number of underrepresented minorities applying to top-quintile colleges. This result is robust to other definitions of the "marginal" admit including the 10th percentile student and the average of the bottom 10 and 20 percent of students. It should be remembered, however, that the top-tier schools might lower their preference for minority students if they received more applications.

4.5 Simulation of the Elimination of Affirmative Action

I use the results of the estimated scoring system to simulate the effect of the elimination of affirmative action at public colleges. Ultimately, I wish to know whether the quality of the best college to which the student is accepted will change with this policy. To evaluate this effect, I first predict whether the student will be accepted at their best college and whether they will be accepted at their "second-best" college. I assume that all students who apply to college are accepted by a school of some quality. If a student is rejected to the two colleges in the NELS data, I assume that a third college will accept the student. I estimate the rank of this third college as 0.92 times the rank of the "second best" college.[24] I then estimate the rank of the best college where the student will be accepted as the following:

(5) Predicted Rank = Pr(Best)*[Rank of Best College]
+ [1-Pr(Best)]*Pr(Second-Best)*[Rank of Second-Best College]
+ [1-Pr(Best)]*[1-Pr(Second-Best)]*[Rank of Third-Best College]

where Pr() is the predicted probability of being accepted at the respective college.[25]

[24] The average ratio of the rank of the student's best choice to their second-best choice was 0.92. This ratio is nearly the same for underrepresented minorities and other students.

[25] For the average student who applied to two schools, [1-Pr(Best)]*[1-Pr(Second-Best)] equals 4.7 percent with affirmative action and 4.9 percent without affirmative action. Thus, the impact of this hypothetical third-best school on the student's predicted college rank is small. It is assumed that the admissions decisions of each college are independent.

While, one could imagine a movement to compel both public and private colleges to eliminate their affirmative action policies, recent initiatives and court decisions have focused on eliminating race-based preferences at public colleges.[26] Thus, I focus my analysis on public colleges. To measure the consequence of public colleges dropping affirmative action, I then replicate the above procedure while setting the race-based preference to zero for public colleges.

The results of this exercise show that black and Hispanic students would be shifted into colleges with lower-quality students. Initially, the best college where the overall average student is predicted to be accepted has a median student with a 989 combined score on the SAT. For black and Hispanic students, this college rank is much lower, 921 and 972, respectively. As a combined group, black and Hispanic students' best option would be to attend a college with an average rank of 943, which is 56 points (or 0.51 standard deviations) lower than the average best option for white and Asian-American students. This gap would increase to 62 points (or 0.57 standard deviations) if race-based preferences were eliminated at public colleges and 66 points (or 0.60 standard deviations) if affirmative action is banned at all colleges.[27]

Figure 1 displays the distribution of students across colleges of various qualities. As can be clearly seen, there is a large initial difference between the distribution of colleges that are attended by white and Asian-American students as contrasted with underrepresented minorities. The darkest line shows the distribution of underrepresented minorities after eliminating affirmative action at public institutions. The contrast between this line and the original distribution for underrepresented minorities shows that a universal ban on affirmative action at public institutions would have an

[26] Note that private institutions could be compelled to drop their affirmative action programs if they were denied federal funding, as has been recently discussed.

[27] There are two feedback effects that have not been incorporated. First, I have not changed the likelihood of admissions of white and Asian-American students. Furthermore, I am assuming that each college's median SAT score stays unchanged after the policy change. As marginal underrepresented minority students are rejected from higher-tiered colleges, these colleges' median SAT scores would likely rise. This effect would likely raise the average rank of colleges attended by white and Asian-American students. Likewise, as these newly rejected students moved to lower-tiered colleges, one could observe changes in the median SAT score of these schools. In results not shown, these feedback effects are found to be very small.

adverse effect on these minorities, but the magnitude of the shift in the distribution is small relative to the initial difference between the groups.

Some might argue that this shift would be beneficial to underrepresented minorities, as they would be placed into colleges at where they are more similar to their peers. This idea is sometimes called the "fit" hypothesis (Bowen and Bok, 1998). I test the degree to which this shift reduces the gap between the test scores of underrepresented minorities and their peers.

First, note that the median freshman at the best college to which the average NELS student is accepted has a 989 SAT score. However, the average SAT/ACT index score of the accepted NELS students is only 924. In fact, only a third of the students are found to have an SAT/ACT index score that is higher than the median SAT score of the best college to which they are accepted. There are two possible explanations for this result. First, it is possible that some students will not attend their best choice, but will attend a college with a lower rank.[28] Second, it is well known that colleges use various methods to inflate their reported SAT/ACT median scores.[29] Thus, we should not be surprised to see this divergence in scores.

Overall, the average accepted student has an SAT/ACT score that is 65 points lower than the reported median student at the best college to which they are accepted. However, as expected, this "gap" is much higher for Hispanic and black students (153 and 162 points, respectively) and lower for Asian-American and white students (75 and 43 points, respectively). If race-based preferences at all institutions were eliminated, the Hispanic and black gaps would fall to 141 and 153 points, respectively. Therefore, eliminating affirmative action policies would only slightly lower the gap (less than eight percent) between the scores of underrepresented minorities and their classmates. A large

[28] As shown in Table 1, only about half of the students attended the best college of the two given in the NELS data.

[29] Regarding U.S. News rankings, Duffy and Goldberg (1998) note, "Some schools, for example, include only fully completed applications whereas other colleges count any student who has returned an information card as an applicant. Similarly, many colleges neglect to include minorities, alumni children, athletes, or other specially recruited groups when they report their SAT scores, thus bolstering their mean test scores." Additionally, since some schools do not require test scores, the scores they receive may be biased upwards.

gap would remain. This result should not be surprising. Dickens and Kane (1999) note that if a college admitted all students above a certain SAT score, the admitted black students would have lower average SAT scores than the admitted white students due to the large differences in the test score distributions in the general population. Thus, we should not be surprised if a gap in SAT scores persists after affirmative action is eliminated.

4.6 Affirmative Action at the University of Michigan

It is impossible to determine, with available data, which colleges use race-based preferences and which do not. Thus, the previously discussed results demonstrate the *average* effect of affirmative action on admission. However, it would be interesting to know how a ban on affirmative action would affect those colleges that use race-based preferences. The University of Michigan is one such school. In fact, UM's undergraduate admission system has been challenged in court and a lower court finding is currently being appealed. Table 2 displays the applicant scoring system used for UM undergraduate admissions in the 2000-01 school year.[30] Note that an underrepresented minority is given a bonus of 20 points. This bonus is the equivalent of an increase of one point in the student's grade point average. An equal bonus is given to students who attend a high school that mainly serves underrepresented minority students. This scoring system is used as a first step in the analysis of an applicant. Those students who are on the margin of acceptance are given closer examination of their letters of recommendation and other factors. Nonetheless, the scoring system plays a substantial role in most admissions decisions.

I apply this scoring system to all NELS students, with the top-scoring students accepted.[31] Then, I set the twenty-point bonus given to underrepresented minorities to zero. Note, that these students

[30] This is the scoring system that was used for most undergraduates. The College of Engineering used a slightly different system, which also included a race-based preference.

[31] Estimation of these factors requires some assumptions. School Factor is estimated as a function of the percent of the student's high school that attended college. Curriculum is a function of the number of core and advanced placement classes that the student completed. The student is assumed to come from an underrepresented county if he attended a rural high

can still be eligible for a twenty-point bonus if they are socio-economically disadvantaged or they attended a high school serving a predominately minority population. This additional bonus could also be prohibited by court decision or through a voter initiative. In light of this potentiality, I perform a second test that eliminates the twenty-point bonus for students who attend a high school serving a predominately minority population. Table 6 displays the change in the underrepresented minority share of accepted students. If UM were to accept the top-ten percent of high school students, underrepresented minorities would have an 19 percent share in the class. Excluding the bonus given to underrepresented minorities would reduce this share to 15 percent. Further eliminating the bonus given to students from underrepresented minority high schools would reduce the share to 11 percent. Therefore, it can be seen that the two layers of affirmative action in the UM system substantially increases the share of minority students who are accepted. Similar findings are found with lower thresholds of acceptance. However, at lower thresholds the loss in share is less pronounced.

If the direct bonus given to underrepresented minorities were eliminated, but the bonuses given to socio-economically disadvantaged students and those who attend high schools that mainly serve underrepresented minority students were maintained, then race would remain correlated with admittance. This fact demonstrates that the regression coefficients discussed in Sections 4.1 and 4.2 include both the direct effect of race-based preference and the indirect effects of other variables that may be correlated with race. Some of these indirect effects will be captured by the inclusion of dummy variables for low-income parents and private, urban, and rural high schools.

All of these results suggest that affirmative action policies are very important in maintaining minority shares, particularly in elite colleges. However, the results do not show that the test score

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school. Socio-economic disadvantage is assumed to be present when family income is less than $25,000. The other factors (excluding underrepresented minority and underrepresented minority high school) are not included, as NELS does not have applicable data. Note that several of these factors may be correlated with race/ethnicity.

gap between underrepresented minority students and their classmates would be eliminated with the end of race-based preferences. Nonetheless, given the movement to eliminate these policies, many are hopeful that alternatives, such as an x-percent strategy, can be used as substitutes which can maintain minority shares without directly using a race-preference.

5 Simulation of an X-Percent Policy

Next, I examine how the newly implemented x-percent systems may work using data on NELS students. To simulate the effect, I assume that a new policy is established that grants admission to *every* public four-year college for in-state students who are in the top-ten percent of their high school class.[32] First, note that if high schools were completely segregated, then the distribution of students by race/ethnicity in the top-ten percent of their high school class would match the distribution of students by race/ethnicity in the general population. That is, one would observe that ten percent of whites qualify as well as ten percent of blacks, etc. However, high schools are not completely segregated and the distribution of students in the top-ten percent does not match the distribution in the general population. This result is shown in Table 7. 19 percent of Asian-American students are in the top-ten percent of their high school graduating class, while only five percent of black students would qualify under the new policy. Of course, the policy is only applicable to students who apply to in-state, public, four-year colleges.[33] Overall, 17 percent of these applicants are in the top-ten percent of their classes. However, this fraction is not constant across race/ethnicity groups. Asian-American students again lead with 34 percent qualifying, and black students trail with 12 percent qualifying. Second, note that the qualifiers are disproportionately female. This fact can be most clearly seen

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[32] The systems in Texas, California, and Florida do not grant this automatic admission to out-of-state students. The systems in Florida and California only guarantee admission to *one* of their public universities. Also, note that I have tested the sensitivity of the results to alternative thresholds (including top-four percent and top-twenty percent). These results are discussed later in the text.

[33] 48 percent of high school graduates in NELS apply to a four-year college. Of these, 66 percent sent one of their two applications to an in-state, four-year, public college.

when looking at population shares where the female share is 50 percent of high school graduates, but 60 percent of qualifiers.

However, it may be the case that the new policy helps underrepresented minorities gain the admission they lost after the elimination of affirmative action. To test this hypothesis, I first predict the share accepted at their best choice under the old system. I then drop race-based preferences at public colleges and re-estimate the share accepted. Finally, I add an automatic qualification for students who are in the top-ten percent and apply to an in-state public four-year college. I assume that the total number of accepted students remains unchanged. Thus, the new qualifiers displace some students who would otherwise have been accepted.

The results are presented in Table 8. The major finding of this simulation is that the top-ten percent policy does little to bring the share of underrepresented minorities back to their initial level. After dropping affirmative action, the share of underrepresented students among students accepted at their best choice falls from 17.53 percent to 16.48 percent. This share rises to only 16.68 percent after adding the new qualification mechanism. This represents a gain back of only 19 percent of the share that was lost.[34] After adding the top-ten percent policy, the number of Hispanic and black students accepted at their best choice are 96 percent and 95 percent, respectively, of their level under

[34] A sensitivity analysis was performed on this estimate. The results of this analysis confine the rebound from using the x-percent program between 12 and 79 percent. To produce this range, the following procedure was used. First, I produced high and low estimates of the magnitude of affirmative action by constructing a 95 percent confidence interval around the sum of the coefficients on underrepresented minority and the interaction with the college's rank. Second, I replicated the simulations with these high and low estimates of affirmative action. Using the higher estimate of affirmative action, the underrepresented minority share of those accepted at their best college choice would begin at 18.55 percent. After eliminating affirmative action, this share would fall to 16.87 percent and rise back to only 17.07 percent with the new x-percent program. At the lower estimate of affirmative action, the underrepresented minority share would begin at 16.28 percent. After eliminating affirmative action, this share would fall to 16.01 percent and rise back to 16.22 percent with the new x-percent program.

I performed further robustness checks with alternate specifications and data. The first robustness check simulated the affirmative action preference using five separate regression estimates for each of the five college quintiles. The results of this procedure imply a 7 percent rebound from using the x-percent program. The second robustness check calculated the original specification using the combined data from the applications to the best and second-best colleges. The results of this procedure imply a 13 percent rebound from using the x-percent program. A final robustness check doubled the race preference for half of the underrepresented minority applicants and gave the other half no preference. This estimate simulated the fact that only some colleges use affirmative action. The results of this procedure imply a 9 percent rebound from using the x-percent program. Thus, none of these robustness checks found that the x-percent policy could restore the minority share produced by the traditional affirmative action admissions policies.

affirmative action. The numbers of white and Asian-American students who are accepted at their best choice rise one and three percent, respectively, above their levels under affirmative action.

In general, these programs have little effect, as their intended beneficiaries are very likely to be accepted at their best college choice without the aid of the automatic admission. The only students who are affected are those who were rejected at their best choice (that was an in-state, public, four-year college), but are in the top-ten percent of their high school class. This is a very small group of students. Of the 4,898 students with data on their acceptance to their best choice, only 23 students would have had their admission status change. This result is confirmed by data from students in Florida, which is discussed in Section 5.3. Furthermore, this result holds for minority recipients as well. Most colleges accept underrepresented minority students who are in the top-ten percent of their high school class, even without affirmative action. Without race-based preferences at public colleges, I estimate that the average underrepresented minority student who is in the top-ten percent of their high school class would have an 82 percent chance of being accepted by their best college choice.

Note that these results are sensitive to the choice of the x-percent threshold. Under a top-four percent rule, as expected, very little changes. The underrepresented minority share would rise from 16.48 to 16.52 percent. Alternatively, a top-twenty percent rule has more effect. Under this threshold, the underrepresented minority share would rise to 16.82 percent, which represents a gain back of nearly a third of the share that was lost with the elimination of affirmative action.

At top-quintile colleges, the results are similar. Initially, the underrepresented share of students accepted to their best choice is 11.6 percent. Eliminating race-based preferences at public colleges would lower this share to 10.1 percent. Adding a top-ten percent policy for public colleges would increase this share to 10.8 percent. However, this promising result only holds if the top-x percent policy allows qualifiers to enter *every* public college in the state. The programs in Florida and California only guarantee acceptance to *one* of their state universities. For example, students who

qualify under California's top-four percent program may gain access to the UC system, but could still be denied admission by top-tier campuses such as UC Berkeley. Thus, minority students may be shifted to lower-tier colleges with these top-x percent programs.

It is also interesting to evaluate how this policy change would affect the gender share and the regional share. Despite the fact that females are overrepresented among students in the top-ten percent of their high school class, the gender shares of students accepted at their best choice would remain relatively unchanged by the new policies. The bottom panel of Table 8 shows the effect on regional shares. Some have hypothesized that these new programs would enhance the share of rural students who are accepted. This hypothesis does not appear to be correct so long as applications do not change. In general, the rural, urban, and suburban shares are unaffected by the top-ten percent policy.

5.1 Does the Degree of High School Segregation Affect the Efficacy of an X-Percent Policy?

California, Texas, and Florida high schools are among the more segregated in the nation. These states rank 4th, 10th, and 19th for black segregation and 2nd, 3rd, and 7th for Hispanic segregation, respectively.[35] It may be possible that these states x-percent programs will be more efficacious than states with lower degrees of segregation. To test this hypothesis, I rank students within each race/ethnicity group by their scores on a series of standardized tests given in the 8th, 10th, and 12th grades. I then establish race-specific, top-ten percent criteria. In effect, this race-specific cut-point approximates the distribution of qualifiers that would occur if high schools were completely segregated, *ceteris paribus*. After performing this experiment, I find that Asian-American students would need an average test score of 66.2 to be among the top-ten percent of Asian-American students.[36] The required test score is 64.5, 57.2, and 55.6 for white, Hispanic, and black students,

[35] Based on the percentage of white students in a school attended by a typical black or Hispanic student for the 1996-97 school year (Orfield and Yun, 1999).
[36] For all NELS students, the average test score is 49.7 with a standard deviation of 9.8.

respectively. The effect of these race-specific criteria should increase the number of Hispanic and black students who automatically qualify and decrease the number of white and Asian-American students who qualify. Indeed this is the case. The underrepresented minority share of those qualifiers who apply to a public in-state college would rise from 18 to 24 percent if high schools became completely segregated. As a result, the top-ten percent policy would have more effect in raising underrepresented minority shares. The share of underrepresented students accepted at their best choice, which fell from 17.53 to 16.48 percent after dropping affirmative action at public colleges, would rise back to 17.17 percent given the top-ten percent qualification under complete segregation. This result shows that even under extreme segregation, the x-percent program would not fully restore the minority share. Furthermore, this result suggests that x-percent strategies will be less efficacious in maintaining minority enrollments in states with lower degrees of segregation. Therefore, if positive results occur in California, Texas, and Florida, one might be concerned that the results could not be replicated in other, less-segregated states.

5.2 The Effect of Course Requirements

In these simulations, I have assumed that qualification is based only on being in the top-x percent of one's high school class and graduating from high school with no additional requirements. However, the programs in Florida and California include course requirements. As will be shown, these course requirements further limit the ability of x-percent programs to maintain underrepresented minority shares.

The NELS data contain information on the number of credits taken in the following subjects: English, math, science, social science, foreign language and computer science. The transcript data were recorded after the student's senior year. I explore whether the student, by the end of their senior year, has taken the following number of courses: four in English, three in math, two in science, two in

social science, and two in foreign language. These requirements are closer to the Florida requirements than the California requirements.[37]

Among high school graduates who are in the top-ten percent of their class, 77 percent have satisfied these course requirements. This fraction, however, varies substantially across groups, with a high of 81 percent for Asian-American students and a low of 65 percent for Hispanic students. The course requirements would redistribute the benefit of the new program to white and Asian-American students and away from Hispanic and black students. Underrepresented minorities, as a group, fall from 15.7 percent to 14.0 percent of the beneficiaries due to these course requirements. As a result, the top-x percent program would be even less effective in restoring minority shares of enrollment. The share of underrepresented students among students accepted at their best choice, which fell from 17.53 percent to 16.48 percent after eliminating affirmative action at public colleges, would only rise to 16.64 percent after adding a top-ten percent program with course requirements. This represents a gain back of only 15 percent of the share that was lost.

For all groups, with the exception of Asian-American students, the two-year foreign language course requirement is the most binding requirement. The foreign language requirement is particularly binding for black and Hispanic students. If this requirement were eliminated, the fraction of top-ten percent students who would meet the course requirements would rise from 65 to 78 percent for Hispanics and from 72 to 88 percent for blacks. The adverse effect of the foreign language course requirement on Hispanics is particularly paradoxical, as many Hispanics are bilingual. However, it should be noted that Florida allows students to waive the foreign language requirement if they pass a foreign language competency test. For Asian-American students, the four-year English and three-year math requirements are the most binding.

[37] Florida's program requires that by the end of the senior year, the student must complete the following courses: English (4 years), math (3), natural sciences (3), social science (3), and foreign language (2). Additionally, the student must have taken four more courses in English, math, natural sciences, social sciences or foreign language. California requires that by the end

When one looks at the students who applied to an in-state, public, four-year college, the results show that the course requirements have smaller effects on the shares. Among students who are in the top-ten percent of their high school and applied to an in-state, public, four-year college, 81 percent have completed the required courses. Hispanic students are the only group that is substantially below this fraction (72 percent). Again, the two-year foreign language requirement disqualifies many Hispanic students. Without the foreign language requirement, 87 percent of Hispanic students in this group meet the course requirements. This fraction is comparable to every other group.

5.3 The Efficacy of Florida's "Talented 20" Program in 2000

The first class to be affected by Florida's new policies entered college in the fall of 2000. The Talented 20 program, which was announced by Governor Jeb Bush in November 1999, was approved by the State University System's Board of Regents in February, 2000. A court challenge delayed implementation until the summer. However, by this time students had already submitted their applications and these applications were processed through the regular admissions system, which maintained affirmative action. Students were notified of their acceptance or rejection in the spring of 2000. In June of 2000, applicants who had been rejected through the regular admissions process, but were qualified for admission by their status in the top-twenty percent of their high school class, were notified that they should reapply.

I have obtained data from the Florida Board of Regents on the first cohort of students who qualified for automatic acceptance. These data include information on the public Florida colleges to which the student applied and whether the student was initially accepted. 22,519 students qualified for automatic admission under the Talented 20 program. 65 percent of these students were female. Underrepresented minorities, who were 43 percent of Florida's 11th grade students in 1998-99[38], were

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of the junior year, the student must complete the following courses: English (3), math (3), laboratory sciences (1), history / social science (1), foreign language (1), and electives (2).

[38] Common Core of Data, National Center for Education Statistics.

26 percent of the qualifiers. If Florida had used a top-ten percent threshold, 66 percent of the qualifiers would have been female and 24 percent would have been underrepresented minorities. 11.6 percent of the Talented 20 received a free or reduced price lunch as opposed to 28.3 percent of Florida's 1998-99 high school students.[39] Thus, the program's benefits are disproportionately being received by white and Asian-American students and non-low-income students. These results support the findings of the simulation based on the NELS students.

In general, most of the Talented 20 students who applied to a public Florida institution were accepted and race appeared to play little role in the pattern of acceptances and rejections for these students. For example, 87 percent of Talented 20 applicants were accepted at the University of Florida. This rate of acceptance varied little by race/ethnicity with a range from 85 percent (Hispanics) to 95 percent (blacks). These rates of acceptances were even higher at less selective Florida institutions.

Using these data, I have regressed each university's acceptance/rejection decision on the available data. These data include the student's race, gender, grade point average, weighted grade point average, and whether the student received a free or reduced-price lunch. Notes that these data do not include the students test scores or participation in extracurricular activities that would be of interest to admissions committees. Thus, the results are difficult to assess. Using a conditional logit specification with high school fixed effects, the following variables were significant at the five-percent level. For the University of Florida: weighted grade point average (+), grade point average (-), female (-), black (+), Hispanic (+), mixed race (+); for Florida State University: weighted grade point average (+), grade point average (-), female (-), free lunch (-), black (-); for the University of Central Florida: weighted grade point average (+), grade point average (-), female (-), free lunch (-), black (+),

[39] Ibid. Note, "high school" is defined here as any school with an 11th grade student in the 1998-99 school year.

American Indian (-). However, these results cannot be taken to indicate degrees of affirmative action, since omitted variables are likely correlated with the included variables and bias the findings.

Florida's program does not provide automatic admission to any public Florida institution. Rather, it only provides a guarantee of admission to *one* of the ten schools in Florida's State University System. A student must still go through the regular admissions program. If the student is rejected at three or more schools, she is supposed to notify her high school counselor who then negotiates with the state for a slot in one of the schools. Overall, 71 percent of the Talented 20 students applied at one or more of the ten Florida public institutions. Of those who applied to one of these institutions, 96 percent were accepted by at a least one of these schools.[40] Therefore, the new program can only affect the 4 percent who were denied by all of the Florida public colleges to which they applied.

As a result, the Florida program has little effect for most of its supposed beneficiaries. Furthermore, the beneficiaries are disproportionately white, Asian-American, and non-poor. Finally, since the "One Florida" policy eliminates the ability of the University of Florida and Florida State University to use affirmative action, minority students will likely be shifted to less selective schools. In general, the guarantee of admission only grants these minority students access to colleges where they would have already been accepted.

6 Conclusions

This paper has shown that large race-based preferences existed for minority college applicants in 1992. These preferences existed at both top-tier and less selective institutions. Eliminating these preferences would shift minority students to less-selective institutions. The establishment of a top-x percent program would have only small effects on the access of minority students to top-tier institutions. There are not enough minority students in the top-x percent of American high schools for the program to substantially improve minority shares in top-tier colleges. The programs are

particularly inefficacious when they include course requirements or when they limit the beneficiary's campus choice.

There have been no states that have implemented an x-percent program without first dropping their affirmative action policies. Thus, these x-percent programs appear to be devised, implicitly or explicitly, to ameliorate the adverse effects of the elimination of race-based preferences. Politically, these programs are salient. By implementing the policy, politicians and legislators can appear to be sympathetic to concerns for equitable minority access. However, this paper finds that it is not currently possible for these programs to substantially affect the distribution of admitted students.

These policies could have other merits. For example, these policies could encourage students in poor high schools to succeed and could increase the competition between high school students. However, early results show that lack of participation in the programs may be a problem. For example, even three years after the implementation of the top-ten percent program in Texas, 700 Texas high schools still do not send any students to the University of Texas at Austin and 74 high schools produced half of the entering class (Selingo, 2001). Similarly, in the first year of California's top-four percent plan, only 82 percent of the high schools in the state were participating (Arenson, 2000). If minority students are more likely to attend these non-participating schools, their access to the UC system will be further thwarted.

Some have advocated using class-based, rather than race-based, affirmative action. However, studies of these policies show that they would not affect the race/ethnicity composition of campuses to the desired degree. Cancian (1998) finds that substituting a class-based admissions program for traditional affirmative action would substantially lower the share of underrepresented minorities, as there are many non-minorities in these disadvantaged classes. Kane (1998) finds similar results. Further, instituting these programs could have adverse effects on the academic composition of the

[40] However, some of the minority students in the Talented 20 likely benefited from affirmative action admissions policies.

admitted students. Conrad and Sharpe (1996) find that using a class-based program in exchange for a race-based program at the University of California would lower the median SAT score of incoming classes.

Therefore, x-percent programs or alternative class-based admissions cannot succeed in maintaining the race / ethnicity compositions that can be obtained under traditional affirmative action. Simply put, these programs are blunt instruments. Given the persistent gaps in test scores and other measures of academic preparedness between underrepresented minorities and white and Asian-American students, affirmative action appears to be the only effective tool in maintaining minority enrollment in top-tier colleges.

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Table 1

NELS 1994 Follow-Up, Descritive Statistics (Unweighted)

		Total	Asian and White (non-Hispanic) Students	Under-represented Minority Students (URM)	Percentage URM
All Students		14,915	10,875	4,040	27%
Applied to a 4-Year College (Rank Known for Both Applications)		6,247	5,019	1,228	20%
With Data on Acceptance to "Best" 4-Year College		4,898	3,981	917	19%
With Data on Acceptance and All Independent Variables		4,351	3,569	782	18%
"Best" 4-Year College Application	Public College	4,029	3,152	877	22%
	Private College	2,218	1,867	351	16%
	Top-Quintile	2,073	1,801	272	13%
	2nd-Quintile	1,506	1,266	240	16%
	3rd-Quintile	1,199	947	252	21%
	4th-Quintile	889	654	235	26%
	5th-Quintile	580	351	229	39%
Acceptance Rates at "Best" 4-Year College	Overall	80%	81%	77%	
	Top-Quintile	72%	72%	70%	
	2nd-Quintile	83%	84%	78%	
	3rd-Quintile	83%	84%	76%	
	4th-Quintile	85%	87%	79%	
	5th-Quintile	85%	86%	83%	
Average Median Freshman SAT Score for "Best" Choice		1,023	1,034	977	
Average Median Freshman SAT Score for "Second-Best" Choice		974	986	922	
Percent Who Attended "Best" College Choice (of Those Who Applied to a 4-Year College)		41%	42%	35%	
Percent Who Attended "Best" College Choice (of Those Who Were Accepted By Their Best Choice)		53%	53%	50%	

For students with two reported applications, the "best" college choice is the one with the higher median freshman SAT score.
Colleges are sorted by median freshman SAT score and placed in quintiles based on aggregate enrollment.

Table 2

The University of Michigan's Selection Index for Undergraduate Admissions*

	Factor	Note	Minimum	Maximum
Academic Factors	Grade Point Average	20*GPA	0	80
	Test Score	See Below	0	12
	High School Quality		0	10
	High School Curriculum		-4	6
Other Factors	Michigan Resident		0	10
	Underrepresented Michigan County		0	6
	Underrepresented State		0	2
	Legacy (Parents, Stepparents)	Assign Only	0	4
	Legacy (Grandparents, Siblings, Spouses)	One	0	1
	Outstanding Essay		0	3
	Personal Achievement		0	5
	Leadership and Service		0	5
	Socioeconomic Disadvantage	↑	0	20
	Underrepresented Racial/Ethnic Minority Student	↑	0	20
	Underrepresented Racial/Ethnic Minority High School	Assign Only	0	20
	Men in Nursing	One	0	5
	Scholarship Athlete	↓	0	20
	Provost's Discretion	↓	0	20

	Test Score		
	ACT	SAT I	Points
Assign the Larger Point Value	1-19	400-920	0
	20-21	930-1000	6
	22-26	1010-1190	10
	27-30	1200-1350	11
	31-36	1360-1600	12

* This system was used for freshman applicants to the 2000-01 College of Literature, Science and the Arts.

Table 3

Determinants of Admission to Student's "Best" College

	Variable k	Coefficient (Robust Standard Error)		Mean Student	Percentage Change in the Probability of Acceptance with a Discrete Change in Variable k*
Student Characteristics	Asian-American	-0.12		0.05	-3%
		(0.11)			
	Hispanic	0.28	**	0.07	6%
		(0.14)			
	Black (non-Hispanic)	0.45	***	0.10	9%
		(0.13)			
	Native American	-0.04		0.01	-1%
		(0.30)			
	Grade Point Average (Core Courses)	0.67	***	2.73	12%
		(0.07)			
	SAT / ACT Index	0.0018	***	923	9%
		(0.0003)			
	Advanced Placement Course Taker	0.15	*	0.52	4%
		(0.08)			
	Female	-0.11		0.54	-3%
		(0.07)			
	High School Athlete	-0.08		0.65	-2%
		(0.08)			
	High School Student Government	0.26	***	0.25	6%
		(0.08)			
	Parent's Income is Greater than 75,000	0.13		0.23	3%
		(0.08)			
	Parent's Income is Less than 25,000	0.08		0.17	2%
		(0.09)			
	Parent Attended College	0.21	***	0.65	6%
		(0.08)			
	Parents Married When 8th Grade Student	0.17		0.75	5%
		(0.10)			
	Student from Midwest	-0.06		0.29	-1%
		(0.10)			
	Student from West	-0.25	**	0.16	-7%
		(0.11)			
	Student from South	-0.27	**	0.31	-8%
		(0.11)			
	Private High School	0.31	***	0.13	7%
		(0.10)			
	Suburban High School	0.04		0.44	1%
		(0.10)			
	Rural High School	0.20	*	0.27	5%
		(0.11)			
	Missing High School Location	0.19		0.06	4%
		(0.22)			
College Characteristics	College's Median SAT / ACT ("Rank")	-0.0059	***	1,011	-19%
		(0.0004)			
	Private College	0.15		0.32	4%
		(0.13)			
Student And College	In-state Student	0.37	***	0.73	11%
		(0.10)			
	In-state Student at a Private College	-0.19		0.15	-5%
		(0.16)			
	Constant	2.88	***	1.00	
		(0.44)			

Probit Regression, Weighted by f3f2pnwt.

Dependent variable equals one if accepted at "best" college.

Number of Observations = 4,341.

Pseudo R^2 = 0.209.

Significance: *** if Pr<=1%, ** if Pr<=5%, * if Pr<=10%.

* Discrete Change is One-Standard Deviation from the Mean for Continuous Variables and One Unit for Dummy Variables

Table 4

Heterogeneity in Affirmative Action by College Quality

		Quintile of College "Rank"				
	All Schools	Top	Second	Third	Fourth	Bottom
Coefficient on Underrepresented Minority	0.37	0.57	0.20	0.26	0.41	0.34
Robust Standard Error	0.10	0.22	0.18	0.18	0.24	0.22
Signifcance	***	**			*	
N	4,341	1,396	1,067	847	631	394
Psuedo R^2	0.209	0.251	0.250	0.222	0.300	0.182
% Change in Number of Underrepresented Minorities Accepted at Their Best Choice After Dropping Race-Based Preferences	-10.2%	-21.3%	-5.4%	-7.0%	-9.3%	-5.7%
Underrepresented Student's Initial Share of Students Accepted at Their Best Choice	16.4%	10.9%	12.0%	16.0%	20.7%	36.4%
Underrepresented Student's Share Without Affirmative Action	14.7%	8.5%	11.4%	14.9%	18.8%	34.3%

Probit Regression, Weighted by f3f2pnwt.

Dependent variable equals one if accepted at best college.

Significance: *** if Pr<=1%, ** if Pr<=5%, * if Pr<=10%.

Colleges "Rank" is defined as median freshman SAT score. Quintiles are based on aggregate enrollment.

Table 5

Heterogeneity in Affirmative Action by College Quality (Continued)

		Coefficient (Robust Standard Error)	
Summed Coefficients	URM	0.53	***
		(0.20)	
	URM * 2nd Quintile College	-0.14	
		(0.24)	
	URM * 3rd Quintile College	-0.23	
		(0.25)	
	URM * 4th Quintile College	-0.20	
		(0.27)	
	URM * 5th Quintile College	-0.17	
		(0.28)	
	URM at Top-Quintile College	0.53	***
		(0.20)	
	URM at 2nd-Quintile College	0.39	**
		(0.17)	
	URM at 3rd-Quintile College	0.31	*
		(0.17)	
	URM at 4th-Quintile College	0.33	
		(0.22)	
	URM at 5th-Quintile College	0.37	*
		(0.21)	
	URM	-1.20	
		(0.74)	
	URM * College Rank	0.00159	**
		(0.00075)	

Probit Regression, Weighted by f3f2pnwt.

Dependent variable equals one if accepted at best college.

Number of Observations = 4,351.

Pseudo R^2 = 0.217 and 0.210 for each respective regression.

Significance: *** if Pr<=1%, ** if Pr<=5%, * if Pr<=10%.

Colleges "Rank" is defined as median freshman SAT score.

Quintiles are based on aggregate enrollment.

Figure 1

Distribution of College Students Across Colleges of Varying Student Quality by Race

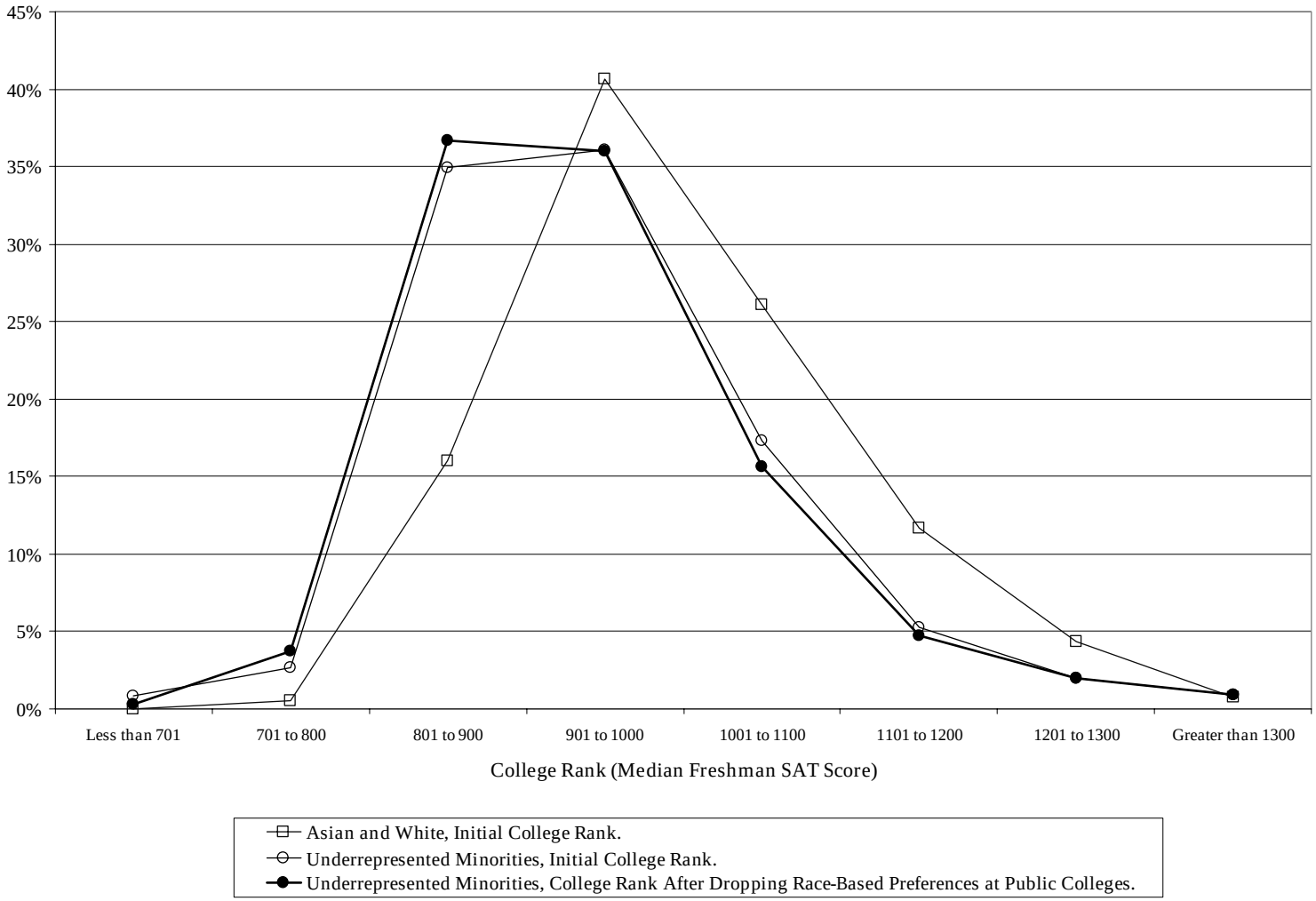

Table 6

Simulated Effect of the Affirmative Action System Used by the University of Michigan Applied to NELS Students

	Underrepresented Minority Share of Accepted Students		
Acceptance Threshold	Current System	Eliminating the Bonus Given to Underrepresented Minorities	Eliminating the Bonus Given to Under-represented Minorities and Students from Underrepresented Minority High Schools
Top 10% of NELS Students	19%	15%	11%
Top 20% of NELS Students	21%	17%	13%
Top 30% of NELS Students	23%	19%	16%
Top 40% of NELS Students	25%	21%	18%
Top 50% of NELS Students	26%	22%	19%
Top 60% of NELS Students	27%	23%	20%
Top 70% of NELS Students	27%	24%	22%
Top 80% of NELS Students	27%	24%	23%
Top 90% of NELS Students	27%	24%	24%

Table 7

Distribution of Students in the Top-10% of Their High School Class

	Percentage in the Top-10% of Their High School		Share of Total		
	All High School Graduates	Students who Applied to an In-state, Public, 4-year College	High School Graduates	Qualifiers Among High School Graduates	Qualifiers Among Students who Applied to an In-state, Public, 4-year College
Asian-American	19%	34%	4%	7%	10%
White (non-Hispanic)	11%	16%	72%	77%	72%
Hispanic	8%	19%	11%	9%	9%
Black (non-Hispanic)	5%	12%	12%	7%	9%
Underrepresented Minority	**7%**	**14%**	**24%**	**16%**	**18%**
Female	12%	19%	50%	60%	60%
Male	8%	15%	50%	40%	40%
Total	10%	17%	100%	100%	100%

American Indian and Race Missing Students Are Not Shown Due to Low Sample Sizes.

Table 8

Effect of Replacing Affirmative Action with a Top-10 Percent Program at Public Colleges

	Predicted Share of Those Accepted At Best Choice			
	Initial Policy	Excluding Race-Based Preferences at Public Colleges	New Policy: Excluding Race-Based Preferences at Public Colleges and Adding New Qualification	Ratio of New Policy to Initial Policy
Asian-American	4.6%	4.6%	4.7%	1.03
White (non-Hispanic)	77.9%	78.9%	78.6%	1.01
Hispanic	7.0%	6.6%	6.7%	0.96
Black (non-Hispanic)	9.7%	9.1%	9.2%	0.95
Underrepresented Minorities	**17.5%**	**16.5%**	**16.7%**	0.95
Female	54.6%	54.5%	54.7%	1.00
Male	45.4%	45.5%	45.3%	1.00
Urban	22.9%	22.7%	22.8%	0.99
Suburban	42.6%	42.8%	42.8%	1.00
Rural	26.5%	26.6%	26.4%	1.00
Region Missing	8.1%	8.0%	8.1%	1.00
Total	100%	100%	100%	1.00

American Indian and Race Missing Students Are Not Shown Due to Low Sample Sizes.