Industrial & Labor Relations Review

Volume 58, *Issue* 3 2005 *Article* 6

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Abstract

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KEYWORDS: affirmative action, minority applicants, college and university admissions, black students, Hispanic students, college application behavior

*The authors are grateful to Jesse Rothstein, Melissa Clark, Martin Kurzweil, and Stacy Dale Berg for valuable assistance, and to participants at the Berkeley Labor Lunch for comments. They also thank the Andrew Mellon Foundation for financial support and the College Board for making the data available.

WOULD THE ELIMINATION OF AFFIRMATIVE ACTION AFFECT HIGHLY QUALIFIED MINORITY APPLICANTS? EVIDENCE FROM CALIFORNIA AND TEXAS

DAVID CARD and ALAN B. KRUEGER*

Between 1996 and 1998 California and Texas eliminated the use of affirmative action in college and university admissions. At the states' elite public universities admission rates of black and Hispanic students subsequently fell by 30–50% and minority representation in the entering freshman classes declined. This study investigates whether the elimination of affirmative action changed minority students' college application behavior. A particular concern is that highly qualified minorities—who were not directly affected by the policy change—would be dissuaded from applying to elite public schools, either because of reduced campus diversity or because of uncertainty about their admission prospects. The authors use information from SAT takers in the two states to compare the fractions of minority students who sent their test scores to selective state institutions before and after the elimination of affirmative action. They find no change in the SAT-sending behavior of highly qualified black or Hispanic students.

Since the late 1960s many of the nation's elite colleges and universities have used affirmative action policies to boost the admission rates of black and Hispanic students.[1] Although the status of affirmative action at state-run institutions has always been controversial, the Supreme Court's 1978 *Bakke* decision created a legal foothold by permitting the use of race as one factor in the evaluation of applicants. In the 1990s, however, affirmative action came under renewed political and legal attack, and between 1996 and 1998 California and Texas halted the use of race-based admis-

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The SAT data used in this paper are used under a confidentiality agreement from the College Board. Copies of the computer programs used to generate the tables will be provided on request to the first author at Department of Economics, University of California, 549 Evans Hall #3880, Berkeley, CA 94720-3880; Card@econ.berkeley.edu.

[1]See Bowen and Bok (1998:1–14) for a brief history of affirmative action policies in college admissions. Kane (1998) summarized the extent of affirmative action at elite institutions in the mid-1990s. Throughout this paper, we use "minority" to refer to African-American and Hispanic students. These two groups, plus American Indians, are classified as "under-represented minorities" by the University of California and many other institutions.

Industrial and Labor Relations Review, Vol. 58, No. 3 (April 2005). © by Cornell University.
0019-7939/00/5803 $01.00

sion preferences. The effect on minority admissions at the top public universities in the two states was immediate. At UC Berkeley the fraction of black and Hispanic applicants who were offered admission fell from one-half to one-quarter. At Texas A&M the admission rates of black and Hispanic applicants fell from 90% to 70%. The declines in admission rates led to proportional declines in the fractions of entering minority freshmen at these campuses, triggering concern about the effects on campus diversity.[2]

A concern of many analysts was that the elimination of affirmative action would have an unintended effect on highly qualified minority applicants. To the extent that these students value racial and ethnic diversity, the drop in minority admission rates at the top public schools in California and Texas might lead them to apply elsewhere, intensifying the impact of the switch to race-blind admissions. Moreover, given uncertainty about admission prospects, the elimination of affirmative action could cause even highly qualified minority applicants to redirect their search toward less competitive public schools or private colleges where affirmative action remained in effect or where admissions standards were much lower.[3]

In this paper we use micro data for the population of SAT takers in California and Texas to track changes in the fraction of minority students who sent their scores to selective public colleges and universities following the elimination of affirmative action. Both California and Texas require the SAT test (or the alternative ACT test) for admission to public four-year colleges and universities.[4] Although the list of schools designated to receive a student's test scores is not exactly the same as the list that receive an application, an analysis of two different data sets shows a very high correlation between the number of students applying to an institution and the number sending their test scores there. In light of this, we use data on SAT takers to test whether the elimination of affirmative action in Texas and California led to any changes in the propensity of minority students to apply to the most selective public institutions. We also examine other outcomes, including the number of schools designated to receive scores and the lower quality bound of the schools on the list. Our analysis pertains to a period before the Supreme Court ruled in 2003 that, "narrowly tailored," race can be taken into account as one factor among many in admissions decisions in the *Gratz v. Bollinger* and *Grutter v. Bollinger* cases.

Affirmative Action and Admissions at Selective Public Institutions in California and Texas

The Situation before 1996

In the mid-1990s a relatively high fraction of minority students at the University of California (UC) were admitted "by exception"—that is, by a process that bypassed the standards for high school grade point averages and standardized test scores. For example, in 1996, 23% of black freshman enrollees and 11% of Hispanic enrollees were classified as admitted by exception, compared with approximately 2% of Asian and white enrollees (UC Office of the President 1998). Most of the exceptional

[2]For example, the minority share of entering freshmen at Berkeley fell from 22% in fall 1997 (the last cohort admitted with race preferences) to 12% in 1998, while at Texas A&M the minority share of entering freshmen fell from 20% in 1995 to 12% in 1997. Sources for these statistics are described in the next section.

[3]If some highly qualified minority students feel stigmatized by being identified as members of a less-qualified group, they may actually prefer institutions with race-blind admissions, leading to a rise in applications after the lifting of affirmative action. The evidence on such stigma effects is limited—see Turner and Pratkanis (1994).

[4]Only a small fraction of students in California and Texas take the ACT and not the SAT; see Clark (2003).

Table 1. Characteristics of Freshman Applicants, Admittees, Enrollees, and SAT Takers in 1995.

							Data from SAT Takers Who Sent Scores:				
	Percent	Admission Rates:		Yield Rates:		Enrollee		Average SAT:		GPA A– or Better:	
	Minority (1)	All (2)	Minorities (3)	All (4)	Minorities (5)	Pct. Minority (6)	Pct. Minority (7)	All (8)	Minorities (9)	All (10)	Minorities (11)
California											
UCLA	22.1	43.1	52.1	35.5	39.5	29.9	23.4	1105	954	57.6	40.1
San Diego	15.5	59.5	52.6	24.7	19.1	10.6	16.8	1126	979	57.6	41.5
Berkeley	19.2	39.9	53.6	39.0	35.8	23.6	18.8	1155	1003	64.8	47.6
Santa Barbara	18.8	81.7	75.1	23.1	22.5	16.8	17.5	1090	967	48.2	37.5
Davis	15.3	71.8	81.0	26.4	19.1	16.5	14.3	1109	987	56.8	44.1
Irvine	19.8	74.3	68.7	25.5	21.3	15.2	17.2	1080	955	51.3	39.4
Santa Cruz	21.7	85.1	86.1	19.2	18.4	21.0	17.9	1086	960	43.8	33.7
Riverside	24.7	79.5	77.6	20.9	24.9	28.7	23.1	1036	923	43.8	34.0
Texas											
UT Austin	19.7	94.1	97.8	47.6	41.7	19.5	26.2	1077	967	56.8	46.9
Texas A&M	15.1	74.2	89.0	57.1	51.0	19.6	20.7	1063	965	57.8	46.6
Texas Tech	18.5	100.0	100.0	45.8	38.2	14.6	19.9	1014	911	48.8	37.3
S.W. Texas	30.3	75.8	68.5	56.8	52.0	22.8	26.5	967	885	39.4	31.4
Univ. Houston	48.6	96.6	94.5	63.0	61.5	36.3	40.4	982	898	39.5	31.6
Univ. N. Texas	27.1	76.5	64.5	52.8	49.5	16.7	23.2	1007	899	44.9	16.7

Notes: See text for sources. Administrative data for California pertain to the Fall 1995 freshman cohort of California residents. Yield rate is fraction of students offered admission who matriculate.

Texas admission and yield rates are based on data by ethnicity for 1995 first time freshman reported in Sharp (1999).

Number of Texas applicants and ethnic distribution are based on data for Fall 1998 first-time Texas undergraduate applicants.

admittees were at the three most selective UC campuses: Berkeley, UCLA, and UC San Diego. Comparable data for the selective undergraduate institutions in Texas (Texas A&M University, University of Texas at Austin, Texas Tech University, Southwest Texas State University, University of Houston, and University of North Texas) are unavailable.[5] Nevertheless, a survey of admission policies in Sharp (1999, Chap. 2) suggests that the two most selective institutions, Texas A&M and UT Austin, operated significant affirmative action policies in 1995.

One indicator of the extent of affirmative action is the gap between admission rates of minority and non-minority applicants. Table 1 presents admission data for the eight UC campuses and the six selective Texas institutions in 1995, including the admission rates of all applicants and of minority applicants. We also show the characteristics of the "SAT-sending" pool for each institution—the set of students who sent their SAT scores to the campus for admission in fall 1994–96. Not all students who send their SAT scores actually apply to an institution, and some applicants take the ACT rather than the SAT. Nevertheless, as discussed below, we believe that the SAT-sending pool is a relatively good proxy for the actual application pool.

Consistent with the existence of significant affirmative action programs, black and Hispanic students were admitted at relatively high rates at the most selective California and Texas universities just prior to the elimination of affirmative action. Indeed, at UCLA, Berkeley, UT Austin, and Texas A&M, minority applicants had *higher* admission rates than other groups in 1995. This is particularly remarkable in light of the gap in qualifications between minority and non-minority SAT senders in the two states. For example, the difference in average SAT scores between minority SAT senders and the overall pool was about 150 points at the three most selective UC campuses, and approximately 100 points at the other UC campuses and the Texas schools. Similarly, there was a 15–20 percentage point gap in the fraction of students with at least an A-minus grade point average between the overall SAT-sending pool and the minority pool at the most selective UC campuses, and a 10-point gap at the other UC campuses and the Texas schools.

The high admission rates of minority applicants at UCLA, UC Berkeley, and Texas A&M, coupled with relatively high "yield rates" of minority admittees (that is, the matriculation rate of those offered admission), meant that the entering classes at these campuses had *even higher* minority representation than the applicant pools (compare column 6 to column 1 in Table 1). At most of the other selective institutions in the two states, the fraction of minority enrollees was slightly lower than the fraction of minority applicants, reflecting a combination of lower minority admission rates and lower minority enrollment rates conditional on admission. The force of affirmative action programs was therefore most visible at the elite public institutions of California and Texas. Kane's (1998) analysis suggests that the same was true nationwide: he concluded that the impact of affirmative action in the 1990s was confined to the most selective 20% of colleges and universities.

The Elimination of Affirmative Action in California and Texas

In California the elimination of race-based admission policies arose through a political process. The UC Board of Regents, acting with the support of the Governor, voted in 1995 to eliminate affirmative action in admissions starting in fall 1998 (see National Association for College Admission Counseling 2001). Before the

[5]We follow Sharp (1999) and Thomas (2002) in defining these six campuses as selective. University of Texas schools, including UT Austin, offer "provisional admission" to all high school graduates with the requisite number of high school courses. These students must earn a 2.0 GPA or better in summer classes to enter in the fall. Because of this policy, it is unclear whether UT Austin should be considered highly selective.

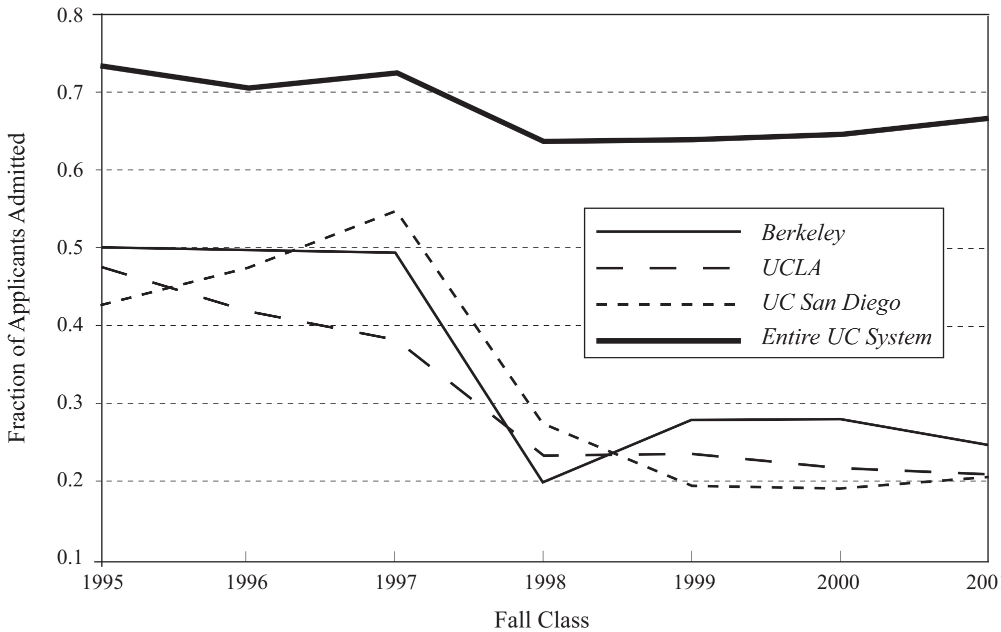

Figure 1a. Admission Rates of Black Freshman Applicants.

policy could take effect, however, an election was held on a statewide proposition (Proposition 209) outlawing affirmative action in public employment, education, and contracting. Proposition 209 was passed by voters in November 1996, but only became law after a year-long series of appeals. Affirmative action in UC admissions therefore ended as originally planned by the Regents with the fall 1998 cohort.

The elimination of affirmative action in Texas stemmed from a 1992 lawsuit filed by Cheryl Hopwood and others challenging the constitutionality of admissions at the University of Texas School of Law. Initially the federal district court ruled that the use of race-based admission preferences was legal. On appeal, however, the Fifth Circuit Court of Appeals reversed the lower court, declaring that the goal of a diverse student body is "not of sufficient compelling interest to support the use of race as a factor in admissions" (*Hopwood v. State of Texas,* 78 F.3d 932, 5th Circuit 1996). After the Supreme Court refused to hear the case, the Appeals Court ruling was interpreted by the state Attorney General as outlawing the use of racial preferences in college admissions. Although the final status of the *Hopwood* decision was only clarified in time to affect freshman cohorts entering after 1997, some schools, including Texas A&M, appear to have begun the process of dismantling affirmative action a year earlier (Sharp 1999:26), presumably in response to the Appeals Court's decision.

The halting of affirmative action had an immediate impact on minority admissions at the University of California. Figure 1a shows admission rates of black freshman applicants at Berkeley, UCLA, and UC San Diego, and in the UC system as a whole, before and after 1998, while Figure 1b reports the same data for Hispanic applicants.[6] Admission rates of black applicants

[6]These data are taken from University of California Office of the President (2003).

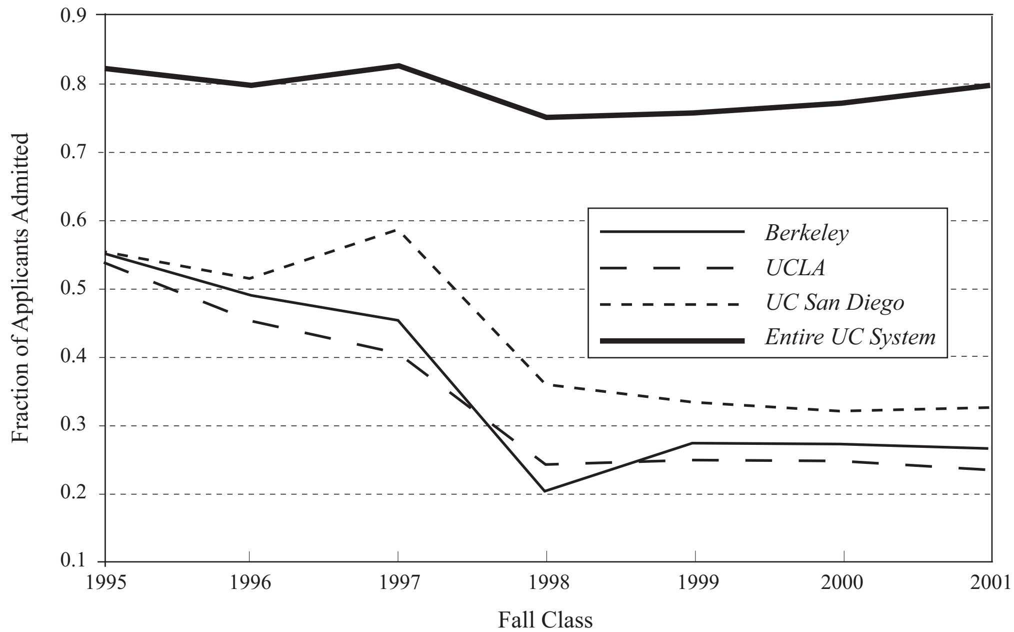

Figure 1b. Admission Rates of Hispanic Freshman Applicants.

at the three most selective campuses fell from 45–55% in the 1995–97 period to 20–25% in 1998–2001. Admission rates of Hispanic applicants show a similar decline, although there was a slight downward trend at UCLA and Berkeley even before 1998.[7] Despite the large drops at these campuses, system-wide admission rates fell by much less, reflecting the relative stability of minority admission rates at UC Riverside (the least selective UC campus) and UC Santa Cruz.[8]

[7]Although the data are not shown, admission rates for Asian and white applicants at the three campuses were trending smoothly over the 1995–2001 period.

[8]Most UC applicants apply to several campuses, including one of the less selective campuses. At UC Riverside, average admission rates of black applicants were 67% in 1995–97 and 68% in 1998–2001, while average admission rates of Hispanic applicants were 79% in 1995–97 and 80% in 1998–2001. At UC Santa Cruz, average admission rates for blacks were 78% in 1995–97 and 65% in 1998–2001, while for Hispanics the averages were 84% in 1995–97 and 77% in 1998–2001.

Evidence on the effects of ending affirmative action in Texas is clouded by several factors, including year-to-year variability in admission rates at the Texas schools, lack of consistent data (especially with respect to provisionally admitted students), and the implementation of a new policy in fall 1998 that guaranteed automatic admission to *any* Texas campus for high school students who graduated in the top 10% of their class. Nevertheless, as shown in Figures 2a and 2b, available data suggest that the admission rates of black and Hispanic freshman applicants at Texas A&M and UT Austin both declined relative to the rates for whites and Asians after 1996.[9] As noted, the

[9]The data in Figure 2 for 1995–97 are taken from Sharp (1999, Tables 1b and 2b) and refer to first-time Texas freshman applicants. The 1999–2001 data are taken from annual statistical summaries reported by the Texas Higher Education Coordinating Board (THECB, various years), and also refer to first-time Texas undergraduate applicants. The UT Austin admission rate data include provisional admits as admitted.

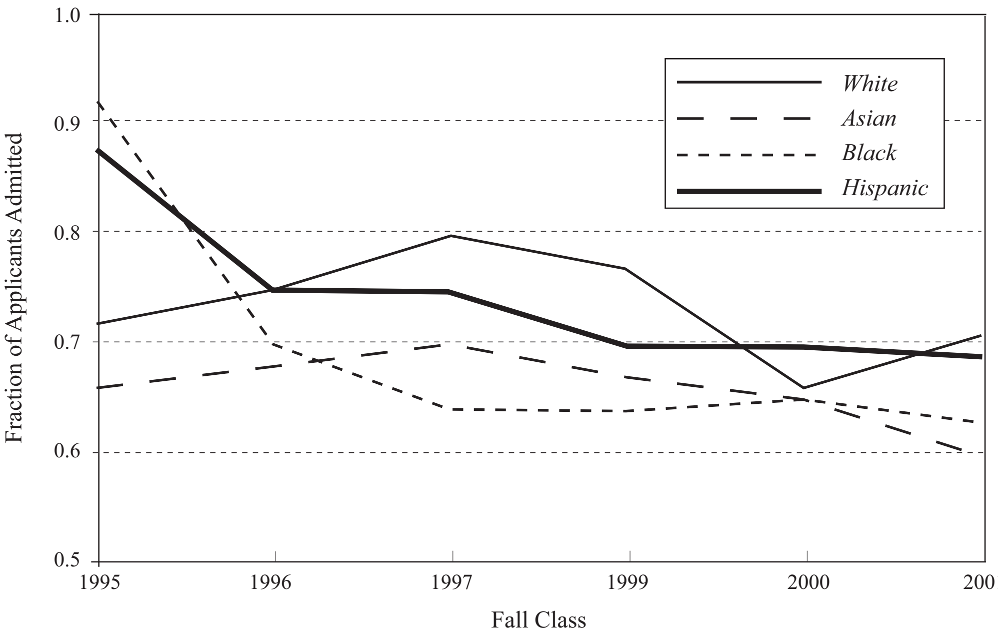

Figure 2a. Admission Rates of Freshman Applicants, Texas A&M University.

decline at Texas A&M began with the 1996 entering cohort and continued with 1997 cohort. Assuming that minority admission rates in 1995 provide a valid counterfactual for admissions in the absence of *Hopwood,* we estimate that the elimination of affirmative action at Texas A&M lowered Hispanic admission rates by 15 percentage points and black admission rates by 30 percentage points. At UT Austin a similar pattern is discernible, although the relative decline in minority admittance rates continued after 1997. In particular, black and Hispanic admission rates fell by 5–7 percentage points relative to admission rates of whites and Asians between 1995 and 1997, and by another 4–5 percentage points between 1997 and 2001.

Even holding constant applicant behavior, the effects of ending affirmative action on the makeup of the student body depend on the relative admission rate of minority students *and* on the relative fraction of admitted minority students who decide to enroll (that is, the relative yield rate). At the three most selective UC campuses the relative yield rate of minority students rose slightly between 1997 and 1998 (by about 10%), partially offsetting the 50–60% declines in minority admission rates.[10] Nevertheless, the short-run effect of ending affirmative action was a sharp decline in the ethnic diversity of entering freshmen. Between 1997 and 1998 the fraction of minorities in the freshman class fell from 22% to 12% at UC Berkeley; from 22% to 15% at UCLA; and from 13% to 10% at UC San Diego.

At Texas A&M, data reported by Sharp (1999, Table 1b) show a small (3%) relative decline in the yield rate of minority versus non-minority admittees between 1995 and

[10]The rise in enrollment rates of admitted minorities may have been due in part to the change in the composition of the admitted minority pool, and in part to efforts of the UC campuses to increase minority yield rates after the elimination of affirmative action.

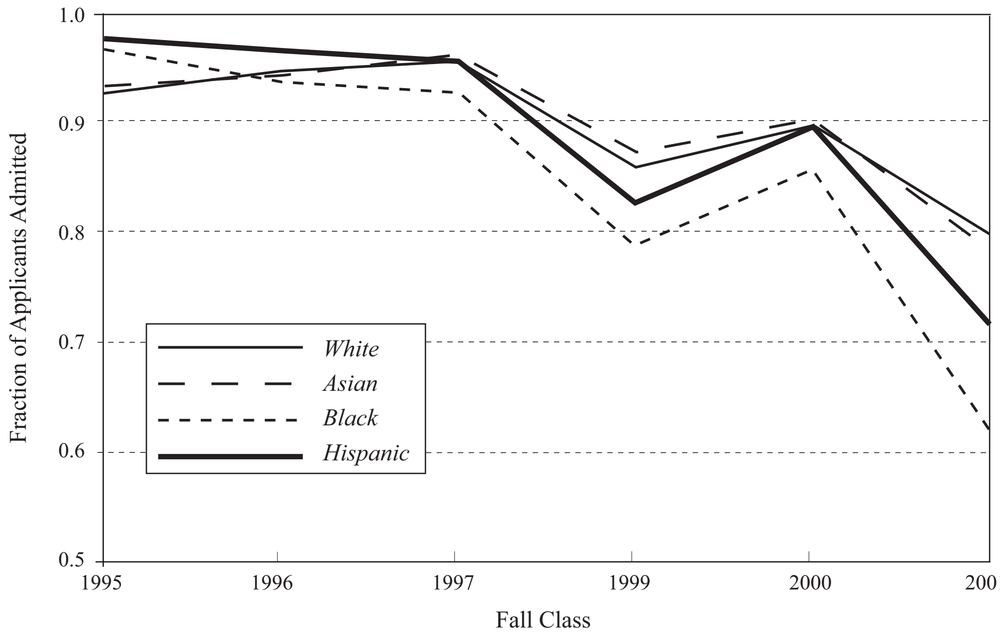

Figure 2b. Admission Rates of Freshman Applicants, UT Austin.

1997. Coupled with the roughly 20% decline in the admission rate of minority applicants and the 10% *rise* in the admission rate of non-minorities, these trends imply a 33% decline in the fraction of minorities among newly entering freshmen.[11] At UT Austin, data presented by Tienda et al. (2003) suggest that the minority yield rate was fairly stable before and after the *Hopwood* decision. Thus, the 6% decline in the relative admission rate of minority applicants between 1995 and 1997 would have been expected to lead to a comparable decline in the fraction of minority students among newly enrolling freshmen. According to data in Bucks (2003), however, the actual decline was larger—about 20%. We believe the discrepancy is attributable to inconsistencies in the UT Austin data, rather than to a rapid shift in the composition of applicant flows.[12]

The Effect of Affirmative Action Policies on Applicant Behavior

A Model of Application Behavior

Most existing studies of college choice (Kohn et al. 1976; Fuller et al. 1982; Brewer, Eide, and Ehrenberg 1999) have ignored the application process and focused on which college a student actually attends.[13]

[11]Data reported by Bucks (2003) based on different data sources show a 37% decline in the minority fraction of freshman enrollees between 1995 and 1997.

[12]As noted earlier, data on UT Austin applicants and admission rates vary from source to source.

[13]Long (2002) is an exception. Like us, Long studied the effect of ending affirmative action on minority students' decisions about where to send their SAT scores. However, his data set lacks the identities of the specific schools listed by each student. Instead, he has information on a selectivity ranking of the different institutions and whether they are public or private and 2- or 4-year institutions. Dale and Krueger (2002) did not explicitly model the decision of where to apply, but they used information on the set of schools applied to by a student as a control for unobserved ability.

Admission to elite public and private schools is uncertain, however, and applicants to these institutions must recognize that they may not be admitted to any given school. In Card and Krueger (2004) we outlined a very simple model of the application decision process, highlighting two channels for changes in affirmative action policies to influence minority application rates to selective public schools: through changes in the probability of admission and through changes in the utility of attending. Both channels work in the same direction for less qualified minorities. Assuming they are less likely to be admitted to selective state schools in the absence of affirmative action, and that they value a bigger minority presence on campus, less qualified minorities will be less likely to apply to selective public schools and more likely to apply to lower-ranked state schools and private or out-of-state public schools where affirmative action is unchanged.

The impact on the application decisions of highly qualified minority students is potentially in the same direction. To the extent that highly qualified minorities value a larger minority presence on campus, they will assign a lower utility to attending elite public schools in the post–affirmative action era, leading to a reduction in application flows. At the same time, they may raise their assessments of lower-ranked public schools in anticipation of a larger inflow of minority students after the end of affirmative action. Thus, like their less qualified peers, highly qualified minority students will be diverted from elite public schools to lower-ranked institutions. A caveat is that some highly qualified minority students may prefer a "non–affirmative action" campus environment, and put little or no weight on the relative number of minority students on campus. These preferences could lead to a rise in applications by some highly qualified minority students to the elite public colleges after the end of affirmative action.

Although the admission probabilities of highly qualified minorities were not directly affected by ending affirmative action, students have imperfect information on their actual admission prospects at any given school. Moreover, admission rates at elite schools are typically less than 100% even for students with high test scores and strong grades. This uncertainty blurs the distinction between highly qualified and less qualified minority applicants, and makes it more likely that even highly qualified minority students perceive some risk of a decline in their probability of admission at elite public schools, lowering the likelihood that they will apply to these schools.

Since our research design focuses on changes in the probability of applying to elite schools by minorities relative to non-minorities, it is also worth considering the effect of ending affirmative action on white and Asian students. Presumably, the elimination of racial preferences has a small positive effect on admission probabilities for non-minority applicants.[14] If non-minorities place little or no value on the fraction of minorities on campus, this would be expected to lead to a small increase in the likelihood of applying to the elite public schools after the end of affirmative action.

SAT Takers Data

We now turn to an analysis of the behavioral responses of minority applicants to the elimination of affirmative action in California and Texas. Our data are derived from the College Board's Test Takers Data Base, and include all SAT takers in California and Texas in the 1994–2001 admission cohorts. Since students can take the test multiple times, the College Board defines cohorts based on their high school completion dates. For example, the 1994 cohort includes students who would be expected to finish high school in spring 1994 and enter college the following September.[15]

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[14]If the total number of students admitted remains constant, then the effect on the admission rate of non-minorities is $pm/(1-pm)$ times as big as the effect on the admission rate of minorities, where pm is the fraction of minorities in the applicant pool. For the elite public schools in California and Texas this ratio was about 0.25.

[15]We do not know how many times a student has taken the test. The data set includes only the most

Over the 1994–2001 period the annual number of SAT takers rose steadily in California and Texas, reflecting a combination of rising numbers of high school graduates and increasing test participation.[16] Test takers report their ethnicity and other academic and family background information in the Student Descriptive Questionnaire component of the SAT. The ethnic categorization is a combination of race and Hispanic origin.[17] Both California and Texas have high fractions of minority test takers (6% black and 18% Hispanic in California; 10% black and 20% Hispanic in Texas). California also has a high fraction of Asian test takers (22%). A striking trend in both states is the rise in the fraction of test takers who decline to state their ethnicity.[18] In both states the increase seems to have started in 1996 (that is, around the time of the elimination of affirmative action) and was accompanied by a parallel decline in the fraction of white non-Hispanic test takers. Based on this pattern we infer that most non-identified test takers are white.

Mean SAT scores are slightly higher in California than in Texas, whereas high school GPAs are higher in Texas. For example, 44% of Texas test takers reported a GPA of A-minus or better in 1994, versus 36% in California. Over the 1990s high school grades rose in both states, with 50% of Texans and 43% of Californians reporting an average of A-minus or better by 2001. SAT takers also report their class rank, and unlike the GPA distributions the class rank distributions are similar in the two states and fairly stable over time. Roughly one-fifth of SAT takers in both states reported that they were in the top 10% of their class, and another fifth reported that they were in the second decile.

Table 2 presents comparisons by ethnicity of SAT takers' outcomes in the two states. To set the stage for our later analysis, the table shows means for each group from the periods before (1994–96) and after (1999–2001) the elimination of affirmative action. Several key patterns are evident in the table. First, as noted in Table 1, average SAT scores were lower for black and Hispanic students than for whites and Asians. Second, the ethnic differences in SAT outcomes did not greatly change after 1997. Third, although black and Hispanic students had lower GPAs than whites and were less likely to be in the top rank of their class, the disparity in classroom achievement was smaller than the disparity in test scores. For example, pre-1997, California blacks were only one-fifth as likely as whites to score 1150 or better on the SAT, but were one-third as likely to report at least an A average, and 38% as likely to report being in the top decile of their class. (Similar comparisons hold for Hispanics and for both groups in Texas.) The relatively smaller minority gaps in class performance than in test scores could reflect differences in average grading standards and peer groups in schools attended by minorities, or differences in minority test performance conditional on class performance (Steele and Aronson 1998), or both.[19]

recent test results and most recent background information. Most of the records are for students in their senior year (73.9%). Nearly all the remaining records (25.7%) are for students in their junior year. We restrict attention to the 85% of test takers who designated at least one school to receive their test scores. The excluded group are more likely to have taken the test in their junior year, more likely to have lower average scores and lower cumulative GPAs, and more likely to be black or Hispanic.

[16]See Card and Krueger (2004), Appendix Table 1. Over the 1990s the number of graduates of public high schools was rising at a rate of 2.4% per year in California and 1.7% per year in Texas, compared with growth rates of 2.8% and 3.7%, respectively, in the number of SAT takers in our data set.

[17]The specific categories are (1) American Indian or Alaskan Native; (2) Asian, Asian American, or Pacific Islander; (3) Black or African-American; (4) Mexican or Mexican-American; (5) Puerto Rican; (6) Latin American, South or Central American, or other Hispanic or Latino; (7) White; and (8) Other.

[18]The fraction of non-reporters in California rose from 5% in 1996 to 13% in 2001, and in Texas from 3% in 1996 to 10% in 2001.

[19]Rothstein (2004) estimated models that relate college grades (for UC students who entered in Fall 1993) to high school grades and SAT scores. He concluded that the SAT captures differences across

Table 2. Characteristics of SAT Takers before and after the Elimination of Affirmative Action.

		SAT Outcomes:						SAT Scores Sent to:			
	Number Observations	*Mean*	*< 1150*	*1150–1299*	*> 1300*	*Cumulative GPA A or A+*	*Ranked in Top Decile*	*Mean No. Schools*	*Selective Publics*	*Most Selective Publics*	*In-State Privates*
California											
Black Non-Hispanic											
1994–1996	22,646	862	92.5	6.0	1.5	7.4	9.0	5.6	50.8	41.8	30.9
1999–2001	22,600	877	90.7	7.2	2.1	9.8	11.5	5.8	51.6	41.8	31.8
Hispanic											
1994–1996	61,093	902	89.1	8.5	2.4	12.9	13.8	5.3	63.5	49.5	36.1
1999–2001	69,694	907	88.7	8.6	2.7	15.6	16.3	5.4	63.8	49.7	33.6
White Non-Hispanic											
1994–1996	134,796	1081	63.6	23.9	12.5	22.9	24.0	5.7	60.5	42.7	28.4
1999–2001	139,154	1103	58.8	25.9	15.3	26.8	29.4	5.8	63.5	46.8	31.1
Asian											
1994–1996	73,103	1039	68.0	18.4	13.5	27.7	24.7	6.5	82.0	70.8	42.3
1999–2001	82,383	1060	64.0	19.8	16.2	28.9	27.5	6.5	83.5	71.3	39.0
Texas											
Black Non-Hispanic											
1994–1996	23,266	860	94.2	4.8	1.0	12.0	11.8	5.0	59.1	35.7	26.2
1999–2001	29,028	859	93.6	5.2	1.2	14.5	12.8	5.1	64.2	36.5	24.7
Hispanic											
1994–1996	46,170	922	89.3	8.3	2.4	20.6	17.6	4.9	68.8	51.6	31.3
1999–2001	57,652	911	89.6	8.0	2.4	23.1	19.1	4.8	66.1	49.0	25.8
White Non-Hispanic											
1994–1996	133,864	1055	69.6	20.8	9.6	31.3	24.7	4.9	79.3	61.9	31.1
1999–2001	144,664	1063	67.8	21.6	10.6	35.5	26.9	4.8	78.1	61.1	28.8
Asian											
1994–1996	13,101	1074	62.5	20.4	17.1	39.0	32.9	6.0	85.6	75.7	53.9
1999–2001	15,485	1087	60.4	21.0	18.6	39.6	36.0	5.7	87.1	76.4	46.7

Notes: Samples include SAT takers who selected at least one college to receive their scores. Year refers to college entry cohort, which may differ from the test year. SAT scores are recentered. GPA and class rank are based on student self-reports. Schools included as selective publics, most selective publics, and in-state privates are described in the text.

Before taking the SAT, students designate a list of institutions to receive their test scores. Test takers can specify up to four schools to receive their scores without charge, and four more for an additional fee (currently, $6.50 per school). After the test is completed, they can add additional schools to the list for the same incremental fee. Our data set includes the identities of up to 20 institutions that each SAT taker designated to receive his or her test scores. (Only 1% of test takers designate more than 14 schools.) We summarize information on the characteristics of the list of schools in the four right-hand columns of Table 2.

On average, SAT takers sent their scores to 5–6 institutions, with a tendency for Asian students to send their scores to more schools and Hispanics to send their scores to fewer. We classify a student as sending scores to a selective public institution if he or she sent scores to one of the schools listed in Table 1, and to a more selective public school if the list included UCLA, Berkeley, or UC San Diego (for California students) or Texas A&M or UT Austin (for Texas students). For comparison purposes, we also present probabilities of sending scores to one or more of the major in-state private institutions: University of Southern California, Stanford, University of San Diego, and the Claremont Colleges in California; Baylor, Rice, and Trinity University in Texas.

There are notable differences across ethnic groups in the probabilities of sending scores to different types of institutions. For example, in both California and Texas, black students were less likely than whites to send scores to selective public institutions. When the comparison is narrowed to the most selective schools, however, blacks in California were about as likely as whites to submit their scores, whereas blacks in Texas were much less likely. We believe some of these differences reflect the locations of the various campuses. Two of the three most selective University of California campuses (UCLA and Berkeley) are located in large urban areas, whereas many of the other UC campuses are not. UT Austin and Texas A&M are located in smaller cities with relatively low minority populations, while several of the other Texas schools are in urban environments. These considerations suggest that it is probably most useful to focus on *changes* in the relative propensity of different groups to send their scores to different institutions after the elimination of affirmative action, rather than on the levels at any particular time. Looking at the simple means in Table 2, there is little evidence of a systematic fall-off in interest of minority students in the elite or other selective public institutions in California or Texas.

Sending SAT Scores versus Applying

How closely do changes in the probability of sending SAT scores to different institutions reflect changes in application behavior? Ideally, it would be possible to answer this question using a sample of students who report both the schools to which they applied and the ones to which they sent their test scores. We are unaware of any such data. As an alternative, we obtained two different data sets that allow us to estimate the correlation between the number of students sending their SAT scores to an institution and the number who actually applied. The first consists of data by ethnic group and year for the eight UC campuses over the period from 1995 to 2001. We used the test taker data set to calculate the number of students in each of four ethnic groups (black, Hispanic, Asian, and white and other) who submitted their SAT scores to each campus in each year, and compared this to the corresponding number of freshman applicants.[20] Specifi-

schools that are correlated with minority share and parental income but are not reflected in high school grades. This is consistent with the peer group/grading standards interpretation of the larger gap in SAT scores than grades.

[20]Information on the number of applicants at each school was obtained from the document "Final summary of freshman applicants, admissions, and enrollments 1995–2002" available at http://www.ucop.edu/news/studstaff.html.

cally, we fit a series of regression models of the form

$$(1) \qquad \log(S_{jct}) = \delta_{jt} + \gamma_c + \lambda \log(A_{jct}) + \varepsilon_{jct},$$

where S_{jct} is the number of California students in ethnic group j who sent their SAT scores to campus c for admission in year t, A_{jct} is the number of first-time freshman applications from California residents in ethnic group j at campus c in year t, δ_{jt} represents an unrestricted dummy for each ethnic group in each year, γ_c represents a dummy for each campus, and ε_{jct} is a residual. Under reasonable assumptions, the coefficient λ in this equation provides an estimate of the degree of attenuation bias that would be expected when the fraction of students in a given ethnic group who send their SAT scores to a particular campus is used as a dependent variable in place of the fraction who actually apply to the campus.[21]

Our second data set consists of counts of the number of students in each of four ethnic groups with SAT scores in six different ranges (under 1000, 1000–1100, 1100–1200, 1200–1300, 1300–1400, and over 1400) who sent their SAT scores or applied to one of 19 public and private institutions for admission in fall 1995.[22] Using this data set we fit a set of models similar to equation (1), estimated over observations representing different combinations of ethnic group, SAT range, and school.

The estimation results are summarized in Table 3. Panel A shows the results from the UC sample: the first two columns show results based on applications to all eight UC campuses, while the third and fourth columns report results when the sample is restricted to the three most selective UC campuses (UCLA, Berkeley, and UC San Diego). The specifications in columns (1) and (3) include campus dummies and ethnicity-year effects. In these models the coefficient λ is precisely estimated with a value just under 1, suggesting that trends in the number of applicants to a particular campus are closely mirrored by trends in the number of students who send their SAT scores to that campus. The models in columns (2) and (4) expand the specification by adding a full set of "two-way" interactions between campus, ethnicity, and year dummies (that is, campus-by-ethnicity and campus-by-year dummies in addition to the ethnicity-by-year dummies). These specifications provide a very stringent test of the signal in observed SAT-sending rates as measures of underlying application behavior. When the model is fit to all eight campuses, the estimate of λ falls to 0.48

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[21]To see this, let N_{jt} represent the number of graduating high school seniors in ethnic group j in year t, let A_{jct} represent the number of these who apply to campus c, and let S_{jct} represent the number who send their SAT scores to campus c. Let $\pi_{jct} = A_{jct}/N_{jt}$ represent the application rate and $\mu_{jct} = S_{jct}/N_{jt}$ represent the SAT-sending rate. Suppose the model of interest is $\log \pi_{jct} = X_{jct}\beta + Z_{jct}\gamma + e_{jct}$, where Z_{jct} represents a set of basic controls (for example, dummies for year, ethnic group, and campus) and X_{jct} represents a set of covariates of primary interest (for example, year-ethnicity-campus interaction effects). Consider the linear projection

$$\log \mu_{jct} = \lambda \log \pi_{jct} + Z_{jct}\phi + u_{jct}.$$

If u_{jct} is orthogonal to X_{jct}, then a regression of SAT-sending rates on X and Z will yield an estimate of the effect of the X's that tends to $\lambda\beta$, rather than to β. (In the classical measurement error case, $\lambda = 1$ and there is no bias arising from the use of a noisy dependent variable.) This equation implies that

$$\log S_{jct} = \lambda \log A_{jct} + (1-\lambda) \log N_{jt} + Z_{jct}\phi + u_{jct}.$$

Notice that if Z includes unrestricted dummies for each ethnic group in each year, the number of graduates is absorbed by Z and the estimate of λ from this model can be used to infer the degree of attenuation bias when SAT sending rates are used in place of actual application rates.

[22]Data on the number of applicants by ethnicity and SAT range were made available to us by researchers at the Andrew Mellon Foundation. The institutions are Barnard College, Bowdoin College, Columbia University, Harvard University, Macalester College, Middlebury College, Oberlin College, Penn State University, Pomona College, Princeton University, Smith College, Swarthmore College, UCLA, University of Illinois (Urbana-Champaign), University of Pennsylvania, University of Virginia, Wellesley College, Williams College, and Yale. Across the 456 campus/ethnic group/SAT range cells in this sample the mean ratio of applicants to SAT takers is 0.79.

Table 3. Relationship between Number of Applicants and Number of SAT Takers Sending Scores to Different Campuses.

Panel A: Applications to 8 UC Campuses, by Ethnicity and Year (1995–2001)

	All 8 UC Campuses		*3 Most Selective*	
	(1)	*(2)*	*(3)*	*(4)*
Log Number of Applicants	0.95 (0.03)	0.48 (0.05)	0.96 (0.06)	0.74 (0.13)
Campus & Year*Ethnicity Effects?	Yes	Yes	Yes	Yes
Campus*Ethnicity & Campus*Year Effects?	No	Yes	No	Yes
R-Squared	0.994	0.999	0.990	0.999
Number of Observations	224	224	84	84

Panel B: Applications to 19 Schools, by Ethnicity and SAT Range (1995)

	All Schools and SAT Ranges (1)	*4 Public Schools Only (2)*	*All Schools SAT > 1100 (3)*	*4 Public Schools SAT > 1100 (4)*
Log Number of Applicants	0.84 (0.03)	0.85 (0.06)	0.81 (0.03)	0.90 (0.08)
Campus*Ethnicity & Ethnicity*SAT-Range Effects?	Yes	Yes	Yes	Yes
R-Squared	0.981	0.991	0.991	0.997
Number of Observations	456	96	304	64

Notes: Standard errors in parentheses. Entries in Panel A are estimation results from regressions of the log of the number of SAT takers who sent their scores to a particular campus (by ethnicity and year) on the log of the number of applications received by the campus and the other dummies indicated. Sample includes data for 4 ethnicity groups for 7 years (1995–2001). Entries in Panel B are estimation results from similar regressions estimated for 19 schools, 4 ethnicity groups, and 6 SAT ranges. SAT ranges are under 1000, 1000–1100, 1100–1200, 1200–1300, 1300–1400, and 1400 or more.

(but remains highly statistically significant), whereas in the model for the three most selective campuses the estimate drops less, to 0.74.

Panel B shows the results from the 1995 applicant sample. The advantage of this sample is that it allows us to compare numbers of SAT senders and applicants in relatively narrow SAT ranges. In particular, we can restrict attention to relatively high-scoring SAT takers and applicants. A potential disadvantage is that most of the schools in the sample are private institutions. Indeed, 10 are relatively small liberal arts colleges. To address this concern, we report specifications in columns (2) and (4) that are restricted to the four state universities in the sample (Penn State, UCLA, University of Illinois, and University of Virginia). Like the results for the UC campuses, the estimates of the coefficient λ in Panel B are relatively precise, with values ranging from 0.81 to 0.90. These estimates suggest that SAT-sending rates provide relatively good information on actual application behavior, particularly for relatively high-scoring SAT takers applying to large public universities.

Changes in Minority SAT-Sending

We now turn to an analysis of the effects of ending affirmative action on the propensity of minority students to send their SAT scores to the selective public colleges and universities in California and Texas. The

Table 4. Changes in the Relative Probability That Minority Students Send SAT Scores to Selective and Most Selective State Universities, by Student Characteristics.

Year	To Selective State Universities: All (1)	SAT > 1150 (2)	A/A+ GPA (3)	To Most Selective State Universities: All (4)	SAT > 1150 (5)	A/A+ GPA (6)
Part A: California SAT Takers						
1995	0.011	0.019	0.021	0.010	0.025	0.023
	(0.005)	(0.011)	(0.010)	(0.005)	(0.012)	(0.012)
1996	0.002	0.030	0.027	–0.001	0.036	0.030
	(0.004)	(0.010)	(0.010)	(0.004)	(0.012)	(0.011)
1997	–0.006	0.030	0.028	–0.006	0.030	0.037
	(0.004)	(0.010)	(0.009)	(0.004)	(0.012)	(0.011)
1998	–0.009	0.005	0.025	–0.010	0.004	0.029
	(0.004)	(0.010)	(0.009)	(0.004)	(0.012)	(0.011)
1999	–0.013	0.022	0.032	–0.018	0.022	0.026
	(0.004)	(0.010)	(0.009)	(0.005)	(0.012)	(0.011)
2000	–0.004	0.027	0.033	–0.010	0.034	0.039
	(0.004)	(0.010)	(0.009)	(0.005)	(0.012)	(0.011)
2001	–0.001	0.027	0.036	–0.008	0.034	0.045
	(0.005)	(0.010)	(0.009)	(0.005)	(0.012)	(0.011)
Average (1999–2001) – Average (1994–1996)						
Estimate	–0.010	0.009	0.018	–0.015	0.010	0.019
(Std. Err.)	(0.003)	(0.008)	(0.007)	(0.003)	(0.009)	(0.008)

Continued

framework for our analysis is the difference-in-differences approach pioneered by Ashenfelter (1978).

We compare the fraction of minority students who send their SAT scores to a particular set of institutions before and after the elimination of affirmative action, relative to trends for comparable non-minority students.

Table 4 presents our main results. Each column of the table reports the estimated interaction effects between year dummies and minority status from a linear probability model for the event of sending SAT scores to at least one selective or most selective public college. The models are estimated separately by state and for each of the different subsamples indicated in the column headings. All the models include unrestricted dummies for ethnicity, year, range of SAT scores, range of GPA, class rank, and parental education. The minority-year effect interaction coefficients measure the changes in the probability of sending SAT scores to a particular class of institutions for minorities relative to non-minorities (that is, the differences-in-differences relative to the base year).

Looking first at the results for California in the upper panel of the table, results for all test takers in columns (1) and (4) show a small but statistically significant drop in the relative probability of sending scores to selective or most selective universities between 1997 and 1999. The peak relative impact is –1.3% (for the probability of applying to any selective school) and –1.8% (for the probability of applying to one of the most selective schools). Between 1999 and 2001, however, the trend is reversed, and the relative year effects for minorities in 2001 are both statistically insignificant, indicating no long-run change compared to the base year of 1994. Interestingly, when the sample is restricted to students with higher SAT scores or higher cumula-

Table 4. Continued.

	To Selective State Universities			To Most Selective State Universities		
	All	*SAT > 1150*	*A/A+ GPA*	*All*	*SAT > 1150*	*A/A+ GPA*
Year	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Part B: Texas SAT Takers						
1995	0.013	0.000	–0.008	0.014	–0.021	–0.005
	(0.005)	(0.013)	(0.010)	(0.006)	(0.015)	(0.012)
1996	0.009	–0.005	0.005	0.016	–0.020	0.012
	(0.005)	(0.012)	(0.010)	(0.005)	(0.014)	(0.011)
1997	0.011	0.003	0.001	0.003	–0.020	–0.014
	(0.005)	(0.012)	(0.010)	(0.005)	(0.014)	(0.011)
1998	0.016	–0.021	–0.004	0.006	–0.044	–0.020
	(0.005)	(0.012)	(0.009)	(0.005)	(0.014)	(0.011)
1999	0.018	–0.016	–0.012	0.007	–0.035	–0.013
	(0.005)	(0.012)	(0.010)	(0.005)	(0.014)	(0.011)
2000	0.019	0.006	0.003	0.005	–0.028	–0.004
	(0.005)	(0.012)	(0.009)	(0.005)	(0.014)	(0.011)
2001	0.024	0.003	–0.001	0.021	–0.021	–0.006
	(0.005)	(0.012)	(0.009)	(0.005)	(0.014)	(0.011)
Average (1999–2001) – Average (1994–1996)						
Estimate	0.013	0.000	–0.003	0.001	–0.014	–0.010
(Std. Err.)	(0.004)	(0.009)	(0.007)	(0.004)	(0.011)	(0.008)

Notes: Table shows estimates (and standard errors) of the interaction of year dummies with minority ethnicity in linear probability models for the event of sending SAT scores to selective state universities (columns 1–3) or most selective state universities (columns 4–6). All models also include year effects, ethnicity effects, and controls for parents' education, SAT range, cumulative GPA, rank in high school class, and grade when test is written.

tive GPAs, there is no evidence of a dip between 1997 and 1999. Thus, the 1997–99 drop is confined to relatively less-qualified SAT takers.[23] The table also shows the change in the average of the minority relative year effects from 1994–96 to 1999–2001. These are slightly negative for the overall samples but positive (and statistically significant) for the high SAT scorers and the high GPA subgroup.

The results for Texas are broadly similar. In the case of Texas, the only statistically significant relative year effects arise in the models for high-scoring SAT takers. Most notable are the effects in column (5) for SAT-sending rates to the most selective public universities by students scoring 1150 or higher on the SAT. Compared to 1995–97, the relative probability that minorities sent their scores to Texas A&M or UT Austin fell by 4.4% in 1998, then gradually recovered. Interestingly, there is no similar trend for students with an A or A+ GPA. Since one would expect parallel changes for the high SAT scorers and the high GPA population if there was a true behavioral reaction of highly qualified minorities to the elimination of affirmative action, we are reluctant to draw any strong conclusions from the drop among the high scorers. In any case, by 2001 the relative probability of sending SAT scores to the most selective Texas institutions was back to the 1995 level. Absent changes in admissions rules, the observed changes in application

[23]If we fit the model to SAT takers with scores under 1000, the peak relative impact is –2.1% in 1999 (standard error 0.7%). By 2001 the relative effect for lower-scoring minorities is very close to 0.

rates would have had only a trivial effect on the composition of students at elite schools.

We have fit models similar to those in Table 4 with separate relative year effects for black and Hispanic test takers (see Card and Krueger 2004, Table 5). Since the number of highly qualified black applicants is small, the black relative year effects are somewhat variable from year to year. Overall, there is no evidence of a downward trend in the probability that highly qualified black or Hispanic students sent their scores to selective or most selective public universities after the elimination of affirmative action. In fact, the only statistically significant relative change is for high-GPA Hispanics in California, who were *more* likely to send their scores to the UC campuses as a whole, and to the most selective UC campuses in particular, after 1998.

We have also analyzed changes in the relative probability that highly qualified minority students sent their SAT scores to less selective public institutions only (that is, to the UC campuses other than Berkeley, Los Angeles, and San Diego, and the Texas schools other than A&M and Austin). If the elimination of affirmative action causes highly qualified minorities to lower their sights from most selective to less-selective public colleges, one might expect to see a rise in such behavior. In California, using samples of students with SAT scores above 1150, or with at least an "A" average, we find virtually no change in this outcome after 1998. In Texas there is a slight increase in the relative probability that high-SAT minorities sent their scores only to one of the less selective public colleges after 1997 (the change from 1994–96 to 1999–2001 is 1.4% with a standard error of 0.8%), but as in the models in Table 4, this effect appears to be temporary. A comparison of 2001 to the 1994–96 average shows no significant change. Also, as in Table 4, the results for high-GPA minorities in Texas are less striking, and show little relative change after 1997 (the change from 1994–96 to 1999–2001 is 0.7% with a standard error of 0.8%).

Finally, we examined a variety of other characteristics of the list of schools that each student designated to receive his or her test scores, including the number of schools in the list, the minimum quality of the institutions in the list (judged by the average SAT of all students who sent their scores to each school in the list), and the minority preference of the applicant (measured by the maximum share of minority SAT senders at each of the schools on the list). We used national samples of all SAT takers in 1994–96 to assign these characteristics to each school, and then calculated the relevant statistics over the set of schools in each student's list. Results for these outcomes are presented in Card and Krueger (2004, Table 6).

In brief, we draw three main conclusions. First, there is no relative trend in the number of applications sent by minorities relative to non-minorities after the end of affirmative action. Second, there are no statistically significant changes in the minimum average quality of the list of SAT-receiving schools specified by minorities relative to non-minorities in the post–affirmative action period. In particular, highly qualified minorities did not seem to be adding lower-quality "safety schools" to the list of institutions receiving their test scores in the post–affirmative action era. Our strongest results pertain to the maximum minority share. The data show a slight shift of high-achievement minority students *away* from high-minority schools, contrary to what might have been expected. Taken as a whole, we believe our analysis of the SAT takers data base suggests that the elimination of affirmative action had little or no effect on the application behavior of highly qualified minority students in California or Texas.

Summary

The case for preserving or eliminating affirmative action depends on many factors. One issue is whether the elimination of racial preferences in college admission would indirectly harm the educational outcomes of highly qualified minorities by diverting the most able black and Hispanic students away from elite colleges and universities. In this paper we have used the recent experiences in California and Texas to analyze the effects of ending affirmative action on the critical first step of the college choice process—the decision of where to apply. We used a simple difference-in-differences research design to measure relative changes in the probability that minority SAT takers sent their test results to selective public institutions after affirmative action was ended in the two states. Changes in the number of students who send SAT scores to a given institution are very highly correlated with changes in the number who actually apply, and we have little reason to doubt that changes in the probability of sending SAT scores to selective public colleges accurately reflect changes in the probability of applying to these colleges.

Our main finding is that the elimination of race-based admissions preferences in California and Texas had little or no effect on the decisions of highly qualified minorities to submit their SAT scores (and presumably apply) to the selective institutions in the two states. This is true whether we use SAT scores or high school grades to define highly qualified candidates. It is also true whether we focus on minority students generally or treat black and Hispanic students separately. Moreover, the end of affirmative action had no appreciable impact on other characteristics of the list of schools designated by minority test takers to receive their scores, including the minimum quality of the schools in the list.

Our findings suggest that the application decisions of highly qualified minority students are not very sensitive to changes in the racial and ethnic composition of the student bodies at selective public colleges and universities caused by ending affirmative action. The data do not allow us to tell whether this is because minority students are relatively unconcerned about the broad demographic characteristics of their potential peer group, or because any such concerns are outweighed by the perceived advantages of attending more selective institutions. At a minimum, however, fear that ending affirmative action would cause a diversion of highly qualified minority students away from the elite colleges and universities appears to be unfounded.

Our results further suggest that minority applicants were not "seduced" to apply to elite schools because of affirmative action when race-based affirmative action polices were permitted in California and Texas. Instead, the fact that their SAT-sending behavior did not change after the elimination of affirmative action suggests that minority applicants thought they deserved consideration for admission at top schools irrespective of affirmative action. In this respect, affirmative action did not have a scarring effect on minority students.

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