Minority Enrollments at Public Universities of Diverse Selectivity Levels Under Different Admission Regimes: The Case of Texas

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1. Introduction

The 1990s were times of turmoil for higher education in Texas. Although the use of race as a “plus” factor in admission decisions so as to create a diverse student body had been upheld in the 1978 Bakke ruling, the Hopwood decision effectively ended in 1996 the consideration of race as a plus factor in Texas and the other states that fall within the Fifth Circuit (Horn & Flores, 2003). Hopwood severely affected the number of minorities enrolling at the most selective Texas campuses, University of Texas-Austin and Texas A&M, and to reverse this negative impact the Texas legislature passed in 1997 the House Bill 588. HB 588, known as the “top 10% plan,” guarantees automatic admission to any public institution of their choice to all seniors graduating in the top decile of their class, which in a sense constitutes a “color-blind” affirmative action program (Fryer, Loury, & Yuret, forthcoming; Horn & Flores, 2003; Niu, Tienda, & Cortes, 2006; Tienda, Leicht, Sulliva, Maltese, & Lloyd, 2003).

Several researchers have studied the impact of the elimination of affirmative action and the implementation of the top 10% plan on minorities by focusing on application, admission and enrollment behaviors of students in Texas. These researchers have found that the probability of minority students applying to, being admitted to, and enrolling at, Texas public flagship universities decreased considerably after Hopwood (Chapa & Lazaro, 1998; Finnell, 1998; Kain, O'Brien, & Jargowsky, 2005; Long, forthcoming; Texas Higher Education Coordinating Board, 1998; Tienda et al., 2003). Moreover, the top 10% plan reduced significantly the percentage of
minority students taking college admission tests (Dickson, 2006) and also minority enrollments
at the public flagship universities (Kain et al., 2005; Long, forthcoming; Tienda et al., 2003).
Thus, the literature suggests that the ban on affirmative action reduced the number of minorities
at the Texas flagship campuses\textsuperscript{1} and that the top 10\% plan, although well-intentioned, has not
been able to restore the number of minorities to pre-Hopwood levels.

However, changes in admission policies are not the only source of variation in the
composition of public colleges’ freshman classes. Demographic forces also affect the number of
minority and majority students who constitute the potential pool of applicants and are particular
important in Texas, a state that is at the verge of becoming the second state in the country where
whites are no longer in numerical majority (Purdum, 2000). In fact, minority shares of Texas
high school graduates have been increasing since the year before Hopwood: 50 percent of high
school graduates in the 2001-02 academic year were white, a decrease of 7 percentage points
from the academic year 1991-92, and the number of Hispanic high school graduates increased by
20 percent between 1991-92 and 2001-02.\textsuperscript{2}

Nonetheless, the research on the impact of the elimination of affirmative action and the
implementation of the top 10\% plan in Texas has, for the most part, ignored these demographic
shifts in the state’s high school graduate population.\textsuperscript{3} Moreover, this literature has focused only
on the two flagship universities (UT-Austin and Texas A\&M) while ignoring how these policy

\textsuperscript{1} The decrease in minority enrollments at flagship universities as a result of the elimination of affirmative action is
not characteristic of Texas only. Although the evidence on the effect of affirmative action policies on SAT sending
behavior is debated (see Card & Krueger, 2005; Dickson, 2006; Long, 2004), studies using administrative data from
California and Washington State have arrived to the same conclusion: the elimination of affirmative action reduces
the percentage of minorities enrolled at the highly selective public colleges (Brown & Hirschman, 2006; Lomibao,
Barreto, & Pachon, 2004).

\textsuperscript{2} Authors’ calculations based on Texas Education Agency (various years).

\textsuperscript{3} See Dickson (2006), Kain et al. (2005), and Tienda et al. (2003) for examples of research that has looked at the
impact of these policy changes on enrollment rates without netting out the effect of demographic trends in the
population of high school graduates. In contrast, using data on applicants to UT-Austin and Texas A&M, Long
(forthcoming) took into account demographic changes in the high school graduating classes when estimating the
effect of these admission policy changes.
changes and demographic trends affected minority enrollments at universities of lower selectivity level. One of the expected effects of the elimination of affirmative action is to produce a shift of minority students who are now rejected by top-tier universities into lower-rank colleges (Long, 2004). This cascading effect needs to be studied, as well as whether the opposite shift, an effect we will call upgrading, occurred after the top 10% plan was introduced.

Given the changes in admission policies and the demographic trends observed in the state of Texas, this study seeks to answer the following research questions:

1. How have minority enrollment probabilities at Texas public universities of different selectivity levels changed with the elimination of affirmative action and the introduction of the top 10% plan? In particular, do we observe a cascading effect in response to Hopwood and an upward reallocation of minority students in response to HB588?

2. To what extent student behavior, measured by minority application and enrollment patterns, or admission decisions, measured by admission rates, contributed to the changes observed in minority enrollment probabilities during the different admission regimes?

3. What has been the impact of the demographic transition on how minority application, admission, and enrollment changed during the different admission regimes?

This study is a first in a series of papers that use administrative data from one Texas flagship university, one selective public university, and one less selective public university to

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4 Long (2004), using data on SAT takers who reside in Texas, simulated what would be the effect of the elimination of affirmative action on the number of SAT scores reports sent to public universities of different selectivity levels. His model predicted a decline in the number of SAT score reports sent by underrepresented minorities to top, 2nd and 3rd quintile public universities, but his data did not allow him to estimate what happened with admissions and enrollments.
investigate minority enrollment probabilities during different admission regimes. Its goal is to provide an overall description of what happened to minority enrollments at three public universities of different selectivity levels when admission regimes were changing and the demographic composition of the high school graduating class was shifting too. It is organized as follows. In section 2 we describe the data and our empirical strategy, while in section 3 we describe overall state-level trends in minority college enrollment during the period in which Texas was changing admission policies. In section 4 we analyze how minority enrollment probabilities at three universities of different selectivity levels changed with the different admission regimes, analyze how the different components of this enrollment probability behaved during these transitional times, and provide preliminary evidence of the cascading and upgrading effects. In section 5 we decompose the change in transition rates from high school to college to understand the relative importance that application, admission, and enrollment have on the changes we observe in enrollment probabilities. Lastly, section 6 relates the changes observed in minority applications, admissions and enrollments to the demographic transition experienced by the high school graduating classes to analyze whether demographic shifts smooth out or deepens the consequences of the changes in admission policies. We conclude the study in section 7 with a summary of results and some implications for policy.

2. Data and Empirical Methodology

Data

The state of Texas provides a unique policy experiment to analyze the impact of changes in admission policies on a variety of educational outcomes, since it has experienced in the last
decade three particular admission regimes: affirmative action, merit-based admissions, and top 10% plan (Dickson, 2006). The affirmative action regime goes until the spring of 1997, and covers the period before *Hopwood* when public and private colleges used race as a plus factor when considering admissions. The merit-based admission period extends from the fall of 1997 to the spring of 1998. During this period, colleges in Texas could not use race as a plus factor and did not have to automatically admit students in the top 10% of their class. The top 10% plan became effective in the fall of 1998, and public colleges must admit students graduating in the top 10% of their class but cannot use race as a plus factor.\(^5\)

This study takes advantage of these policy experiments and relies on administrative data from the Texas Higher Education Opportunity Project (THEOP) at Princeton University. We use administrative data from three public universities: Texas A&M University (flagship), Texas Tech (selective), and TAMU-Kingsville (less selective).\(^6\) These universities were selected to cover the entire range of institutional selectivity of the public universities in Texas. In addition, the THEOP data collected from these institutions cover the three admission regimes. The THEOP dataset is extremely rich and contains information on applicants, admits and enrollees. From these administrative records, we are able to estimate the number of all applicants, admitted students, and first-year enrollees during the three admission periods for each of the universities and for each racial/ethnic group. In addition, the THEOP administrative files contain information on the individual characteristics of all applicants, such as SAT scores and high school rank.

Finally, this study also relies on data from the Texas Education Agency’s Public School Statistics, which are linked to the THEOP administrative dataset. From this source, we compute the number of high school graduates from each racial/ethnic group, and the percentage of the

\(^5\) After the 2003 Supreme Court ruling on *Grutter v. Bollinger* race can again be considered by admission officers. However, the use of race is limited to being part a full-file review and cannot be used in a mechanical way.

total of high school graduates that each racial/ethnic group represents to evaluate how the
demographic composition of high school graduates has changed during the different admission
regimes in Texas.

**Empirical methodology**

One could be inclined to compare minorities in each entering class for each of the three
Texas universities as a share of minority high school graduates to determine whether their
enrollment probabilities have declined, which seems to be a straightforward computation.
However, the probability of enrollment at a particular postsecondary institution depends on (i)
the proportion of high school graduates that apply; (ii) the proportion of applicants that are
admitted; and (iii) the proportion of admitted students that enroll (Brown & Hirschman, 2006;
Manski & Wise, 1983; Tienda et al., 2003). The first stage in this sequential process is taken by
students, who have to decide whether to apply to college and to which colleges. The second stage
is taken by the universities, who decide whether to admit the applicants. This stage is directly
affected by affirmative action and percentage-plan polices, because these policies can constrain
the proportion of minority students each university admits. The last stage in the enrollment
decision is again taken by students who must decide where to enroll—if they have been admitted
to at least one university.

Thus, the probability of enrollment at university \( j \) by race/ethnic group \( i \) at time \( t \) can then
be written as:

\[
\Pr(\text{Enr}_{ijt}) = \frac{\text{Enr}_{ijt}}{\text{HS}_{ijt-1}} = \left( \frac{\text{App}_{ijt}}{\text{HS}_{ijt-1}} \right) \times \left( \frac{\text{Adm}_{ijt}}{\text{App}_{ijt}} \right) \times \left( \frac{\text{Enr}_{ijt}}{\text{Adm}_{ijt}} \right)
\]

where \( \text{HS} \) is the number of high school graduates of race/ethnicity \( i \) at time \( t-1 \) and measures the
demographic composition of the potential applicant pool. \( \text{App} \) is the number of applicants of
race/ethnicity $i$ to university $j$ at time $t$, $Adm$ is the number of admitted applicants at university $j$ of race/ethnicity $i$ at time $t$, and $Enr$ is the number of admits of race/ethnicity $i$ who enroll in university $j$ at time $t$. The first factor represents the application rate, the second factor the admission rate, and the last factor the enrollment rate, for each racial/ethnic group, of university $j$ at time $t$. This approach allows decomposing the probability of enrollment into the different decision processes that feed into, and suggests that demographic trends can modify considerably the pool of potential applicants and, as a result, affect the composition of the student body that enrolls. For example, if there is a significant increase in the number of minority students among high school graduates and the college application rates remain the same, we should expect the number of minority applicants to grow. And if minority applicants are spread out in the ability distribution, we should also see the number of minority admits and enrollees go up *ceteris paribus*. However, a limitation of this approach is that it assumes that only Texas high school graduates apply to a Texas institution of higher education. Nevertheless, this assumption does not appear to be problematic since 90 percent of college students in Texas are residents of this state (National Center for Education Statistics, 2003).

Measuring the intervening steps in race/ethnicity $i$’s probability of enrollment at institution $j$ during time $t$, however, does not show the relative importance of each of the processes involved in that probability. A decomposition of differences in rates, which is essentially the total derivative of equation 1, can be used to estimate the relative impact of these three processes on the overall change in the probability of enrollment (Brown & Hirschman, 2006; Preston, Heuveline, & Guillot, 2001):

\[
\Delta_{t,t+1}[\Pr(Enr_{ij})] = \left\{ \Delta_{t,t+1}\left(\frac{App}{HS}\right) \times \left[ av_{t,t+1}\left(\frac{Adm}{App}\right)\right] \times \left[ av_{t,t+1}\left(\frac{Enr}{Adm}\right)\right] \right\}
\]
where $\Delta_{t,t+1}$ indicates the percentage point change in the application, admission, and enrollment rates from $t$ to $t+1$, and $av$ indicates the average application, admission, and enrollment rate, respectively, between $t$ and $t+1$. Although changes in admission policies directly modify the proportion of minority applicants that are admitted to a university, they can also indirectly affect the proportion of minority high school graduates that apply and the percentage of admitted candidates that enroll. For example, policies that eliminate or modify affirmative action programs can be seen by prospective students as a signal that minorities are no longer welcome in the campus, and can influence how high school counselors advise students, thereby reducing minority application and enrollment rates (Brown & Hirschman, 2006; Tienda et al., 2003).

Thus, this decomposition helps evaluate whether the elimination of affirmative action and the introduction of the top 10% plan also modified application and enrollment behaviors of different racial/ethnic groups.

3. From High School Graduation to College Enrollment: The Texas Context

This study seeks to describe what happened to the probability of minority enrollment at three public universities in Texas when admission regimes changed from affirmative action to merit and finally to the top 10% plan. However, as we already discussed, the composition of the graduating high school class can considerably modify the potential pool of college enrollees. In addition, we need to have a description of the overall enrollment trends in the state in order to
situate the changes we observed at our three universities. Thus, in this section we first analyze
the trends in the demographic composition of Texas high school graduates, then we discuss the
trends in the demographic composition of the enrollees at Texas public universities, and finally
we look at the overall probability of minority enrollment in the Texas public system of
postsecondary education.

There has been a considerable increase in the number of students graduating from Texas
high schools in the decade 1992-2002, as figure 1 shows, with the graduating class of 2001
(application year 2002) being 42% larger than the class of 1991 (application year 1992). This
important growth in the number of high school graduates could certainly create a “squeeze” in
college admissions, since we cannot expect colleges and universities to generate so many
additional spaces given budgetary, physical, and educational constraints. Evidently, figure 1 also
indicates that although the number of freshmen enrolled at Texas public colleges and universities
increased by 30% in these 10 years, it has not kept pace with the surge in college-age students in
the state. This demographic momentum and the squeeze it creates leads us to analyze below who
are the students that are being displaced from the most prestigious public four-year colleges, and
whether this displacement is associated with the students’ race/ethnicity.

FIGURE 1 ABOUT HERE

Texas has not only experienced an important increase in the size of the high school
graduating class, but also an important change in its demographic composition (table 1, panel A).
Hispanics and “others” (Asians, Native Americans and mixed races) are the groups with the
largest increase in the number of high school graduates and, as a result, by 2002 whites were no
longer the majority of high school graduates in the state of Texas. The demographic make-up of
the entering class at public institutions of higher education, however, does not reflect these
compositional changes in the potential pool of applicants. Among enrollees at Texas public universities, the share of blacks and Hispanics has remained relatively stable (table 1, panel B).

TABLE 1 ABOUT HERE

Relating high school graduates to first-year college enrollments leads us to computing the probability of enrollment, also known as the *transition rate* from high school to college, which is simply the share of Texas public high school graduates that enrolls at a Texas public college. In a sense, the transition rates allow adjusting for changes in the supply of students (Brown & Hirschman, 2006). Figure 2 shows that the highest transition rate belongs to “others” (who are mostly Asians), while the lowest rate belongs to Hispanics. The share of Hispanic and black high school students who attended a Texas public college started to decline even before the *Hopwood* decision, and this trend continued at least during the initial years of the top 10% policy. It is important to note, however, that the largest absolute and relative declines in transition rates for blacks and Hispanics occurred between 1996 and 1997, the year that affirmative action ended. In contrast, the share of “other” high school graduates enrolling at a Texas public colleges increased considerably during the transition years from *Hopwood* to the top 10% plan (more exactly, from 1995 to 1997).

FIGURE 2 ABOUT HERE

In sum, although the elimination of affirmative action in the state of Texas apparently did not induce a decline in the overall percentage of minority high school graduates enrolling in public colleges and universities—since it was declining before *Hopwood*—it deepened the reduction in this transition rate. Whites also experienced a decline in their transition rate concomitant to *Hopwood*, but their decline in relative terms was only minor (4 percentage points). Thus, while the declines were not limited to minority students, they were considerably
larger for these groups than for whites and were outside the ranges of the pre-
_Hopwood_ trend; therefore, these declines might be the consequence of the end of affirmative action. Moreover, the introduction of the top 10% plan did not necessarily help recover minority enrollment shares back to pre-
_Hopwood_ levels. Nonetheless, these state-wide trends could mask important variation in how the probability of enrollment at universities of different selectivity level changed with the ban of affirmative action and the introduction of the top 10% plan. Previous research showing similar effects to the ones we just described focused only at Texas selective colleges (Chapa & Lazaro, 1998; Finnell, 1998; Kain et al., 2005; Texas Higher Education Coordinating Board, 1998; Tienda et al., 2003). However, Brown and Hirschman (2006), using data from the state of Washington, found that minority enrollments differed considerably in their response to the elimination of affirmative action depending on the selectivity level of the university. To see whether this occurred in Texas, we analyze next data from three public universities that cover the entire range of selectivity.

4. Cascading and Upgrading? Admission Policies and Minority Enrollment Probabilities at Public Universities of Different Selectivity Levels

A particular concern that arises when affirmative action can no longer be practiced is whether minority students might feel discouraged from applying to, and enrolling at, selective institutions. Indeed, previous studies have found that the number of minority enrollments at Texas most selective colleges declined after _Hopwood_ (Chapa & Lazaro, 1998; Finnell, 1998; Kain et al., 2005; Texas Higher Education Coordinating Board, 1998; Tienda et al., 2003). However, these studies did not include less selective institutions and could not tell whether there
was a cascading (upgrading) effect; that is, whether minority students responded to the elimination of affirmative action (the introduction of the percentage plan policy) by shifting their application and enrollment patterns from selective to less selective universities where their chances of being admitted might not have been affected (from less selective to selective now that admissions are guaranteed).  

Our unique administrative dataset contains information on applications, admissions and enrollments from three Texas public universities of different selectivity levels: Texas A&M, Texas Tech and Texas A&M-Kingsville. Texas A&M is one of the two most selective public postsecondary institutions in the state of Texas. In 2002 it admitted 68.3% of its 17,281 applicants and enrolled close to 7,000 students in its freshman class, of which only 12.3% were traditionally underrepresented minorities (blacks and Hispanics). Texas Tech is located in the middle of the selectivity distribution. Of the 12,313 students that applied in 2002, it admitted 74.6% and had an enrollment yield of 48.1% that represents close to 4,400 students. Although it enrolls fewer students than Texas A&M, it has a similar share of minorities (13.2%). Lastly, TAMU-Kingsville is a non-selective institution that admits all applicants. It is much smaller than the other two universities, enrolling in its 2002 freshman class approximately 1,100 students—an enrollment yield of 48.6%. It can also be labeled as a Hispanic-serving institution, since Hispanics represented 70.6% of all first-year students in 2002. Since the three public

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7 Long (2004) looked at SAT-sending behavior of minority students (but not at actual applications) and his simulations suggest that this cascading effect in minority college applications is indeed plausible once race can no longer be used as a plus factor for admissions. However, Long’s study included only data on SAT-sending behavior, which could only signal application preferences, and thus could not tell whether cascading also occurred with enrollments.

8 These figures include in-state and out-of-states applicants, admits, and enrollees. The yield rate for Texas A&M in 2002 was 59%. These are authors’ calculations based on THEOP administrative data.

9 Throughout the remainder of the paper “minorities” will refer only to blacks and Hispanics, who are the groups traditionally underrepresented in higher education.

10 Of the 105,390 students available in the Texas Tech dataset, 421 did not report their race/ethnicity. Most of the non-reporting occurs after 1999. These are authors’ calculations based on THEOP administrative data.

11 In 2002, 2,363 individuals applied to TAMU-Kingsville and all of these applicants were admitted.
universities attract mostly in-state students and we wish to compare the racial composition of college enrollees with that of the Texas high school graduating class, we will limit our discussion only to Texas residents.

The probabilities of minority and non-minority enrollment under the different admission regimes at these three public universities are shown in figure 3. Enrollment probability is computed, as indicated by the left-hand-side term of equation 1, as the percentage of first-year in-state enrollments out of the total number of Texas high school graduates in the previous academic year. First, as panel A indicates, minority enrollments at Texas A&M as a share of minority high school graduates declined considerably with the Hopwood ruling, which took effect on March of 1996 and as a result affected admissions (and therefore enrollment probabilities) for the academic year 1996. Although the reductions in enrollment probabilities between 1995 and 1996 and between 1996 and 1997 are small in absolute terms, in the order of 0.2/0.3 percentage points for blacks and 0.3/0.4 percentage points for Hispanics, they represent a relative decline of over 20%. In contrast, non-minority enrollment probabilities at Texas A&M increased at the time of Hopwood by about 12% (although they declined in the year of merit-only admissions but by only 4%). The introduction of the top 10% clearly did not positively affect minority enrollment probabilities at Texas A&M, since they continued their declining trend and never recovered to pre-Hopwood levels. At Texas Tech (panel B) Hopwood is also negatively related to minority enrollment probabilities, which decreased by 16% (blacks) and 25% (Hispanics) when affirmative action ended. Non-minority enrollment probabilities also decreased

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12 Texas residents constituted in 2002 86% of Texas A&M’s, 92% of Texas Tech’s, and 97% of TAMU-Kingsville’s applicants. Texas residents represented more of 94% of all first-year enrollees at these three universities.

13 Throughout the remainder of the paper, “non-minorities” refer to whites and Asians. We include Asians because they are more likely to be overrepresented in higher education in general, and in very selective institutions in particular.
between 1996 and 1997, but only by 3%. However, and in contrast to what happened at Texas A&M, the introduction of the top 10% plan appears to have been instrumental in helping minority enrollment probabilities reach pre-Hopwood levels by 2000. Nevertheless, non-minority enrollments grew stronger with HB588 and therefore the gap between minority and non-minority enrollment probabilities at Texas Tech widened considerably. Lastly, panel C indicates that Hispanics’ enrollment probability at TAMU-Kingsville was declining considerably before 1996 and that it increased slightly once Hopwood took effect, significantly contrasting with what happened at the other two universities. However, after the top 10% plan was implemented, Hispanic enrollees at TAMU-Kingsville as a share of high school graduates reverted to its declining trend. In contrast, non-minority enrollment probabilities at TAMU-Kingsville suffered an important decline, in the order of 24%, with Hopwood while it increased by about 5% between 1997 and 1998 when the top 10% was introduced.

FIGURE 3 ABOUT HERE

Thus, our analysis of minority and non-minority enrollment probabilities constitutes preliminary evidence that a cascading effect may have occurred in Texas when affirmative action ended, with decreases in minority enrollment probabilities at the two selective institutions and slight increases at the non-selective one. The top 10% plan did not help recover minority enrollment probability at the most selective college, Texas A&M. Nonetheless, HB588 appears to be related to changes in minority enrollment probabilities but only at the lower section of the selectivity tier, generating a redistribution of minorities from the non-selective to the selective institutions—but not most selective—as our upgrading hypothesis predicts. But in order to understand whether the observed trends in minority enrollment probabilities are related to changes in admissions or to changes in student behavior (application and enrollment decisions),
we need to decompose the enrollment probability into the preliminary processes that are part of it. As described in the right-hand-side of equation 1, the enrollment probability at a particular university depends on the proportion of high school graduates that applies (the application rate), the proportion of applicants that are admitted (the admission rate), and the proportion of applicants that enroll (the enrollment rate or yield).

Applying to college is the first step in the process of enrolling in postsecondary education. The number of in-state applicants to our three universities increased between 1992 and 2002 in parallel to the surge in high school graduates. Of an applicant pool of 225,000 students in 2002, the highest in-state application rate belongs to the flagship university Texas A&M with an application rate of 6.5%. In-state application rates at the other two universities are lower: 5% of high school graduates applied to Texas Tech in 2002, and only 1% applied to TAMU-Kingsville. These overall application rates, however, mask important differences by race/ethnicity. Figure 4 suggests that minority in-state application rates are significantly below non-minority application rates at Texas A&M (panel A) and Texas Tech (panel B), while the opposite occurs at TAMU-Kingsville (panel C). Minority in-state application rates at Texas A&M were increasing at the beginning of our 10-year period, but declined considerably (by as much as 16%) in coincidence with the Hopwood ruling. They continued this decline once the top 10% plan was introduced, declining by as much as 25% between 1997 and 1998, and started to recover in 1999 but never reaching pre-Hopwood levels. Non-minority application rates continued their increasing trend up until the introduction of HB588, when they suffered an important decline (of about 14%, although not as considerable as that for minorities) and they

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14 These are authors’ calculations based on THEOP administrative data and Texas Education Agency (various years).
15 This can be explained by the geographic location of TAMU-Kingsville, which is a predominantly Hispanic residential area and located only 100 miles away from the US-Mexico border.
quickly recovered. At Texas Tech, minority in-state application rates decreased considerably between 1996 and 1997 with the end of affirmative action, and continued their decreasing trend during the first years of the top 10% plan. However, they reached pre-Hopwood levels by the year 2000. In contrast, non-minority application rates at Texas Tech increased by about 9% with Hopwood but declined considerably with the introduction of the top 10% plan. Lastly, Hispanic application rates at TAMU-Kingsville barely increased between 1996 and 1997, but suffered from an important decline with the introduction of the top 10% plan. Non-minority in-state application rates to TAMU-Kingsville, in contrast, decreased by as much as 15% with Hopwood but increased considerably with the top 10% plan. These trends in applications rates, therefore, are suggestive that the elimination of affirmative action discouraged minorities from applying to the most selective universities while encouraged them to apply to non-selective institutions, as the cascading effect predicts, although these trends do not appear to suggest that applications experienced upgrading when HB588 was enacted.

FIGURE 4 ABOUT HERE

Admission constitutes the only stage in the college enrollment process that depends solely on the postsecondary institution, although it can be conditioned by the qualifications of candidates, the absorptive capacity of the institution, and the expected enrollment yield (Brown & Hirschman, 2006). Moreover, it is the stage that is directly affected by affirmative action and percentage-plan policies, since these policies also impose a constraint in the number of minority applicants that can be admitted to a university—although we have seen that the changes in admission policies in Texas can also be related to changes in minority application rates. Overall, the number of in-state applicants admitted to Texas A&M, Texas Tech and TAMU-Kingsville

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16 The initial confusion generated by the top 10% plan might have caused the decline in application rates to Texas A&M and Texas Tech for students of all racial/ethnic backgrounds.
shows an increasing trend during our 10-year period of analysis. As the most selective university in our sample, Texas A&M has the lowest average admission rate and in 2002 it admitted 71% of its in-state applicants. Admission rates at Texas Tech are not much lower than at Texas A&M, admitting in 2002 75.4% of its in-state applicants. TAMU-Kingsville, as a less-selective institution, admits all of its applicants. Clearly suggesting that affirmative action was actively used at Texas A&M before the Hopwood ruling, in-state admission rates for minorities were considerably higher than for non-minorities (figure 5, panel A). In fact, in the year that preceded Hopwood over 90% of minority in-state applicants were admitted to Texas A&M. In contrast, affirmative action does not seem to have been used as extensively at Texas Tech (panel B), since at this university in-state admission rates for minorities were considerably below those for non-minorities when race was considered a plus factor in admission decisions. With the elimination of affirmative action, minority admission rates at Texas A&M declined by as much as 20% to levels below those for non-minorities and stayed below non-minority rates even after the introduction of the top 10% plan. Non-minority admission rates, in contrast, experienced an increase with Hopwood. At Texas Tech, minority admission rates declined considerably in concomitance with the Hopwood ruling, with blacks’ admission rates decreasing by 25% and Hispanics by 15% between 1996 and 1997. Non-minority admission rates also declined during the merit-only admission period, but their decrease in relative terms was considerably smaller. And while minority admission rates increased during the first years of the top 10% plan, they regressed to below pre-Hopwood levels by 2000 and by the end of our 10-year period the gap between minority and non-minority in-state admission rates widened. In sum, this analysis of

17 Although U.S. News and World Report (2003) classifies this university as “most selective,” it has mildly selective admission policies particularly regarding to in-state applicants.
18 These are authors’ calculations based on THEOP administrative data.
19 Admission rates for TAMU-Kingsville are not analyzed because they are always 100%.
admission rates suggests that the universities seemed to have responded to the elimination of affirmative action and the introduction of the top 10% plan as expected (by reducing admission rates for minorities during the merit-only period, and increasing them but only slightly with the percentage plan). In addition, it suggests that the negative effect of *Hopwood* on minority admissions was considerably stronger at the most selective institution in the sample, an institution that was actively practicing affirmative action.

**FIGURE 5 ABOUT HERE**

Lastly, enrolling at a postsecondary institution is the final stage of the college choice process. After being admitted students decide where to enroll, and changes in admission policies could affect enrollment preferences if minority students sense that even though they qualify for admissions the campus does not offer a welcoming environment to minorities. Texas A&M has the highest average enrollment yield and attracted 63.3% of the in-state admitted students in 2002, a reflection of the high demand that comes attached to its selectivity. Interestingly, the enrollment yield of Texas Tech in 2002 was similar to that of TAMU-Kingsville, attracting 48.9% of their in-state applicants. But the overall enrollment rate at Texas Tech showed little fluctuation during the 10 years for which we have data, while enrollment rates at TAMU-Kingsville decreased considerably throughout this period.\(^20\) As figure 6 shows, in-state enrollment yields behave differently from application and admission rates. For example, enrollment yields at Texas A&M (panel A) and Texas Tech (panel B) show an overall decreasing trend before the elimination of affirmative action. Moreover, increases and decreases in enrollment rates do not appear to be that closely related to changes in admission policies. Minority and non-minority enrollment rates at Texas A&M started to decline in 1993, three years before the *Hopwood* ruling, although the decline accelerated with *Hopwood* and this acceleration

\(^{20}\) The data presented in this paragraph are authors’ calculations based on THEOP administrative data.
was stronger among minorities. Both minority and non-minority enrollment yields at Texas A&M increased with the introduction of the top 10% plan, and after 1998 they continued on a parallel trend. At Texas Tech, blacks’ enrollment yield actually increased by 14% during the year of merit-based admissions while Hispanics’ yield decreased by only 1% and non-minorities by 6%. These enrollment rates climbed above pre-Hopwood levels during the first years of the top 10% plan. Lastly, in-state enrollment rates for minorities and non-minorities at TAMU-Kingsville show a declining trend, although Hispanics’ enrollment yield did not decrease when affirmative action ended and the top 10% plan was introduced (panel C). Thus, this analysis of enrollment yields indicate that there is some evidence of minority discouragement from enrolling at the most selective university once affirmative action is eliminated, and that cascading might have taken place given the slight increase in minority enrollment rates at TAMU-Kingsville. However, these effects appear to be much weaker at this stage of the enrollment process and suggest that changes in admission policies have a smaller impact on the universities’ ability to attract minority admitted students than on their ability to attract minority applicants and admit them.

FIGURE 6 ABOUT HERE

5. The Contributions of Applications, Admissions and Enrollments to Changes in the Probability of Enrollment

Our analysis so far has related the trends observed in minority enrollment probability and in its components (application, admission, and enrollment rates) to the changes in admission policies experienced by Texas public universities in the 1990s. However, these trends do not tell
anything about the relative importance of each of these processes. Understanding the relative contribution of each of the stages of the enrollment decision is important for policy purposes; if application and the enrollment yield are found to be more critical than admissions (the component affected by policy changes), then college administrators should focus their efforts in improving the recruitment of minorities or in programs that lead to increases in their yield. In addition, since the universities in our sample have at best mildly selective admission policies, we need to know how important are student decisions in determining the impact of changes in admission policies. Therefore, in this section we decompose the year-to-year changes in college enrollment as a share of high school graduates—that is, the change in the transition rate from high school to each of the universities in our sample—into its three preliminary stages, as explained in equation 2. Although we present information for all the years available in our dataset, we restrict most of our discussion to the years when admission policies were experiencing changes; 1995 to 1996 (both affirmative action years, although the Hopwood decision came in March of 1996), 1996 to 1997 (from affirmative action to merit-only admissions), 1997 to 1998 (from merit-only to the top 10% plan) and 1998 to 1999.

When Hopwood was decided in March 1996, Texas Attorney General ordered all universities in the state to immediately halt the use of race in admissions. By the time of the ruling, applications had been already received by Texas A&M but admission decisions had not been made. Thus, and as a consequence of the timing of the judicial decision, the impact of Hopwood on minority in-state enrollment probabilities at this flagship university came first from declines in admissions (between admission years 1995 and 1996) and then from reductions in minority applications (between years 1996 and 1997), as seen in panel A of figure 7. Changes in application and admission rates, in contrast, are less important for explaining the changes
observed in non-minority in-state transition rates during these years (panel B). As expected by its
design, the introduction of the top 10% plan affected mostly student behavior—given that
universities must automatically admit all applicants in the top decile of their high school class—and the changes observed in the share of both minority and non-minority high school graduates enrolled at this university can be mostly attributed to application and enrollment decisions.
However, once students became aware of the particularities of the top 10% plan, admissions
again took preeminence in explaining the observed changes in transition rates for both groups.

FIGURE 7 ABOUT HERE

At Texas Tech, in contrast, minority in-state transition rates did not experience a decline
until the merit-only period. This difference with Texas A&M could be explained by the timing of
the Hopwood ruling vis-à-vis Texas Tech’s timing of its admission decisions. When admission
officers could no longer use race as a plus factor in admissions, we see that admissions explain
the brunt of the decline in minority in-state transition rates at this university (figure 8, panel A).
In contrast, the decrease we observe in non-minority transition rates between 1996 and 1997 can
be associated with changes in student behavior (figure 8, panel B). Once the top 10% plan was
implemented, most of the observed changes in the share of Texas minority and non-minority
high school graduates enrolling at Texas Tech can be attributed to changes in student behavior—
changes in the application rate or in the enrollment yield, but mostly on applications.

FIGURE 8 ABOUT HERE

Lastly, since Texas A&M Kingsville is a non-selective institution, admissions remained
unaffected—and at 100% for all groups—when affirmative action ended and the top 10% plan
was introduced (figure 9). In the case of this university, almost all of the changes in in-state
transition rates for both minorities and non-minorities can be attributed to changes in application
rates, which explain more than those of enrollments. Lack of data on applications before 1996, unfortunately, do not allow us to analyze whether these patterns were observed also during the period in which affirmative action was a policy commonly used by selective universities.

FIGURE 9 ABOUT HERE

In sum, the decomposition of differences in transition rates shows that although changes in admission policies from affirmative action to merit-only do indeed seem to have affected institutional behavior, with our two selective institutions reducing the share of minority applicants being admitted, changes in the behavior of potential students have also a considerable role in explaining the observed changes in minority enrollment probabilities. In particular, student behavior becomes an important factor in explaining enrollment probabilities once the top 10% plan was introduced. Finally, changes in minority in-state application rates tend to exceed changes in the enrollment yield. Thus, from a policy perspective, our analysis suggests that college administrators might need to concentrate their efforts in reaching out to minorities while they are still in high school so as to provide incentives for them to apply.

6. Accounting for the Demographic Transition

So far we have suggested that the elimination of affirmative action in Texas is related to decreases in minority enrollment probabilities at the most selective institutions, Texas A&M and Texas Tech, and that the introduction of the top 10% plan did not have an immediate positive impact on minority enrollments. Moreover, we have seen that applications are as important as admissions in explaining the brunt of these declines in minority enrollment probabilities. And although we have related these changes to the number of minority and non-minority students
graduating from Texas high schools, we have not fully accounted for the important demographic shifts that the state of Texas was experiencing during the times of the changes in admission policies. These demographic shifts could exacerbate or smooth out the impact of the end of affirmative action and the implementation of percentage-plan alternatives. Thus, in this section we look at the relationship between the demographic composition at the end of high school and at college entrance under different admission regimes by analyzing the degree of minority representation in applications, admissions, and enrollments at our three public universities of different selectivity levels. Representation is computed as the difference between a minorities’ share of applicants, admits, and enrollees and their share of high school graduates in the previous spring (Long, forthcoming), and it acquires negative values when a group is underrepresented and positive values when it is overrepresented.

As panel A of figure 10 shows, minorities were considerably underrepresented among in-state applicants to Texas A&M and Texas Tech even before Hopwood, with a representation gap of over 20 percentage points, although this underrepresentation was relatively stable. When affirmative action ended in 1996, minority underrepresentation at both universities experienced a small increase—that is, minorities became more underrepresented—and in the case of Texas A&M this increase continued after the introduction of the top 10% plan. In the case of Texas Tech, minority underrepresentation stabilized with the top 10% plan but at a level below pre-Hopwood. In contrast, minorities were considerably overrepresented among in-state applicants to TAMU-Kingsville, and this overrepresentation peaked during the time of the merit-only admissions policy and slightly declined with the introduction of the top 10% plan. These trends in minority representation constitute further evidence of Hopwood’s cascading effect on applications.
Panel B of figure 10 reinforces our previous suggestion that Texas A&M was actively practicing affirmative action, since minority underrepresentation among admitted students was less prominent than among applicants. Moreover, it was declining before affirmative action was struck down in March of 1996. After that, minority representation among admits at Texas A&M deteriorated. Although Texas Tech did not seem to have practiced affirmative action as strongly as Texas A&M, minority representation also deteriorated with *Hopwood* and continued its decline with the top 10% plan.

Lastly, minority underrepresentation among in-state freshman enrollments at Texas A&M was slightly improving at the beginning of our period of analysis. However, it considerable worsened when affirmative action was eliminated and the top 10% plan did not help recuperate minority representation among enrollees at this selective institution. Minority underrepresentation at Texas Tech deteriorated slightly with *Hopwood* and remained relatively stable once HB588 took effect, but always below pre-*Hopwood* levels. In contrast, at TAMU-Kingsville minority overrepresentation among enrollments experienced a small increase with *Hopwood* but declined slightly with the introduction of the top 10% plan (panel C, figure 10). Again, how differently minority representation among enrollments changed at selective and non-selective institutions with the elimination of affirmative action represent further evidence of cascading.

**FIGURE 10 ABOUT HERE**

In sum, although we had observed some immediate improvements in minority application, admission, and enrollment rates at Texas A&M and Texas Tech with the introduction of the top 10% plan,\(^{21}\) when we take into account the increase in the share of

\(^{21}\) Recall section 4, where we find that admission, application, and enrollment rates for minorities increased somehow with the top 10% plan but these increases were not enough for these rates to reach pre-*Hopwood* levels.
minority students graduating from high school we find that minority representation among applicants, admits, and freshmen at these institutions does not appear to have been affected much by the top 10% plan. Thus, these findings point to the limits of percentage-plan policies to recover minority representation at selective public colleges after an end to affirmative action when the demographic composition of high school graduates is also shifting and becoming increasingly minority.

7. Conclusions

This study has provided a thorough description of how minority enrollment probabilities at public universities of different selectivity levels respond to changes in admission policies from affirmative action to merit-only and to a percentage plan when the demographic composition of the potential pool of applicants is also shifting. We have taken advantage of admission policy changes that occurred in the state of Texas with Hopwood and HB588, which constitute two natural experiments, and a unique administrative dataset that includes applications, admissions and enrollments to Texas A&M (most selective), Texas Tech (selective), and Texas A&M Kingsville (less selective).

Although our analysis has been descriptive and, therefore, does not allow us to assign causality (we leave this for a future study), we are confident that the changes we observed in minority enrollment probabilities, in the components of these probabilities, and in minority representation can be related to the exogenous variations in admission policies. Our confidence stems from clear breaks from pre-Hopwood trends and from magnitudes in the changes that are so sizable that they fall outside the normal ranges of variation.
Our analysis of minority enrollment probabilities suggest that the elimination of affirmative action and the introduction of the top 10% plan has had a differential effect depending on the selectivity level of the postsecondary institution. We found that Hopwood is related to shifts in minority enrollments from selective institutions to less selective ones, a result predicted by the cascading hypothesis. Although the top 10% plan does not appear to be related to improvements in minority enrollment probabilities at our most selective university, this policy seems to have helped increased minority enrollment probabilities at the selective college while reducing them at the non-selective one, as the upgrading hypothesis predicts. Thus, it appears that the top 10% plan positively affected minority enrollments but only at the lower section of the selectivity tier. However, once we took into account the important increases in minority shares among high school graduates, we found that top 10% plan can no longer be related to improvements in minority representation at the selective university.

In addition, our study has found that changes in admission policy appear to have affected not only the institutional decision of who to admit, but also the application and enrollment decisions that are taken by students. Minority admission rates suffered an important decline with Hopwood, but reductions in minority application rates also explain a large share of the declines observed in transition rates. In particular, we found that the elimination of affirmative action has discouraged minority students from applying to the selective universities and that the top 10% plan did not provide enough encouragement to revert minority enrollment probabilities to pre-Hopwood levels. And although minorities experienced, after affirmative could not longer be practiced, a discouragement effect from applying to the most selective universities, they do not necessarily feel discouraged from enrolling at these selective institutions once they have been admitted.
What are the implications of our findings? First, the cascading of minority students from selective to non-selective institutions when affirmative action ended and the very limited upgrading effect of HB588 can have a long-term negative impact on minorities. Six-year graduation rates are considerably higher at more selective institutions, and *Hopwood* decreased the number of minorities applying to, being admitted to, and enrolling at the most selective college in our sample. As a result, the number of minority students who attain bachelor’s degrees in the state of Texas could have also experienced a decline. This, in turn, can exacerbate social and economic inequalities between white and minority groups given that college selectivity has been related to increased earnings, particularly for minorities (Brewer, Eide, & Ehrenberg, 1999; Daniel, Black, & Smith, 1995; Hoxby, 1998; Loury & Garman, 1995). And, so far, the top 10% plan does not seem to constitute a tool that can help revert this trend.

A second implication relates to the ability of race-based admission policies to yield a “critical mass” of students; that is, a student body that reflects the demographic composition of the high school graduates. Our decomposition exercise suggested that, although affirmative action resulted in very high minority admission rates at our most selective institution, the bulk of the changes in minority enrollment probabilities is explained by student behavior given that our most selective university has an admission policies that is actually only mildly selective. A back-of-the-envelop calculation to understand the potential of three strategies available to college administrators for increasing minority enrollments (Brown & Hirschman, 2006) suggests that raising minority application rates to the average application rate for all groups would have increased 2002 minority enrollments by 200% at Texas A&M and by 134% at Texas Tech. In

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22 Six-year graduation rates for the universities in our sample are obtained from IPEDS and are as follows. Texas A&M: average, 77%; black, 60%; Hispanic, 72%. Texas Tech: average, 55%; black, 45%; Hispanic, 43%. TAMU-Kingsville: average, 28%, black, 16%; Hispanic, 29% (Integrated Postsecondary Education Data System, 2006).

23 These were in 2002 6.5% at Texas A&M and 5% at Texas Tech.
contrast, admitting all minority students that apply (that is, having a 100% admission rate) without modifying admission and enrollment rates would have increased minority enrollments by 51% and 71% while persuading all admitted minorities to enroll would have resulted in increases of 80% and 142% at Texas A&M and Texas Tech, respectively. Therefore, these calculations imply that if policymakers college administrators want to increase the number of minorities in selective public universities they should try to concentrate their efforts in reaching out to minorities while they are still in high school, for example by improving the quality of high schools, offering advanced placement courses and college counseling services at traditionally disadvantaged high schools, strengthening the relationships between K-12 and college through dual enrollment, and waiving college admission fees.

Finally, our study highlights the limitations of a percentage-plan policy to increase minority representation at selective public universities when there are important demographic transitions taking place. Moreover, it suggests that percentage-plan policies are not necessarily a good substitute to race-based admission policies since they fail to increase minority representation in applications, admissions and enrollments to affirmative action levels.

In conclusion, the Texas experiments leave us in a conundrum. We have seen that affirmative action policies yield the smallest underrepresentation of minorities at selective universities. But we also have found that if we were to minimize minority underrepresentation, policymakers and admission officers need to focus mostly on enticing minority students to apply and not so much on giving race-based preferences. However, the use of race as a plus factor at selective colleges in the end acts as a signal to minorities that they are welcome there. As a result, affirmative action policies still constitute an important policy tool to increase minority representation in higher education and, presumably, minority graduation rates.
References


Figure 1: Trends in Public High School Graduates and Enrollments at Public Colleges and Universities in Texas

![Chart showing trends in public high school graduates and enrollments at public colleges and universities in Texas.](chart1)

Source: Texas Education Agency (various years), IPEDS, and Texas Higher Education Coordinating Board (various years).

Note: College enrollees includes Texas residents and non-residents.

Figure 2: Trends in Enrollment Probabilities at Texas Public Colleges and Universities

![Chart showing trends in enrollment probabilities at Texas public colleges and universities.](chart2)

Source: Authors’ computations based on Texas Education Agency (various years), IPEDS and Texas Higher Education Coordinating Board (various years).
Figure 3: Enrollment Probabilities at Three Texas Public Universities

Panel A: Texas A&M

Panel B: Texas Tech

Panel C: TAMU-Kingsville

Source: Authors’ computations based on THEOP Administrative Data and Texas Education Agency (various years).
Note: First-year enrollments include Texas residents only.
Figure 4: In-state Application Rates at Three Texas Public Universities

Panel A: Texas A&M

Panel B: Texas Tech

Panel C: TAMU-Kingsville

Source: Authors’ computations based on THEOP Administrative Data and Texas Education Agency (various years).
Note: Includes in-state students only.
Figure 5: In-state Admission Rates at Two Texas Public Universities

Panel A: Texas A&M

| Year | Affirmative action | Merit | Top 10%
|------|-------------------|-------|-------
| 1992 | 57%               |       |       
| 1993 | 57%               |       |       
| 1994 | 62%               |       |       
| 1995 | 67%               |       |       
| 1996 | 72%               |       |       
| 1997 | 77%               |       |       
| 1998 | 82%               |       |       
| 1999 | 87%               |       |       
| 2000 | 92%               |       |       
| 2001 | 97%               |       |       

Source: Authors’ computations based on THEOP Administrative Data.

Note: These rates are conditional on application.
Figure 6: In-state Enrollment Rates at Three Texas Public Universities

Panel A: Texas A&M
Affirmative action | Merit | Top 10%

Panel B: Texas Tech
Affirmative action | Merit | Top 10%

Panel C: TAMU-Kingsville
Affirmative action | Merit | Top 10%

Source: Authors’ computations based on THEOP Administrative Data.
Note: These rates are conditional on admission.
Figure 7: Decomposition of the Transition Rate from High School to Enrollment at Texas A&M

Panel A: Minorities

Affirmative action | Merit | Top 10%

-0.4% 0.0% 0.4%

In-state transition rate

92-93 93-94 94-95 95-96 96-97 97-98 98-99 99-00 00-01 01-02

Panel B: Non-minorities

Affirmative action | Merit | Top 10%

-1.5% 0.0% 2.0%

In-state transition rate

92-93 93-94 94-95 95-96 96-97 97-98 98-99 99-00 00-01 01-02

Application | Admission | Enrollment

Source: Authors’ computations based on THEOP Administrative Data and Texas Education Agency (various years).

Note: Includes in-state students only.
Figure 8: Decomposition of the Transition Rate from High School to Enrollment at Texas Tech

Panel A: Minorities

Panel B: Non-minorities

Source: Authors’ computations based on THEOP Administrative Data and Texas Education Agency (various years).
Note: Includes in-state students only.
Figure 9: Decomposition of the Transition Rate from High School to Enrollment at TAMU-Kingsville

Panel A: Minorities

Panel B: Non-minorities

Source: Authors’ computations based on THEOP Administrative Data and Texas Education Agency (various years).
Note: Includes in-state students only. Data on applications available only for 1996 onwards.
Figure 10: Degree of Minority Representation at Three Texas Public Universities

Panel A: Applications

Panel B: Admissions

Panel C: Enrollments

Source: Authors’ computations based on THEOP Administrative Data. Note: includes in-state residents only.
Table 1: Demographic Composition of High School Graduates and College Freshman Class - Texas Public Institutions

<table>
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<th>Race/Ethnicity</th>
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<th>Top Ten Plan</th>
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<tr>
<td>Other</td>
<td>2.79</td>
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Panel A - Composition of High School Graduates

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<td>9.34</td>
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</tr>
</tbody>
</table>

Panel B - Composition of Freshman Class

Source: Authors’ computations based on Texas Education Agency (various years), IPEDS and Texas Higher Education Coordinating Board (various years).
Note: Includes Texas residents and non-residents.