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Nearby Affirmative Action and its Effect on College Quality

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Abstract

This paper explores how variation in the availability of affirmative action practiced by nearby colleges affected the application and enrollment decisions of three cohorts of students in 1972, 1982, and 1992. I find significant differences in the degree of preference given to minority applicants by various college characteristics, with less affirmative action used by private colleges and colleges in the Midwest (particularly in later cohorts), and more selective institutions giving larger preferences to minority applicants. Given the spatial distribution of college characteristics, I find substantial variation in the degree of affirmative action available to students at nearby colleges. However, this variation in nearby affirmative action had very small effects on the average quality of institutions at which minority and non-minority students apply and enroll. More nearby affirmative action increases the likelihood that minority students apply to a 4-year college, and increases the likelihood that the highest ability non-minority college applicants submit more than one application.

Keywords: Affirmative Action, College Quality, Human Capital
JEL classification: I2, J24, H52

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This paper explores how variation in the availability of affirmative action practiced by nearby colleges affected the application and enrollment decisions of three cohorts of students in 1972, 1982, and 1992. I find significant differences in the degree of preference given to minority applicants by various college characteristics, with less affirmative action used by private colleges and colleges in the Midwest (particularly in later cohorts), and more selective institutions giving larger preferences to minority applicants. Given the spatial distribution of college characteristics, I find substantial variation in the degree of affirmative action available to students at nearby colleges. However, this variation in nearby affirmative action had very small effects on the average quality of institutions at which minority and non-minority students apply and enroll. More nearby affirmative action increases the likelihood that minority students apply to a 4-year college, and increases the likelihood that the highest ability non-minority college applicants submit more than one application.

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1. Introduction

The recent Supreme Court decisions, regarding the University of Michigan's undergraduate and law school admissions systems, have clarified how affirmative action can be used by colleges in a constitutionally permissible manner. As a result, some institutions which had discontinued their use of affirmative action are now considering reinstituting the policy. However, there are continuing efforts in several states to ban affirmative action via ballot initiatives, as was used successfully in Washington and California in the late 1990s and Michigan in 2006. To inform these debates, more needs to be known about how affirmative action affects students' lives.

This paper evaluates the effects of affirmative action in college admissions on the quality of colleges attended by minority and non-minority students using nationally representative panel data from three cohorts of college entrants in 1972, 1982, and 1992. This work exploits regional and temporal variation in the degree of affirmative action available to

the student to explore how those variations affected the quality of colleges attended by minority and non-minority students. This work builds on the findings of Bowen and Bok (1998), Kane (1998b), and (Long, 2004b), by exploring cross-cohort changes with nationally representative data and exploring the effects of "nearby" affirmative action.

Affirmative action in university admissions spread throughout the country during the late 1960s and early 1970s. (Howard, 1997; Bowen and Bok, 1998; Lipson, 2006) However, little is known about the magnitude of the preferences given by individual institutions to minority applicants nor how these preferences varied by institutional characteristics, by region, or across time. Kane (1998a) notes that "(n)early two decades after the U.S. Supreme Court's 1978 *Bakke* decision, we know little about the true extent of affirmative action admissions by race or ethnicity…Hard evidence has been difficult to obtain, primarily because many colleges guard their admissions practices closely" (p. 17). As a result, there is little historical evidence that would allow a researcher to evaluate how affirmative action has varied across institutions. It is reasonable to believe that different regions of the United States would have different historical patterns regarding the dynamic history of affirmative action in admissions. Institutions in the South have been under great pressure from court decisions to actively pursue affirmative action as a remedy for prior overt discrimination and to integrate their institutions. Other regions of the country have faced different histories with respect to the civil rights movements which may have led to different histories of introducing affirmative action into their institutions. Unfortunately, there is little historical analysis which would allow for concrete comparisons of policies over time or across regions. An exception is Lipson (2006), who documents the historical and political evolution of affirmative action at UC-Berkeley, UT-Austin, and UW-Madison. He finds that each of these institutions faced similar dynamic patterns of student demand for affirmative action, instituted race-based admissions in the late

1960s and early 1970s, and maintained similar statements of support for affirmative action policies by top administrators despite recent increased public opposition. However, the mechanisms of preferential admissions policies used by the schools differed.[1] It is not possible with his historical analysis to directly infer whether the institutions different policies led to different magnitudes of preferences for minority students. Thus, the empirical estimates described below are the first to document how the magnitude of affirmative action preferences have varied across space and have changed over time.

I find the following. First, for all three cohorts, minority applicants to more selective institutions were more likely to be accepted than otherwise similar non-minority students. The relationship between institutional selectivity and the degree of affirmative action was similar across the three cohorts, with a slightly attenuated relationship between selectivity and racial preferences for the 1982 cohort. Second, there were not significant differences between the degree of affirmative action practiced by colleges in the Northeast and South Census regions across any of the three cohorts. Conversely, colleges in the Midwest offered smaller preferences for minority applicants, and this difference widened across time. Colleges in the West practiced less affirmative action in 1972 and 1982 than colleges in the Northeast, but this difference evaporated by 1992. Third, private colleges are found to offer smaller preferences. Finally, there relation between the college's enrollment size and levels of affirmative action was insignificant.

Using these regression results, I estimate the degree of affirmative action practiced by colleges that are "nearby" the high school student applicant and evaluate how nearby affirmative action affected students' application and enrollment behavior. I find that nearby affirmative action mildly decreased the average quality of colleges at which non-minority

[1] For example, UW-Madison used individual assessment rather using a more formulaic point system like those that had been used at UC-Berkeley and UT-Austin.

students applied and enrolled. Part of the adverse effect of affirmative action on non-minortity students may be mitigated due to the fact that increased levels of nearby affirmative action prompts the most able non-minority college applicants to apply to more than one institution. These results have the interesting implication that affirmative action may not substantially harm the life prospects of non-minority students, as it gives them the incentive to apply to more (and perhaps better) colleges. Secondly, I find that nearby affirmative action increased the likelihood that minority students would apply to any college (likely prompting marginally qualified minority students to apply) and thus mildly *decreased* the average quality of colleges at which minority students applied and enrolled. It is important to stress that the magnitudes of these student responses are generally small. It is reasonable to believe that student responses to discrete, publicized changes in affirmative action policies, as occurred in various states in the mid-1990s, could prompt greater behavioral responses than these regional and temporal variations in affirmative action, which may be difficult for students to perceive.

2. Prior Research on the Effects of Affirmative Action and College Quality

Several recent studies find substantial degrees of advantage given to minority applicants over otherwise similar applicants at top-tier institutions. Bowen and Bok (1998) examine the admissions decisions of five highly selective institutions in 1989. They find that eliminating affirmative action would reduce "…the overall probability of admission for black applicants from its actual value of 42 percent in 1989 to a hypothetical value of 13 percent" (32). Espenshade, Chung, and Walling (2004) use admissions data from three highly selective institutions in the early 1980s, 1993, and 1997. They find that the odds of admission for black and Hispanic applicants were 5.5 and 3.7 times that of comparable white applicants. These advantages were comparable to the advantages given to athletes (4.2) and legacies (3.1).

Espenshade and Chung (2005) simulate that eliminating affirmative action would reduce black and Hispanics probabilities of admission by 21.5 and 13.9 percentage points, respectively.

Kane (1998b) expands on these works by investigating the size of preferences given to minority applicants using nationally representative longitudinal data for applicants in 1982. He finds that the likelihood of admission for black and Hispanic applicants is significantly higher at the most selective two-quintiles of colleges. This estimate nicely coincides with the survey responses reported by Klitgaard (1985) that show 41% of private colleges and 46% of public colleges using affirmative action in the mid 1980's. At the top-quintile colleges, black applicants received an advantage equivalent to an increase of two-thirds of a point in high school grade point average or 400 points on the SAT, and for an average student, being black raised the probability of admission by 10.3 percentage points, while being Hispanic raised the likelihood of admission by 8.6 percentage points (Kane, 2000).

Using 1992 high school graduates, Long (2004b) finds significant preferences for underrepresented minority students[2] at the most selective 39% of 4-year colleges, which were attended by around 45% of college enrollees. For a student with mean characteristics, being an underrepresented minority (URM) raises the probability of acceptance by 10 percentage points for applicants to the top-quintile colleges (consistent with Kane 2000). But, this marginal effect is over 30 percentage points at the most elite colleges, those with median SAT scores above 1300 (consistent with Bowen and Bok 1998). As predicted by these estimates, Card and Krueger (2005) find that admission rates of black and Hispanic applicants to UC-Berkeley, UCLA, and UC-San Diego fell 20 to 30 percentage points after the enactment of Proposition 209, which banned affirmative action in California.

[2] Defined as students who are black, Hispanic, or Native American.

The effects of college quality on later life outcomes are difficult to estimate. While most of the studies on the effects of college quality on a student's earnings later in life have found positive effects[3], causality is a particular challenge for this literature due to selection on the part of both the student and the college. Recent findings of Dale and Krueger (2002) challenge the prior results. When they attempt to control for unobservable student characteristics, they find no payoff for attending a college with a higher average SAT score (except for low-income students), but do find a payoff for attending a college with a higher net tuition. Black and Smith (2004a) critique the prior literature's use of linear parametric estimation models. They find positive significant effects of college quality on wages using an ordinary least squares specification, but insignificant effects of quality using a propensity score technique.[4] Thus, estimating the returns to selectivity is challenging and has not reached an unambiguous consensus.

3. Model

The analysis in this paper is particularly concerned with the process by which college quality is determined by and for the student. This process is governed by the student's application choices, the colleges' admissions decisions, and the student's enrollment decision. In the college admission process, applicants are implicitly or explicitly scored on characteristics that determine students' likelihood of success in college and later life outcomes. Equation 1 models the process by which colleges score applicants:

$$(1) \qquad Z = f(M, \boldsymbol{A}, \boldsymbol{D}, \boldsymbol{H}, \boldsymbol{N}, I, S),$$

[3] See James et al. (1989), Loury and Garman (1993, 1995), Behrman, Rosenzweig, & Taubman (1996), Daniel, Black, & Smith (1997, 2001), Bowen and Bok (1998), Hoxby (1998), Kane (1998), Brewer, Eide, & Ehrenberg (1999), Monks (2000), Black and Smith (2004b), and (Long, forthcoming).

[4] Long (forthcoming) finds only modest evidence for selection bias in ordinary least squares regressions (when adequate control variables are available) using a variety of alternative methods of estimation.

where Z is the college's score of the applicant, which is a function of the student's racial/ethnic minority status (M), academic abilities and high school achievements ($\boldsymbol{A}$), individual and family demographic characteristics ($\boldsymbol{D}$), high school quality ($\boldsymbol{H}$), neighborhood characteristics ($\boldsymbol{N}$), whether the student lives in the same state as the college (I), and the college's selectivity (S), with bolded letters indicating vectors of characteristics. Applicants who score above a particular threshold are accepted. A more selective college will give a particular applicant a lower score than a less selective college.[5] Affirmative action is reflected by the degree to which colleges place emphasis on the student's race/ethnicity in the admission decision, controlling for the student's other characteristics. Prior research has documented that the preference given to minority applicants is larger at more selective colleges.[6] Given the history of affirmative action as discussed in the introduction, the model is extended to allow the preference for minority students in the admission decision to vary by the college's region ($\boldsymbol{R}$). Furthermore, it may be reasonable to expect that affirmative action may vary by enrollment (E) and private/public status (P). For example, smaller colleges may find it more difficult to recruit minority students and thus need to use larger preferences in admission (or, alternatively, need to recruit more minorities to achieve a "critical mass" of minority students), and public universities may have more of an explicit desire to reduce racial inequality as a result of their public missions. It may also be the case that region, enrollment, and private/public status play a direct role in colleges' scoring of applicants. Thus, Equation 1 is rewritten as: $Z = f(M(S, \boldsymbol{R}, P, E), \boldsymbol{R}, P, E, \boldsymbol{A}, \boldsymbol{D}, \boldsymbol{H}, \boldsymbol{N}, I, S)$.

In considering whether to apply to an institution, a student will first compute the indirect utility of attendance at each institution V_j. This indirect utility is a function of the

[5] This method of modeling the admissions decision is equivalent to a model where S is omitted from the scoring function, and rather the colleges have different thresholds as a function of S.
[6] See Kane (1998) and Long (2004b).

expected effects of attendance at this college on the student's later life outcomes life (***Y***), idiosyncratic preferences for various college attributes (***B***), and the student's cost of attendance at this institution (*C*):

(2) $V_j = f(\boldsymbol{Y}_j, \boldsymbol{B}_j, C_j)$

At the time of application decisions, the student's expected indirect utility is given as follows:

(3) $$E\left[V\left(Apply_1, Apply_2, ..., Apply_J\right)\right] = E\left[V_j \mid Apply_1, Apply_2, ..., Apply_J\right] - \sum_{j=1}^{J} \alpha_j Apply_j ,$$

where *E* is the expectation operator, *V*() indicates the student's indirect utility as a function of his/her application choices, $Apply_j$ is an indicator variable that equals one if the student applies to college *j*, and α_j is the cost of applying to college *j*. The student chooses his/her application set so as to maximize Equation 3.

Suppose the student has three college options: attend college 1, attend college 2, or not attend college. Let the indirect utility associated with these outcomes be denoted V_1, V_2, and V_3, respectively, with $V_1 > V_2 > V_3$. Let π_j denote the probability of being accepted by college *j*. If the student applied to both colleges, the student's expected indirect utility would be the following:

(4) $\pi_1 V_1 + (1- \pi_1)\pi_2 V_2 + (1- \pi_1)(1- \pi_2)V_3 - \alpha_1 - \alpha_2$

If the student only applied to the second college, the student's expected indirect utility would be the following:

(5) $\pi_2 V_2 + (1- \pi_2) V_3 - \alpha_2$

The difference between (4) and (5) gives the added expected indirect utility upon applying to college 1:

$$(6) \qquad \frac{\Delta E[V()]}{\Delta Apply_1} = \pi_1 [V_1 - \pi_2 V_2 - (1- \pi_2) V_3]- \alpha_1$$

The expression in parentheses gives the increase in expected indirect utility from attending college 1 relative to the expected alternative. The student is more likely to apply to college 1 when the probability of being accepted by college 1 is increased, when the indirect utility associated with attendance at college 1 is much higher than the alternatives, and when the cost of application is low. These results can be generalized to accommodate more than two college choices.[7]

For the applicant's top-choice college (i.e., college 1), affirmative action at that college should raise the probability of application by minority applicants and lower the probability of application by non-minority applicants. Applications to less preferred colleges will be lowered for minority applicants and raised for non-minority applicants as a result of affirmative action at the applicant's top choice (see the appendix for this derivation).

It is not, however, clear whether affirmative action will raise or lower the selectivity of the colleges at which minority and non-minority applicants apply. If we assume that the applicants' top-ranked colleges positively correlate with institutional selectivity, then we should expect minority applicants to be more likely to apply to more selective institutions as a result of affirmative action.

On the other hand, in response to an increase in affirmative action at their preferred college, non-minority applicants should be more likely to apply to institutions that are less preferred from their point-of-view. If affirmative action increases their likelihood of applying to several of their less preferred options, it is possible that by doing so, these increased applications may increase the selectivity (or quality) of the "best" college at which they apply.

[7] For similar models of the effect of the probability of admission on students' application choices, see Long (2004a) or Card and Krueger (2005).

This result can hold if the ordering of students' preferred colleges do not perfectly correspond to institutional selectivity, which is shown below to be the case.

Equations 2 and 3 also suggest that students may be more prone to apply to colleges that are near to their parent's home where the costs of attendance, both in terms of actual costs and psychic costs, may be smaller. The quality-level of colleges to which a student applies is, thus, a function of the quality-level of colleges that are nearby the student's high school residence. Consequently, the degree of affirmative action practiced by nearby colleges will affect the student's decisions, and this effect will vary by the student's race/ethnicity. The quality-level of colleges at which students apply is given by Equation 7:

$$(7) \qquad \boldsymbol{Q} = f(\overline{F}(M), M, \boldsymbol{A}, \boldsymbol{D}, \boldsymbol{H}, \boldsymbol{N}, \overline{\boldsymbol{Q}}),$$

where $\overline{F}$ is the weighted average degree of affirmative action practiced by colleges near the student and $\overline{\boldsymbol{Q}}$ is the weighted average-level of college quality at nearby colleges. The methods for computing these weighted averages and the definition of college quality are discussed below. Student's enrollment decisions are modeled comparably.

4. Data

Data are taken from three longitudinal surveys conducted by the U.S. Department of Education. The National Longitudinal Study of the High School Class of 1972 (NLS72) followed high school seniors from the spring of 1972 through 1986. High School and Beyond (HSB) followed 1980 high school seniors and sophomores. I use data from the sophomore cohort, who were followed until 1992. Finally, the National Education Longitudinal Studies (NELS) followed eighth grade students from 1988 until 2000. These three cohorts were high school seniors in 1972, 1982, and 1992, respectively. These data allow for analysis of decadal

changes in the degree of affirmative action practiced by colleges and the effects of these changes on students' behavior.

In each cohort, students were asked to list their first- and second-choice colleges to which they applied. Students in the NLS72 were also asked to list their third-choice. The students were asked whether they were accepted by each of the colleges they listed. The NLS72 and HSB students were asked these questions in the years following high school (1973-74 and 1984 respectively). NELS students were asked this question in their senior year and again in 1994 (the 1994 responses are used when available). I construct a dataset of applications, which includes one row for each application.[8]

Two measures of college quality are constructed using data from Barron's Profiles of American Colleges (1972, 1982, and 1992). The first measure is median freshman SAT test score.[9] This measure captures the institution's selectivity (and is also a measure of peer quality). The second measure is an index which is constructed using the first principal component from a principal component analysis based on the following characteristics (sign of weights in parentheses): median freshman SAT test score (+), percent of students accepted (-), Barron's index of selectivity (+), tuition (+), full-time-faculty to enrollment ratio (+), and percent of faculty with a Ph.D. (+).[10] This measure of college quality is normalized to have a mean of zero and a standard deviation of one.

[8] I exclude applications if the student's admission decision was missing, the college was not listed in the Barron's guide for that year, the Barron's guide listed the admissions process as "Special" (e.g., art colleges), or the college was outside of the continental U.S.

[9] For colleges reporting ACT scores, these scores are converted into SAT-equivalent scores and then averaged with the SAT scores, when both are available. For some colleges in the 1992 data, I estimate medians using the fraction of students who are within categorical ranges (e.g., percentage with ACT score less than 21, 21 to 23, etc.). For a small number of colleges where no test score data were reported, I assign the average SAT score of schools in their Barron's selectivity tier.

[10] See Black and Smith (2004a, 2004b) and Long (forthcoming) for similar uses of college quality indexes and more discussion. Tuition is based on out-of-state tuition if there is a discount given to in-state students. Missing values are imputed using the other available measures prior to conducting the principal component analysis. This index produces a reasonable list of top-tier colleges. The top-five colleges in each year were the following: Cal Tech, Yale, Princeton, Harvard, and Amherst for 1972; Yale, Cal Tech, Princeton, Harvard, and MIT for 1982; and Yale, Harvard, Brown, Cal Tech, and MIT for 1992.

Table 1 contains the descriptive statistics for the three cohorts. Note that students will be defined as "minority" if they are black, Hispanic, or Native American. While it would be interesting to estimate the degree of affirmative action separately for each group, it is difficult to do so given the available sample sizes and the number of interactions that are estimated. Long (2004b) finds insignificant differences between the treatment of blacks and Hispanics for the NELS cohort. All dollar values are inflated into 2005 dollars using the consumer price index for all urban consumers. The first-three columns show the full sample.[11] While the variable definitions are not perfectly comparable across the three cohorts, the mean values across cohorts are similar. Missing data is not a particularly large problem for most variables, however many students have at least one missing value for one of the control variables. In the middle three columns, I impute students' missing variables in the ***A***, ***D***, ***H***, and ***N*** vectors using the available non-missing values of the ***A***, ***D***, ***H***, and ***N*** variables for that student. These imputations, which have only small effects on the mean values for most of these variables, will be used in the subsequent regressions.

The last four columns of Table 1 show the descriptive statistics of each variable for the constructed applicant dataset. This applicant dataset forms the basis for the subsequent admissions regressions.

5. Specifications and Results

5a. How Does Affirmative Action Vary?

I begin by first estimating the colleges' admissions systems. The following specification is used:

[11] Students from Alaska and Hawaii are dropped from the samples as it was impractical to estimate the regional degrees of affirmative action given the small number of colleges in these states.

$$(8) \quad Z_{ij}^{*} = \beta_0 + M_i\beta_1 + M_iS_j\beta_2 + M_i\boldsymbol{R}_j\boldsymbol{\beta_3} + M_iE_j\beta_4 + M_iP_j\beta_5 + S_j\beta_6 + \boldsymbol{R}_j\boldsymbol{\beta_7} + E_j\beta_8 + P_j\beta_9 + \boldsymbol{A}_i\boldsymbol{\beta_{10}} + \boldsymbol{D}_i\boldsymbol{\beta_{11}} + \boldsymbol{H}_i\boldsymbol{\beta_{12}} + \boldsymbol{N}_i\boldsymbol{\beta_{13}} + I_{ij}\beta_{14} + S_j(\boldsymbol{A}_i\boldsymbol{\beta_{15}} + \boldsymbol{D}_i\boldsymbol{\beta_{16}} + \boldsymbol{H}_i\boldsymbol{\beta_{17}} + \boldsymbol{N}_i\boldsymbol{\beta_{18}} + I_{ij}\beta_{19}) + \boldsymbol{C}_i\boldsymbol{\beta_{20}} + \varepsilon_i$$

where Z_{ij}^{*} is college j's (unobserved) scoring of applicant i, and $\boldsymbol{C}_i$ is a vector of cohort dummies. College j is predicted to admit student i if $Z_{ij} > 0$. Assuming ε_i is distributed normally yields a probit model. The probability of the student being admitted is the following:

$$(9) \quad \text{Prob}(Admit_{ij}=1) = \Phi(Z_{ij}^{*})$$

The term $S_j()$ allows the weight that colleges attach to student attributes to rise or fall by college selectivity. Region is defined using the U.S. Census Bureau's groupings of states in the Northeast, South, Midwest, and West, with Northeast used as the base case.

Equation 8 is estimated using the merged data from the three cohorts. Additionally, the cohort dummy variables are interacted with M_iS_j and $M_i\boldsymbol{R}_j$ to test whether the there were changes in the relationships between the preference given to minorities and institutional selectivity and region.

The first three columns of Table 2 show the probit coefficients using all 4-year colleges, while the last three columns show the results restricted to colleges with a median SAT greater than or equal to 900 (i.e., colleges with more selective admissions).[12] Since most applications go to these more selective colleges (15,813 out of 19,983), the results are fairly similar.

[12] Note that neither the sign nor the significance of the interacted probit coefficients can be directly interpreted as the sign or the significance of the marginal effect *on the probability of admission* (Ai and Norton (2003) and Norton, Wang, and Ai (2004)). In fact, depending on the individual student's characteristics, the marginal effect of the interaction term on the probability of admission can be negative for some students, while positive for others. Rather, as I discuss the sign and significance of the interaction terms, these should be understood as the marginal effect of the interaction term on the college's scoring of applicants (Z). Thus, for example, a positive value for the coefficient β_2 indicates that the boosts given to minority applicants' scores (Z) are increasing in college selectivity, while this does not necessarily indicate that the boosts in the

Consistent with the prior results in Kane (1998b) and Long (2004b), the magnitude of affirmative action is found to be increasing in the college's median freshman SAT score. To illustrate the magnitude of affirmative action as it relates to college selectivity for each of the cohorts, I compute a marginal effect for each four-year college using the following equation based on the mean characteristics of college applicants (restricted to applicants whose SAT score was greater than or equal to 900) and assuming the student is an in-state applicant:

$$(10) \qquad \Phi(\hat{Z}_{ij} \mid \text{minority}) - \Phi(\hat{Z}_{ij} \mid \text{non-minority})$$

Figure 1 shows the predicted probability of acceptance for minority and non-minority applicants based on the college's median freshman SAT score, for each of the three cohorts.[13] For this figure (as well as Figures 2-5), the college is assumed to be a public institution located in the Northeast with 5,000 undergraduate students enrolled. The probability of admission for non-minorities is remarkably constant across the three cohorts, and falls precipitously as median freshman SAT score increases. Figure 1 shows that the probability of admission falls more slowly for minority applicants as selectivity rises. Figure 2 shows the marginal effect, as defined in Equation 10.

Columns 1 and 4 of Table 2 show that colleges in the Midwest and West offer significantly smaller preferences for minority applicants than colleges in the Northeast. Private colleges are also found to offer less affirmative action than public colleges, and this effect is significant when estimated with all 4-year colleges. The effect of enrollment size on affirmative action is insignificant in all specifications.

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probability of acceptance for minority applicants is increasing in college selectivity. Put differently, the sign of β_2, which equals $\frac{\partial \frac{\Delta Z_{ij}^*}{\Delta M_i}}{\partial S_j}$, need not be equivalent to the sign of $\frac{\partial \frac{\Delta \Phi(Z_{ij}^*)}{\Delta M_i}}{\partial S_j}$.

[13] These figures are based on the specification in Column 6 of Table 2. The results of this specification are discussed subsequently.

Columns 2 and 5 of Table 2 add minority × selectivity × cohort to the specification. The positive relationship between institutional selectivity and affirmative action is attenuated for the 1982 cohort relative to the 1972 and 1992 cohorts. This attenuation is reflected in Figure 2 by the flatter slope of the marginal effect curve for the 1982 cohort.

Columns 3 and 6 of Table 2 add minority × region × cohort to the specification. There was an insignificant difference between Midwestern and Northeastern colleges in 1972. The significant gap between the regions opens up in 1982 and persists in 1992 (although the point estimates are not significant for 1992). Among the more selective colleges, there was a weakly significant difference between the South and the Northeast in 1972, which disappears for the latter two cohorts. The significant difference between the West and the Northeast evaporates between the 1982 and 1992 cohorts. These effects are illustrated in Figures 3-5, which show the marginal effect of being a minority by region for each of the three cohorts separately. From these figures, it is apparent that the degree of affirmative action used in the Northeast and South converged between 1972 and 1982; the West converged with the Northeast and South between 1982 and 1992; and the Midwest diverged from the other three Census regions.[14]

[14] It is an interesting question why the Midwest diverged from the other three Census regions. While I do not have a definitive answer for this question, there are two possibilities which seem intriguing. The first is declining political support for affirmative action in the Midwest relative to the rest of the nation. For every even year between 1970 and 2004 (excluding 2002) the American National Election Survey asked survey respondents a variant of the following question: "Some people feel that the government in Washington should make every possible effort to improve the social and economic position of blacks and other minority groups. Others feel that the government should not make any special effort to help minorities because they should help themselves. Where would you place yourself on this [1 to 7] scale, or haven't you thought much about it?" Averaging the annual results by decade reveals declining support for government intervention in all regions, but particularly in the Midwest. The Midwest declined from 3.69 (with 7 indicating the highest support) in the 1970s to 3.13 in the 2000s. The rest of the country declined from 3.69 in the 1970s to 3.40 in the 2000s. The South showed the smallest decline, from 3.52 to 3.31. (Also during this period, the male black-white wage gap outside the South increased, while the male black-white wage in the South converged with the rest of the nation (Vigdor, 2006)). Given these different regional political environments, it is reasonable to expect differential political pressure to produce different degrees of affirmative action (Lipson, 2006). A second possible explanation is minority's smaller share of the student population in the Midwest relative to the other regions. For the 2003 school year, 23% of Midwest students enrolled in public elementary and secondary schools were black, Hispanic, or American Indian / Alaska Native (author's calculation based on data in the Snyder, Tan, and Hoffman, 2006). Whereas, such underrepresented minority student shares were 29%, 44%, and 44% in the Northeast, South, and West, respectively. Lipson (2006) documents evidence that the admissions policies at UC-Berkeley, UT-Austin, and UW-Madison "used the principle of 'underrepresentation' – as measured by state demographics – to guide their decisions of racial targeting" (p. 24). It could be the case that meeting the goal of a "diverse" student body in the Midwest may be accomplished with a smaller share of minorities on campus, and thereby require smaller affirmative action efforts in the admission system to achieve this goal. Clearly, further research is warranted to address this question.

To get a full picture of the variation in the degree of affirmative action practiced by the various colleges, Figure 6 shows the marginal effect of being a minority applicant on the probability of admission. This figure plots the marginal effect for all regular four-year colleges whose median freshman SAT was greater than or equal to 900 and who was listed in the 1972, 1982, and 1992 Barrons college guides based on the college's actual region, enrollment, and public/private status. This figure shows that, given the colleges' actual characteristics, the marginal effects top-out at around forty percentage points, which is consistent with prior estimates. More importantly, these figures show that for any given level of institutional selectivity there was considerable variation in the degree of preference given to minority applicants.

5b. How Much Does Affirmative Action Vary at "Nearby" Colleges?

Next, I test whether the degree of affirmative action that is available to underrepresented minority students at colleges near the student's home affects the quality of the college at which the student applies, and the quality of the college at which the student enrolls. For this analysis, it is necessary to parameterize the influence of distance on a student's college choice. This parameter is estimated using the following gravity equation[15]:

$$(11) \qquad T_{hj} = \kappa H_h^{\alpha} E_j^{\beta} exp(\gamma_1 D_{hj} + \gamma_2 I_{hj}),$$

where T_{hj} is the count of the number of students at high school h that apply to college j, H_h is the number of students at high school h who enroll in any four-year college within the Barron's guide, E_j is the enrollment of college j, D_{hj} is the distance between high school h and college j, I_{hj} is an indicator variable that equals one if the high school is in the same state as the college, and κ, α, β, γ_1, and γ_2 are the parameters to be estimated. The parameter γ_1 gives the resistance

[15] This model is adapted from Raphael (1998), who applied it to study spatial mismatch of workers and jobs in the San Francisco Bay Area.

of the enrollment decision to the distance of the students from the college, and γ_2 gives the preference students have for enrolling in in-state colleges.

The parameter estimates for Equation 11 are shown in Table 3. Consistent with the results in Hoxby (1997), who finds that the college sorting process is becoming more nationalized, I find that resistance to distance has decreased over time; γ_1 declines from -0.00302 to -0.00286 to -0.00277 between the three cohorts.[16] This declining resistance to distance is likely caused by declining costs of travel and increasing parental income. Students' preference for enrolling in in-state colleges (i.e., γ_2) also declined from 3.08 to 3.01 to 2.80 between the three cohorts.

To compute the average characteristics of nearby universities, I use a weighted average, where the weight assigned to college *j* for student *i* is the following:

$$(12) \qquad W_{ij} = E_j \exp(\gamma_1 D_{ij} + \gamma_2 I_{ij})$$

More weight is given to universities that are larger, closer, and in-state. To illustrate this weighting scheme, Figure 7 shows the weights for four fictional students living in Reno, Davenport, Boston, and Austin, respectively. This figure shows the degree to which college markets are localized. The figure for Austin shows the importance of UT-Austin, which is the largest circle. The Reno figure shows the paucity of universities in the West, and shows the importance of the University of Nevada at Reno, the University of Nevada at Las Vegas, and the pacific coast universities for such a student.

Using these weights, I compute the average degree of affirmative action of nearby universities using the following equation:

$$(13) \qquad \overline{F_i} = \sum_{j=1}^{J_i} W_{ij} \left(\Phi(\hat{Z}_{ij} \mid \text{minority}) - \Phi(\hat{Z}_{ij} \mid \text{non-minority}) \right) \Big/ \sum_{j=1}^{J_i} W_{ij}$$

[16] The median distances traveled for these years were 67 miles for 1972, 59 miles for 1982, and 76 miles for 1992. The 90th percentile distances were 347 miles for 1972, 400 miles for 1982, and 457 miles for 1992.

The marginal effect of being a minority on the probability of admission, which is in parentheses in Equation 13, is estimated using the results in column 6 of Table 2. $\overline{F}_i$ is thus the estimated average nearby affirmative action available given student *i*'s characteristics and location.

A central question in this analysis is how much does affirmative action vary for students who live in different locations. This variation in affirmative action is remarkably large. Table 4 shows the descriptive statistics for $\overline{F}_i$. For the merged sample, $\overline{F}_i$ averages 0.042, and has a standard deviation of 0.068. In other words, a one-standard deviation increase in nearby affirmative action is equivalent to a 6.8 percentage point increases in the marginal effect of being a minority student on the likelihood of admission. The second panel of Table 4 restricts the sample to high school students with SAT/ACT>=900. Among these students, $\overline{F}_i$ averages 0.033, and has a standard deviation of 0.045. The third panel of Table 4 shows the regional variation in nearby affirmative action. This panel shows the convergence of the Northeast with the South and West, and steady decline in affirmative action in the Midwest.

Figure 8 shows the distribution of nearby affirmative action using a hypothetical student, with the average characteristics of college applicants, living at the centroid of each county for each of the three cohorts, and for the merged data. This figures shows the movement of affirmative action from the Northeast and Midwest in 1972 to the Northeast and South in 1982, and then to the Northeast, South, and West in 1992.

5c. Does Variation in Nearby Affirmative Action Affect Students' College Quality?

To test whether there is a significant relation between the degree of local affirmative action and the quality of colleges at which students apply and are enrolled, I use the following specification, estimated separately for minority and non-minority students:

$$(14) \quad Q_i = \overline{F}_i \theta_1 + \overline{Q}_i \theta_2 + \boldsymbol{A}_i\boldsymbol{\theta_3} + \boldsymbol{D}_i\boldsymbol{\theta_4} + \boldsymbol{H}_i\boldsymbol{\theta_5} + \boldsymbol{N}_i\boldsymbol{\theta_6} + \varepsilon_i$$

Q_i is alternatively defined as the median freshman SAT or the index of college quality of college *j* at which the student's apply or enroll. When Q_i is defined based on applications, for students who apply to more than one college, I define Q_i as the highest quality college at which the student applied. $\overline{Q_i}$ is the weighted average quality of nearby colleges, based alternately using median freshman SAT score or the index of college quality. This variable is included in the specification as nearby college quality will directly affect Q_i and indirectly affect $\overline{F_i}$. Thus, exclusion of $\overline{Q_i}$ would lead to a biased estimate of θ_1.

Tables 5a and 5b show the estimates for θ_1 and θ_2 in Equation 14, with Table 5b restricted to students whose SAT score were greater than or equal to 900. The top panels of these tables show the effects on non-minority college applicants, while the bottom panels show the effect on minority college applicants. As expected, more nearby affirmative action appears to lower the median freshman SAT score of the best college at which non-minority students apply. However, this effect is quite small; a one-standard deviation increase in average nearby affirmative action (which is 6.8 percentage points, as shown in Table 4) would decrease the quality of a non-minority student's best application by 4 to 5 median freshman SAT points or 0.08 to 0.13 standard deviations in the index of college quality. The effects on the quality of college at which these students enroll is also small; a one-standard deviation increase in average nearby affirmative action would decrease the quality of a non-minority student's enrolled college by 7 to 11 median freshman SAT points or 0.08 to 0.14 standard deviations in the index of college quality. Why are these effects so small? One possibility is that the presence of more affirmative action practiced by nearby colleges may give non-minority students an incentive to apply to more colleges, and in the process potentially increase the quality of the best colleges at which theses students applies. This hypothesis is tested below.

For minority applicants, the results are likewise surprising. When estimated using all minority applicants, the results generally show an insignificant effect of nearby affirmative action. Moreover, the weakly significant results in the 4th column of Table 5a suggests that more nearby affirmative action *lowers* the index of college quality by 0.07 standard deviations. For the much smaller sample of minority applicants whose SAT score was above 900 (679 students), the results suggest that a one standard deviation increase in nearby affirmative action *lowers* the quality of colleges at which minorities apply and enroll by 0.34 and 0.29 standard deviations, respectively.

These surprising results may be explained if more nearby affirmative action increases the likelihood of minority students to apply to any four-year college. The minority students who are at the margin of not applying to any four-year college are likely to be less academically talented than non-marginal minority applicants. Entry of these marginal minority applicants, who are likely to apply to less-selective institutions, would drive down the average quality of colleges at which minority applicants apply and enroll. This hypothesis is tested below.

The bottom-line from these results is that nearby affirmative action has small overall effects on the average quality of colleges at which both minority and non-minority students apply and enroll. More importantly, these results suggest that nearby affirmative action does not have large adverse effects on the quality of colleges at which non-minority students enroll.

Secondly, these results also show the strong effects of nearby college quality on the quality of colleges at which both minority and non-minority students apply and enroll.[17] As shown in Table 5a, a 100 point increase in median freshman SAT score raises the quality of

[17] These results are consistent with the results of DesJardins, Dundar, and Hendel (1999), Do (2004), Turley (2006), and Griffith and Rothstein (2007), who each document the importance of nearby college quality on application and/or enrollment behavior.

college at which non-minority and minority students enroll by 90 and 67 points, respectively. Likewise, a one-standard deviation increase in college quality raises the quality of college at which non-minority and minority students enroll by 1.05 and 1.01 standard deviations, respectively. As shown in Table 5b, the effects of nearby college quality are even larger for more academically talented students.

5d. Does Variation in Nearby Affirmative Action Affect Whether a Student Applies and the Number of Applications Sent?

In a general sense, it seems implausible that variation in nearby affirmative action could affect whether a student applies to any four-year college given the high number of non-selective institutions available. However, it could be the case that students are prompted to apply to a four-year college only if they believe they have a realistic chance of being accepted at a particular desired college. To test this possibility, I estimate Equation 15:

$$(15) \quad \text{Prob}(1 + \textit{Applications}) = \Phi(\overline{F}_i \rho_1 + \overline{Q}_i \rho_2 + \boldsymbol{A}_i\boldsymbol{\rho_3} + \boldsymbol{D}_i\boldsymbol{\rho_4} + \boldsymbol{H}_i\boldsymbol{\rho_5} + \boldsymbol{N}_i\boldsymbol{\rho_6} + \varepsilon_i)$$

The first two columns of Table 6 show the estimates for ρ_1 and ρ_2. As shown in the top panel, nearby affirmative action has insignificant effects on the likelihood of application of non-minority students. However, for minority students (shown in the bottom panel), nearby affirmative action has a strong and significant effect on whether they apply. A one-standard deviation increase in nearby affirmative prompts a 2.1 percentage point increase in the likelihood of applying to any four-year college. The estimated effect for the small sample of academically talented minority student is comparable (2.4 percentage points), but not significant. As noted above, this influx of marginal minority applicants could explain the

overall modest decrease in the effects of nearby affirmative action on the average quality of colleges at which minority students apply and enroll.[18]

Next, I test whether nearby affirmative action prompts students to apply to more than one institution.[19] This incentive should be particularly present for non-minority students who face a greater risk of not being accepted to any institution if they only apply to one institution. To test this hypothesis, I estimate Equation 16 using only those students who applied to a four-year college:

$$(16) \quad \text{Prob}(2+ \textit{Applications}) = \Phi(\overline{F}_i \tau_1 + \overline{Q}_i \tau_2 + \boldsymbol{A}_i \boldsymbol{\tau_3} + \boldsymbol{D}_i \boldsymbol{\tau_4} + \boldsymbol{H}_i \boldsymbol{\tau_5} + \boldsymbol{N}_i \boldsymbol{\tau_6} + \varepsilon_i)$$

The results are shown in the last three columns of Table 6. I estimate Equation 16 for all applicants, and separately for those whose SAT score was at or above 900 and 1,000 points. For non-minority students whose SAT score was greater than 1,000, a one-standard deviation increase in nearby affirmative action increases the probability of applying to more than one 4-year college by 7.8 percentage points. Such high-ability non-minority students, who are more likely to apply to more selective institutions, face a greater threat of rejection due to nearby affirmative action. Furthermore, such high-ability students are a non-trivial fraction of all non-minority college applicants (4,366 of the 10,685) – thus, their application response could be consequential.

By applying to more than one institution, the non-minority applicant has a very good chance of applying to an institution of higher quality. Among those students who applied to more than one college, the "second-choice" college had a higher median freshman SAT test score than the student's "first-choice" college for 40%, 42%, and 46% of students in the NLS72,

[18] These results suggest that it would be helpful to simultaneously estimate the decision to apply to any college and the quality of the colleges at which the student applies. Unfortunately, there is no sensible exclusion restriction (or instrumental variable) which can be used to identify the decision to apply separately from the decision on the quality of college at which the student applies (or enrolls).

[19] Unfortunately, the HSB and NELS data do not include information on the number of applications submitted beyond the students' first two preferred colleges at which they applied.

HSB, and NELS cohorts, respectively. For the index of college quality, these rates are 41%, 45%, and 48%, respectively. Thus, by prompting non-minority students to apply to more colleges, nearby affirmative action raises the quality of the best college at which such students apply and thereby offsets some of the adverse effect that nearby affirmative action would have on the quality of colleges at which such students enroll.

Finally, for minority applicants nearby affirmative action has an insignificant effect on the likelihood of applying to 2+ institutions.

6 Conclusions

I find significant differences in the preferences given to minority applicants over otherwise similar non-minority applicants as a function of the college's degree of selectivity, Census region, and private/public status. The overall degree of affirmative action used by colleges decline between the years 1972 and 1982. Further, affirmative action used by colleges in the Midwest substantially declined across the cohorts, while colleges in the West and South nearly converged with colleges in the Northeast. Given the variations in affirmative action practiced by different types of colleges, applicants living in different parts of the United States faced substantially different levels of affirmative action at their nearby institutions. Consequently, it is reasonable to expect that this variation in treatment could lead to effects on application and enrollment behavior, and that these effects would vary by the student's race/ethnicity. I find evidence that higher degrees of affirmative action practiced by nearby institutions significantly lowered the quality of colleges at which non-minority students applied and enrolled – although this effect was very small. Further, I find that the most able non-minority applicants were more likely to apply to more that one institution when they lived in areas with more nearby affirmative action. This behavior could mitigate the adverse effect of nearby affirmative action on non-minority students, as students who apply to more than one

college often apply to a better college with their second choice. For minority students, more nearby affirmative action appears to slightly *lower* the overall quality of colleges at which such students apply and enroll. This result appears to be due to a higher likelihood of minority students applying to any four-year college, whereby these new (marginal) minority applicants lower the overall average quality of colleges at which minorities apply and enroll.

In general, these effects of nearby affirmative action for minority and non-minority students are small. At a minimum, these results show that more affirmative action at nearby institutions did not have large adverse effects on non-minority college aspirants.

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8. Appendix

If the student only applied to the first college, the student's expected indirect utility would be the following: (5-alt) $\pi_1 V_1 + (1- \pi_1) V_3 - \alpha_1$

The difference between (4) and (5-alt) gives the added expected indirect utility upon applying to college 2: (6-alt) $\frac{\Delta E[V()]}{\Delta Apply_2} = (1- \pi_1)\pi_2 [V_2 - V_3]- \alpha_2$

The expression in parentheses [] gives the increase in expected indirect utility from attending college 2 relative to not attending college. The student is more likely to apply to college 2: when the probability of being accepted by college 1 is decreased; when the probability of being accepted by college 2 is increased; when attendance at college 2 is much better than less preferred options (i.e., not attending college); and when the cost of application is low.

Table 1
Variable Means

		Full Sample of Students			Full Sample of Students (A, D, H, and N Variables Imputed if Missing using Non-Missing A, D, H, and N Variables)			Full Sample of Applications to Four-Year Colleges (Missing A, D, H, and N Variables Imputed using Non-Missing A, D, H, and N Variables)			
Variable Group	**Variable**	**NLS72**	**HSB**	**NELS**	**NLS72**	**HSB**	**NELS**	**NLS72**	**HSB**	**NELS**	**Merged**
M	Black, Hispanic, or Native American	0.15	0.26	0.26				0.11	0.18	0.18	0.16
A	Grade Point Average (1)	2.79	2.46	2.56	2.79	2.45	2.53	3.20	2.97	3.04	3.05
	SAT-ACT Test Score Index (2)	820	737	788	818	736	786	972	898	932	930
	Class Rank Percentile	0.53	0.53	0.54	0.53	0.49	0.50	0.70	0.68	0.67	0.68
	Participated in High School Student Government	0.19	0.16	0.17	0.19	0.16	0.16	0.32	0.26	0.26	0.28
	Participated in High School Athletics	0.45	0.35	0.49	0.45	0.34	0.49	0.55	0.47	0.63	0.55
D	Female	0.50	0.50	0.50	0.50	0.50	0.50	0.48	0.53	0.53	0.52
	Parent's Income is Low (3)	0.27	0.22	0.25	0.27	0.19	0.26	0.17	0.14	0.12	0.14
	Parent's Income is High (4)	0.15	0.10	0.12	0.15	0.14	0.12	0.27	0.17	0.24	0.22
	Parent Attended College	0.44	0.53	0.59	0.44	0.53	0.59	0.65	0.75	0.77	0.73
	Socioeconomic Status Percentile (5)	0.51	0.49	0.49	0.51	0.49	0.49	0.65	0.56	0.66	0.62
H	High School Quality Index (6)	0.00	0.00	0.00	0.00	0.00	-0.03	0.30	0.41	0.35	0.36
	Private High School	0.08	0.09	0.09	0.08	0.09	0.09	0.11	0.17	0.16	0.15
N	High School is in a Metropolitan Statistical Area	0.67	0.68	0.70	0.67	0.68	0.70	0.74	0.72	0.76	0.74
	Income Per Capita in Neighborhood (7)	14,822	21,865	21,276	15,009	21,865	21,254	16,326	22,830	24,662	21,827
	Unemployment Rate Age 16+ in Neighborhood	0.07	0.10	0.07	0.07	0.10	0.07	0.07	0.10	0.06	0.08
	Percent with 12+ Years of Education (Age 25+) in Neighborhood	0.54	0.66	0.73	0.54	0.66	0.73	0.58	0.68	0.78	0.69
	Percent with 16+ Years of Education (Age 25+) in Neighborhood	0.11	0.15	0.18	0.11	0.15	0.18	0.14	0.17	0.23	0.18
I	In-State Student							0.75	0.74	0.68	0.72
S	College's Median Freshman SAT Score							1,025	969	993	992
E	College's Enrollment							9,018	9,767	9,291	9,398
P	College is Private							0.32	0.32	0.34	0.33
***Z* > 0**	Accepted by 4-Year College at Which Student Applies							0.89	0.90	0.84	0.88
Q	Best Application -- Median Freshman SAT Score	1,034	980	1,012				1,063	997	1,025	1,024
	Best Application -- Index of College Quality	0.34	0.31	0.49				0.58	0.46	0.62	0.55
	College Enrolled In -- Median Freshman SAT Score	1,010	951	983				1,031	963	997	992
	College Enrolled In -- Index of College Quality	0.12	0.05	0.25				0.30	0.16	0.38	0.27
Number of Observations		12,881	10,498	11,337	12,881	10,498	11,337	5,768	6,425	7,745	19,938

Notes:

(1) NLS72: self-reported; HSB: transcript (or self-report if missing); NELS: transcript.

(2) Imputed if neither test was taken using NCES-administered tests.

(3) NLS72: < $28K; HSB: < $30K; NELS: < $29K in 2005 Dollars.

(4) NLS72: > $84K; HSB: > $100K; NELS: > $107K in 2005 Dollars.

(5) Constructed by the U.S. Department of Education.

(6) The high school quality index is constructed using the first principal component from a principal component analysis based on the following characteristics (sign of weights in parentheses): pupil-teacher ratio (-), daily attendance rate (+), percent of students who dropout (-), percent of students in college preparation program (+), and percent of students who attend a 2- or 4-year college (+).

(7) 2005 Dollars. NLS: Neighborhood = School District; HSB: Neighborhood = County; NELS: Neighborhood = Zip Code of School District.

Table 2
Effect of Being a Minority Student on Colleges' Implicit Scoring of the Applicants (*Z*)

	Probit Coefficients (Robust Standard Errors)					
	(1)	(2)	(3)	(4)	(5)	(6)
Variable	**All 4-year Colleges**			**Colleges w/ Median SAT>=900**		
M = Underrepresented Minority	-1.913 ***			-2.500 ***		
	(0.610)			(0.748)		
M * 1972 Cohort		-2.005 **	-2.036 *		-2.079	-2.242
		(0.886)	(1.103)		(1.359)	(1.536)
M * 1982 Cohort		0.218	0.031		-1.407	-1.388
		(0.637)	(0.695)		(0.860)	(0.866)
M * 1992 Cohort		-3.493 ***	-3.373 ***		-3.543 ***	-3.787 ***
		(0.826)	(0.882)		(1.194)	(1.254)
M * College's Median SAT (00s)	0.245 ***			0.282 ***		
	(0.062)			(0.074)		
M * College's Median SAT (00s) * 1972 Cohort		0.248 ***	0.236 **		0.244 *	0.269 **
		(0.086)	(0.099)		(0.127)	(0.136)
M * College's Median SAT (00s) * 1982 Cohort		0.038	0.062		0.178 **	0.181 **
		(0.063)	(0.066)		(0.082)	(0.082)
M * College's Median SAT (00s) * 1992 Cohort		0.396 ***	0.380 ***		0.379 ***	0.387 ***
		(0.086)	(0.091)		(0.121)	(0.124)
M * Midwest Census Region	-0.439 **	-0.464 **		-0.506 **	-0.509 **	
	(0.200)	(0.200)		(0.229)	(0.232)	
M * Midwest Census Region * 1972 Cohort			0.400			-0.016
			(0.323)			(0.345)
M * Midwest Census Region * 1982 Cohort			-0.598 **			-0.590 **
			(0.231)			(0.251)
M * Midwest Census Region * 1992 Cohort			-0.610			-0.588
			(0.374)			(0.423)
M * South Census Region	-0.168	-0.141		-0.189	-0.180	
	(0.143)	(0.142)		(0.152)	(0.152)	
M * South Census Region * 1972 Cohort			-0.174			-0.684 *
			(0.327)			(0.353)
M * South Census Region * 1982 Cohort			-0.079			-0.160
			(0.210)			(0.223)
M * South Census Region * 1992 Cohort			-0.094			0.086
			(0.226)			(0.238)
M * West Census Region	-0.342 **	-0.324 **		-0.316 **	-0.301 *	
	(0.146)	(0.148)		(0.155)	(0.155)	
M * West Census Region * 1972 Cohort			-0.283			-0.592 *
			(0.292)			(0.310)
M * West Census Region * 1982 Cohort			-0.576 **			-0.475 *
			(0.231)			(0.247)
M * West Census Region * 1992 Cohort			-0.069			0.043
			(0.228)			(0.238)
M * Private College	-0.315 **	-0.299 **	-0.294 **	-0.153	-0.156	-0.161
	(0.149)	(0.146)	(0.146)	(0.164)	(0.165)	(0.164)
M * College's Enrollment (0,000s)	-0.068	-0.069	-0.072	0.039	0.033	0.037
	(0.075)	(0.077)	(0.080)	(0.082)	(0.083)	(0.085)
P-Value for Joint Significance of M*Region Variables	0.064 *	0.052 *	0.012 **	0.101	0.111	0.021 **
Number of Observations	19,938	19,938	19,938	15,813	15,813	15,813
Psuedo-R^2	0.21	0.21	0.22	0.21	0.21	0.22

Estimated using a probit regression. All regressions also include whether the student was in the same state as the college; the student's GPA, SAT/ACT index, class rank, student government and athletics participation, gender, low- and high- parental income, parent attend college, socioeconomic status, high school quality index, private college; neighborhood's metropolitan status, income per capita, unemployment rate, and percent of adults who completed high school and college; these same variables are interacted with the college's median SAT; and cohort dummy variables. Standard errors are clustered based on the applicant's ID to account for students who have multiple applications in the dataset.

Table 3
Effect of Distance on the Number of Students from School *h* Enrolling in College *j*

	NLS72		HSB		NELS	
Miles between *h* and *j*	-0.00302	***	-0.00286	***	-0.00277	***
	(0.00011)		(0.00010)		(0.00009)	
h and *j* in Same State	3.08	***	3.01	***	2.80	***
	(0.06)		(0.05)		(0.05)	
Ln(College Enrollees$_h$)	1.030	***	0.943	***	0.967	***
	(0.036)		(0.024)		(0.022)	
Ln(College Enrollment$_j$)	0.853	***	0.605	***	0.743	***
	(0.018)		(0.015)		(0.016)	
Constant	-13.8	***	-11.8	***	-12.7	***
	(0.2)		(0.2)		(0.1)	
Number of Observations	1,154,031		1,298,510		1,613,826	
Psuedo-R^2	0.354		0.331		0.321	

Negative binomial regression results.

Table 4
Variation in Neaby Affirmative Action

		(1) NLS72 All Students	(2) HSB All Students	(3) NELS All Students	(4) Merged All Students	(5) Merged Non-Minority Students	(6) Merged Minority Students
All HS Students	Mean AA	0.064	0.041	0.021	0.042	0.040	0.048
	Standard Deviation of AA	0.077	0.053	0.069	0.068	0.069	0.063
	Number of Observations	12,881	10,498	11,337	34,716	8,535	26,181
HS students with SAT/ACT >= 900.	Mean AA	0.047	0.024	0.025	0.033	0.032	0.038
	Standard Deviation of AA	0.052	0.030	0.047	0.045	0.046	0.041
	Number of Observations	4,254	2,730	3,703	10,687	9,760	927
Mean AA by Student's HS Region	Northeast	0.170	0.115	0.068	0.113	0.112	0.119
	Midwest	0.074	-0.005	-0.089	0.002	0.003	-0.007
	South	0.002	0.063	0.048	0.042	0.037	0.050
	West	0.009	0.004	0.064	0.021	0.017	0.029

Note: Based on results of the specification in Column 6 of Table 2, with marginal effects of being a minority applicant based on individual students' characteristics.

Table 5a
Effect of Nearby Affirmative Action on the Quality of Colleges at Which Students Apply and Enroll
Merged NLS72, HSB, and NELS Data

		Outcome							
		***Qi* = Best Application's Median Freshman SAT Score**		***Qi* = Best Application's Index of College Quality**		***Qi* = Enrolled College's Median Freshman SAT Score**		***Qi* = Enrolled College's Index of College Quality**	
Sample	**Variable**								
Non-Minority Applicants	Average Nearby Affirmative Action (θ_1)	-4.45	*	-0.08	***	-7.08	***	-0.08	***
		(1.96)		(0.02)		(1.91)		(0.02)	
	Average Nearby Median Freshman SAT Score or Index of College Quality (θ_2)	0.92	***	1.13	***	0.90	***	1.05	***
		(0.06)		(0.04)		(0.05)		(0.04)	
	Number of Observations	10,700		10,700		10,330		10,330	
	R^2	0.399		0.438		0.378		0.413	
Minority Applicants	Average Nearby Affirmative Action (θ_1)	1.17		-0.03		5.45		-0.07	*
		(4.84)		(0.03)		(5.42)		(0.04)	
	Average Nearby Median Freshman SAT Score or Index of College Quality (θ_2)	0.85	***	1.05	***	0.67	***	1.01	***
		(0.15)		(0.11)		(0.16)		(0.11)	
	Number of Observations	2,789		2,789		2,486		2,493	
	R^2	0.293		0.353		0.287		0.366	

Average nearby affirmative action computed based on results using the specification in Column 6 of Table 2 (converted into standard deviation units). All regressions also include the student's GPA, SAT/ACT index, class rank, student government and athletics participation, gender, low- and high- parental income, parent attend college, socioeconomic status, high school quality index, private high school; and neighborhood's metropolitan status, income per capita, unemployment rate, percent of adults who completed high school and college, and cohort dummies.

"***", "**", and "*" indicate two-tailed significance at the 1%, 5%, and 10% levels.

Table 5b
Effect of Nearby Affirmative Action on the Quality of Colleges at Which Students Apply and Enroll
Merged NLS72, HSB, and NELS Data -- Restricted to Students with SAT/ACT score >= 900

		Outcome							
		***Qi* = Best Application's Median Freshman SAT Score**		***Qi* = Best Application's Index of College Quality**		***Qi* = Enrolled College's Median Freshman SAT Score**		***Qi* = Enrolled College's Index of College Quality**	
Sample	**Variable**								
Non-Minority Applicants	Average Nearby Affirmative Action (θ_1)	-4.75		-0.13	***	-10.60	**	-0.14	***
		(3.58)		(0.03)		(3.81)		(0.03)	
	Average Nearby Median Freshman SAT Score or Index of College Quality (θ_2)	1.05	***	1.29	***	1.02	***	1.17	***
		(0.08)		(0.06)		(0.07)		(0.06)	
	Number of Observations	6,647		6,647		6,625		6,625	
	R^2	0.379		0.432		0.351		0.400	
Minority Applicants	Average Nearby Affirmative Action (θ_1)	-14.61		-0.34	**	-21.09		-0.29	***
		(13.93)		(0.12)		(14.84)		(0.11)	
	Average Nearby Median Freshman SAT Score or Index of College Quality (θ_2)	1.09	***	1.61	***	1.24	***	1.39	***
		(0.30)		(0.21)		(0.34)		(0.23)	
	Number of Observations	679		679		677		677	
	R^2	0.302		0.359		0.311		0.322	

Average nearby affirmative action computed based on results using the specification in Column 6 of Table 2 (converted into standard deviation units). All regressions also include the student's GPA, SAT/ACT index, class rank, student government and athletics participation, gender, low- and high- parental income, parent attend college, socioeconomic status, high school quality index, private high school; and neighborhood's metropolitan status, income per capita, unemployment rate, percent of adults who completed high school and college, and cohort dummies.

"***", "**", and "*" indicate two-tailed significance at the 1%, 5%, and 10% levels.

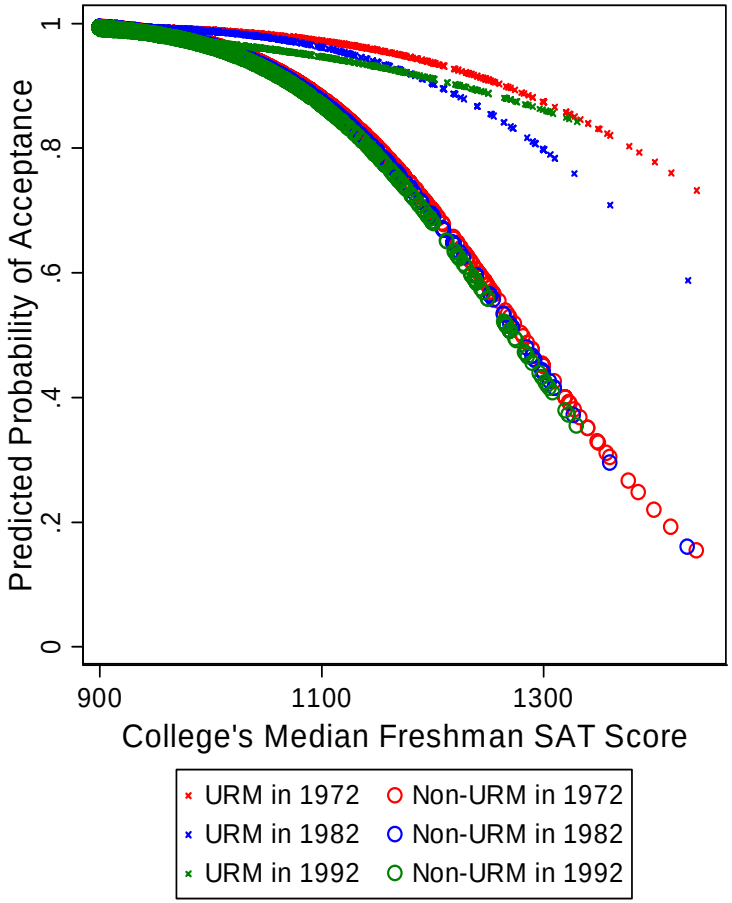
Table 6
Marginal Effect of Nearby Affirmative Action on Whether the Student Applies to a 4-Year College, and Whether the Student Applies to More Than One 4-Year College
Merged NLS72, HSB, and NELS Data

		Applied to a 4-year College			*Applied to More Than One 4-Year College*			
Sample	**Variable**	**All High School Students**	**High School Students with SAT/ACT >= 900**		**All 4-Year College Applicants**	**4-Year College Applicants with SAT/ACT >= 900**	**4-Year College Applicants with SAT/ACT >= 1000**	
Non-Minority Students	Average Nearby Affirmative Action (ρ_1, τ_1)	0.25%	1.82%		-0.35%	1.70%	7.80%	**
		(0.66%)	(1.44%)		(1.28%)	(2.35%)	(3.41%)	
	Average Nearby Median Freshman SAT (ρ_2, τ_2)	-0.01%	0.05%	*	0.14% **	0.14%	0.06%	***
		(0.02%)	(0.03%)		(0.03%)	(0.04%)	(0.05%)	
	Number of Observations	26,181	9,760		10,685	6,638	4,366	
	R^2	0.329	0.222		0.086	0.074	0.069	
Minority Students	Average Nearby Affirmative Action (ρ_1, τ_1)	2.05%	** 2.43%		-1.81%	1.48%	-1.78%	
		(0.97%)	(4.22%)		(2.32%)	(6.65%)	(11.89%)	
	Average Nearby Median Freshman SAT (ρ_2, τ_2)	-0.06%	* 0.04%		0.19% **	0.13%	0.16%	
		(0.03%)	(0.09%)		(0.07%)	(0.13%)	(0.19%)	
	Number of Observations	8,535	927		2,783	679	342	
	R^2	0.232	0.235		0.105	0.118	0.158	

Average nearby affirmative action computed based on results using the specification in Column 6 of Table 2 (converted into standard deviation units). All regressions also include the student's GPA, SAT/ACT index, class rank, student government and athletics participation, gender, low- and high- parental income, parent attend college, socioeconomic status, high school quality index, private high school; and neighborhood's metropolitan status, income per capita, unemployment rate, percent of adults who completed high school and college, and cohort dummies.

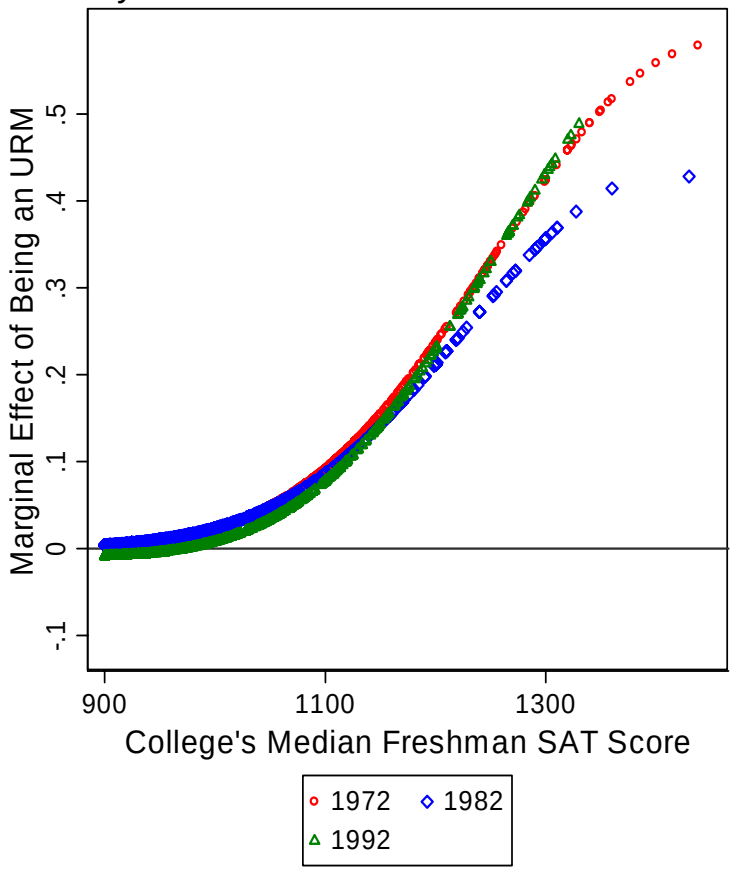
"***", "**", and "*" indicate two-tailed significance at the 1%, 5%, and 10% levels.

Figure 1
Predicted Probability of Acceptance
by Median Freshman SAT, Cohort, and Race



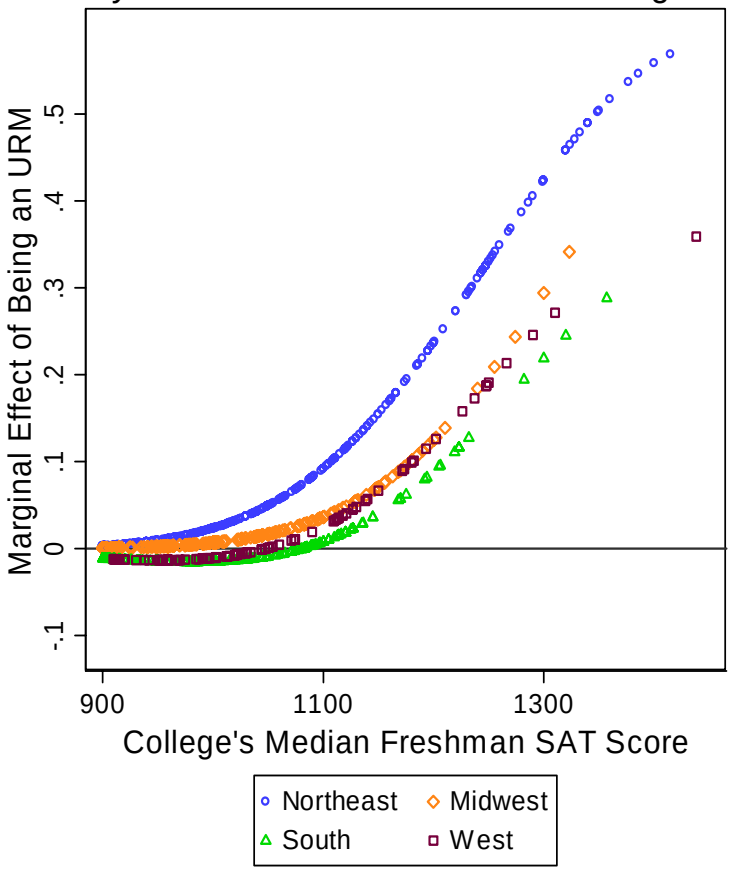
Note: Calculations are based on the specification in Column 6 of Table 2 using the mean characteristics of 4-year college applicants whose SAT-ACT composite score was greater than or equal to 900 (with college characteristics set equal to public, Northeast college with enrollment = 5,000).

Figure 2
Predicted Marginal Effect of Being an URM
on Probability of Acceptance
by Median Freshman SAT and Cohort



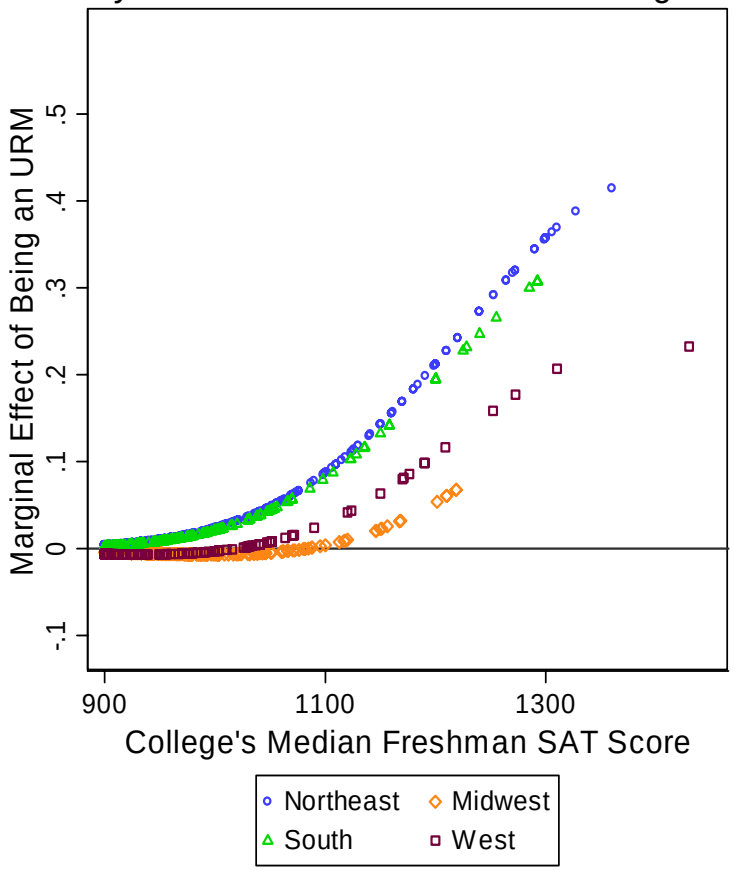
Note: Calculations are based on the specification in Column 6 of Table 2 using the mean characteristics of 4-year college applicants whose SAT-ACT composite score was greater than or equal to 900 (with college characteristics set equal to public, Northeast college with enrollment = 5,000).

Figure 3
Predicted Marginal Effect of Being an URM
on Probability of Acceptance in 1972
by Median Freshman SAT and Region



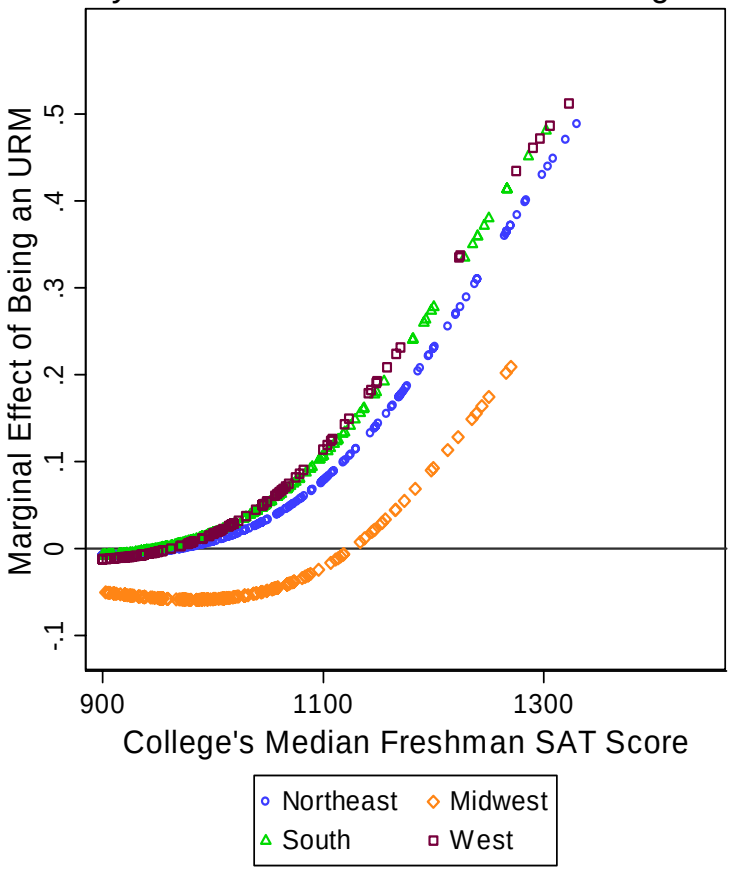
Note: Calculations are based on the specification in Column 6 of Table 2 using the mean characteristics of 4-year college applicants whose SAT-ACT composite score was greater than or equal to 900 (with college characteristics set equal to a public college with enrollment = 5,000).

Figure 4
Predicted Marginal Effect of Being an URM
on Probability of Acceptance in 1982
by Median Freshman SAT and Region



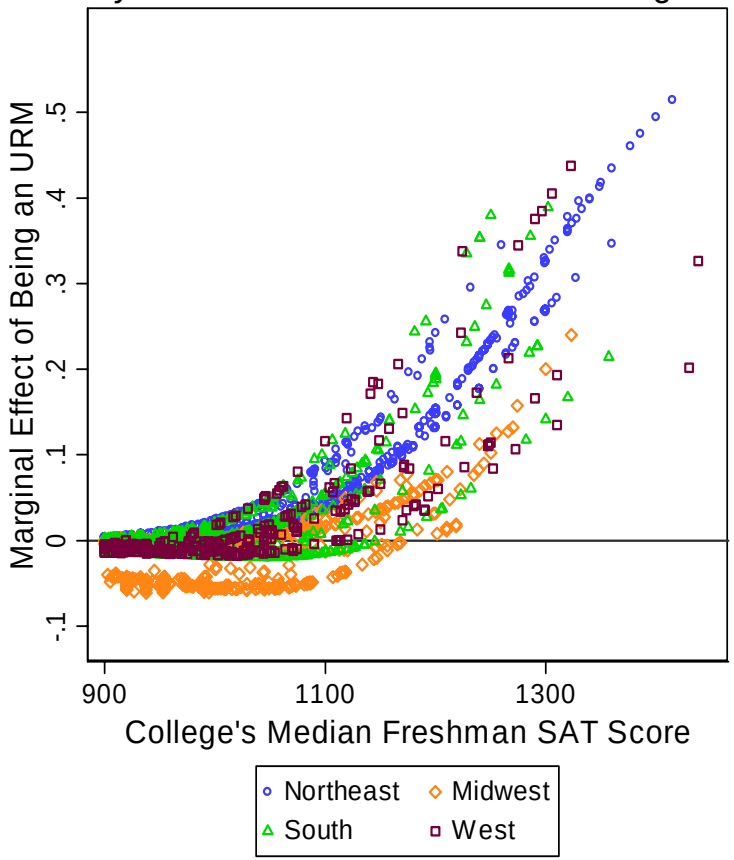
Note: Calculations are based on the specification in Column 6 of Table 2 using the mean characteristics of 4-year college applicants whose SAT-ACT composite score was greater than or equal to 900 (with college characteristics set equal to a public college with enrollment = 5,000).

Figure 5
Predicted Marginal Effect of Being an URM
on Probability of Acceptance in 1992
by Median Freshman SAT and Region



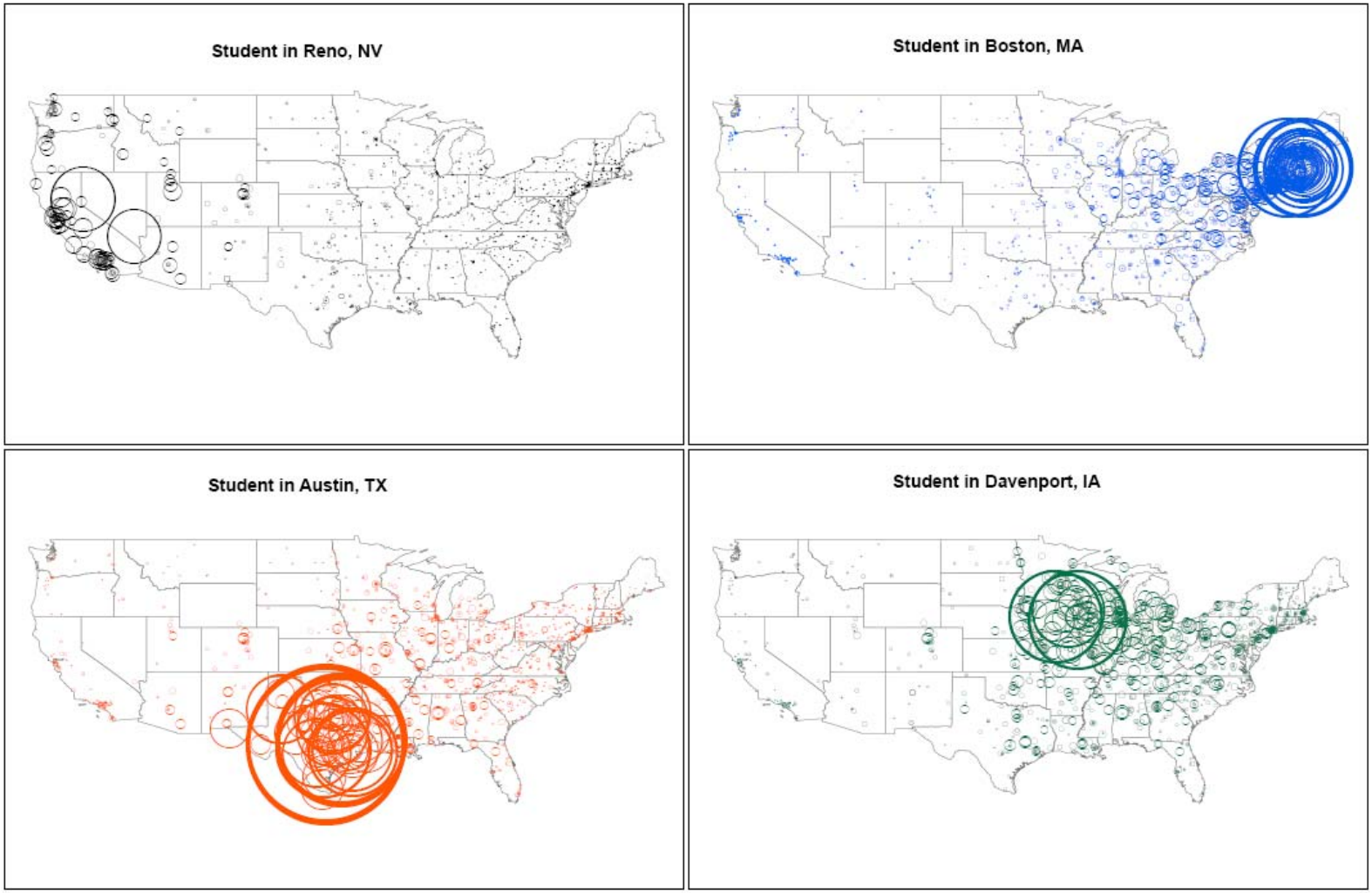
Note: Calculations are based on the specification in Column 6 of Table 2 using the mean characteristics of 4-year college applicants whose SAT-ACT composite score was greater than or equal to 900 (with college characteristics set equal to a public college with enrollment = 5,000).

Figure 6
Predicted Marginal Effect of Being an URM
on Probability of Acceptance
for Colleges in 1972, 1982, and 1992
by Median Freshman SAT and Region



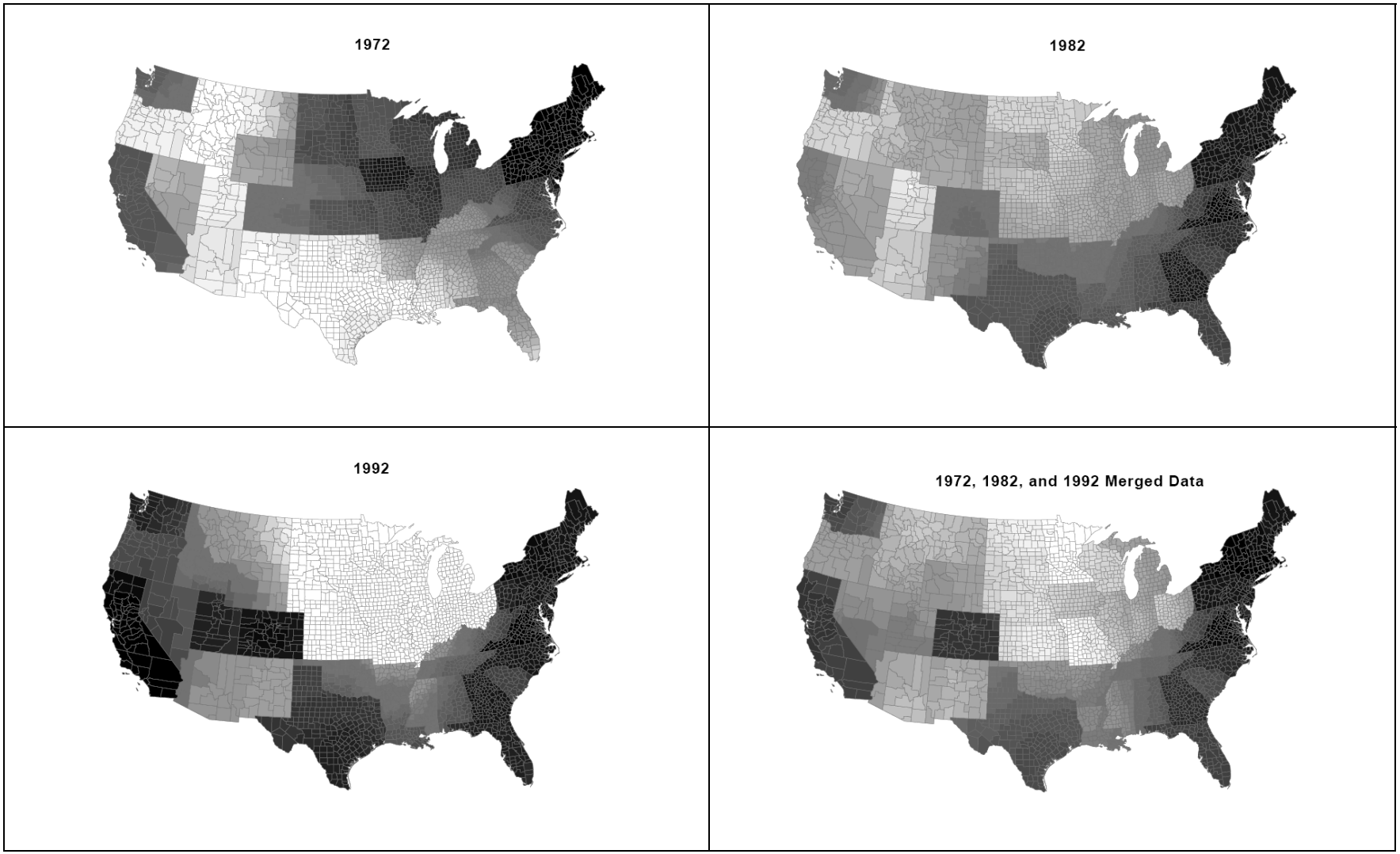
Note: Calculations are based on the specification in Column 6 of Table 2 using the mean characteristics of 4-year college applicants whose SAT-ACT composite score was greater than or equal to 900 (using actual college characteristics).

Figure 7
Weights Assigned to Colleges for Hypothetical Students Living in Various Cities



Note: The size of each circle is proportional to the size of the weight assigned to the college. If weight is less than three, the college is represented by a single dot. Weights determined using NELS student data and Barrons (1992).

Figure 8: Average Nearby Affirmative Action by County



Note: Darker values indicate higher levels of nearby affirmative action. Computed using the average characteristics of 4-year college applicants. County boundaries are defined using the 2000 Census. Gray scale breaks determined by the 25 quantiles of the distribution of county-level average affirmative action using the combined data from 1972, 1982, and 1992.