The Impact of Affirmative Action Bans on the Enrollment of Students of Color in Graduate Studies

Thesis Proposal

Submitted by

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March, 2009

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Abstract

Graduate education is a key pathway to important areas of influence in our nation and the training ground for specialized knowledge critical to individual, national, and global success. Students of color, however, remain severely underrepresented at graduate schools. While 15 percent of the U.S. population is Latino, this group constituted only 6 percent of the entire graduate student population in 2006. Additionally, of all the doctoral degrees conferred in 2005, only 3 percent were granted to Latinos; another 6 percent were conferred to African Americans, who make up 14 percent of the total population (U.S. Census Bureau, 2008; Planty *et al.*, 2008). The disparities are even starker within particular fields of study. Enrollment figures for 2006 in science and engineering, critical fields to the economic competitiveness of the U.S., reveal that Latinos and African Americans each constitute only 4 percent of the students (NSF, 2008).

Currently, statewide affirmative action bans in five states threaten the ability of higher education institutions to address this underrepresentation. These bans prohibit the considerations of race or ethnicity as a factor in admissions, which the U.S. Supreme Court has in fact held constitutionally permissible for increasing student body diversity (*Grutter v. Bollinger* (2003)). Following the implementation of these bans in several states, research has documented a decline in the admission and enrollment of students of color at more selective *undergraduate* institutions in these states and in the professions of law and medicine. However, to date, no empirical study has documented the impact of the same bans on student of color enrollment in graduate fields of study, where one would also anticipate an impact in light of the selective admissions processes of graduate schools and the fact that they have employed race-conscious policies to increase

racial/ethnic student body diversity (Attiyeh & Attiyeh, 1997; Dugan *et al.* 1996). With my proposed thesis research, I will address this gap using an approach that supports causal inference.

Specifically, I will treat the impact of policies that banned the use of affirmative action in public higher education institutions in four states—Texas (*Hopwood v. State of Texa*s), California (Proposition 209), Washington (Initiative 200), and Florida (One Florida Initiative)—as natural experiments. I will utilize these exogenous changes in policy, or affirmative action bans, to estimate their causal impact on enrollment rates of student of color in *graduate studies* at public institutions in these states. I will focus my analysis across, and within, eight fields that represent a cross-section of graduate studies in which admissions practices are generally selective—biological sciences, business, education, engineering, health sciences, humanities, physical sciences, and the social sciences. I will also investigate whether the impact of the affirmative action bans differs by disciplines because the need to consider race or ethnicity as a factor in admissions may vary by discipline given differences in program selectivity, emphasis on standardized testing, and student of color representation by field. I propose to use aggregate data from the *CGS/GRE Survey of Graduate Enrollment and Degrees*, the only annual survey to cover these graduate fields of study, and data from the *U.S. Census Bureau* and *Bureau of Labor Statistics* on state demographics and labor market conditions to address my questions with a difference-in-differences strategy to identify the causal effect of the bans.

With this proposed study, I seek to inform the public policy debate, should additional states adopt bans on affirmative action in higher education. Given the critical role that graduate schools play in training leaders, scholars, and professionals, institutions and policymakers should consider the long-term impact such policies can have on our nation's leadership, economic health, and democratic ideals.

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The Impact of Affirmative Action Bans on the Enrollment of Students of Color in Graduate Studies

Graduate education is a key pathway to important areas of influence in our nation and the training ground for acquiring specialized knowledge critical to individual, national, and global success. In today's increasingly diverse society, the legitimacy and strength of our democratic form of government depend on equitable access to graduate institutions for individuals from all races and ethnicities (*Grutter v. Bollinger*, 2003). Yet, despite recent increases in overall enrollment (CGS, 2008), students of color remain severely underrepresented in graduate school. While 15 percent of the U.S. population is Latino, this group constituted only 6 percent of the entire graduate student population in 2006. Additionally, of all the doctoral degrees conferred in 2005, only 3 percent were granted to Latinos; another 6 percent were conferred to African Americans, who make up 14 percent of the total population (U.S. Census Bureau, 2008; Planty *et al.*, 2008). Disparities are even starker *within* particular fields of study. For instance, enrollment statistics for 2006 in science and engineering, fields critical to the economic competitiveness of the United States, reveal that Latinos and African Americans each constitute only 4 percent of students (NSF, 2008). These disparities are even more troubling when we consider that racial and ethnic minorities are projected to make up 54 percent of the population by midcentury (U.S. Census Bureau, 2008).

In addition, statewide bans on affirmative-action in higher education in five states—California, Florida, Michigan, Washington, and most recently, Nebraska—threaten the ability of higher education institutions to address these concerns because they prohibit the consideration of an applicant's race or ethnicity as a factor in the admissions decision. Institutions have long sought to defend affirmative action efforts as a way of increasing the racial and ethnic diversity

of their student bodies (Bowen & Bok, 1998). And, although the U.S. Supreme Court upheld the constitutionality of considering race in admissions in a 2003 decision, *Grutter v. Bollinger*, public controversy over such race-conscious measures remains (Mangan, 2008). In the meantime, research conducted after the banning of affirmative action in Texas, California, Washington, and Florida has documented a decline in the admission and enrollment of students of color at the more selective *undergraduate* institutions in each state (Chapa & Lazaro, 1998; Colburn, Young & Yellen, 2008; Cross & Slater, 2002; Finnell, 1998; Karabel, 1998; Kaufmann, 2007; Tienda *et al.*, 2003) as well as in the professions of law and medicine (Chapa & Lazaro, 1998; Guerrero, 2002; Karabel, 1998).

Despite this research on the impact of affirmative action bans at the undergraduate level, no research has investigated the impact of banning affirmative-action either at the graduate level (outside the professional fields of law or medicine) or within specific graduate fields or disciplines. Because of the selective admission practices of graduate schools and the documented use of race-conscious admissions practices across fields (Attiyeh & Attiyeh, 1997; Dugan *et al.* 1996), one might anticipate that a policy banning the consideration of race as a factor in admissions would also impact the enrollment of graduate students of color. In my dissertation, I propose to conduct such research using an approach that supports causal inference.

Specifically, I propose to treat the imposition of the affirmative action bans in four states—Texas (after *Hopwood v. State of Texas*), California (with Proposition 209), Washington (with Initiative 200), and Florida (with the One Florida Initiative)—as natural experiments. Arguing that these policy changes were implemented exogenously, I will estimate the causal impact of the bans on the rates of enrollment of students of color in graduate studies at public institutions in these states, using a difference-in-differences strategy. In estimating the overall

impact of affirmative action bans in the public institutions in these four states, I propose to focus on eight substantive fields that represent a cross-section of graduate academic disciplines—biological sciences, business, education, engineering, health sciences, humanities, physical sciences, and the social sciences. I propose to focus on these fields not only because they represent areas of specialized training that are important for our nation's progress (NSF, 2008) but also because they have admissions practices that are generally selective. I will estimate the causal impact of affirmative action bans on graduate enrollment both across, and within, these disciplines. Because there are no individual-level data publicly available on my problem area, I propose to analyze data that have been aggregated to the level of academic discipline from the *CGS/GRE Survey of Graduate Enrollment and Degrees*. The *CGS/GRE Survey* is the only annual survey that collects data on graduate student enrollment in these fields of study. In addition, I will merge data from the *U.S. Census Bureau* and *Bureau of Labor Statistics* on state demographics and labor market conditions.

Background and Context

Bans on Affirmative Action in Admission to Higher Education

The debate surrounding the use of race-based affirmative action has had a long history at higher education institutions, where leaders have sought to implement its use as a tool for increasing the representation of students of color on campus (Bowen & Bock, 1998). These efforts to employ affirmative action, however, have also been the target of legal challenges and public controversy. Sustained efforts by the higher education community to defend their practices culminated in 2003 when, in *Grutter v. Bollinger*, the U.S. Supreme Court upheld the right of higher education institutions to consider race in their admissions decisions. In its

rationale, the Court emphasized the need for colleges and universities to consider race "in a society, like our own, in which race unfortunately still matters," not only so the institution could obtain the educational benefits of student body diversity but also "to cultivate a set of leaders with legitimacy in the eyes of the citizenry." The Court thus emphasized the important role that colleges and universities play as a training ground for the future leaders of our nation, and endorsed the use of carefully implemented race-conscious policies as a tool for increasing the representation of students of color and for furthering institutional missions.

The Court's decision in *Grutter* came at a time of mixed public support for race-based affirmative action. When the Court issued its decision, bans on race-based policies in education were already in place in four states: Texas, California, Washington, and Florida. The ban in Texas had been implemented because of a Fifth Circuit opinion that prohibited the consideration of race in higher education admissions (*Hopwood v. State of Texas* (1996)); the bans in California, Washington and Florida were the result of voter-approved state-wide ballot measures or executive orders that prohibited the consideration of race in employment, education and contracting decisions in public institutions in the state. The ban in Texas was in place from 1997 until 2003, when the Court's decision in *Grutter* overruled *Hopwood*. The bans in California, Washington and Florida have been in effect since 1998, 1999, and 2000, respectively.[1]

After *Grutter*, controversy over affirmative action continued, with voters in Michigan approving a state-wide affirmative action ban in 2006, and most recently, in Nebraska in 2008. Thus, currently, there are five states that prohibit affirmative action: California (with Proposition 209), Washington (with Initiative 200), Florida (with the One Florida Initiative), Michigan (with Proposal 2), and Nebraska (with Initiative 424). In my thesis research, I propose to investigate

[1] When issued, *Grutter* overruled the ban in Texas but did not reverse the bans in California, Washington and Florida; this occurred because *Grutter* was a federal court decision that applied nationally (and superseded court-based decisions such as *Hopwood*) but did not supersede ballot measures or executive orders.

the impact of the implementation of the affirmative action bans in three of these states—California, Washington and Florida—because these are the states in which the bans have been in place long enough to determine their impact. In addition, I propose to examine the impact of the ban that was implemented in Texas in 1997 (and remained in place until 2003, again providing me with sufficient data to examine the impact). In *Appendix A*, I list various state policies and court decisions relevant to my proposed research with respective dates for when each policy became effective.

Impact of Affirmative Action Bans on the Admission and Enrollment of Students of Color

After bans on affirmative action were implemented in Texas (1997), California (1998), Washington (1999), and Florida (2000), research began to document a decline in the admission and enrollment of students of color at the more selective *undergraduate* institutions in these states. Previously, simulation studies had predicted that undergraduate enrollment would fall among students of color in the absence of affirmative action policies. Bowen & Bok (1998), for example, estimated that at selective colleges and universities, the percentage of African Americans in incoming classes would decline from 7.1 percent to 3.6 percent; and Espenshade & Chung (2005) estimated that at highly selective private research universities, the proportion of admitted African American and Latino students would decline from 9 percent to 3.3 percent and 7.9 percent to 3.8 percent, respectively. Other studies had reached similar conclusions (Kane, 1998; Long, 2004a).

The findings of subsequent empirical studies at the undergraduate level have been consistent with these simulation findings. After *Hopwood's* ban of affirmative action in Texas, for instance, Tienda *et al.* (2003) documented a decline in the percentage of African American

and Latino student enrollment at the state's two most selective institutions, University of Texas (UT) Austin and Texas A&M, with enrollment dropping by about 1 percent among African Americans at Texas A&M and UT Austin, and dropping by over 2 percent (from 15.8 percent to 13.7 percent) among Latinos at UT Austin between 1997-2000 (see also Chapa & Lazaro, 1998; Finnell, 1998). Other studies also documented sharp declines in both California and Florida, with the proportion of underrepresented minority students halving at the University of California at Berkeley immediately after the affirmative action ban (Colburn, Young & Yellen, 2008; Cross & Slater, 2002; Karabel, 1998; Kaufmann, 2007).

Though these studies have documented declines in minority enrollment, the research did not control for unobserved factors that may have affected minority enrollment inadvertently. Their findings therefore cannot support causal interpretation. But, other studies, using methodologies that can support causal inference, have examined the effect of affirmation action bans on the college *application* behavior of students. For instance, Dickson (2006) found a decline in the number of minority students who took college entrance exams once affirmative action was banned in Texas, while Long (2004) documented a large decrease in the number of SAT score reports that minorities sent to selective colleges in California and Texas. Card and Krueger (2004), however, found that highly qualified African American and Latino students did not change their submission of SAT scores to elite public institutions in either state.

At the *graduate* level, simulation studies have also predicted declines in enrollment among students of color when race ceases to be considered in admissions decisions. In a study of admission into graduate management education programs, Dugan *et al.* (1996) estimated that failing to consider race during the admissions process (for applicants who registered for the GMAT between 1990-1991) would reduce the probability of acceptance among African

Americans from 70 percent to 52 percent and among Latinos from 78 percent to 60 percent. In an investigation of law school admissions, Wightman (1997) projected that, at the twenty-five to thirty most selective law schools, the first-year enrollment of African American students in 2000 would decline from 6.5 percent to less than 1 percent (see also Cross & Slater, 1997). After affirmative-action bans were established, empirical research documented actual declines of these magnitudes in the enrollment of students of color in law and medical schools (Chapa & Lazaro, 1998; Guerrero, 2002; Karabel, 1998).

Just as in the fields of law and medicine, one might anticipate bans on affirmative action to impact the graduate enrollment of students of color, given prior research that has documented the existence of race-conscious admissions practices across various graduate fields of study (Attiyeh & Attiyeh, 1997; Dugan *et al.*, 1996). One might also anticipate the impact of the bans, if any, to differ by field of study because of heterogeneity in admissions practices across disciplines. That is, logically, the impact of race as a factor in admission (and consequently the impact of banning it) may differ across programs that are more selective and rely more heavily on standardized tests. This is because students of color are generally underrepresented at higher percentiles on standardized tests and generally overrepresented at lower percentiles (see, e.g., Bowen & Bok, 1998). Consideration of race in admission, and its impact on enrollment, may also be more relevant in fields where students of color are more underrepresented.

Conclusion: Research Questions

To date, no empirical research has addressed the effects of affirmative action bans at graduate school, or by field of study. This gap in the research is not surprising, however, given the specialized nature of graduate education, where admissions considerations differ by

discipline, and the limited sources of data for tracking graduate student enrollment consistently by field. I have negotiated access to the only large-scale data that are available on this topic and, even though these data have been aggregated to the level of discipline, I propose to address this important policy question in my thesis. My specific research questions are:

1) *Did the elimination of affirmative action in Texas, California, Washington and Florida reduce the enrollment of students of color into graduate studies at public institutions in these states?*
2) *Did the impact of eliminating affirmative action on the enrollment of students of color into graduate studies, if any, differ across the fields of biological sciences, business, education, engineering, health sciences, humanities, physical sciences, and the social sciences?*

For the reasons outlined above, I anticipate that banning affirmative action will reduce the enrollment of students of color in graduate school. I also anticipate that any decline in the enrollment of students of color will be greater in fields that place a greater emphasis on standardized testing and where students of color are generally more underrepresented, such as the biological sciences, engineering, health sciences, and physical sciences, compared to the fields of business, education, humanities, and social sciences (CGS, 2008; NSF, 2008).

Research Design

In my proposed research, I will use a difference-in-differences strategy to estimate the impact of bans in affirmative action on the rates of enrollment of students of color in my key states. The difference-in-differences strategy treats the bans in these states as exogenous policy disruptions and uses a “before” and “after” comparison to estimate the effect, adjusting for

secular changes in enrollment that could have taken place irrespective of the affirmative action bans by comparisons to enrollment rates in similar fields of studies in states not affected by bans. I will use standard multilevel regression methods to implement the proposed strategy. Effectively, in specifying my regression models, I subtract a pair of mean differences—referred to as the "first" and "second" differences—from each other to obtain an estimate of the causal impact of the policy disruption. The "first difference" will compare enrollment rates before and after the affirmative action bans were put into place, incorporating four years of pre- and post-ban enrollment data. This difference will indicate whether there was a change in enrollment associated with the onset of the affirmative action ban. If the affirmative action ban did indeed have an impact on the enrollment rates of students of color, then I anticipate that I will see a decline in the enrollment rates after the policy went into effect.

However, because enrollment rates may differ from year to year for other reasons (due to changes in demographics or labor market conditions, for example), this estimated "first difference" may also contain the impact of these "secular" changes. Thus, I will also use a "second difference" to capture these external influences and I will specify my regression models to effectively remove this "second difference" from the "first difference." I will estimate this second difference by taking advantage of a comparison group made up of students in the same graduate fields of study who lived in states with similar demographics and labor markets but where affirmative action bans were not implemented over the same period. Because those students were in states that did not prohibit affirmative action, I can attribute changes in the enrollment rates of students of color over the same period to the general underlying trends rather than to the affirmative action bans. Then, when I subtract the second difference from the first

difference, I am left with a plausible estimate of the impact of the affirmation action ban on the enrollment rates of students of color across, or within, the disciplines.

Dataset

I will use aggregate data on student enrollment rates by discipline from the *CGS/GRE Survey of Graduate Enrollment and Degrees,* a national survey co-sponsored by the *Council of Graduate Schools* and *Graduate Record Examinations Board*, and the only annual survey that collects enrollment information across all fields of graduate study. I have negotiated access to this dataset with the *Council of Graduate Schools*, which has provided me with the enrollment data after removing institutional identifying information to protect confidentiality.

The *CGS/GRE* dataset contains aggregate program-level enrollment data, by race and ethnicity, in 49 distinct fields of study (see *Appendix B*) from approximately 500 graduate-level institutions that have responded consistently to the survey over the last two decades (1986-2006). The participating institutions are representative of all of the graduate programs in our nation; they grant approximately 90 percent of doctorates awarded each year in the United States and 75 percent of the nation's master's degrees (CGS, 2008). Because the dataset provides aggregate enrollment information at each institution—by discipline—the *unit of analysis* in my proposed research will be *discipline within institution.* I will merge the *CGS/GRE* data with information on state demographics and labor market conditions from the *U.S. Census Bureau* and *Bureau of Labor Statistics* so that I can also control for other state-level time-varying characteristics that may have influenced enrollment in graduate studies during the time periods under investigation and to increase the precision of my analyses.

Sample

I will include in my sample 77 graduate institutions in my four key states (California, Florida, Texas, and Washington) and 137 institutions in my comparison group (Arizona, Colorado, Georgia, Illinois, Massachusetts, Michigan, New Jersey, New York, North Carolina, Pennsylvania, Ohio, and Virginia). Data on the institutions in my key states allow me to estimate the "first difference" in my analysis; those in the comparison group provide for the estimation of the "second difference" to account for any secular trends in enrollment rates. I have selected the particular states in my comparison group because the breath of graduate programs in these states, their demographic characteristics, levels of educational attainment, and labor markets (measured by per capita income and unemployment rate) are comparable to those in my key states (see *Appendix C*). I will refine this list of states as I learn more about the policies, contexts, and appropriateness of each state as a comparison and discuss the selection with my committee.

I will include in my sample, disciplines that fall within the biological sciences (*n*=196), business (*n*=362), education (*n*=876), engineering (*n*=439), health sciences (*n*=142), humanities (*n*=646), physical sciences (*n*=564), and the social sciences (*n*=579) (see *Appendix D* for sample sizes by state and across fields). My power analyses suggest that the total sample of 214 institutions and approximately 17 areas of study per institution (3,804 total observations across all fields in institutions across all states) will provide moderate power (.80) to detect an effect size of about 11 percent of a standard deviation.[2] In my sample, I will include each field of

[2] This analysis corresponds to an alpha-level of .05, an intra-class correlation of .05, and covariates that explain 30 percent of the variance (a reasonable estimate based on the proposed covariates in this study and the findings from my Qualifying Paper (Garces, 2009)). The effect size corresponds approximately to effect sizes documented in prior studies (.10 of a standard deviation) examining the impact of affirmative action bans on black students' college application behavior (Dickson, 2006). Notably, these estimates do not consider the multiple time periods that I will consider in my analysis.

study/discipline within an institution over an eight-year period: four years before the implementation of the affirmative action ban and four years after. I have adopted this eight-year "analytic window" to increase the number of observations present in my sample (enhancing the statistical power of my analysis), while straddling and staying close to the policy enactment date to isolate the effect of the change.

Measures

For my outcome variable, *MINENRL*, I will create a continuous variable to measure the percentage of historically underrepresented graduate students of color within a given discipline at a given institution in a given year. I define "underrepresented students of color" as African Americans, Latinos, and Native Americans/Alaska Natives. I exclude Asian Americans because the percentage of Asian Americans at selective colleges and within certain graduate fields of study, such as science and engineering, is larger than their percentage of the population at large (NSF, 2008).

For my main question predictors, I will create a dummy variable, *KEYSTATE*, which I will code 1 if the field of study or discipline is at an institution in a key state (Texas, California, Washington, and Florida); and 0 otherwise (Arizona, Colorado, Georgia, Illinois, Massachusetts, Michigan, New Jersey, New York, North Carolina, Pennsylvania, Ohio, and Virginia). I will also create a second dummy variable, *AFTER*, indicating whether the value of the enrollment rate outcome was obtained after the respective affirmative action ban took effect, coded to identify the year the policy took effect in each respective state. Thus, *AFTER*=1 if the state is Texas and the year is 1997 (and after), if the state is California and the year is 1998 (and after), if the state is Washington and the year is 1999 (and after), and if the state is Florida and year is 2000 (and

after); and =0 otherwise. I will also create a series of dummy variables for the eight disciplines/fields that I propose to distinguish in my analyses.

To increase the precision of my impact estimates, I will also incorporate selected covariates into my analyses (see *Appendix E*). I will create control variables to represent: (1) enrollment characteristics in a field of study (percentage of enrolled students who are full-time, U.S. citizens/residents, and those who are female); (2) institutional characteristics, such as *Carnegie Classification* (Doctoral/Research University Intensive/Extensive or Masters and Specialized);[3] and (3) selected time-varying state characteristics, such as racial demographics (percent of the population by race), educational attainment (percent of the population 25 years and over with a bachelor's degree), and economic indicators (unemployment rate for 25-34 year olds and per capita income). I will also include a vector of dichotomous predictors to account for state fixed effects (to control for all time-invariant differences, observed and unobserved, among states), and year-of-ban fixed effects (to account for chronological differences in the years in which the affirmative action bans were implemented).

Data Analyses

Research Question 1: Did the elimination of affirmative action in Texas, California, Washington and Florida reduce the enrollment of students of color into graduate studies at public institutions in these states?

To address this question, I will fit the following multilevel statistical model, treating aggregate enrollment rates as my outcome:

[3] These variables include the institutional-level characteristics in my dataset. Because the *Council of Graduate Schools* provided the dataset without institutional identifying information to protect confidentiality, I am unable to incorporate additional characteristics that could also influence enrollment. I discuss these limitations below.

$$MINERL_{tdj} = \beta_0 + \beta_1(AFTER_{dj} * KEYSTATE_{tdj}) + \beta_2 AFTER_{dj} +$$

$$\beta_3 KEYSTATE_{tdj} + \beta_4 X_{tdj} + \beta_5 W_{tj} + \beta_6 Z_t + \delta_s + \alpha_y + (\varepsilon_{tdj} + u_j) \quad (1)$$

at time *t,* for graduate field of study/discipline *d*, within institution *j*. Variables X_{tdj}, W_{tj}, and Z_t represent vectors of selected field of study enrollment characteristics, institutional, and time-varying state control characteristics, respectively; δ_s and α_y represent state and year-of-ban fixed effects, respectively;[4] ε_{tdj} is a time- and discipline-level residual and u_j is an institutional-level residual. The presence of the state fixed effects accounts for the lack of independence among observations within a state; the presence of the institutional random effects accounts for the clustering of disciplines within an institution, over time.

Parameter β_1 is the principle coefficient of interest in this hypothesized model because it represents the difference-in-differences effect of banning affirmative action in graduate studies. If its estimated value is non-zero, negative and statistically significant, then I will interpret the result as suggestive evidence that, on average across disciplines, institutions and states, affirmative action bans reduced enrollment rates in graduate studies among student of color. During my analyses, I propose to refine this basic model and investigate the sensitivity of my findings to potential threats to validity (described below).

Research Question 2: Did the impact of eliminating affirmative action on the enrollment of students of color into graduate studies, if any, differ across the fields of biological sciences,

[4] During my orals, I plan to discuss with committee whether I should replace the state fixed effects by the corresponding random effects to specify a more parsimonious model, and so that I can model any secular trends in enrollment over time.

business, education, engineering, health sciences, humanities, physical sciences, and the social sciences?

To address this second research question, I will add a vector of dichotomous predictors representing the eight fields/disciplines (except for the field of humanities, which I will omit as the reference category), and all two- and three-way interactions between them and the other principal question predictors, in model (1) above. If there is a statistically significant three-way interaction among the field/discipline dummies and the *AFTER* by *KEYSTATE* interaction in model (1), then I will know that, on average across institutions and states, the ban on affirmative action had a differential effect in the field that the corresponding dichotomous predictor represents, compared to the reference category.

Threats to Validity and Limitations of the Proposed Research

A threat to the internal validity of my proposed findings (that is, a threat to any causal interpretation of the impact of a policy disruption) includes external events or policies other than the affirmative action bans in each state that could have affected the enrollment of students of color in graduate study during the time under investigation. While I already address this concern by incorporating a "second difference" into my analysis, as described, the internal validity of my findings relies heavily on the selection of the most appropriate comparison group providing the second difference. To address this issue, I propose to conduct sensitivity analyses in which I will repeat my analyses using alternate comparison groups. I will test the impact of "pseudo-discontinuities"—differences across adjacent time periods before and after the bans, as well as differences over the same period but in graduate fields of study at institutions in different set of

comparison states.[5] I would not expect to detect any differences, if the logic underpinning my proposed research is sound.

Second, the lack of institutional identifying information—the terms under which I have been granted access to the dataset—presents limitations for my analysis because I am unable to consider specific institutional-level characteristics that may also influence enrollment, such as average GRE scores, average tuition, and financial aid, all of which may help increase the precision of my estimates. To address this concern, my proposed covariates include field of study, institutional and state-level characteristics that capture similar information; however, my inability to account for more specific institutional variables might affect my standard errors. Despite this limitation, the *CGS/GRE* Survey is the only annual dataset that tracks graduate student enrollment rates across all graduate fields of study/disciplines and therefore provides an informative dataset to investigate this important policy question.

Third, it is possible that institutions might have adopted alternative measures to mitigate the potential decline in student of color enrollment at their institution following the ban of affirmative action in admission practices. At the undergraduate level, for example, institutions in Texas adopted specific scholarship and retention programs to continue to attract a diverse student body (Horn & Flores, 2003). Similar efforts at the graduate-school level could affect my estimates, providing only a conservative estimate of the causal effect of the policies.

Finally, my outcome measure—aggregate enrollment rate—captures only the joint impact on applications, admissions, and enrollment. Thus, it does not allow me to differentiate the impact of affirmative action bans, if any, separately in each of these areas. Such differences may

[5] Because my data is longitudinal, I will also be able to implement a regression discontinuity design and will work with my committee to use this approach in a sensitivity analysis. A regression discontinuity approach provides an alternate estimate of the effect that does not rely on a "second difference" obtained from institutions in different states, but also has some disadvantages when employed in this context.

be important for setting public policy and institutional efforts that seek to address the consequences of these policies. The overall impact across these areas, however, is an important starting point for future research in this area.

Policy Implications

My goal is to help identify and obtain an unbiased estimate of the causal impact of what may be becoming a national trend—the elimination of race-conscious policies in higher education institutions—and the implications that such bans might have on a broad scale. The impact of policies that may potentially exacerbate the current underrepresentation of students of color in graduate studies, where students obtain the specialized knowledge and training for areas of influence in our nation, should be of interest to institutions and policymakers. Any differences in impact across fields of study or disciplines are also important to consider so that institutions can direct outreach and recruitment efforts toward students of color who seek degrees in these areas. Such targeted outreach and recruitment efforts are critically important because future leaders, professionals, and scholars will need to reflect the interests and concerns of an increasingly racially and ethnically diverse society and our nation will need to meet the workforce demands of a globalized economy.

(Word count: 4,989)

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Appendix A

Table 1. State-wide policies and court decisions relevant to this study, with effective policy dates.

State	Policy Type	Description	Affirmative Action Ban	Institutional Sector Affected	Policy Change Date
Texas	Court decision	*Hopwood v. State of Texas*, a Fifth Circuit Court decision that bans consideration of race as a plus factor in admissions decisions in Texas	Yes	Public and Private	1997 to 2003
California	State initiative	Proposition 209 bans use of race/ethnicity in employment, education and contracting decisions	Yes	Public	1998
Washington	State initiative	Initiative 200 bans use of race/ethnicity in employment, education and contracting decisions	Yes	Public	1999
Florida	Executive Order	One Florida Initiative bans use of race in public institutions	Yes	Public	2000
All states (except public institutions in CA, WA, and FL)	Court decision	*Grutter v. Bollinger*, U.S. Supreme Court decision that permits use of race as a factor in admissions decisions and abrogates *Hopwood* but does not supersede state initiatives and executive orders.	No	Public and Private	2003

Note: Proposition 209 superseded Board of Regents Resolution SP-1, which barred the consideration of race in the University of California system.

Sources: *Hopwood*, 78 F.3d 932 (5th Cir.); Cal. Const. art. I, §31; Wash. Rev. Code §49.60.400 (2003); Fla. Governor's Exec. Order No. 99-201 (1999); *Grutter*, 539 U.S. 306 (2003).

Appendix B

Table 2. Taxonomy of fields of study in *CGS/GRE Survey of Graduate Enrollment and Degrees*, organized by major fields of study/disciplines considered in this study.

Fields of Study within each Major Field		
Fields Considered in Proposed Study		**Fields not Included in Proposed Study**
Business	*Biological Sciences*	*Other Fields*
Accounting	Agriculture	Architecture and Environmental Design
Banking & Finance	Biological Sciences	Communications
Business Administration & Management		Home Economics
Business, Other	*Engineering*	Library & Archival Sciences
Public Administration	Chemical Engineering	Religion & Theology
	Civil Engineering	All other fields
Education	Electrical & Electronics	
Education Administration	Industrial Engineering	
Curriculum & Instruction	Materials Engineering	
Early Childhood Education	Mechanical Engineering	
Elementary Education	Engineering, Other	
Evaluation & Research		
Higher Education	*Health Sciences*	
Secondary Education	Health & Medical Sciences	
Special Education		
Student Counseling	*Physical Sciences*	
Education, Other	Chemistry	
	Computer & Information	
Humanities	Earth, Atmospheric, & Marine Science	
Arts--History, Theory	Mathematical Sciences	
Arts--Performance & Studio	Physics and Astronomy	
English Language & Literature	Physical Sciences, Other	
Foreign Languages & Literature		
History	*Social Sciences*	
Philosophy	Anthropology & Archaeology	
Humanities & Arts, Other	Economics	
	Political Sciences	
	Psychology	
	Sociology	
	Social Sciences, Other	

Source: *CGS/GRE Survey of Graduate Enrollment*

Appendix C

Table 3. Relevant characteristics of key states (those with affirmative action bans) and select comparison states (those without affirmative action bans) for year 2000.

	Selected State Characteristics								
		Demographics[1]					**Educational Attainment**[1]	**Labor Market Conditions**[1, 2]	
	No. of Public Institutions	*Total Population*	*Percent White*	*Percent Latino*	*Percent Black*	*Percent Native American*	*Percent 25 yrs & over with Bachelor's degree*	*Per capita income (1999 dollars)*	*Unemployment rate for 25-34 yr olds*
United States			75.1	12.5	12.3	0.9	24.4	$21,587	3.7
Key States									
California	29	33,871,648	59.5	32.4	6.7	1.0	26.6	$22,711	4.9
Florida	8	15,982,378	78.0	16.8	14.6	0.3	22.3	$21,557	3.1
Texas	35	20,851,820	71.0	32.0	11.5	0.6	23.2	$19,617	3.4
Washington	5	5,894,121	81.8	7.5	3.2	1.6	27.7	$22,973	4.9
Comparison States									
Arizona	3	5,130,632	75.5	25.3	3.1	5.0	23.5	$20,275	3.7
Colorado	7	4,301,261	82.8	17.1	3.8	1.0	32.7	$24,049	2.3
Georgia	17	8,186,453	65.1	5.7	28.7	0.3	24.3	$21,154	3.0
Illinois	10	12,419,293	73.5	12.3	15.1	0.2	26.1	$23,104	4.1
Massachusetts	9	6,349,097	84.5	6.8	5.4	0.2	33.2	$25,952	2.0
Michigan	10	9,938,444	80.2	3.3	14.2	0.6	21.8	$22,168	3.3
New Jersey	13	8,414,350	72.6	13.3	13.6	0.2	29.8	$27,006	3.6
New York	18	18,976,457	67.9	15.1	15.9	0.4	27.4	$23,389	4.5
North Carolina	14	8,049,313	72.1	4.7	21.6	1.2	22.5	$20,307	2.8
Ohio	11	11,353,140	85.0	1.9	11.5	0.2	21.1	$21,003	4.0
Pennsylvania	15	12,281,054	85.4	3.2	10.0	0.1	22.4	$20,880	3.9
Virginia	10	7,078,515	72.3	4.7	19.6	0.3	29.5	$23,975	2.2
No. of institutions	214								

Sources: U.S. Census Bureau American Community Survey[1] and Bureau of Labor Statistics Geographic Profile of Employment and Unemployment[2].

Appendix D

Table 4. Sample size in key states (those with affirmative action bans) and comparison states (those without affirmative action bans) for each discipline/field of study, by state and in total across states and fields.

	Key States				Comparison States												All states
	CA	**FL**	**TX**	**WA**	**AZ**	**CO**	**GA**	**IL**	**MA**	**MI**	**NC**	**NJ**	**NY**	**OH**	**PA**	**VA**	
Biological Sciences	32	11	27	7	6	4	10	16	5	13	10	7	12	15	13	8	196
Business	42	24	49	9	8	10	28	27	12	28	18	14	14	37	21	21	362
Education	69	56	118	24	24	18	69	53	29	56	43	44	61	81	82	49	876
Engineering	71	35	46	14	18	20	13	26	9	38	19	15	26	45	20	24	439
Health Sciences	18	7	20	4	3	4	10	9	6	8	5	10	7	11	13	7	142
Humanities	100	38	66	22	19	18	27	47	20	41	31	26	53	62	42	34	646
Physical Sciences	79	32	58	19	16	24	25	41	12	40	31	23	42	57	33	32	564
Social Sciences	96	37	63	18	18	21	26	47	14	37	21	21	46	53	30	31	579
All Fields	507	240	447	117	112	119	208	266	107	261	178	160	261	361	254	206	3804
No. of institutions	29	8	35	5	3	7	17	10	9	10	14	13	18	11	15	10	214

Note: Number of observations for the outlined disciplines/fields of study are calculated for a one year period. The final analysis will include an eight-year period, four years before and four years after the ban. The pre- and post-ban years of analysis for each key state are as follows California (1994-1997 & 1998-2001), Florida (1996-1999 & 2000-2003), Texas (1993-1996 & 1997-2000), and WA (1995-1998 & 1999-2002). My final analyses will account for the lack of independence among observations within fields of study/disciples over time, within institutions, and within states.

Source: CGS/GRE Survey of Graduate Enrollment and Degrees.

Appendix E

Table 5. List and definition of covariate measures.

VARIABLE NAME	DEFINITION
Field of Study Enrollment Characteristics	
Full-Time	Continuous variable indicating percentage of enrolled students in field of study who are full-time.
Citizenship	Continuous variable indicating percentage of enrolled students in field of study who are US Citizens/Residents.
Female	Continuous variable indicating percentage of enrolled students in field of study who are female.
Institutional Characteristics	
Doctoral	Whether institution is categorized as Doctoral/Research Extensive or Doctoral/Research Intensive under 2000 Carnegie Classification (1=yes, 0=no).
Masters/Specialized	Whether institution is categorized as Masters or Specialized under 2000 Carnegie Classification (1=yes, 0=no).
State Characteristics	
Racial and Ethnic Demographics	
Percent White	Continuous variable indicating annual percent of White population.
Percent Latino	Continuous variable indicating annual percent Latino/a population.
Percent Black	Continuous variable indicating annual percent African American population.
Percent Native American	Continuous variable indicating annual percent Native American population.
Educational Attainment	
Percent pop. 25 over w/ Bachelor's Degree	Continuous variable indicating annual percent of population 25 years and over with a Bachelor's degree.
Labor Market	
Per capita income	Continuous variable indicating annual per capita income (in inflation-adjusted dollars for relevant year).
Unemployment Rate for 25-34 year olds	Continuous variable indicating annual state unemployment rate for 25-34 year olds.
State Fixed Effects	
State	A set of dummy variables (one for each state in the sample), included to account for time-invariant differences, observed and unobserved, among states.
Year of Ban Fixed Effects	
Year	A set of dummy variables (one for each year of implementation), included to account for chronological differences in the years in which the affirmative action bans were implemented.