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HOW DO AFFIRMATIVE ACTION BANS AFFECT STUDENT RACIAL AND SOCIO-ECONOMIC COMPOSITION?

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by
Huacong Liu

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The dissertation of Huacong Liu was reviewed and approved* by the following:

Liang Zhang  
Associate Professor of Higher Education  
Dissertation Adviser  
Chair of Committee

John J. Cheslock  
Associate Professor of Higher Education

Alicia C. Dowd  
Professor of Higher Education

Mark J. Roberts  
Professor of Economics

David S. Guthrie  
Associate Professor of Education  
Graduate Program Chair

*Signatures are on file in the Graduate School.
Abstract

This study investigates the consequences of state-wide affirmative action bans on students’ college enrollment outcomes. In particular, I examine four states that have banned the consideration of race in college admissions in public colleges and universities in the past decade, Michigan, Nebraska, Arizona, and New Hampshire. The enactment of these bans provides quasi-experimental variation in affirmative-action policies. The bans come from a mix of sources, ranging from voter initiatives to executive orders and court rulings. The variation in time and location of these bans provides useful variation in identifying the effect of banning affirmative-action policies on college enrollment outcomes.

This dissertation consists of two parts in which I utilize data from two different sources, the Integrated Postsecondary Education Data System (IPEDS) and the Current Population Survey (CPS) between 1999 and 2014 to examine the effects of these bans. In the first part, I examine these relationships using the IPEDS which contains institutional level data. Findings suggest that although overall the bans do not significantly decrease racial minorities enrollment at 4-year public colleges and universities, a ban is associated with a significant reduction of racial minorities enrollment in Michigan and New Hampshire at public 4-years. Beyond the impact on racial minority students, the bans also change the socioeconomic composition of the freshman classes. In particular, the bans increase low-income students’ college enrollment in Michigan, Arizona, and New Hampshire.

Moreover, this study utilizes a quantitative case study method - the synthetic control method to conduct a close-up examination of the four public flagship universities. Findings demonstrate that for a competitive public flagship, as is the case for the University of Michigan, a ban decreases the racial diversity of its freshman class. For non-competitive public flagships
(i.e. the University of Nebraska, the University of Arizona, and the University of New Hampshire), the ban changes the socioeconomic composition of the student body - low-income students’ representation at these campuses increases in years following the bans.

The rest part of the dissertation uses the CPS data and examines the effects of the bans across racial and income groups. Findings suggest that the bans affect low-income students differently than their effects on high-income students across racial groups. In particular, the bans decrease low-income racial minorities’ chances of college enrollment more than they do for high-income ones. Yet, for white students, the bans increase low-income students’ chances of college enrollment more than they do for high-income ones. These findings shed new light on the discussion of the impact of affirmative action policies on the intersection of race and income-based class.
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CHAPTER 1: INTRODUCTION
**Brief History of Affirmative Action in Higher Education**

Affirmative action began in the United States with Lyndon Johnson’s 1965 executive order that affected the hiring practices of all federal contractors. Although the focus of Johnson’s original executive order was on hiring practices of federal contractors, post-secondary institutions in the United States quickly adopted these practices as well.

As President Lyndon Johnson stated in his commencement address at Howard University in June 1965,

“You do not take a person who, for years, has been hobbled by chains and liberate him, bring him up to the starting line of a race and then say, ‘you are free to compete with all the others,’ and still justly believe that you have been completely fair... We seek not just freedom but opportunity.”

The decision to engage in affirmative action in admissions is not federally mandated; instead, both the decision to enact race-based affirmative-action policies and the way in which minority candidates are given admission preference are decisions made by each postsecondary institution. As a result of the rapid spread of affirmative action into the higher education sector, race-based admissions preferences are one of the most prevalent and contentious fixtures of American higher education.

Reflected in Johnson’s speech, the initial rationale for affirmative action policies was to repair historical wrongs and to mitigate disparities among race groups, with the hope that affirmative action could play some role in reducing inequalities in life outcomes between minority and majority groups. These gaps, in the realm of higher education, are manifested as pre-college achievement gap and enrollment gap in post-secondary education. Both these gaps are well documented. For example, in 1996, the median SAT score among minority college
candidates was at the 22nd percentile for non-minorities (Akhtari & Bau, 2016). Among students who attend college, racial minorities are under-represented at selective institutions and over-represented at low tier schools. In 1996, minorities made up almost 18% of all new college freshmen, but they accounted for only 11% of enrollment at schools in the top quality quartile and nearly 30% in the bottom quartile (Akhtari & Bau, 2016).

Over the past decades, three landmark Supreme Court cases have shaped how affirmative action admissions policies are practiced at colleges and universities in the United States. In Bakke v. California Board of Regents (1978), the Court ruled out the use of explicit quota systems. In Grutter v. Bollinger (2003), the University of Michigan successfully defended the consideration of race as one of many factors in university admissions. However, in 2006, Michigan voters passed Proposal 2, which amended the state constitution to ban the consideration of race or ethnicity in college admissions at public educational institutions. Later on, in Schuette v. Coalition to Defend Affirmative Action (2013), the Supreme Court ruled that a state ban on universities considering race as part of their admissions process does not violate the Equal Protection Clause of the US Constitution.

In a more recent case, Fisher v. University of Texas at Austin (2012), the Court first remanded the case back to the Fifth Circuit, stating that the Court of Appeals did not hold the University's admission policies to a standard of strict scrutiny. This standard requires universities to provide more evidence in explaining the necessity to practice race-conscious admissions policies. The Supreme Court reheard the case in 2015 and ruled in 2016 that the race-conscious admissions program in use by the University of Texas at Austin was lawful under the Equal Protection Clause.
As a result of these landmark Supreme Court cases concerning the practice of race-conscious admissions policies, universities can use race as a factor in admissions as long as it is narrowly tailored, while at the same time, states can prohibit race-based admissions, at least at public colleges and universities. Overall, at the state level, since the late 1990s, eight states including California, Washington, Florida, Michigan, Nebraska, Arizona, New Hampshire, and Oklahoma have banned affirmative action in college admissions at public postsecondary institutions, either through voter initiatives, judicial rulings, or executive orders.

Although the rationale to practice race-conscious admissions policies has shifted from remedying historical wrong doings to pursuing a diverse student body that is beneficial to all races, the disparities in college access among race groups persist. What is also alarming is the gap in college access across income groups. As reported in a recent study (Chetty et al., 2017), if upper tail mobility rate is defined as the fraction of students coming from families in the bottom quintile who reach the top 1 percentile, the top 10 colleges by this measure are all Ivy League colleges. Yet, looking at the access rate at the Ivy League institutions, they have more students from the top 1% than the bottom 50% of the income distribution. Income segregation of students across colleges is comparable to that across neighborhoods in the average American city.

These widely documented gaps in college access both across races and across the income distribution motivate this present study in examining the effects of affirmative action bans on college enrollment outcomes across race groups and across income distributions within races. The variation in time and location of these state-wide affirmative action bans provides useful variation in identifying the effects.
Gap in Current Research Examining Consequences of State Affirmative Action Bans

A long line of empirical studies suggest that race-based admissions policies have enabled higher education institutions to recruit students with diverse backgrounds and perspectives (e.g. Bowen & Bok, 1998; Brown & Hirschman, 2006; Espenshade & Chung, 2005; Kane, 1998; Long, 2004, 2007). The effects of those earlier bans in California, Washington, Texas and Florida have been studied quite extensively in the literature. Studies of single state bans have shown declining minority enrollment at selective public institutions in California, Texas, and Washington after statewide bans (e.g. Backes, 2012; Brown & Hirschman, 2006; Long, 2004), as well as within graduate fields of study (Garces, 2012, 2013).

Few studies though examine the impact of bans in these later states, i.e. Michigan, Nebraska, Arizona, New Hampshire, and Oklahoma, except for Hinrich (2012), Backes (2012), and Naven (2017). Universities in these five states are generally not as selective in admissions as the ones in those earlier states, except for Michigan. However, understanding the effects of these later bans deserves a well-thought-out quantitative analysis. A commonly held view is that affirmative action does not affect higher education institutions that are not selective in admissions. Yet a ban may have an indirect effect on student application and enrollment decisions. Especially considering that universities increased outreach efforts in racial-minority communities and low-income students concentrated high schools after a ban (Laird, 2005), the information nudge may have altered students’ application and enrollment decisions.

The student body composition is a result of a series of individual decisions including application, admissions and enrollment. If a ban sends a negative signal to racial minority students, and/or alters student’s application and enrollment decisions due to increased outreach efforts, a ban would matter even in states with few or no selective colleges and universities.
Therefore, the impact of state-wide bans and the subsequent institutional responses, even for states with few or no competitive institutions, deserve careful quantitative analysis, instead of relying on an untested presumption to evaluate the effect of these policy changes.

**Focus of the Current Study**

The primary goal of this dissertation is to understand to what extent state-wide affirmative action bans have changed the student body composition and college enrollment outcomes across races and across income groups. I draw data from multiple sources to examine this issue. In particular, institutional level data from the Integrated Postsecondary Education Data System (IPEDS), and individual level data from the Current Population Survey (CPS) October School Enrollment Supplement are used in this dissertation. Specifically, the following two questions are addressed:

1. At an institutional level, did state bans on affirmative action in Michigan (MI), Nebraska (NE), Arizona (AZ), and New Hampshire (NH) between 2006 and 2012 result in a change in the student body composition—racial and socioeconomic composition in particular—of higher education institutions located in those states? Do these effects vary across states, and institutional types?

2. At an individual level, how have affirmative action bans affected the chances of attending college differently for low-income students compared to high-income ones? How does the relationship differ across racial groups, i.e. white and under-represented minorities?

In essence, these two research questions speak to a similar issue: how bans on race-based affirmative action have affected both under-represented racial minorities and low-income students. Yet they differ substantively in the perspective of analysis. The first question focuses
on the student body compositional change at an institutional level. Relying on the IPEDS annual survey of higher education institutions, I take a difference-in-differences (DiD) approach to examine the effects on student body racial and socioeconomic composition of the freshman class for post-secondary institutions in each of the states. Moreover, employing a unique quantitative case study method - synthetic control method (SCM), I conduct a close-up examination of the effects on enrollment outcomes at each of the four public flagship universities.

The second question explores the heterogeneous effects of the bans across racial and income groups, and investigates how specifically low-income students’ college enrollment outcomes have been affected compared to high-income ones. This step of analysis uses data from the CPS October Supplement files, which provide a nationally representative sample of the population each year. These annual data enable a triple-difference examination of the effects of affirmative actions bans on low-income white and racial minorities separately.

Taken as a whole, drawing data from these different sources, this study provides a fine-grained picture of how bans on race-based affirmative action have affected both under-represented racial minorities and low-income students’ college enrollment outcomes.

**Mechanisms of Bans Affecting the Racial and Socioeconomic Composition**

Race-based affirmative action exert direct impact on under-represented racial minorities because of the removal of racial preferences at the admissions stage. In addition to the effect at the admissions stage, it could also alter students’ behaviors and efforts prior to college. For example, Akhtari and Bau (2016) exploited the 2003 Supreme Court ruling in Grutter v. Bollinger, which overturned Texas’ affirmative action ban, and analyzed students’ behavior and aspirations responding to the policy change. They found that minority students are more likely to invest more time on homework and they are more likely to apply to their first-choice college
after 2003 compared to white students. Overall, Akhtari and Bau’s (2016) study provides evidence that race-based affirmative action in higher education reduced the average racial achievement gap in student outcomes in high school. However, in evaluating the impact of the end of race-based affirmative action at the University of California in 1998, Antonovics and Backes (2014) did not find a widening racial academic gap in SAT scores and high school GPA after Proposition 209. Although empirical results vary, both the theoretical and empirical arguments agree that affirmative action admission policy changes will affect student effort prior to college admission. The effort gap thus leads to differences in enrollment outcomes.

Furthermore, there are several possible channels through which bans on race-based affirmative action could potentially affect low-income students. First, universities may respond to an affirmative action ban by implementing policies that alleviate the negative impact on racial minority and/or ones that raise socioeconomic diversity instead. Case studies investigating institutional changes after state bans on affirmative action provide such evidence. They suggest that universities usually resort to socioeconomic diversity, through increased outreach efforts in low-socioeconomic high schools (e.g. Blume & Long, 2013; Fryer, Loury, & Yuret, 2008; Kahlenberg, 2015; Long, 2007). Take the case of Nebraska for example, in the same year that voters banned affirmative action, the Board of Regents expanded financial aid offering free tuition to all Nebraska Pell Grant recipients. These efforts potentially changed whether students would apply to college or not, and if they did, where they applied.

Second, bans on affirmative action can potentially affect low-income students’ college access in the admissions stage. Universities may change their way of evaluating students – they may give favorable considerations to equally academically qualified students from low-SES background in the pursuit of a socioeconomically diverse student body. Third, because of the
tight connection between race/ethnicity and class, bans on race-based affirmative action could negatively affect socioeconomic diversity, especially in states where the connection between racial-minority membership and low-income status is strong.

Empirically, there has been a long line of research exploring the connection between race- and class-based affirmative action (e.g., Reardon, Baker, Kasman, Klasik, & Townsend, 2015). One the one hand, some scholars have argued to replace race-based affirmative action with one based on socioeconomic status (e.g., Kahlenberg, 2015; Sander, 2014). This argument is largely based on the tight connection between low-income status and racial minority membership, and more importantly, the fact that stratification by class is more severe than it is by race and ethnicity in most elite universities (Carnevale & Rose, 2004). On the other hand, research showed the paradox that a policy targeting low-income students won’t necessarily capture a large portion of racial minorities (Kane, 1998). This is mainly because racial minorities only account for less than half of the low-income population according to a nationally representative high school seniors sample in 1980. Similarly, Loury (1977) argued that when community membership depends only on income, policies promoting equal opportunity can always yield a racially equitable long-run outcome. However, if race plays an independent role in sorting families into neighborhoods, then policies merely promoting equal opportunity will generally not be enough to yield racial equity.

Through the above-mentioned first two channels, bans on race-based affirmative action may lead to an increase in socioeconomic diversity at universities affected by those bans; while through the third channel, the ban may exert a negative effect on socioeconomic diversity. Without a well-thought-out empirical analysis, it is hard to distinguish which of these two effects
dominates, therefore it is hard to discern the overall effect of race-based affirmative action bans on student-body composition, in terms of race/ethnicity and socioeconomic status.

To illustrate further, constructing the counterfactuals is the central problem in evaluating a policy intervention. Among many possible counterfactuals (e.g. Heckman, LaLonde, & Smith, 1999), what is of interest in this study is what would the student body composition have been absent a state-wide affirmative action ban. The key of constructing this counterfactual using non-experimental data is to find observational equivalent units that are not affected by the policy change and to estimate the average treatment effect on the treated. In this study, I carefully considered how to construct a comparison group in the case of DiD analysis and utilized a unique quantitative case study method - SCM, to conduct counterfactual analysis for four state flagship universities, and to explore how the student body composition of their freshman classes is affected by those bans.

Overall, the focus of this present study is not to compare one type of affirmative action with the other. Rather, it provides a nuanced analysis of the consequences of state-wide bans on race-based affirmative action on two dimensions of the student-body composition, both racial and socioeconomic. More importantly, this dissertation explores the within race groups across the income distribution differences in college enrollment outcomes resulting from affirmative action bans.

**Racial and Socioeconomic Diversity at Colleges and Universities**

Although these state bans and a series of Supreme Court rulings have affected how race is considered in college admissions, the Supreme Court has long endorsed the value of a diverse student body. As Justice Powell articulated in the *Bakke* case, “the atmosphere of speculation,
experiment and creation - so essential to the quality of higher education - is widely believed to be promoted by a diverse student body” (Bakke, 1978). More importantly, the Court has recognized that diversity is not defined by race or ethnicity alone. In fact, in Grutter, the Court pointed out that race “is only one element in a range of factors a university properly may consider in attaining the goal of a heterogeneous student body” (Grutter v. Bollinger, 2003). Specifically, socioeconomic diversity has been brought up repeatedly in the Court in the most recent University of Texas in Austin v. Fisher case.

Benefits of socioeconomic diversity as well as racial and ethnic diversity of student body have long been echoed by the nation’s colleges and universities. In an amici brief submitted by eight elite colleges and universities including Harvard in supporting of University of Michigan in the Grutter case in 2003, Harvard argued that it had long been embracing a broader version of diversity as early as the 19th century. As stated by then President Charles Eliot, students need to “feel that very wholesome influence which comes from observation of and contact with larger numbers… from different nations, states, schools, families, sects, and condition of life” (Grutter v. Bollinger, 2003). The nation’s elite institutions firmly believe that diversity helps students confront perspectives other than their own and thus to think rigorously and imaginatively; and they believe that diversity helps students learn to relate better to people from different backgrounds. The pursuit of a broad diversity is reflected in the contemporary mission statements of higher education institutions as well. As an example, as the current Harvard College mission states:

*Through a diverse living environment, where students live with people who are studying different topics, who come from different walks of life and have evolving identities,*
intellectual transformation is deepened and conditions for social transformation are created.\(^1\)

Apparently the nation’s most elite colleges believe that diversity is not defined by race alone. Given that racial and ethnic diversity stand in the center of affirmative action debates, research examining the effects of state bans on affirmative action predominately focuses on racial minorities’ enrollment and racial composition changes of universities (e.g. Backes, 2012; Hinrichs, 2012; Long, 2004a, 2007). Less obvious is how these bans affect universities’ student body socioeconomic composition and the within races across income distribution disparities in college enrollment.

Apart from the narrative of pursuing different dimensions of diversity by the nation’s influential institutions’ (i.e. the Supreme Court, and Harvard University), the contrasting patterns of racial and socioeconomic diversity at colleges and universities with varying quality (relying on some measure of quality) also provide intriguing facts relevant to this study.

Figure 1 presents the relationships between college quality and two dimensions of student-body composition at an institutional level. The top panel shows the share of racial minority students and the bottom plotting the share of low-income students against a measure of college quality (here I used the US news and world report ranking). As indicated in the figure, a U-shape relationship between college quality and racial diversity of student body is evident, whereas the relationship between college quality and socioeconomic diversity is upward sloping. In other words, top institutions have relatively higher shares of racial minorities than shares of low-income students. Institutions that are ranked between 50 and 100 have relatively lower percentages of racial minorities than percentages of low-income students.

\(^1\) This was taken from the website [https://college.harvard.edu/about/history](https://college.harvard.edu/about/history).
Figure 1. Racial and socioeconomic composition and college quality.

Note: The horizontal axis indicates a measure of college quality - the quality decreases as the number goes up, using the U.S. news and world report ranks.

The U-shape pattern between racial diversity and college quality was first presented in Arcidiacono, Khan, and Vigdor (2011). From a mismatch perspective, they explored possible factors causing this pattern. First, affirmative action at the top colleges and universities along the quality distribution can lower the share of racial minority students in the schools just below them. What explains the dip in the share of racial minority students in the middle-quality schools is that this set of schools may be less attractive to minority students (for example, they are perceived as not having a critical mass). Therefore, choosing to attend lower-quality schools, these students are under-matched conditional on their credentials. But it could also be the case that under-represented racial minority students are less informed, on average, about their college possibilities. This also in part explains the under-representation of low-income students at top-ranked colleges and universities. As illustrated by Hoxby and Avery (2013), those who are
economically disadvantaged seem to make poorer college choices than their wealthier counterparts.

Regardless of the reasons for the U-shaped pattern and the upward sloping pattern, the removal of affirmative action would affect the sorting of students into colleges with varying quality. The underlying features of these institutions that lead to these patterns also imply that institutions would respond differently to interventions, such as a state-wide ban on affirmative action.

**Significance**

This study adds to our existing knowledge on the impact of affirmative action on institutions in a number of ways. First, it achieves a more nuanced understanding of consequences of state-wide changes of affirmative action. By focusing on both racial and socioeconomic composition of student body, this study examines not only the direct impact on racial minorities, but also the indirect effect on socioeconomically disadvantaged students.

Second, it clarifies how higher education institutions responded when facing policy changes. Public institutions are accused of becoming “engines of inequality” instead of upholding their “proud tradition of being an engine of social mobility” (Jaquette et al., 2016). Reconciling the seemingly inconsistency of public institutions growing “disproportionately white and richer” and documented recruitment efforts on minority and low-income students needs an empirical analysis. As Park, Denson and Bowman (2013) suggested, recruiting and retaining student bodies that are both racially and socioeconomically diverse are equally important, and one should not be at the exclusion of the other.

Finally, by analyzing the average treatment effect at a state level through a DiD method as well as focusing on each of the four flagship universities by utilizing a quantitative case study
method, this paper provides a rigorous analysis of the effects of state wide bans on student body composition. Instead of pooling together all the states that experienced bans on race-based affirmative action, this study carefully considers time period for analysis and comparison group selection in the DiD analysis. In addition, this study uses a quantitative case study method – SCM, to analyze the changes in student-body composition at each of the four flagship universities. This method is relatively new in education research but has been developed and used previously in public policy and economics literature (e.g. Abadie and Gardeazabal, 2003; Abadie, Diamond, and Hainmueller, 2010, 2015), and most recently in higher education research by Jaquette, Kramer, and Curs (2016). In this study, the SCM complements the DiD approach in that the average treatment effect obtained through the DiD analysis may have obscured the picture at state flagships given that the majority higher education institutions residing in those states are not competitive in admissions. Therefore, examining each of the flagship universities through a SCM analysis sheds light on how these flagships have responded to the policy change.

Understanding the average effect for a state’s higher education institutions as well as on the flagships are both important. Although overall the ban did not have any significant effect on the state’s public institutions, the quantitative case study method employed in this study does indicate that the bans still have significant effect on the state’s public flagships. Furthermore, by analyzing the CPS data and focusing on the effects within racial groups (i.e. white and underrepresented minorities) and across income groups, findings from this study suggest that affirmative action bans affect low-income students differently than their effects on high-income students. These findings shed new light on the discussion of the impact of affirmative action policies on the intersection of race and class.
Organization and contributions of the dissertation

Chapter Two of this dissertation reviews relevant literature on changes of affirmative action policies and empirical analyses of their effects. Chapter Three utilizes the Integrated Postsecondary Education Data System data to explore the effects of affirmative action bans on racial and socioeconomic composition of the student body in four states, and the effects on single flagship universities. Chapter Four draws upon the Current Population Survey data and focuses on the effects within races (i.e. white and underrepresented minority students) across income groups. Chapter Five provides a comprehensive conclusion which integrates findings across the two parts of analysis and outlines implications for research and practice.
CHAPTER 2: LITERATURE REVIEW
Broadly this study relates to a large literature that studies the effects of affirmative action policies. This literature has focused primarily on affirmative action policies in higher education and their impact on college application behavior, college admissions, the issue of mismatch, and college graduation. This study’s main contribution is to a much smaller literature about the impact of affirmative action bans on student college enrollment outcomes. This chapter reviews literature that is pertinent to this study, including: (1) diversity and efficiency arguments for affirmative action; and (2) implication of affirmative action polices on college application and enrollment outcomes. Before reviewing the relevant empirical studies, I present some important Supreme Court cases that shaped how race-conscious admissions policies are practiced today, and state bans in Michigan, Nebraska, Arizona, New Hampshire, and Oklahoma.

**Statewide Bans on Affirmative Action between 2004 and 2013**

The college applications and admissions process in American higher education institutions is complex. As Hossler and Bontrager (2014) wrote, “college admission is one place where the meritocratic and the egalitarian impulses of the American character play out in both competing and complementary ways” (p.156). Although admissions are largely based on students’ merit, however, merit “is not a narrowly defined concept that is easily determined by a grade point average or a test score” (Hossler & Bontrager, p.160). In fact, selective colleges and universities have been practicing holistic reviews for decades. In addition to traditional measures of academic achievement, a holistic review process also takes into consideration of extracurricular activities and school and family background of applicants (Bastedo & Flaster, 2014). In other words, holistic review practices try to identify applicants who maximize the opportunities available at their high school (Lucido, 2015; Mamlet & Vandevalde, 2012). However, the fact is that even if the intention is to have admissions officers to consider high
school and family context during the reading process, cognitive biases may exist which leads people to discount consideration of these contexts (Bastedo & Bowman, 2015). As a result of this, the process of matching students to institutions is much more fluid in the United States than in other education systems (Karen, 2002).

Another distinct feature of college admissions in the United States is that Supreme Court rulings, state voter initiatives, and state judicial rulings play a significant role in influencing how universities practice admissions policies. Over the past decades, Supreme Court rulings such as Regents of the University of California v. Bakke (1978), Grutter v Bollinger (2002) and Fisher v University of Texas (2012) and its rehearing in 2015 have significantly affected admissions practices at selective institutions. In his famous opinion in the Bakke case in 1978, Justice Powell rejected unbounded notions of compensatory justice as a rationale for race-conscious admissions polices and replaced it with achieving diversity as a compelling governmental interest. Powell argued that “the atmosphere of speculation, experiment and creation - so essential to the quality of higher education - is widely believed to be promoted by a diverse student body” (Bakke, 1978).

More than thirty years after the ruling on Bakke, the Court endorsed Powell’s opinion that “educational benefits flow from a diverse student body to a higher education institution, its students and the public it serves” in Grutter v Bollinger (2002). However, the Supreme Court struck down the use of assigning points in the admissions process based on an applicant’s race but validated the use of race as one factor among many in an admissions decision so long as it is part of a holistic review of an applicant and so long as race does not have a uniform impact. Moreover, the Grutter ruling held that for the use of an applicant’s race to be permissible, the college would need to give “serious good faith” consideration to workable non-race-based
alternatives that increase diversity. These rulings, particularly the need for holistic review, have made it costly for universities to practice affirmative action.

The most recent Supreme Court case affecting college admissions practice is the *Fisher v University of Texas* in 2012, and its rehearing in 2015. Although the Supreme Court reaffirmed the importance of the value of diversity in higher education in its 2013 ruling, it remanded the *Fisher* case back to the lower court. The argument was that the Fifth Circuit did not assess whether University of Texas has offered sufficient evidence to prove that its admissions program is narrowly tailored to obtain the educational benefits of diversity. In other words, UT had to prove that no workable race-neutral alternative admissions policy would produce the educational benefits of diversity.

In July 2014, the Fifth Circuit Court of Appeals held that the consideration of race or ethnicity by UT Austin in its admission program was narrowly tailored to achieve UT’s compelling educational interests and, therefore, justified under applicable constitutional standards. The Supreme Court decided to rehear the case in December, 2015, and ruled in June, 2016 that the race-conscious admissions program in use by the University of Texas at Austin when Abigail Fisher applied to the school in 2008 is lawful under the Equal Protection Clause.

While these Supreme Court rulings have confined the boundaries of how race can be considered in the admissions by private and public colleges in the country, state level voter initiatives and judicial rulings have also been influencing the practices of college admissions. As noted by Blume and Long (2012), a policy environment has emerged in the past few decades that is defined by “a complex web of voter initiatives, judicial rulings, and gubernatorial executive orders which limit the use of affirmative action at public and private colleges” (p.230). For instance, in the late 1990s, Texas, California, Washington, and Florida banned affirmative action,
either through voter initiatives, judicial rulings, or executive orders. Public universities in three of these four states responded to the elimination of affirmative action by implementing a sort of the top-x% plan. Only Washington state did not implement any percent plan after its. During the time period examined in this study (2000-2014), the following five states banned affirmative action via voter referenda:

**Michigan.** The University of Michigan’s admissions policies brought much public attention in 2003 in the *Grutter v. Bollinger* and *Gratz v. Bollinger* cases. The Court’s ruling affirmed that the law school’s admissions were individualized and its race-conscious admissions program did not unduly harm nonminority applicants. However, the undergraduate admissions policy was not narrowly tailored to achieve the asserted compelling interest in diversity, and therefore violated the Equal Protection Clause.

The University of Michigan made major revisions to its affirmative action policy to make it more flexible in the wake of the Supreme Court’s *Gratz v. Bollinger* decision in 2003, but it did not eliminate affirmative action at that time. However, in November 2006, as a result of 58 percent of Michigan voters passing Proposal 2, public universities in Michigan are currently not allowed to use affirmative action in admissions. This made Michigan the third state in the nation that approved such a ballot initiative.

According to the Chronicle of higher education, an exit poll of 3,000 voters conducted for The Detroit News showed stark race- and gender-based divisions on how Michigan residents viewed Proposal 2. A solid majority of men supported it, while a solid majority of women were opposed. Broken down by race, the results of the exit poll showed that at least 56 percent of the white respondents voted in favor of Proposal 2, but at least 86 percent of black and 69 percent of
Hispanic voters cast ballots against it. Broken down by educational attainment level, the strongest opponents of the measure — with more than 6 out of 10 voting against it — were people at the extremes of the spectrum, who either had never earned a high-school diploma or had graduated from college and gone on to graduate or professional school. The strongest advocates of the measure were people whose educations had not achieved beyond a high-school diploma or some technical training.

According to the Chronicle of Higher Education, after the ban, Michigan adopted alternative strategies to award financial aid and recruit students from underrepresented backgrounds. The University of Michigan, for instance, focused its recruiting efforts on high schools that traditionally cater to minority groups, as well as to students in single-parent homes and other indicators of socioeconomic class. Michigan created two scholarship programs that use similar criteria. Mary Sue Coleman, the university’s president then, and other administrators made personal calls to prospective students from those demographic groups.

**Nebraska.** The same organization that won passage of a similar measure in Michigan advocated the affirmative-action measures in Nebraska and Colorado. The Nebraska Civil Rights Initiative, known as Measure 424, was voted to pass with 58 percent of the vote in November, 2008; while a similar referendum failed in Colorado in 2008.

Measure 424 amended the Nebraska Constitution to prohibit any political subdivision and institutes of higher learning from discriminating against, or giving preferential treatment to any person based on race, gender, color, ethnicity or national origin. According to the Chronicle of

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Higher Education, public institutions in Nebraska did not use race as a factor in undergraduate admissions any way. However, officials were concerned that the ban on use of race and gender would have a great effect on how institutions award financial aid program.

**Arizona.** In June 2009, a referendum calling for the state Constitution to be amended to ban affirmative action in public institutions was put on the ballot in Arizona. According to the Chronicle of Higher Education, Arizona was the first state in which a proposed ban on affirmative-action preferences was put on the ballot by the legislature, rather than through petitions submitted by voters.

The Arizona Civil Rights Amendment, also known as Proposition 107, was then passed by its voters in November 2010 as a legislatively referred constitutional amendment. The amendment banned public colleges and other state and local agencies from granting preferential treatment based on race, sex, color, ethnicity, or national origin in employment, contracting, and education-related decisions. According to a report by the Chronicle of Higher Education, voters supported the referendum by an overwhelming margin (60 percent).

**New Hampshire.** In June 2011, New Hampshire passed a bill HB 623 that prohibits preferences in recruiting, hiring, promotion, or admission by state agencies, the university system, the community college system, and the postsecondary education commission. It took effect on January 1, 2012. The measure prohibits preferential treatment or discrimination based

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on race, sex, national origin, religion, or sexual orientation. According to the Chronicle of Higher Education’s report, compared to other states that have experienced highly publicized battles over similar bills or ballot initiatives, New Hampshire passed its measure with little input from national advocacy groups on either side of the affirmative-action debate.\(^5\)

**Oklahoma.** Oklahoma voters approved State Question 759 in November 2012, banning affirmative action measures in state government hiring, public contracting, and higher education. The measure amends the state constitution to prohibit any consideration of race, gender, ethnicity, and national origin by the state government. It was passed at 59 to 41 percent by its voters. This makes Oklahoma the eighth state in the nation that have banned the use of race-based affirmative action in college admissions.

A difference of these five states from those banned affirmative action in late 1990s is that public universities in these five states did not implement any sort of top x% plan as institutions did in Texas, California, and Florida. Qualitative studies examining the effects of affirmative action bans note that in states where affirmative action was abruptly ended, university admissions would always resort to socioeconomic affirmative action as an alternative (Laird, 2005).

However, whether universities in states where affirmative action was banned actually responded by pursuing socioeconomic diversity remains untested in the empirical literature. Understanding this issue is relevant because affirmative action as a public policy will likely continue for years to come. The controversy surrounding affirmative action and the interest in empirical research on the topic will undoubtedly remain. Understanding higher education

institutions and students’ responses following state bans on affirmative action requires further analysis.

Moreover, the impact of bans on low-income students have been overshadowed by research on racial minorities. Reconciling the inconsistency between the image of under-representation of low-income students in American higher education and institutions’ alleged efforts in recruiting socioeconomically disadvantaged students calls for detailed analysis. Furthermore, the new policy environment created by more state bans on affirmative action via voter referendum and executive orders makes this research a timely study.

**Diversity and Efficiency Arguments for Affirmative Action**

The present day debates on affirmative action are based on an assumption that racial diversity is beneficial to students of all races. Theoretical arguments point out that there might also be efficiency gains. This section provides a brief review of the diversity and efficiency arguments for affirmative action admissions policies.

**Benefits of racial diversity.** Conceptually, one’s college experience is heavily influenced by the nature of one’s peers, both in terms of what one learns from them and what networks one forms with them (Gall, Legros, & Newman, 2015). Hypothetically, a student who graduates having encountered peers from a broad range of backgrounds will likely have different life opportunities and earnings potential than one who has not. Building on the concept of human capital and culture capital, Arcidiacono and Vigdor (2010) introduced the concept of “diversity capital” and defined it as “a measure of an individual’s ability to create surplus in interactions with individuals of different racial, ethnic and socioeconomic backgrounds” (p.538).
Studies using both single- and multi-institutional data from the University of Michigan and the Cooperative Institutional Research Program shows that classroom diversity and informal interaction among different racial groups have multiple educational and civic outcomes (Gurin, Dey, Hurtado, & Gurin, 2002), such as leadership skills, and cross-cultural workforce competencies (Jayakumar, 2008). Similarly, Boisjoly, Duncan, Kremer, Levy, and Eccles (2006) exploited conditional random roommate assignment at one large state university and showed that white students randomly assigned African American roommates interacted more comfortably with minorities years after college entry than white students assigned white roommates.

However, empirical studies examining the effects of diversity on post-graduate earnings have not reached strong conclusions. Daniel, Black, and Smith (2001) reported statistically positive relationship between the fraction of African American students at a college or university and earnings of white male students using the National Longitudinal Survey of Youth (NLSY 79) data. Yet, Arcidiacono and Vigdor (2010) found only weak evidence of any relationship between collegiate racial composition and the postgraduate outcomes of White and Asian students. Their analysis is based on data from the country’s 30 most selective colleges (College & Beyond). As the authors noted, this study may suffer from omitted variable bias because college racial composition may be correlated with unobserved institution-level components of education quality or with individual-level determinants of productivity. The sample of universities in this study are the nation’s 30 most selective colleges. Given the U-shaped relationship between college quality and the percentage of racial minorities, the sign of the bias resulting from omitted variables is most likely positive in their analysis. In examining the effects of diversity on post-graduate earnings utilizing a broad selectivity range of colleges
and universities, Hinrichs (2011) also did not identify any effect on post-college earnings from attending racially diverse institutions.

Admittedly, one critique of these empirical studies is that these findings are either based on self-reported data or results are unlikely to be interpreted as causal. In other words, in the absence of programs employing random assignment of individuals to campuses with varying degrees of racial diversity, any evidence offered on this question will be subject to criticism that diversity may correlate with unobserved determinants of individual or institutional characteristics. With the controversy surrounding affirmative action, the interest in empirical research on the topic will undoubtedly remain. Hopefully with the availability of more administrative data on students from their K-12 education, through college and into the workforce, research studying the effects of affirmative action on long-run outcomes will be fruitful.

**Socioeconomic diversity.** The underrepresentation of low-income students has received growing attention from both the public media and empirical researchers. According to an access index constructed by the New York Times’ Upshot column, which measures how economically diverse is a college’s student body by, even among the most endowed colleges and universities in the country, a large variation of economic diversity is observed. Empirical studies also indicate that the proportion of low-income students at selective colleges has for decades remained virtually unchanged (e.g. Bastedo, 2015; Chetty et al., 2017), and selective universities are increasingly stratified by socioeconomic status, both within and across racial groups over the past decades (Posselt, Jaquette, Bielby, & Bastedo, 2012). More importantly, studies show that stratification by class is far greater than stratification by race on selective campuses. For example, Carnevale and Strohl (2013) noted that white students are overrepresented at selective
colleges by 15 percentage points, while African-American and Hispanic students are underrepresented by 9 percentage points. While the racial gap is astounding, the socioeconomic gap is even more alarming. High-income students are overrepresented by a 45 percentage points, and low-income students are underrepresented by 20 percentage points.

Consistent with the Supreme Court’s discussions of a broad diversity, Park, Denson and Bowman (2013) challenged the notion that race-related mechanisms are the only way to yield outcomes to promote diversity. The authors examined and confirmed that a socioeconomically diverse institution is associated with more frequent interactions across class lines, across race and greater involvement in co-curricula diversity activities. Moreover, Park et al.’s (2013) study and earlier work such as Kane (1998) contended that racial diversity and socioeconomic diversity are not interchangeable concepts. This means that efforts or policy intending to increase or decrease one type of diversity won’t subsequently increase or decrease the other type of diversity. Therefore, recruiting and retaining student bodies that are both racially and socioeconomically diverse are equally important, and one should not be at the exclusion of the other. Griffith (2008) tested peer effects in major choices among students with diverse socioeconomic backgrounds, and she found that the ratio of Pell Grant receivers increases the likelihood of choosing social science majors for White and Asian students from low-income backgrounds.

**Efficiency arguments for Affirmative Action.** While racial preferences in admissions can be argued for on the basis of benefits of a diverse student body, there may be efficiency arguments in its support as well. Taking a general equilibrium approach, Gall, Legros, and Newman (2015) tested the widely accepted notion that there might be a classic equity-efficiency trade-off regarding affirmative action policy: diversity may be desirable from social or political objectives but it comes at an economic cost. The authors showed that this trade-off may be
The study indicated that the free market policy (no affirmative action) may generate too much segregation. Though rematch policies (e.g. affirmative action) cannot directly address the market imperfections, they may provide an instrument for correcting the inefficiency of the match as well as distortions in investment incentives: properly designed, they can raise aggregate output and investment, reduce inequality, and increase welfare. As a result, affirmative action may be beneficial to equity and efficiency.

Durlauf (2008) also took a theoretical approach to understand whether an affirmative action policy is inefficient if the goal is to maximize the aggregate human capital of the population. He argued that it is not obvious a priori that racial preferences are inefficient for two reasons. First, he highlighted the fact that racial preferences will be inefficient when there are complementarities between school quality and student preparation. Second, even if aggregate human capital would be higher without racial preferences, such admission preferences could increase the allocative efficiency of human capital across communities. That is, the social returns to raising human capital among individuals from heavily minority communities may be particularly high. In such a case, sacrificing productive efficiency in terms of the aggregate amount of human capital for allocative efficiency in terms of the distribution of human capital across different groups in the economy may be efficiency enhancing.

**Consequences of Affirmative Action Policy Changes on Student Applications and Enrollment Outcomes**

There is a long line of empirical studies examining how affirmative action admissions policies affect the matching between students and colleges. Two general conclusions can be drawn from this line of research. First, substantial degrees of advantage are given to minority
applicants over otherwise similar applicants at top-tier public and private universities due to race-conscious admissions policies (Bowen & Bok, 1998; Espenshade, Chung, & Walling, 2004; Kane, 1998; Long, 2004b, 2007; Manski & Wise, 1983). Second, affirmative action has also affected the quality of institutions that minority and majority students enroll. These enrollment outcomes are a result of a complex sequential decisions made by both students and admissions officers in response to affirmative action or changes of it (Brown & Hirschman, 2006; Epple, Romano, & Sieg, 2008; Long, 2007; Manski, 1983).

Focusing only on enrollment outcomes, several studies demonstrated declined minority enrollment in flagship public universities in California, Texas, and Washington after statewide bans on these preferences (e.g. Backes, 2012; Brown & Hirschman, 2006; Long, 2004b). Studies looking separately at application behaviors have shown mixed findings. Card and Krueger (2004) found that the elimination of affirmative action did not have any adverse effect on the applications of the most highly qualified minority students. Brown and Hirschman (2006) identified that declines in minority college applications is the primary mechanism for lower number of minority enrollments at University of Washington after the state ban on affirmative action. Niu, Tienda, and Cortes (2006) and Dickson (2006) reported similar findings for minority students in Texas.

Arcidiacono (2005) and Howell (2010) used structural models of how students sort into schools to predict how the removal of affirmative action affects both the extensive margin (whether students enroll at all) and the intensive margin (where they enroll). Both papers have individuals make their application decisions based on expectations regarding their probabilities of admittance. These models predict substantial reductions in the share of minority students
attending the most selective schools following a ban but, because many schools are nonselective, they predict little effect on the share of minorities enrolled in four-year colleges overall.

Blume and Long (2013) focused on a broad picture of state and institutional level practices of affirmative action between 1992 and 2004. They found that affirmative action declined substantially between 1992 and 2004 in states where affirmative action was prohibited during this period by referenda, judicial rulings, or administrative decisions. In contrast, levels of affirmative action were unchanged throughout the rest of the United States, suggesting that the requirement imposed by the 2003 *Grutter* ruling had little immediate effect on universities’ abilities to continue to provide preferential admission to minority applicants. Moreover, Blume and Long (2014) estimated that declines of affirmative action also had effects on the levels of affirmative action in states that are nearby but that lack highly selective colleges, for instance, Arizona, Idaho and Nevada.

Grodsky and Kalogrides (2008) provided one of the few studies examining affirmative action in higher education from an organizational perspective. They contended that “a college’s likelihood of considering race in the admissions process may be shaped by the interplay of organizational attributes and historical, political, and regulatory contexts that constrain the college’s ability to act” (p.2). Morphew and Hartley’s (2006) analysis of over 1000 colleges and universities’ mission statements revealed that diversity is a common element across both private and public institutions. Yet, Grodsky and Kalogrides (2008) argued and confirmed that “public institutions were more likely to engage in affirmative action than comparable private institutions”. They also hypothesized and their results confirmed that more prestigious institutions are more likely to consider race/ethnicity in admissions. Last, they found that the political context of the state, at least as measured by the racial/ethnic and party
composition of the legislatures and party of the governor, had little net effect on the decisions of public colleges and universities to consider race/ethnicity in their admissions decisions.

Although not directly focusing on effects of affirmative actions changes, Jaquette, Curs, and Posselt (2016) analyzed whether growth in the proportion of nonresident students was associated with a decline in the proportion of low-income students. Among other things, they found that there is a negative relationship between the two and it is stronger in states with affirmative action bans. This finding suggests that low-income students might be crowded out by nonresident students following bans on affirmative action. It therefore provides a grounding for a hypothesis that bans on affirmative action may lead to student body socioeconomic compositional changes. The difference of this proposed study is that it exploits exogenous changes of affirmative action in five states to examine how low-income students’ college enrollment patterns are affected by institutions’ responses to bans on affirmative action.

Recent studies such as Hinrichs (2012) and Backes (2012) continue to show that black and Hispanic enrollment dropped at top institutions following state bans on affirmative action, yet the evidence that overall black enrollment at public universities falling was weak. Given the similarity of methods and data sources to this proposed study, I discuss in a bit more detail about Hinrichs (2012) and Backes’ (2012) studies. Both studies exploited the timing of affirmative action bans across several of the states to estimate difference-in-difference models of college enrollment. Using data from the American Community Survey and the Current Population Survey, Hinrichs (2012) showed that affirmative action bans had no overall effect on the likelihood minority students attended any college or attended a four-year college. However, he also drew data from the IPEDS between 1995 and 2003 and found that bans decreased underrepresented minority enrollment and increased white enrollment at selective colleges.
Hinchins (2012) found that affirmative action bans may have caused a large fall in underrepresented minority enrollment at certain universities and can cause an increase at others. Similarly, Backes (2012) used IPEDS data from 1990-2009 to examine whether minority students were less likely to enroll in a four-year public college following a statewide affirmative action ban. His study showed that black and Hispanic enrollment dropped at the top institutions; however, there is little evidence that overall black enrollment at public universities fell.

Using administrative law school application-level data between 1990 and 2006 from UC Berkeley, Yagan (2015) identified a more nuanced pattern of black students’ behaviors: affirmative action bans reduced black enrollment not only by reducing black admission advantages but also by reducing applications from black students who can still gain admission but preferred alternative schools that still practice affirmative action.

A more recent study by Naven (2017) used 30 years’ of the IPEDS data (1984 – 2014) to study the effects of the bans on student enrollment as well as graduation. He employed both an event study method and a triple difference method and found that affirmative action programs increased minority enrollment by as much as 24% at selective public universities and 12% at all public universities. Thus his study indicated that eliminating affirmative action programs would lead to a significant decrease in minority enrollment at these respective rates.

One weakness of Hinrichs (2012) and Backes’ (2012) studies is that they did not give any consideration to time period and comparison group when using the DiD method. Given that they both analyze more than one state, with each of the states banned affirmative action at a different time, usually 3-5 years before and after each of the ban ought to be included in the analysis. But instead, they pooled together all the states and relied on a ban dummy variable to infer any effect of the ban. This method also makes it problematic for the selection of a comparison
group. Since states differ significantly, the rest of the states that did not experience any ban would not be a viable comparison group for all the states that had banned affirmative action in their study. Aside from employing a quantitative case study method, this proposed study also adopts a DiD research design and uses more than one way to construct comparison group. Another distinction of this paper from Hinrichs (2012), Backes (2012), and Naven (2017) is this study’s focus on heterogeneous effects across the income distribution within races.
Chapter 3: Analysis of Institutions
Before proceeding to evaluate the affirmative action policy changes on student enrollment outcomes in Michigan, Nebraska, Arizona, and New Hampshire, it is worth describing the demographic changes of the college age individuals in these four states in order to put the analyses into context. I draw population data from the Surveillance, Epidemiology, and End Results (SEER)\textsuperscript{6} Program, which contains estimates of the single year of age population by race in a given state and year by drawing data from the U.S. Census. Races include white, Black, American Indian/Alaska Native, and Asian or Pacific Islander. Based on my own calculation using the CPS October School data, 18-19-year olds make up about 88 percent of full-time undergraduate students at four-year universities in 2014. So I used the combined population estimates for 18-19 year-olds to show a broad picture of the demographic changes of White and African American students in these four states between 1999 and 2015.

Figures 2 – 5 indicate that 18-19 year olds White and African American population both are declining since 2008. In Nebraska, Arizona, and New Hampshire, relative to the White population, numbers of 18-19 years old African Americans have increased more pronouncedly between 1999 and 2015, especially in Arizona and New Hampshire. The specific numbers are presented in Table 1.

\textsuperscript{6} Data is downloaded from \url{https://seer.cancer.gov/popdata/download.html}. 
Figure 2: Population of 18-19 years olds Whites and African Americans in Michigan

Figure 3: Population of 18-19 years olds Whites and African Americans in Nebraska
Figure 4: Population of 18-19 years olds Whites and African Americans in Arizona

Figure 5: Population of 18-19 years olds Whites and African Americans in New Hampshire
Table 1: Population of 18-19 years olds Whites and African Americans in MI, NE, AZ, and NH

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<td>2006</td>
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<td>2007</td>
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Note: Original data is downloaded from the Surveillance, Epidemiology, and End Results (SEER) Program, which contains estimates of the single year of age population by race in a given state and year by drawing data from the U.S. Census.

Table 2 displays the actual percentages of under-represented minority and low-income students at the four public flagship universities. The percentage of URM declined after 2006 at the University of Michigan. The other three flagships have experienced increases in percentages of URM students after each of the state-wide ban. Both the University of Arizona and the University of Nebraska have increased percentages of low-income students after the change of the affirmative action policy.
<table>
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<th>Year</th>
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<td>0.16</td>
<td>0.163</td>
<td>0.24</td>
</tr>
<tr>
<td>2003</td>
<td>0.120</td>
<td>0.15</td>
<td>0.161</td>
<td>0.24</td>
</tr>
<tr>
<td>2004</td>
<td>0.101</td>
<td>0.14</td>
<td>0.173</td>
<td>0.19</td>
</tr>
<tr>
<td>2005</td>
<td>0.122</td>
<td>0.15</td>
<td>0.167</td>
<td>0.19</td>
</tr>
<tr>
<td>2006</td>
<td>0.112</td>
<td>0.15</td>
<td>0.199</td>
<td>0.18</td>
</tr>
<tr>
<td>2007</td>
<td>0.100</td>
<td>0.13</td>
<td>0.198</td>
<td>0.17</td>
</tr>
<tr>
<td>2008</td>
<td>0.099</td>
<td>0.11</td>
<td>0.200</td>
<td>0.19</td>
</tr>
<tr>
<td>2009</td>
<td>0.084</td>
<td>0.12</td>
<td>0.221</td>
<td>0.19</td>
</tr>
<tr>
<td>2010</td>
<td>0.086</td>
<td>0.15</td>
<td>0.258</td>
<td>0.25</td>
</tr>
<tr>
<td>2011</td>
<td>0.087</td>
<td>0.15</td>
<td>0.273</td>
<td>0.32</td>
</tr>
<tr>
<td>2012</td>
<td>0.080</td>
<td>0.16</td>
<td>0.276</td>
<td>0.32</td>
</tr>
<tr>
<td>2013</td>
<td>0.085</td>
<td>0.14</td>
<td>0.286</td>
<td>0.3</td>
</tr>
<tr>
<td>2014</td>
<td>0.080</td>
<td>0.14</td>
<td>0.280</td>
<td>0.31</td>
</tr>
</tbody>
</table>
In order to understand the effects of affirmative action bans on student-body composition, this analysis takes two approaches. The first step uses pooled data and conducts a state by state DiD analysis to evaluate the average treatment effect of a ban on racial and socioeconomic composition of the student body. Compared to the existing studies that also employed a DiD approach in analyzing the effects of a state-wide ban, this study carefully considers time periods for analysis and comparison group selection, rather than pooling together all the states that experienced bans on race-based affirmative action but at different times.

The second approach employs SCM to examine the impact of a ban on student body compositional changes at each of the public flagships using a small number of similar universities to build the counterfactual. The DiD estimator only represents the average treatment effect across all treated institutions, and masks the heterogeneous effects across institutions with varying quality. For example, among the four states being examined in this study, Arizona, Nebraska, and New Hampshire do not have any selective institutions. And the average treatment effect obtained through the DiD analysis may not have any statistical significance in states with few or no selective institutions. Yet it is still meaningful to understand what happened and what would have happened at each of the four flagships. Large public flagships account for more than half of the total undergraduate enrollment in the United States, and moderately selective public universities have been “underrepresented in affirmative action scholarship” (Gaertner & Hart, 2013). A few qualitative studies document that after the bans, these flagships increased their outreach efforts in racial minority concentrated communities as well as low-income high schools (Garces & Cogburn, 2015), the effect of these increased efforts warrants a close-up examination using some type of quantitative case study method.
SCM suits the need of a quantitative case study well. The intuition behind the SCM is similar to that for a matching approach that aims to select an appropriate control group, by minimizing the distance in pre-treatment characteristics between treated and weighted average of control institutions. One main difference between the traditional DiD model and the SCM is that the former assigns equal weights to the institutions selected for the comparison group. By contrast, the SCM approach assigns its own weight based on the pre-treatment fit to the treated group. Therefore, SCM allows for an accurate construction of a comparison unit, especially considering that the unit of analysis is a single institution. Both methods are explained in detail in the following sections.

**Difference-in-differences Analysis**

Table 3 below provides the respective years when affirmative action was banned in those states. I do not include Oklahoma in the analysis because it only has 1 year of enrollment data since the ban of affirmative action. Since the four states (MI, NE, AZ, NH) banned affirmative action in different years, my strategy is to evaluate the effect of a ban in each of these states individually.

*Table 3: Coding for time of bans on affirmative action for the states examined*

<table>
<thead>
<tr>
<th>State</th>
<th>When ban was in place that affected fall admissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michigan</td>
<td>2006</td>
</tr>
<tr>
<td>Nebraska</td>
<td>2008</td>
</tr>
<tr>
<td>Arizona</td>
<td>2010</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>2011</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>2012</td>
</tr>
</tbody>
</table>
To test the effects of affirmative action bans, comparing the student body composition before and after the ban is necessary. This lends itself to a DiD design, which sets up an implicit treatment-control comparison. The key is to construct the control group in a way that the treatment group and the control group will behave the same way in the absence of the policy change for the treatment group. In this analysis, in addition to including time variant institution level characteristics that might have contributed to student body compositional changes, I use two ways to construct comparable states to account for general factors that might have contributed to the changes. Before going into details about constructing control/comparison groups of the research design, I specify the baseline models as follows:

\[
\text{Composition}_{ist} = \alpha_0 + \delta * \text{ban}_{st} + \pi_t + \pi_i + X_{ist}'\alpha_i + \epsilon_{ist} \tag{1}
\]

where \(\text{Composition}_{ist}\) is the dependent variable measuring institution \(i\)'s racial or socioeconomic composition of its student body in state \(s\) in year \(t\). The data section discusses how they are measured. Using Michigan as an example, a dummy variable \(\text{ban}_{st}\) equal to 1 when an affirmative action ban is in place in the state of Michigan at time \(t\) (\(\text{ban}=1\) if Michigan and year is 2006 and after); \(\pi_t\) represents year fixed effects and is a vector of dummy variables indicating years; \(\pi_s\) denotes institution fixed effects; \(X_{ist}\) represents a set of covariates of institution \(i\) in year \(t\), including tuition and fees, and an indicator of whether institution \(i\) adopts a reduced- or no- loan financial aid policy for students entering in fall of year \(t\); \(\epsilon_{ist}\) is the error term.

The parameter \(\delta\) measures the impact of an affirmative action ban and represents the expected change in the outcome variable when an institution becomes affected by a statewide ban. Due to the heterogeneous nature of the treatment, the coefficients should be interpreted as the average treatment effect across all treated institutions.
The analysis of more than one state experiencing policy change at different years makes things complex. In this case, mainly due to the short time of policy change for some of the states, I include different number of years before and after the affirmative action policy change for each of the four states. For Michigan, the state having the earliest change of affirmative action among the four states being examined, I include seven years before 2006, the year when Michigan banned affirmative action, and eight years after that change. This gives the analysis for the case of Michigan a total of 15 years of data, i.e. 2000-2014. For Nebraska, which banned affirmative action in 2009, data from 2004 to 2014 are gathered. For Arizona, which banned affirmative action in 2011, data from 2008 to 2014 are pooled together. For New Hampshire, which banned affirmative action in 2012, data from 2010 to 2014 are obtained for the analysis. As a robustness check, I also included all the available years of data (1999 – 2014) for each of the states and results are robust in spite of including different number of years before and after the policy implementations.

Second, a more complex issue relates to the construction of a comparison group. The selection of a comparable group is critical in using the DiD method because the causal inference hinges upon the assumption that the treatment group and the comparison group are the same absent the policy change for the treatment group being true. I follow the practice of Zhang and Ness’ (2010) of constructing multiple comparison groups, and use two different comparison groups in this analysis.

**Regional interstate compacts.** I first construct the comparison group based on regional interstate compacts for higher education. There are four main such compacts: Midwestern Higher Education Compact (MHEC), New England Board of Higher Education (NEBHE), Southern Regional Education Board (SREB), and Western Interstate Commission for Higher Education
Previous studies have adopted this practice of selecting comparison group in studying effects of various state policy initiations or changes (e.g. Flores, 2010; Zhang & Ness, 2010). The rationale of relying on regional compacts is that they provide opportunities for state actors to exchange policy or innovation ideas and thus knowledge and practices are disseminated across states and higher education institutions within the same compact (Cohen-vogel, Ingle, & Levine, 2008). Take Michigan for example, universities in the rest of the MHEC are included in the comparison group excluding universities in Nebraska. Last, considering that some states although did not have outright bans (i.e. Alabama, Georgia, Louisiana, and Mississippi), were in jurisdictions that had important affirmative action litigation, I also test the model when dropping institutions from each of these comparison states. To sum up, regression model (1) is estimated separately for each of the four states examined, separately for each of the two outcomes (racial composition and socioeconomic composition of the fall freshman class) and are repeated using each of two different comparison groups.

**States with similar proportions of low-income individuals.** The focus of this study is student body composition after a ban of affirmative action; therefore, it seems appropriate to construct comparison group based on demographic composition of a state’s population, for example, the proportion of low-income individuals in each state. An average of 14.4 percent of Michigan’s population are identified as low-income or below poverty line between 2011 to 2013, according to the Census Bureau. When dividing all the 50 states into quartiles based on a three-year average poverty rate between 2011 and 2013 (8.3 – 10.9%, 11.2 – 13.8%, 14.1 – 16.2%, and 17– 21.4%), Indiana, Oregon, Idaho, Ohio, Montana, Missouri, Florida, Oklahoma, New York, California, Alabama, and Nevada fall into the same quartile as Michigan. Considering that
California and Florida had banned affirmative action prior to 2007, the analysis of universities in Michigan exclude those in California and Florida as well as those in Oklahoma.

Alabama, Arkansas, Georgia, Kentucky, Louisiana, Mississippi, New Mexico, Oklahoma, Tennessee, and West Virginia fall into the same quartile based on the four-year average poverty rate between 2011 and 2014 as Arizona. Given that Oklahoma banned the use of race in college admission in 2013, the construct of the comparison group for universities in Arizona will exclude those in Oklahoma.

Both New Hampshire and Nebraska are in the first quartile of a four-year average poverty rate between 2011 and 2014. The rest of the states that also fall into this category are Alaska, Colorado, Connecticut, Iowa, Maryland, Minnesota, New Jersey, North Dakota, Utah, Vermont, Virginia, and Wyoming. All of these states will be used to construct the comparison group for universities in New Hampshire and Nebraska respectively.

**Synthetic Control Analysis of Four State Public Flagships**

The average treatment effect obtained from the DiD analysis does not reveal the heterogeneous effects of a ban on student body compositional changes at different types of institutions. Especially for states with few or no selective institutions, the DiD analysis may not have any statistical significance.

Yet, knowing the effects of a ban on flagships are still important. This is because first, most students attend public state flagships, and yet moderately selective public universities have been underrepresented in affirmative action scholarship (Gaertner & Hart, 2013). This knowledge gap is significant because large public schools account for more than half of the total undergraduate enrollment in the United States. Moreover, these moderately selective institutions
filed applications from disadvantaged students for whom the stakes are quite high: many low-income and minority applicants may not have the opportunity to attend a four-year college if they are rejected from the state’s flagship university.

Second, qualitatively it has been documented that all these flagships have increased outreach efforts to both racial minority communities as well as socioeconomically disadvantaged communities. This calls for a quantitative case study analysis to assess the impact of the policy on a single institution.

The key question is how student body composition would have evolved the years after a ban in the absence of it. The SCM serves this purpose very well. It was developed in Abadie, Diamond, and Hainmueller (2010, 2015), and has been used in Hinrichs (2012, 2015) on affirmative action. The method can be used for comparative case studies in which a treatment goes into effect at some point in time for a treatment unit but not in a set of potential control units. A researcher chooses a set of variables for matching, and the method selects a convex combination of the potential control units that is the closest to the treatment unit based on the matching variables and a particular criterion for closeness. Studying how the outcome evolves in the treatment unit relative to this synthetic control provides an estimate of treatment effects over time. The SCM is useful because it provides a quantitative method for conducting case studies and allows the data to play some role in selecting the control group. This method complements the DiD approach – the DiD analysis provides the average treatment effect of a ban on universities located in each of the states, and the SCM analysis is informative in understanding the policy effects on the flagships.

As Abadie, Diamond, and Hainmueller (2012, 2015) explained, relative to regression-based comparative case studies, the SCM has important advantages. The key to the SCM is using
a weighted average of units as a comparison. This method precludes the type of model-
dependent extrapolation that regression results are often based on.

Specifically, the synthetic control group method works as follows. Suppose that there is a
sample of \( J + 1 \) higher education institutions and only one of the first institution is exposed to
the policy change. Then \( J \) constitute a “donor pool”. The difference between the pre-treatment
characteristics of a treated institution and a synthetic control institution is given by a vector \( X_1 - X_0 W \) where \( X_1 \) is a \( k \times 1 \) vector of pre-treatment characteristics of a treated institution, \( X_0 \) is a
\( k \times J \) matrix of the values of the same variables for the institutions in the donor pool, and \( W = (w_2, ..., w_{J+1})' \) is a \( J \times 1 \) vector of non-negative weights that form a convex combination of
institutions from the “donor pool”.

The optimal synthetic control weights \( W^* = (w_2^*, ..., w_{J+1}^*)' \) minimize the discrepancy
between \( X_1 \) and \( X_0 W \):

\[
\| X_1 - X_0 W \|
\]

subject to \( 0 \leq w_j \leq 1 \) for \( j = 2, ..., J \) and \( w_2 + \cdots + w_{J+1} = 1 \).

In the literature, there are two ways to minimize this discrepancy. The first approach
minimizes the discrepancy using

\[
\| X_1 - X_0 W \| V = \sqrt{(X_1 - X_0 W)'V(X_1 - X_0 W)}
\]

where \( V \) is a positive semidefinite \( k \times k \) matrix. The choice of \( V \) influences the mean squared
error of the estimator. The optimal \( V \) assigns weights to characteristics in \( X_0 \) and \( X_1 \) that
minimize the root mean squared prediction error. The weights of \( V \) are normalized to sum to one
with the matching variables that are strong predictors of the outcome variable receiving more
weights. It is discussed in detail in Abadie, Diamond, and Hainmueller (2010).
The second approach divides the pretreatment years into a training period and a validation period. Then it uses predictors measured in the training period and select the weighting matrix \( V \) such that the resulting synthetic control minimizes the root mean square prediction error (RMSPE) over the validation period. This is discussed in detail in Abadie, Diamond, and Hainmueller (2015). This cross-validation technique selects the weighting matrix that minimize out-of-sample prediction errors.

This study adopts the second approach and uses the `synth_runner` package in STATA to conduct the analysis. The first half of the pre-treatment period for each ban is specified as the training period.

For the selection of the donor pool, I rely on Barron’s Admissions Competitiveness Index Data and U.S. news and world report ranking. Take the University of Michigan for example. It is categorized as highly competitive in the Barron’s 2008 Index. Universities that are also ranked as highly competitive except for universities located in the banned states are therefore used as the donor pool institutions for the University of Michigan. The University of Michigan is ranked 29 in 2012 in the U.S. news and world report ranking. I choose universities ranked in the top 50 yet not residing in one of the banned states for the donor pool for the University of Michigan.

Given that affirmative action affects college access, an index that measures the competitiveness of the admissions fits the purpose better. Comparing the results between using the two measures of college competitiveness, the ones using the Barron’s index allow for a better pre-treatment fit in the outcome variables for all four institutions. Only results from using the Barron’s Index are presented here. Results from using the U.S. news and world report ranking are available upon request.

Overall, this section presents more than one method to analyze the effect of a state-wide
ban on affirmative action on different types of institutions and institutions with varying quality. Coupling the traditional DiD method with a quantitative case study approach proves to be quite useful in studying these effects in states with few or no competitive institutions. Non-competitive institutions usually admit the majority of applicants regardless the state of an affirmative action policy. So when pooling together a state’s public flagship with other non-competitive institutions, the DiD analysis may not have any statistical significance, and may disguise any effect of a ban on the state’s public flagship. A separate analysis on the state’s flagship is still crucial because of two reasons. First, in quality ranking, the public flagships all rank much higher than other public institutions in these states. Again, pooling together the state’s flagship with other public institutions will not tell much of the effect on the flagship. Second, based on existing qualitative studies, public flagship all increased their outreach efforts in both racial minorities concentrated areas and socioeconomically disadvantaged communities. This makes the analysis separately and solely on public flagships necessary.

Data

I draw data from the Integrated Postsecondary Education Data System (IPEDS), and use four survey components in IPEDS, including Institutional Characteristics, Fall Enrollment, Student Financial Aid and Net Price, and Finance Survey to construct the main variables in this step of analysis. Every higher education institution that participates in the federal student financial aid programs report data on enrollment, program completions, graduation rates, finance, tuition, and many other institutional level variables. The sample consists of data of first-time full-time undergraduate students from these four surveys from 1999 to 2014. All four-year and degree granting institutions are included in the sample.
Variables

The percentage of cohort members who belong to racial or ethnic groups that have been historically underrepresented in American higher education (i.e. African Americans, Hispanics, and Native Americans) is used as a proxy for racial diversity. For the purpose of this study, I use the fall enrollment data of full-time, first-time students in the IPEDS dataset to construct the racial composition of the study body.

In looking at changes of socioeconomic diversity, the variable should measure the socioeconomic composition of the incoming freshmen’s socioeconomic composition. The ideal dataset shall contain institutions’ freshman enrollment breakdowns by students’ family socioeconomic characteristics. However, the IPEDS does not contain such information. The best available indicator of students’ socioeconomic background is the share of full-time freshmen receiving Pell Grants. This has been used similarly in previous studies (e.g. Ehrenberg, Zhang, & Levin, 2006; Hearn & Rosinger, 2014; Jaquette et al., 2016).

The Pell program is the largest source of federal grant aid for students and is directed toward students who are in need of financial aid. For example, over 83% of all dependent Pell recipients had household incomes of less than $40,000 in 2013 (U.S. Department of Education, 2014). Institutions, states, and the federal government consider the Pell Grant to be the foundational grant in need-based aid packages, and consideration of Pell eligibility comes with students completing the Free Application for Federal Student Aid, required by all institutions that participate in federal student aid programs. Prior to 2008, the IPEDS Student Financial Aid survey had only the percentage of full-time freshman receiving any federal student grant aid (excluding the G.I Bill) rather than the number of Pell Grant recipients. Considering that the correlation between the percentage of Pell recipients and the percentage of federal grant
recipients is very high, around 0.99 for every year after 2008, I use the percentage of full-time freshmen receiving any federal student grant aid (excluding the G.I Bill) before 2008, and the percentage of full-time freshman receiving Pell Grant after 2008 as a proxy for socioeconomic diversity.

I also control for institutional factors that would affect college enrollment of low-income and racial minority students. These variables include in-state tuition and fees for full-time undergraduates, and an indicator of reduce- or no-loan aid policy. They are found to significantly affect the percentage of low-income and racial minority students in previous studies (e.g. Hearn & Rosinger, 2014; Jaquette, Curs, & Posselt, 2016). In-state tuition and fees are financial in nature are adjusted for inflation to reflect real-dollar value in 2014 using the Consumer Price Index.

**Results**

Figures 6 to 9 plot the trends of average racial and socioeconomic composition at 4-year public universities and colleges in each of the four states, i.e. Michigan, Arizona, New Hampshire and Nebraska and their comparison states. Figure 6 shows clearly that the gap in racial minority student enrollment between Michigan and its comparison group diverges after 2006. In the rest three states, there are rather modest increases in the percentages of racial minority after each of the bans. In both Nebraska and Arizona, the increase looks sharper compared to their respective comparison group.
Figure 6: Racial and socioeconomic composition at 4-year public universities and colleges in Michigan and comparison group before and after 2006

In Arizona and Nebraska, there is an initial modest increase in the percentage of low-income students after each of the bans, followed by a decrease. In New Hampshire, only one data point after the ban is available. Although there is a decrease in the fraction of low-income students, it is not as drastic as it is for the comparison group.

To obtain counterfactuals absent a policy change in affirmative action, I conducted DiD analyses state by state and obtained average treatment effect for different types of institutions for each of the four states, followed by SCM to gauge the effects of a ban for each of the flagships. For each of the states, the average treatment effect is presented first, followed by a case study of the state’s public flagship using the SCM. Results for the University of Michigan are presented in detail. For the rest three flagships, brief descriptions of the primary findings are provided.
Figure 7: Racial and socioeconomic composition at 4-year public universities and colleges in Nebraska and comparison group before and after 2008
Figure 8: Racial and socioeconomic composition at 4-year public universities and colleges in Arizona and comparison group before and after 2010

Figure 9: Racial and socioeconomic composition at 4-year public universities and colleges in New Hampshire before and after 2011
Table 4 displays impacts of state-wide bans on racial and socioeconomic composition of student body from conducting 34 DiD analyses with institution and time fixed effects. Each of the four panels of the table corresponds to a DiD analysis results for different types of institutions: pooled public and private 4-year institutions, public 4-year institutions, private-not-for-profit 4-year institutions, and private-for-profit 4-year institutions.

There are nine columns for each of the four panels, expect for the last panel. The first column pools together all four states, and evaluated average effect for institutions with varying quality. Columns 2 to 5 display results from using states within the same regional higher education compact to construct comparison groups. The last four columns, columns 6 to 9 show results from using states falling into the same quartile of low-income percentage to construct comparison groups. So each column from each of the four panels comes from one set of DiD analysis using equation (1) but only coefficients of the ban dummy are reported in the table.
Table 4: Regression Results of Effects of Ban on Racial and Socioeconomic Composition

<table>
<thead>
<tr>
<th></th>
<th>Average</th>
<th>MI</th>
<th>AZ</th>
<th>NE</th>
<th>NH</th>
<th>MI</th>
<th>AZ</th>
<th>NE</th>
<th>NH</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Public and Private 4-year Institutions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Low Income</td>
<td>0.016***</td>
<td>0.012**</td>
<td>0.038**</td>
<td>-0.071***</td>
<td>0.027*</td>
<td>0.026*</td>
<td>0.027*</td>
<td>-0.055***</td>
<td>0.022</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.004)</td>
<td>(0.011)</td>
<td>(0.010)</td>
<td>(0.012)</td>
<td>(0.010)</td>
<td>(0.011)</td>
<td>(0.011)</td>
<td>(0.014)</td>
</tr>
<tr>
<td>% URM</td>
<td>-0.004*</td>
<td>-0.018*</td>
<td>0.027***</td>
<td>0.013*</td>
<td>-0.009</td>
<td>-0.014**</td>
<td>0.043***</td>
<td>0.010</td>
<td>-0.011</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.006)</td>
<td>(0.005)</td>
<td>(0.006)</td>
<td>(0.006)</td>
<td>(0.003)</td>
<td>(0.006)</td>
<td>(0.006)</td>
<td>(0.006)</td>
</tr>
<tr>
<td>% African American</td>
<td>-0.002</td>
<td>-0.008*</td>
<td>0.002*</td>
<td>0.006</td>
<td>0.005</td>
<td>-0.001</td>
<td>-0.010*</td>
<td>0.007</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.003)</td>
<td>(0.001)</td>
<td>(0.005)</td>
<td>(0.004)</td>
<td>(0.004)</td>
<td>(0.005)</td>
<td>(0.005)</td>
<td>(0.005)</td>
</tr>
<tr>
<td>% Hispanic</td>
<td>-0.002</td>
<td>-0.010*</td>
<td>0.025***</td>
<td>0.007</td>
<td>-0.014***</td>
<td>-0.012**</td>
<td>0.053***</td>
<td>0.002</td>
<td>-0.016***</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.004)</td>
<td>(0.006)</td>
<td>(0.004)</td>
<td>(0.003)</td>
<td>(0.003)</td>
<td>(0.004)</td>
<td>(0.004)</td>
<td>(0.004)</td>
</tr>
<tr>
<td>% Asian</td>
<td>-0.002*</td>
<td>-0.002*</td>
<td>0.023</td>
<td>0.003</td>
<td>-0.002</td>
<td>-0.006</td>
<td>-0.001</td>
<td>0.003</td>
<td>-0.001</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.001)</td>
<td>(0.012)</td>
<td>(0.002)</td>
<td>(0.003)</td>
<td>(0.003)</td>
<td>(0.004)</td>
<td>(0.004)</td>
<td>(0.004)</td>
</tr>
<tr>
<td>% White</td>
<td>0.003</td>
<td>0.020*</td>
<td>-0.045***</td>
<td>-0.016</td>
<td>-0.022</td>
<td>0.018**</td>
<td>-0.058***</td>
<td>-0.007</td>
<td>-0.017</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.007)</td>
<td>(0.005)</td>
<td>(0.009)</td>
<td>(0.013)</td>
<td>(0.005)</td>
<td>(0.007)</td>
<td>(0.010)</td>
<td>(0.013)</td>
</tr>
</tbody>
</table>

| **Public 4-year Institutions** |         |      |      |      |      |      |      |      |      |
| % Low Income              | 0.021*** | 0.007 | 0.023* | -0.039** | 0.084*** | 0.0160** | 0.034* | -0.032* | 0.056*** |
|                          | (0.005) | (0.009) | (0.0109) | (0.012) | (0.019) | (0.006) | (0.015) | (0.012) | (0.0113) |
| % URM                    | 0.003    | -0.013** | 0.013 | 0.008 | -0.025** | -0.013* | 0.049* | 0.015* | -0.013* |
|                          | (0.003) | (0.004) | (0.011) | (0.007) | (.008) | (0.005) | (0.016) | (0.006) | (0.006) |
| % African American       | 0.003    | -0.002 | 0.002 | -0.008 | -0.001 | 0.003 | 0.000 | 0.006* | 0.011** |
|                          | (0.002) | (0.007) | (0.001) | (0.004) | (0.002) | (0.007) | (0.009) | (0.002) | (0.003) |
| % Hispanic               | -0.000   | -0.011*** | 0.011* | 0.016*** | -0.012* | -0.012* | 0.048** | 0.009 | -0.010 |
|                          | (0.002) | (0.001) | (0.005) | (0.003) | (0.005) | (0.005) | (0.012) | (0.005) | (0.006) |
| % Asian                  | -0.002   | -0.003* | 0.034 | -0.001 | -0.007 | -0.003 | -0.003 | -0.001 | -0.008 |
|                          | (0.001) | (0.001) | (0.022) | (0.001) | (0.005) | (0.002) | (0.005) | (0.003) | (0.008) |
| % White                  | 0.003    | 0.030* | -0.035* | -0.003 | 0.033 | 0.023 | -0.058** | -0.029* | -0.003 |
|                          | (0.004) | (0.013) | (0.012) | (0.010) | (0.021) | (0.010) | (0.017) | (0.012) | (0.015) |
Table 4 Continued: Regression Results of Effects of Ban on Racial and Socioeconomic Composition

<table>
<thead>
<tr>
<th></th>
<th>Regional Compact for Comparison Group</th>
<th>Similar Low-Income Percentage for Comparison Group</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>MI</td>
<td>AZ</td>
</tr>
<tr>
<td>% Low Income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% URM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% African American</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Hispanic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Asian</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% White</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Private-not-for-profit 4-year Institutions

<table>
<thead>
<tr>
<th></th>
<th>Average</th>
<th>MI</th>
<th>AZ</th>
<th>NE</th>
<th>NH</th>
<th>MI</th>
<th>AZ</th>
<th>NE</th>
<th>NH</th>
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<tbody>
<tr>
<td>% Low Income</td>
<td>0.007</td>
<td>0.013</td>
<td>0.025*</td>
<td>-0.087***</td>
<td>0.025</td>
<td>0.026*</td>
<td>0.004</td>
<td>-0.070***</td>
<td>0.013</td>
</tr>
<tr>
<td></td>
<td>(0.005)</td>
<td>(0.007)</td>
<td>(0.009)</td>
<td>(0.013)</td>
<td>(0.016)</td>
<td>(0.008)</td>
<td>(0.006)</td>
<td>(0.014)</td>
<td>(0.017)</td>
</tr>
<tr>
<td>% URM</td>
<td>-0.012**</td>
<td>-0.020***</td>
<td>-0.029***</td>
<td>0.010</td>
<td>0.004</td>
<td>-0.016**</td>
<td>-0.029***</td>
<td>0.002</td>
<td>-0.004</td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td>(0.001)</td>
<td>(0.004)</td>
<td>(0.008)</td>
<td>(0.010)</td>
<td>(0.004)</td>
<td>(0.004)</td>
<td>(0.008)</td>
<td>(0.009)</td>
</tr>
<tr>
<td>% African American</td>
<td>-0.007*</td>
<td>-0.013**</td>
<td>0.002</td>
<td>0.009</td>
<td>0.017*</td>
<td>-0.011*</td>
<td>-0.014**</td>
<td>0.001</td>
<td>0.012</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.004)</td>
<td>(0.002)</td>
<td>(0.007)</td>
<td>(0.007)</td>
<td>(0.005)</td>
<td>(0.003)</td>
<td>(0.006)</td>
<td>(0.007)</td>
</tr>
<tr>
<td>% Hispanic</td>
<td>-0.005**</td>
<td>-0.008</td>
<td>-0.031***</td>
<td>0.001</td>
<td>-0.013**</td>
<td>-0.005**</td>
<td>-0.015***</td>
<td>0.000</td>
<td>-0.016**</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.004)</td>
<td>(0.004)</td>
<td>(0.005)</td>
<td>(0.005)</td>
<td>(0.001)</td>
<td>(0.003)</td>
<td>(0.005)</td>
<td>(0.005)</td>
</tr>
<tr>
<td>% Asian</td>
<td>0.000</td>
<td>-0.000</td>
<td>0.011</td>
<td>0.007*</td>
<td>0.001</td>
<td>-0.001</td>
<td>-0.013***</td>
<td>0.007</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.001)</td>
<td>(0.010)</td>
<td>(0.003)</td>
<td>(0.005)</td>
<td>(0.001)</td>
<td>(0.002)</td>
<td>(0.004)</td>
<td>(0.004)</td>
</tr>
<tr>
<td>% White</td>
<td>0.002</td>
<td>-0.001</td>
<td>-0.053***</td>
<td>-0.001</td>
<td>-0.063**</td>
<td>0.004</td>
<td>-0.060***</td>
<td>0.010</td>
<td>-0.053**</td>
</tr>
<tr>
<td></td>
<td>(0.005)</td>
<td>(0.020)</td>
<td>(0.005)</td>
<td>(0.012)</td>
<td>(0.021)</td>
<td>(0.017)</td>
<td>(0.008)</td>
<td>(0.013)</td>
<td>(0.017)</td>
</tr>
</tbody>
</table>

Private-for-profit 4-year Institutions

<table>
<thead>
<tr>
<th></th>
<th>Average</th>
<th>MI</th>
<th>AZ</th>
<th>NE</th>
<th>NH</th>
<th>MI</th>
<th>AZ</th>
<th>NE</th>
<th>NH</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Low Income</td>
<td>0.046</td>
<td>0.010</td>
<td>0.112***</td>
<td>-0.022</td>
<td>0.029</td>
<td>0.159***</td>
<td>-0.066</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.031)</td>
<td>(0.025)</td>
<td>(0.020)</td>
<td>(0.053)</td>
<td>(0.028)</td>
<td>(0.020)</td>
<td>(0.051)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% URM</td>
<td>0.049</td>
<td>0.059***</td>
<td>-0.024</td>
<td>0.072</td>
<td>0.044***</td>
<td>0.009</td>
<td>-0.002</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.025)</td>
<td>(0.007)</td>
<td>(0.019)</td>
<td>(0.040)</td>
<td>(0.005)</td>
<td>(0.027)</td>
<td>(0.048)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% African American</td>
<td>0.040</td>
<td>0.045***</td>
<td>-0.028</td>
<td>0.055</td>
<td>0.037***</td>
<td>-0.022</td>
<td>0.034</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.021)</td>
<td>(0.006)</td>
<td>(0.021)</td>
<td>(0.039)</td>
<td>(0.005)</td>
<td>(0.025)</td>
<td>(0.036)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Hispanic</td>
<td>0.009</td>
<td>0.013**</td>
<td>0.004</td>
<td>0.017</td>
<td>0.007</td>
<td>0.032***</td>
<td>-0.035</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.014)</td>
<td>(0.003)</td>
<td>(0.016)</td>
<td>(0.016)</td>
<td>(0.005)</td>
<td>(0.005)</td>
<td>(0.029)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Asian</td>
<td>-0.005</td>
<td>-0.006**</td>
<td>0.036</td>
<td>0.037***</td>
<td>-0.006***</td>
<td>-0.017***</td>
<td>0.031**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.007)</td>
<td>(0.001)</td>
<td>(0.056)</td>
<td>(0.009)</td>
<td>(0.001)</td>
<td>(0.002)</td>
<td>(0.011)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% White</td>
<td>-0.027</td>
<td>-0.022</td>
<td>-0.035</td>
<td>0.211***</td>
<td>-0.031**</td>
<td>-0.014</td>
<td>0.203***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.027)</td>
<td>(0.010)</td>
<td>(0.017)</td>
<td>(0.048)</td>
<td>(0.009)</td>
<td>(0.025)</td>
<td>(0.055)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Table 4 displays impacts of state-wide bans on racial and socioeconomic composition of student body from conducting 34 difference-in-differences analyses with state and time fixed effects. Each of the four panels of the table corresponds to a difference-in-differences analysis results for different types of institutions: pooled public and private 4-year institutions, public 4-year institutions, private-not-for-profit 4-year institutions, and private-for-profit 4-year institutions. Only coefficients of the ban dummy are reported.
The average effect on the representation of low-income students at four-year public and private colleges and universities is statistically positive, and this positive effect is larger for public four-year institutions only. To be specific, a ban is associated with two percentage points increase of low-income students at 4-year public universities. Overall, the ban has a negative impact on the representation of racial minority students at public and private 4-year institutions. However, the negative effect is not particularly large, less than one percentage point. And the ban did not decrease the chances of racial minority students entering public institutions.

**Michigan**

As indicated in column 2 and column 6 of Table 4, the ban has resulted in a decrease in the average racial minority representation in Michigan, at both public and private 4-year institutions. This might be suggestive that private-not-for-profit institutions in Michigan adopted similar practices in admissions as the public ones did after the ban. There are differences in results between the two approaches of constructing comparison groups. The negative effect on racial composition is larger in using the regional compact approach, than it is from using the low-income percentage approach.

The effect on socioeconomic composition is significantly positive at public and private 4-year institutions together. However, this effect is no longer significant when examining public institutions only. Comparing the results between these two approaches of constructing comparison groups, the positive effect of socioeconomic diversity is larger when using the low-income proportion of a state’s population as a way to construct comparison group.

Another result worth noting is that the ban seems to have pushed African American and Hispanic students to for-profit-institutions in Michigan. The ban is associated with a 4.4 to 5.9 percentage points increase in the fraction of racial minorities at 4-year-for-profit institutions.
This is not the case for low-income students – the ban does not have a significant impact on low-income students’ representation at for-profit institutions in Michigan.

Using the SCM approach, I analyzed the effect of the state-wide affirmative action ban on UM’s student body racial and socioeconomic composition. Table 5 shows how the pre-treatment characteristics of UM match with that of the synthetic control (Column 2) and with the equally weighted average of 78 institutions in the donor pool (Column 3). The average sticker price of institutions in the donor pool is much higher than it is for UM. And the average percentages of racial minorities are much lower than it is for UM in the years preceding the ban. The differences of predictor values for UM and synthetic UM are much smaller. This shows that the synthetic unit does a better job of approximating the counterfactual of UM than the equally weighted average of donor pool institutions.
Table 5: Predictors for University of Michigan, synthetic University of Michigan, and mean donor pool

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Treated Institution</th>
<th>Synthetic</th>
<th>Average of Donor Institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-state tuition (USD)</td>
<td>7610.5</td>
<td>6735.79</td>
<td>23655.75</td>
</tr>
<tr>
<td>Published in-state tuition and fees (USD)</td>
<td>7373.5</td>
<td>6702.242</td>
<td>23280.86</td>
</tr>
<tr>
<td>% of under-represented minorities (1999)</td>
<td>0.107</td>
<td>0.127</td>
<td>0.081</td>
</tr>
<tr>
<td>% of under-represented minorities (2000)</td>
<td>0.136</td>
<td>0.129</td>
<td>0.080</td>
</tr>
<tr>
<td>% of under-represented minorities (2001)</td>
<td>0.137</td>
<td>0.132</td>
<td>0.083</td>
</tr>
<tr>
<td>% of under-represented minorities (2002)</td>
<td>0.144</td>
<td>0.133</td>
<td>0.080</td>
</tr>
<tr>
<td>% of under-represented minorities (2003)</td>
<td>0.120</td>
<td>0.124</td>
<td>0.087</td>
</tr>
<tr>
<td>% of under-represented minorities (2004)</td>
<td>0.101</td>
<td>0.104</td>
<td>0.087</td>
</tr>
<tr>
<td>% of under-represented minorities (2005)</td>
<td>0.122</td>
<td>0.111</td>
<td>0.090</td>
</tr>
<tr>
<td>% of under-represented minorities (2006)</td>
<td>0.112</td>
<td>0.106</td>
<td>0.095</td>
</tr>
</tbody>
</table>

Table 6 lists the institution names and associated weights for the 4 institutions used to create synthetic UM. These institutions are Ohio State University, Fordham University, University of Illinois at Urbana-Champaign, and Stony Brook University with Ohio State receiving the highest weight.
Table 6: Composition of synthetic University of Michigan (pre-treatment period 1999 - 2006, Treatment year=2006)

<table>
<thead>
<tr>
<th>Institution</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ohio State University-Main Campus</td>
<td>0.832</td>
</tr>
<tr>
<td>Fordham University</td>
<td>0.059</td>
</tr>
<tr>
<td>University of Illinois at Urbana-Champaign</td>
<td>0.056</td>
</tr>
<tr>
<td>Stony Brook University</td>
<td>0.053</td>
</tr>
</tbody>
</table>

The top left panel of Figure 10 shows the percentage of racial minority students over time for UM and synthetic UM. The racial minority representation for synthetic UM mirrors UM quite closely during the pre-treatment period, which indicates that synthetic UM was a reasonable counterfactual for UM. The top panel also illustrates a divergence in outcome between UM and synthetic UM beginning in 2008, an indicator that the state ban had a negative effect on the racial diversity of the first-year students at UM.
Figure 10: Trends in Racial and Socioeconomic Composition at University of Michigan vs. Synthetic University of Michigan and Placebo Tests

The top right panel of Figure 10 displays results from the in-place placebo test. As explained in Abadie et al. (2015), the intuition of the in-place placebo test is that if similar treatment effects arise when the intervention is artificially reassigned to units not directly exposed to the intervention, the estimated SCM treatment effect should be considered large. So the SCM was ran separately for each untreated unit in the donor pool, assigning each unit to a ban in 2006.

This way, the placebo analyses create a distribution of placebo effects against which the estimated effect can be evaluated for the treated unit. The green line in the upper right panel of Figure 10 shows the difference between actual and synthetic UM. The grey lines show the difference between actual and synthetic for the placebo adopters. Visually, Figure 10 suggests
that the negative treatment effect on UM was bigger than average compared to placebo adopters.

The SCM was also run for the socioeconomic composition of UM. Results, as shown in the lower panel of Figure 10 indicate that absent the ban, the percentage of low-income student at UM would have increased, and the placebo test results suggest that the negative treatment effect on low-income students was also above average compared to placebo adopters.

**Nebraska**

As indicated in columns 4 and 8 of Table 4, the ban does not have any significant impact on the representation of racial minorities at both public and private 4-year college and universities in Nebraska. There is a strong positive effect though on Hispanics at 4-year public institutions. In contrast, the ban has a strong negative effect on socioeconomic composition of student body ban in both public and private colleges and universities.

Figure 11 shows the SCM results for the University of Nebraska. Absent the ban, the percentage of racial minorities would have gone up and the share of low-income students would have decreased after 2011. Yet, evaluated against the distribution of the gaps for the donor institutions, the gap for the University of Nebraska is slightly above average in both cases.
Figure 11: Trends in Racial and Socioeconomic Composition at University of Nebraska vs. Synthetic University of Nebraska and Placebo Tests

Arizona

Columns 3 and 7 of Table 4 display the DiD coefficients for higher education institutions in Arizona. Overall, the ban has a positive effect on low-income students’ representation at four-year-public and not-for-private institutions in Arizona. The positive effect remains when examining each type of institutions separately. The effect on low-income students’ representation is larger than the average effect in Michigan, with both ways of constructing control group. Specifically, the ban is associated with a 2.3 to 3.4 percentage points increase in the fraction of low-income students at 4-year-public colleges and universities in Arizona.

Overall, the ban did not decrease racial minority’s representation at four-year public
institutions. However, this effect is positive when using states with similar percentage of low-income families. This suggests that when the outcome variable is racial composition, using states with similar low income population may not be a good way to construct comparison group. Unlike the case in Michigan, the ban did not increase the enrollment of racial minorities at for-profit-4-year institutions.

Figure 12 shows the SCM results for University of Arizona. Absent the ban, the percentage of both racial minorities and low-income students would have gone down. The placebo test results also suggest that the positive treatment effect on both racial minorities and low-income students is above average compared to placebo adopters.

*Figure 12: Trends in Racial and Socioeconomic Composition at University of Arizona vs. Synthetic University of Arizona and Placebo Tests*
New Hampshire

Columns 5 and 9 of Table 4 display the DiD coefficients for higher education institutions in New Hampshire. Overall, the ban has a positive effect on the representation of low-income students in four-year public and not-for-private institutions in New Hampshire. This positive effect remains when examining public institutions only. The effect on low-income students’ representations is the largest among the four states, about 5.6 to 8.4 percentage point increase in the share of low-income students.

Figure 13 displays the SCM results for the University of New Hampshire. Absent the ban, the percentage of racial minorities would have gone up and the share of low-income students would have gone down. Gauging the distribution of the gaps for the donor institutions from the placebo test results, the magnitudes of both the positive effect on low-income students and the negative effect on racial minority students are above average.

Taken together the results from the two analytical approaches, the DiD method yields an average treatment effect evaluation of the state’s universities in a whole. The synthetic control approach provides a unique way to conduct quantitative case study and to examine the policy effect for a single institution. Utilizing both methods, this study is able to reach a more nuanced understanding of the effect of a state-wide affirmative action ban on student body composition.

Especially when applying SCM on examining each of the state public flagships, a general pattern emerges. For a competitive public flagship (e.g. University of Michigan), a ban on race-conscious admissions policy decreases the racial diversity of the freshman class. For non-competitive public flagships, the ban affects the socioeconomic composition of the student body and increases the representation of low-income students.
Discussion and Conclusion

Overall Effect on Racial and Socioeconomic Composition

Results from analyzing the institutional level data demonstrate that affirmative action bans affect both the racial and socioeconomic composition of the freshman class, and these effects vary across states. Overall a state-wide affirmative action ban did not decrease the chances of racial minority students entering public 4-year colleges and universities. However, examining the effect state by state, in Michigan and New Hampshire, a ban is associated with 1.3 and 2.5 percentage points decrease of proportions of racial minorities at 4-year public institutions. The average shares of URM students at these universities are 13 percent and 3
percent respectively in their pre-treatment years. Thus, the changes in representation caused by affirmation action bans are very large in relative terms.

A negative effect is also evident when examining public and private 4-year institutions altogether. Although private institutions are not subject to a state ban, they may have adopted similar behaviors as public ones. This seems to be the case for Michigan. Moreover, consistent with previous studies (e.g. Backes, 2012; Hinrichs, 2012), there is a redistribution of students into different types of institutions as a result of a ban at states with more competitive institutions. For example, the share of URM increased after the ban at private-for-profit institutions in Michigan.

Regarding the effect on socioeconomic composition, in three out of the four states, Michigan, Arizona, and New Hampshire, a ban on affirmative action is associated with an increase in proportions of low-income students at public and private 4-year higher education institutions together, as well as public 4-year institutions only. The magnitude on average is about 2.1 percentage points increase, ranging from 1.6 to 5.6 percentage points increase in a state by state case.

**Contrast Between Effects on Racial and Socioeconomic Composition**

Overall, a state-wide ban on affirmative action has affected both racial and socioeconomic composition of the student body and these effects are in opposite directions – a ban is associated with a decrease in the representation of racial minorities at 4-year colleges and universities; while it has led to an increase of the proportion of low-income students at both public and private four year institutions.

Contrasting the results between the two methods confirms that the effects of a ban vary across institutional types. The average treatment effect obtained from the DiD analysis is only
statistically negative in the case of public universities in Michigan. Although the overall effect on racial minorities at public 4-year institutions is not significant in Arizona, Nebraska, and New Hampshire, the negative effect of a ban still is present at public flagships of these three states. In other words, the SCM indicates that absent a ban, the proportions of underrepresented racial minorities would have gone up at the University of Michigan, University of New Hampshire and University of Nebraska. Therefore, a state-wide ban has decreased the chances of racial minorities obtaining a degree from these three state flagships.

In Arizona and New Hampshire where the positive average treatment effects on socioeconomic composition obtained from the difference-in-difference analysis are most pronounced, the synthetic control approach indicates that absent the ban, the proportions of low-income students would have decreased at the University of Arizona and the University of New Hampshire.

An inherent limitation though with any policy effect evaluation analysis is that it is hard to discern why there is such an effect. As far as I can find, there is not any research paper discussing specific programs at these universities after the state-wide affirmative action policy changes. Instead, browsing the websites of these universities, there are evidences of specific outreach efforts at these universities. For example, the University of Nebraska launched a Rural Future Institute in 2012 which reaches out to rural communities in Nebraska through programs such as collaborative capacity building in rural Nebraska schools via technology. The University of Arizona begun in 2008 the Arizona Assurance Scholars Program, which provides low-income students with the opportunity to pursue a college education through a combination of resources. The University of New Hampshire in 2011 started an Educational Talent Search program, funded by the Department of Education. The program was intended to help low-income youth and adults
earn entrance to college. Evidences from this chapter of analysis are indicative that the programs at the University of Arizona and the University of New Hampshire are successful in raising the socioeconomic diversity of their freshman population. Yet, overall the results presented here regarding an affirmative action’s effect on low-income students should be interpreted as correlational rather than causal. In order to establish a casual relationship, detailed administrative data on student application and admissions information are needed.
CHAPTER 4: ANALYSIS OF STUDENTS
**Introduction**

The analysis in the previous chapter demonstrates that a ban on affirmative action not only affects racial minorities, but also indirectly affects low-income students. Specifically, the results from analyzing the IPEDS data indicate that a ban is associated with a decrease of URMs’ representation at four-year public college and universities in Michigan and New Hampshire and an increase of low-income students’ enrollment at four-year public institutions in Michigan, Arizona, and New Hampshire.

In this chapter, I examine the effects of the bans across racial and income groups. Specifically, this chapter answers the following three questions:

1. For white students, did the bans affect low-income students differently than their effects on high-income ones?
2. Does the answer to the above question differ for the under-represented racial minority group?
3. How do the answers to the above questions vary across states?

The reason to examine the effect of affirmative action across income groups within each racial group is twofold. First, while the institutional level analysis indicates contrasting effects of the bans on URM and low-income students, it is important to explore further the interaction between race and income-based class. Since the initial impetus for affirmative action admissions policies was to improve college access for URM students, it is important to understand which subgroups of the URM were affected the most by the removal of such policies. Second, higher education institutions provide a major channel for upward mobility, especially for students from socioeconomically disadvantaged families (Chetty et al., 2017). Given the growing concerns over decreasing intergenerational income mobility (e.g. Chetty et al., 2016), it is important to...
examine how a change in one of the most important higher education polices affects low-income students’ college access differently across racial groups. This would help identify targeted efforts towards those most in need in providing the upward mobility for both low-income and URM students.

Very few empirical studies have examined the socioeconomic diversity of an admitted class after a change of the admissions policy (Gaertner & Hart, 2013). The majority of previous research exploring the intersection of race and income focuses on whether one can serve as a proxy for the other. This line of research generally concludes that the correlation between the two is not nearly high enough and using low-income as a proxy for racial minority status won’t generate enough racial diversity as it will when using race conscious policies (e.g. Reardon et al., 2015). A case study of the University of Colorado’s change of admissions policy showed somewhat different results. Gaertner and Hart (2013) found that the class-based admissions approach practiced by the university led to slightly increased admission rates for both underrepresented-minority applicants and for students from disadvantaged backgrounds. The contrast between Gaertner and Hart’s (2013) findings and previous studies is largely due to the fact that the correlation between racial minority status and low-income status varies across institutions and states.

Starting from a hypothesis for research question (1), a ban on race-conscious admissions policy affects URM students’ chances of enrolling in post-secondary education, yet universities’ outreach efforts subsequent to a ban may help low-income students’ chances to advance in post-secondary education. A ban therefore shall marginally increase white low-income students’ chances of enrolling in post-secondary education relative to their high-income counterparts.

For research question (2), the overall effect of a ban on low-income URM students is not
that clear. The removal of the consideration of race affects URM students if colleges and universities were practicing race-conscious admissions policies before the ban; however, the increased outreach efforts may help low-income URM students. So the overall effect depends on which of the two outweighs the other.

For research question (3), depending on the correlation between URM and low-income status, the effects of universities’ outreach efforts or class-conscious admissions policies will affect URM students differently across states. If the correlation of the two memberships is strong, the negative effect on low-income URMs might be mitigated by the outreach efforts on socioeconomically disadvantaged students. At the same time, how much the negative effect a ban has on URMs college enrollment is lessened by the outreach efforts also depends on the extent to which race-conscious admissions policy was practiced prior to a ban. So although the correlation between low-income status and URM status is stronger in Michigan than in Nebraska, a ban may still hurt low-income URMs more than in Michigan than it does in Nebraska.

Overall, this step of analysis builds on the findings from the previous chapter and adds to our understanding of how a ban impacts the intersections of different races and ethnicities with different classes (Pruitt, 2015). Some legal scholars pointed out that even if a liberal majority on the Court extends the life of affirmative action in university admissions beyond Grutter’s 2028 deadline, the Supreme Court’s composition are likely to lead to a conservative-leaning Court that eventually insists on an end to affirmative action (Robinson, 2016). Now given the new makeup of the Supreme Court, the fate of the affirmative action in college admissions is yet to be decided. If a class-based admission policy becomes a possible scenario in the future, it is
necessary to get a fine-grained analysis of how a ban on race-conscious affirmative action affected students across races and across income distributions within each race.

Data

I use the Current Population Survey (CPS) data from 1999 to 2014 to conduct this step of analysis. The CPS is conducted by the US Census Bureau and the Bureau of Labor Statistics, and is representative of the entire US population and interviews approximately 56,000 households monthly. Each household is interviewed once a month for four consecutive months one year, and again for the corresponding time period one year later.

Although the main purpose of the CPS is to collect information on the employment status, additional questions are included on education, income, previous work experience, etc. from time to time. For example, the October School Supplement and Internet Use Supplement is an addition to that month’s CPS. The October supplement survey adds basic school enrollment items such as school attendance type, grade, etc. to the CPS. The data is collected by the Census Bureau staff through home interviews in October each year. Interviewers receive a 1 1/2-hour home study that contains questions on school enrollment supplement questions, and a practice interview, among other things.

The CPS October supplement data has been used before in education research. For instance, Flores (2010) has used it to examine the effect of in-state resident tuition policies on undocumented Latino students. For the present study, the October school enrollment data provides information on whether someone attends college and if so, whether that college is public or private and whether it is a two-year or four-year college. Another feature of the CPS is that college students who are dependents of their parents are coded as being from the state where
their parents lives. Thus, it is feasible to examine the effects of an affirmative action ban in the state in which an individual presumably resided while being a senior in high school.

I pool 18 and 19 year olds from the October supplement survey each year between 1999 and 2014. This step of analysis is to estimate the relationship between affirmation action bans and contemporaneous school enrollment of 18 and 19 year olds, especially among white and URM students from different income groups. For this purpose, I only include whites, African Americans, Hispanics, and native Americans for the sample. I aggregate African American, Hispanics and Native Americans as under-represented minorities (URM).

However, the limitation of using the CPS data for this step of analysis is also present. This step of analysis sets out to utilize the detailed information on students’ family income of the CPS data, and to analyze the impact of bans on low-income white and URMs on a number of college enrollment outcomes including whether attending college or not, and types of college. However, the CPS data does not contain a representative sample at a state level. Three of the four states (AZ, NE, NH) are small in terms of population size and their higher education sectors. Each of them does not have enough observations to allow for further dividing the sample by race, income level, and type of college attendance. For instance, for a pooled model investigating the effects on enrollment outcomes at public-4-year institutions, states such as Arizona, Nebraska, and New Hampshire do not have any URM observations or just a couple of observations enrolled in public-4-years. The same issue of having none or a small number of observations for a particular type of college also arises when analyzing Arizona and New Hampshire respectively.

This therefore precludes an analysis by college type for the pooled model, as well as a single state analysis for Arizona and New Hampshire. Eventually the analytical sample contains
a total of 29,103 white students, and 5,326 URM students, including 1,039 white, and 198 URM students from Michigan; 681 white students and 77 URM students from Nebraska; 597 white, and 78 URM students from Arizona; 831 white and 18 URM students from New Hampshire, and their respective control groups.

**Methods**

I estimate difference-in-difference linear probability models that exploit variation over time and state in affirmative action bans. These models are estimated separately for white (those who report being white as their single race and are not Hispanic) and underrepresented minority students (including African Americans, Hispanics, and native Americans). The model is specified as follows:

\[
y_{ist} = \beta_0 + \beta_1 * \text{ban}_{st} + \beta_2 \text{Low\_Income}_i + \beta_3 \text{ban} * \text{Low\_Income}_i + \beta_4 \text{Female}_i + \pi_t + \pi_s + \pi_{st} + \epsilon_{ist} \tag{2}
\]

Here \(y_{ist}\) is the outcome of whether participating in any post-secondary education or not for individual \(i\) from state \(s\) in year \(t\). The outcome is examined among the white and URM students respectively. The variable \(\text{ban}_{st}\) is a dummy indicating state \(s\) having an affirmative action ban in place in year \(t\). The variable \(\text{Female}_i\) is female dummy. \(\text{Low\_Income}_i\) indicates whether individual \(i\) comes from a low-income family or not. Income variable \(\text{hufaminc}\) in the CPS is a categorical variable. In the analysis, I use two ways to define the low-income status for a student. In the first approach, I assign a low-income status to a student if the family income falls into the bottom quartile of the income distribution among the 18 and 19 year olds of that year. Alternatively, I use household income below 30,000 dollars as an indicator for the low-income status. The results basically did not change between the ways of identifying the low-income status.
The time trends that are occurring in all states, particularly for minority enrollment, will be a constant threat to identification, and any estimated effect will essentially be a deviation from the prior trend in enrollment. The model therefore includes a full set of state fixed effects, $\pi_s$; year fixed effects $\pi_t$, accounting for national shocks; $\pi_{st}$, a state specific time trend which controls for statewide demographic changes over time; and $\epsilon_{ist}$, the error term.

The parameter of interest is $\beta_3$, the effect of an affirmative action ban on low-income students as opposed to their high-income counterparts. The model is run separately for whites and URM students. $\beta_3$ is a with-in race across income group estimator. It compares outcomes among the white and URM students respectively across income strata (Arcidiacono & Lovenheim, 2016). With-in race estimators have been used in prior studies examining effects of affirmative action in law schools (Ho, 1997; Rothstein & Yoon, 2008; Williams, 2013).

**Define Control Group**

CPS is also survey data, and the same issue concerning how to construct a comparison state arises here. I adopt a similar strategy as in the last chapter while analyzing the IPEDS data. This includes two ways to construct comparison states: (1) states in the same regional interstate higher education compacts; (2) states with similar proportions of low-income individuals.

**Use Higher Education Regional Compact.** Take Michigan for example. Illinois, Indiana, Missouri, North Dakoda, South Dakoda, Ohio, Wisconsin, and Nebraska are all member states of the Midwestern Higher Education Compact. Students from these states except for Nebraska are used as the control group for students in Michigan. Similarly, students in Illinois, Indiana, Iowa, Kansas, Minnesota, Missouri, North Dakota, Ohio, South Dakota, Wisconsin in all years are used to construct the comparison group for students in Nebraska.
Use States with similar percentages of low-income households. I also use states with similar proportions of low-income individuals to construct a comparison state for each of the four states being examined. For example, an average of 14.4 percent of Michigan’s population are identified as low-income or below poverty line between 2011 to 2013, according to the Census Bureau. When dividing all the 50 states into quartiles based on a three-year average poverty rate between 2011 and 2013 (8.3 – 10.9%, 11.2 – 13.8%, 14.1 – 16.2%, and 17– 21.4%), Indiana, Oregon, Idaho, Ohio, Montana, Missouri, Florida, Oklahoma, New York, California, Alabama, and Nevada fall into the same quartile as Michigan. Considering that California and Florida had banned affirmative action prior to 2007, the analysis of students in Michigan exclude those in California, Florida, and Oklahoma.

Both New Hampshire and Nebraska are in the first quartile of a four-year average poverty rate between 2011 and 2014. The rest of the states that also fall into this category are Alaska, Colorado, Connecticut, Iowa, Maryland, Minnesota, New Jersey, North Dakota, Utah, Vermont, Virginia, and Wyoming. All of these states are used to construct the comparison group for students in Nebraska.

Results

Summary Statistics

The summary statistics shown in Table 7 and 8 indicate that there is a strong positive time trend of both URM and white students’ enrollment over the years examined. In all the states that banned affirmative action, white students’ proportion of total enrollment has increased at post-secondary institutions. For example, in Michigan, 54.1% of 18-19-year olds of whites
enrolled in college before the ban; while in post ban years, the average proportion of whites enrolled in college is 57.5%.

The change in proportions of URMs college enrollment varies. For instance, in Michigan, 42.4% of 18-19-year olds of URMs enrolled in postsecondary education before the ban, while the average proportion in post-ban years is about 42.2%. Arizona has seen an increase in the average percentage of URMs college enrollment, from an average of 32.9% in pre-ban years to 45.9% in post-ban years.

**Table 7: Proportion of URM students in post-secondary education by state**

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Treated</td>
<td>Comparison</td>
</tr>
<tr>
<td>Michigan</td>
<td>0.424 (0.054)</td>
<td>0.335 (0.026)</td>
</tr>
<tr>
<td>Nebraska</td>
<td>0.464 (0.087)</td>
<td>0.358 (0.020)</td>
</tr>
<tr>
<td>Arizona</td>
<td>0.329 (0.061)</td>
<td>0.290 (0.022)</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>0.213 (0.107)</td>
<td>0.394 (0.042)</td>
</tr>
</tbody>
</table>

Note: In the URM category are African Americans, Hispanics, and Native Americans.

**Table 8: Proportion of White students in post-secondary education by state**

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Treated</td>
<td>Comparison</td>
</tr>
<tr>
<td>Michigan</td>
<td>0.541 (0.022)</td>
<td>0.480 (0.011)</td>
</tr>
<tr>
<td>Nebraska</td>
<td>0.348 (0.025)</td>
<td>0.491 (0.008)</td>
</tr>
<tr>
<td>Arizona</td>
<td>0.388 (0.025)</td>
<td>0.414 (0.009)</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>0.469 (0.021)</td>
<td>0.573 (0.013)</td>
</tr>
</tbody>
</table>

These time trends that are occurring in all states, particularly for minority enrollment, will be a
constant threat to identification. Besides national time trends, the model also includes state year dummies to account for this state-specific time trend, as specified in equation 2.

Figures 14 and 15 visually display the impact of bans on URM enrollment. The dots on the solid and dashed lines are the means of the residuals “$u_{lst}$” from the regression in this equation:

$$Y_{lst} = y_t + \tau_s + \pi_{st} + u_{lst}$$  \hspace{1cm} (3)

where $Y_{lst}$ is an URM student $i$, from state $s$ at year $t$’s, enrollment status at any post-secondary institution. $y_t$ is a time trend, $\tau_s$ is state fixed effect, $\pi_{st}$ is state specific time trend and $u_{lst}$ is the residual.

Equation (3) controls for time trends, state specific time trends, and differences in baseline URM enrollment between the states, so the differences in residuals “$u_{lst}$” between each of the treated states and their comparison states roughly captures the effect of an affirmative action ban. As shown in both figures, there is a sharp decrease in URM students’ chances of enrolling in post-secondary education immediately after the elimination of affirmative action in three states – Michigan, Nebraska, and New Hampshire, compared to their comparison states. In order to see whether the bans affected low-income students differently than their effects on high-income ones, equation (2) is estimated with an inclusion of an individual’s low-income status and its interaction with an affirmative action ban.

The difference between Figure 14 and 15 is that the residuals in Figure 14 come from regressions without the state specific time trend. The two figures basically demonstrate the same patterns. The similarity of the two figures is interesting, indicating that the estimates are not sensitive to the inclusion of state and year fixed effect. The DiD model specified in equation (2) is estimated both with and without the state-year fixed effect.
Figure 14: Residuals from predicting URM students’ college enrollment in four states, with time and state fixed effects.
Figure 15: Residuals from predicting URM students’ college enrollment in four states, with time and state fixed effects, and state specific time trends

DiD Regression Results

Table 9 displays the regression results following the specification in equation (2) with standard errors that are robust to clustering at the state level. Columns (1) and (2) use the pooled sample and show that on average the bans decreased the overall rate of college attendance among URM students. Yet these policy changes increased the chances of college enrollment of low-income students. This is consistent with the findings from the previous chapter.

Still focusing on the pooled model, when examining the effects of the bans across income groups separately for white and URM students, the coefficients for the interaction terms indicate that the bans affected low-income students differently than their effects on students from high-
income families. For instance, the ban increased white low-income students’ chances 8.3 percentage points more than it did for white high-income students. However, the opposite is true for URM students – the ban decreased URM low-income students’ chances of college enrollment 8.8 percentage points more than it did for high-income URM students. So the removal of a race-conscious affirmative action hurts low-income URM students the most.

Columns 3 to 6 estimate the DiD model for whites and URM students separately in Michigan, and Nebraska. In both states, the ban caused an increase of white and a decrease of URM students’ college enrollment. Although in the case of Michigan, the positive effect on white students is not significant. The general patterns of the policy effect in each of these two states are consistent with the findings of the pooled model.

Examining effects across income groups in each of the two states, the ban increased white low-income students’ chances more than it did for white high-income students both in Michigan and Nebraska. The effect is larger in Nebraska than it is in Michigan. Similar to the results in the pooled model, the ban decreased URM low-income students’ chances of college enrollment more than it did for high-income URM students. The absolute value of the negative effect is larger in Michigan than it is in Nebraska. Although the correlation between racial minority status and low-income status is stronger in Michigan, Michigan has more selective colleges and universities than Nebraska. This could be the reason that the removal of race-conscious admissions policy hurt low-income URM students more in Michigan than it did for low-income URM students in Nebraska.

As a robustness check, I use an alternative way to define the low-income status and conducted the same regression analyses for the pooled sample and subsamples. The results are displayed in Table 10 and are very similar to those in Table 9.
Discussion and Conclusion

This chapter examines the effects of the affirmative action bans across racial and income groups and provides a fine-grained analysis of how subgroups of students are affected by the policy changes. Overall, the bans decreased URM students’ college enrollment while increased low-income students’ college enrollment. This is consistent with the findings from analyzing the IPEDS data in Chapter 3.

The key part of analysis in this chapter is to identify whether a ban has different effects on low-income white and low-income URM students compared to the high-income ones. To sum up the findings, an affirmative action ban decreased low-income URM students’ chances of college enrollment the most; while it increased low-income white students’ chances of pursuing a post-secondary education. This scenario is possible when universities’ outreach efforts in socioeconomically disadvantaged communities are effective or universities give more consideration to socioeconomically disadvantaged background in the admissions stage.

While examining the varying effects across states, due to the small sample size of URMs in Arizona and New Hampshire contained in the CPS data, only an analysis for Michigan and Nebraska is feasible. Results indicate that in both states, the ban increased white low-income students’ chances more than it did for white high-income students; while it decreased URM low-income students’ chances of college more than it did for high-income URM students. The decrease is larger for low-income URMs in Michigan than it is for low-income URMs in Nebraska. This is likely due to the fact that there are more selective colleges in Michigan than in Nebraska.

The nature of the CPS data precludes a detailed analysis of how exactly students across racial and income groups are sorted into different types of higher education institutions following
affirmative action bans. Yet, this analysis provides a nuanced understanding of post-secondary enrollment outcomes across income distributions within white and URM students respectively.
Table 9: With-in race across income strata estimators for whites and URMs (using income quartile to define low-income status)

<table>
<thead>
<tr>
<th></th>
<th>Pooled Sample</th>
<th>Michigan</th>
<th>Nebraska</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>White</td>
<td>URM</td>
<td>White</td>
</tr>
<tr>
<td>Attending any post-secondary institutions ban</td>
<td>0.054***</td>
<td>-0.745***</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>0.003</td>
<td>0.028</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>-0.220***</td>
<td>-0.184***</td>
<td>-0.225***</td>
</tr>
<tr>
<td>low-income</td>
<td>0.015</td>
<td>0.016</td>
<td>0.019</td>
</tr>
<tr>
<td></td>
<td>0.038</td>
<td>0.025</td>
<td>0.019</td>
</tr>
<tr>
<td>ban * low-income</td>
<td>0.083**</td>
<td>-0.088***</td>
<td>0.048**</td>
</tr>
<tr>
<td></td>
<td>0.092</td>
<td>0.179</td>
<td>0.076</td>
</tr>
<tr>
<td>N</td>
<td>3,280</td>
<td>2,434</td>
<td>1,039</td>
</tr>
<tr>
<td>R²</td>
<td>0.092</td>
<td>0.179</td>
<td>0.076</td>
</tr>
</tbody>
</table>

Every of the six columns correspond to a separate regression estimate of equation (2). Columns 1 and 2 estimate the model using the pooled sample, and for whites and URMs respectively. Columns 3 to 6 estimate the model for whites and URMs separately for students in Michigan, and Nebraska respectively. The table displays estimates for the ban variable, the low-income dummy variable, and the interaction between ban and low-income status, with standard errors corrected for clustering at the state level in brackets. All models also include a gender dummy, year dummies, and state dummies. A single asterisk denotes significance at the 10% level, a double asterisk denotes significance at the 5% level, and a triple asterisk denotes significance at the 1% level. In the URM category are African Americans, Hispanics, and Native Americans.
Table 10: With-in race across income group estimators for whites and URMs (using income below $30,000 to define low-income status)

<table>
<thead>
<tr>
<th>Attending any post-secondary institutions</th>
<th>Pooled Sample</th>
<th>Michigan</th>
<th>Nebraska</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>White</td>
<td>URM</td>
<td>White</td>
</tr>
<tr>
<td>ban</td>
<td>0.053***</td>
<td>-0.743***</td>
<td>0.003</td>
</tr>
<tr>
<td>low-income</td>
<td>0.003</td>
<td>0.028</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>-0.228***</td>
<td>-0.180***</td>
<td>-0.234***</td>
</tr>
<tr>
<td>ban * low-income</td>
<td>0.014</td>
<td>0.016</td>
<td>0.019</td>
</tr>
<tr>
<td></td>
<td>0.091**</td>
<td>-0.092***</td>
<td>0.057**</td>
</tr>
<tr>
<td>N</td>
<td>3,280</td>
<td>2,434</td>
<td>1,039</td>
</tr>
<tr>
<td>R²</td>
<td>0.096</td>
<td>0.17</td>
<td>0.08</td>
</tr>
</tbody>
</table>

Every of the six columns correspond to a separate regression estimate of equation (2). Columns 1 and 2 estimate the model using the pooled sample, and for whites and URMs respectively. Columns 3 to 6 estimate the model for whites and URMs separately for students in Michigan, and Nebraska respectively. The table displays estimates for the ban variable, the low-income dummy variable, and the interaction between ban and low-income status, with standard errors corrected for clustering at the state level in brackets. All models also include a gender dummy, year dummies, and state dummies. A single asterisk denotes significance at the 10% level, a double asterisk denotes significance at the 5% level, and a triple asterisk denotes significance at the 1% level. In the URM category are African Americans, Hispanics, and Native Americans.
CHAPTER 5: CONCLUSION
Affirmative action as a public policy in higher education will most likely to continue in decades to come. Fully understanding the consequences of a ban is crucial. This includes understanding the policy effect on different dimensions of student body composition – racial composition and socioeconomic composition as addressed in this empirical study.

As intended, the investigations in the preceding chapters have explored the link between state-wide affirmative action bans and student enrollment outcomes in Michigan, Nebraska, Arizona, and New Hampshire. The enactment of these bans provides quasi-experimental variation in affirmative-action policies. The bans come from a mix of sources, ranging from voter initiatives to executive orders and court rulings. The variation in time and location of these bans provides useful variation in identifying the effect of the removal of race-conscious admissions policy on student body compositional changes.

Two major differences between these four states and those earlier states make this study necessary. First, states that banned race-conscious admissions policies in earlier decades such as California and Texas have relatively large higher education sectors, with 599 and 388 four-year colleges and universities in 2013 in each state respectively. In contrast, Michigan, Nebraska, Arizona, and New Hampshire have relatively small sectors of higher education, with 171, 47, 121, and 28 four-year colleges and universities residing in each of the four states in 2013.

Not only are the higher education sectors in these four states small in size, but they are also not as selective as the ones in California and Texas. For instance, among all the four-year colleges and universities in these states, only the University of Michigan and Dartmouth College are among the top 50 higher education institutions according to the U.S. News and World Report Ranking. The rest of the colleges and universities residing in these four states, except for Michigan State University, are all ranked outside the top 100 higher education institutions.
Although the higher education sectors are small in size and institutions are not selective in terms of admissions and quality, mechanisms still exist that would affect college enrollment outcomes of both white and underrepresented racial minority students. For example, universities’ increased outreach efforts in minority concentrated and socioeconomically disadvantaged high schools could provide information nudge therefore alter students’ application and enrollment decisions. Moreover, prior work shows that affirmative action shrinks pre-college academic gap between races by incentivizing greater human capital investment by minority high school students (Akhtari & Bau, 2016; Cotton, Hickman, & Price, 2015; Hickman, 2014). Alternatively, an affirmative action ban would enlarge the pre-college racial gaps in grades, standardized test scores, etc. and therefore affect the enrollment gap between races.

As an empirical study of the consequences of affirmative action bans on enrollment outcomes, this work cannot identify and test the mechanism of how bans affect institutions or students’ behaviors. Yet as one of the very few studies focusing the consequences on later states experiencing the bans and not highly selective institutions, findings from this study indicate that a ban on race-conscious admissions policy could also significantly alter students’ enrollment outcomes in these states.

A strength of this study entails using multiple data sources to get a nuanced understanding of how a ban has affected both white and URM students across the income distribution, especially focusing on both low-income URM and white students. These chapters have explored these relationships using both institutional level data and student level data. The results from analyzing different sources of data and utilizing different econometrics methods complement each other well. This comprehensive conclusion will summarize major findings
from each chapter and integrate them to identify complementary lessons learned and opportunities for future research that synthesize these complementary findings.

**Analysis of Institutions**

Using the IPEDS data, findings from Chapter 3 indicate that a state-wide ban on affirmative action has affected both racial and socioeconomic composition of the student body and these effects are in opposite directions. A ban is associated with a decrease in the representation of URM students at 4-year colleges and universities; while it has led to an increase of the proportion of low-income students at both public and private four year institutions.

Consistent with previous findings (e.g. Backes, 2012; Hinrichs, 2012), a state-wide affirmative action ban did not decrease the chances of URM students entering public 4-year colleges and universities. However, when pooling together public and private colleges and universities, there is a significant negative effect on URM students’ enrollment outcome. Moreover, in a state by state analysis, a ban is associated with 1.3 and 2.5 percentage points decrease of proportions of racial minorities at 4-year public institutions in Michigan and New Hampshire respectively. Considering that the shares of students at these universities who are URM are 0.4 and 0.2, the changes in representation caused by affirmation action bans are very large in relative terms, especially in Michigan.

Also consistent with previous studies (e.g. Backes, 2012; Hinrichs, 2012), there is a redistribution of students into different types of institutions as a result of a ban. For example, the ban has pushed URM students into private-for-profit institutions in Michigan.
Regarding the effect on socioeconomic composition, in three out of the four states, Michigan, Arizona, and New Hampshire, a ban on affirmative action is associated with an increase in proportions of low-income students at public and private 4-year higher education institutions, and at public 4-year institutions solely. The magnitude on average is about 2.1 percentage points increase, ranging from 1.6 to 5.6 percentage points increase in a state by state case.

Furthermore, this study employs the SCM to study the effect of the bans on state flagship institutions. As argued by Gaertner and Hart (2012), large public schools account for more than half of the total undergraduate enrollment in the country. These moderately selective institutions such as University of Arizona, University of Nebraska, and University of New Hampshire filed applications from disadvantaged students for whom the stakes are quite high. Many low-income and minority applicants may not have the opportunity to attend a four-year college if they are refused admissions to the state’s flagship.

Results from the SCM analysis demonstrated that the negative effect of a ban on racial composition of the freshman class is present in three out of the four public flagship universities, University of Michigan, University of New Hampshire and University of Nebraska. Absent a ban, the proportions of underrepresented racial minorities would have gone up at these three flagships. A state-wide ban therefore has decreased the chances of racial minorities obtaining a degree from these three state flagships.

In Arizona and New Hampshire where the positive average treatment effects on socioeconomic composition obtained from the difference-in-difference analysis are most pronounced, the synthetic control approach indicates that absent the ban, the proportions of low-income students would have decreased at the University of Arizona and the University of New
Hampshire. This may indicate that the outreach efforts at these two universities have been effective in raising the socioeconomic diversity of their freshman population.

**Analysis of Students**

Given the findings from analyzing the IPEDS data in Chapter 3, the bans have affected college enrollment outcomes of both URM and low-income students. Building on the findings from Chapter 3, Chapter 4 uses the CPS data and examines jointly the effects of the bans on racial minorities and low-income students.

Overall, the negative effect on URM students’ college enrollment found in Chapter 4 is consistent with results from analyzing the institutional level data in Chapter 3. Utilizing the detailed information on family income of the CPS data, Chapter 4 is able to examine in detail the impacts of a ban on low-income URMs and low-income whites separately from their high-income peers. Findings indicate that the bans increased white low-income students’ chances more than they did for white high-income students. However, for URM students, the ban decreased URM low-income students’ chances of college enrollment more than it did for high-income URM students. Although the small sample size of URMs contained in the CPS data in small states such as Arizona and New Hampshire also limits the analysis of college attendance by institutional type, these findings shed new light on the discussion of the impact of affirmative action policies on the intersection of race and income based class.

**Limitation and Direction for Future Research**

This study utilizes a group of quasi-experimental research design methods, and draws data from multiple sources to study the consequences of state-wide affirmative action bans on
students’ college enrollment outcomes, across race and income groups. Despite the careful consideration of methods, as the case for any policy evaluation analysis, it is hard to gauge the mechanism of these effects. For example, findings suggest that in three of the four states, a ban is positively correlated with the representation of low-income students at four year colleges. However, with the data at hand, this study is not able to investigate the mechanisms underpinning these results. Through investigating these universities’ websites and browsing news from the Chronicle of Higher Education, I am able to identify some outreach programs of helping low-income student college access. The results presented by this study of an affirmative action’s effect on low-income students therefore should be interpreted as correlational rather than causal. In order to fully understand the mechanism, administrative data including detailed information on student application, and college admission decision is needed.

More broadly thinking about the effect of affirmative action bans, by altering URM students’ college enrollment behavior, removing or restricting racial preferences could impact URM graduation rates, major choices, and the returns to college in the labor market. So far, there is no work estimating how affirmative action bans influence earnings. Understanding how these bans influence earnings may yield some insight into how affirmative action policies affect long-run outcomes. More importantly, the initial impetus for these policies was the hope that affirmative action could play some role in reducing inequalities in life outcomes between minority and majority groups. So how these policies change the dynamics of the between-group inequalities in the long run? This line of inquiry calls for future study.

Another line of research that deserves future exploration is how racial preferences in college admissions affect precollege investment decisions. Theoretically, there are two opposing views. On the one hand, affirmative action policies may lead high school minority students to
invest less in their human capital by lowering the threshold for college admissions (Coate & Loury, 1993). On the other hand, affirmative action policies may incentivize minority students to work harder by increasing the probability that their hard work will translate into college admission (Fryer & Loury, 2005). Conversely, affirmative action bans could lower minority human capital investment by making it less likely they will be admitted to higher-quality colleges that may have higher returns. Akhtari and Bau (2016) find evidence that reinstatement of affirmative action in Texas is 2003 reduced the achievement gap, measured by standardized test scores and course grades, between minority and white high school students. This empirical study is consistent with affirmative action raising effort levels among minority students, a result also supported by Hickman (2014). In contrast, Antonovics and Backes (2014) do not find a widening score gap after the affirmative action ban in California. To reconcile the differences in empirical findings, this important line of research calls for further investigation by using detailed administrative data.
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Bass.


Vita
Huacong Liu

EDUCATION

Ph.D., Higher Education
Dissertation: “Affirmative Action Bans and Student-body Composition”
Committee: Drs. Liang Zhang (Chair), John Cheslock, Alicia Dowd, Mark Roberts
The Pennsylvania State University, State College, PA
August 2017

M.A., Higher Education
Thesis: “Internationalizing Chinese Higher Education Institutions”
Advisor: Dr. Amy Metcalfe
The University of British Columbia, Vancouver, BC Canada
May 2012

M.A., Economics
Shanghai University of Finance and Economics, Shanghai, China
June 2007

B.A., Human Resources
Zhengzhou Institute of Aeronautical Industry Management, Zhengzhou, China
June 2004

PUBLICATIONS


WORK EXPERIENCES

September 2017 - Thomas Alexander Fellow, OECD Paris


September 2012 - August 2013
International Programs Coordinator, Penn State College of the Liberal Arts

December 2011 - December 2013
Program Manager, Master’s Program in European Economics, The European University Institute, Florence, Italy

January 2010 - December 2011
Research Assistant, The University of British Columbia, BC, Canada

June 2007 - June 2009
Principal & Instructor, Shanghai Sunrise Elite School, Shanghai, China