

Affirmative Action in Undergraduate Education

Peter Arcidiacono,^{1,2} Michael Lovenheim,^{2,3} and Maria Zhu¹

¹Department of Economics, Duke University, Durham, North Carolina 27708; email: psarcidi@econ.duke.edu

²National Bureau of Economic Research, Cambridge, Massachusetts 02138

³Department of Policy Analysis and Management, Cornell University, Ithaca, New York 14853

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Abstract

The use of race in college admissions is one of the most contentious issues in US higher education. We survey the literature on the impact of racial preferences in college admissions on both minority and majority students. With regard to minority students, particular attention is paid to the scope of preferences as well as how preferences affect graduation, choice of major, and labor market earnings. We also examine how schools respond to bans on racial preferences and the effects these responses have on racial diversity at elite schools. With regard to majority students, we examine the evidence on the returns to attending a more racially diverse school, as well as how racial preferences affect friendship formation. Finally, we supplement studies of affirmative action in the United States with evidence from India, which provides a much more straightforward environment in which to study affirmative action owing to the use of quotas and admissions rules based solely on exam scores.

1. INTRODUCTION

Affirmative action in higher education, which entails postsecondary institutions exercising race-based preferences in their admissions process, is an extremely contentious issue in the United States and around the world.¹ In the United States, affirmative action policies generally target African American and Hispanic students, who still are under-represented in higher education. The history of affirmative action in this country is based on the under-representation of these groups in the postsecondary sector. As of the 1960s, many southern colleges and universities were segregated along racial lines as a matter of policy, and even in elite northern schools, black students made up only 1% of enrollment (Bowen & Bok 1998). This segregation was accompanied by a large black-white educational attainment gap. For example, in 1970, 17.4% of whites ages 25–29 held a college degree, relative to approximately 6% of African Americans.

In 1965, President Lyndon B. Johnson gave a commencement speech at Howard University in which he outlined the need for employers to take “affirmative action” to overcome the historical prejudices and disadvantages faced by African Americans in the labor market. This is widely seen as the beginning of affirmative action in the United States. Since that time, schools across the nation have enacted admissions policies that give additional consideration to a student’s race or ethnicity, which have generated a large amount of controversy. At base, affirmative action involves a shift in resources—access to more selective postsecondary schools—from students in the majority to under-represented minority (URM) students.² The extent to which this shift is efficiency enhancing depends on which students benefit from these policies and which students bear the costs, as well as how these different types of students are weighted in the social welfare function.

Although a cost-benefit analysis of affirmative action in university admissions is beyond the scope of this review, it is helpful in framing the value of the empirical work we discuss to first detail the potential costs and benefits associated with providing admissions preferences for URM students. Proponents of providing such preferences argue that there are many benefits associated with these policies, including (a) positive educational benefits of diversity for both majority and URM students, (b) the benefits of attending a higher-quality college for URM students due to access to more or better resources, and (c) social spillovers from fostering interracial interactions and from having minorities in leadership roles.

The main argument against affirmative action is that the resource distortions associated with these policies can harm both minority and majority students. Students in the majority are potentially negatively affected by affirmative action because it can cause a reduction in college quality among those who are displaced by the URM students receiving admissions preferences. Furthermore, majority students may feel that they are being treated unjustly because of affirmative action and subsequently develop more negative attitudes toward URM individuals.³ Finally, an

¹Holzer & Neumark (2000) provide an earlier review of the effects of affirmative action in the labor market, contracting, and higher education.

²Unless otherwise noted, we use the term under-represented minorities (URMs) in this article to refer to African American and Hispanic students. We note that Native Americans are also beneficiaries of affirmative action; the only reason we do not include them in this definition is that generally they constitute such a small portion of students that it is difficult to make meaningful empirical evaluations. The reason affirmative action programs typically target specifically URMs is that in general other traditional minority groups such as females and Asians no longer suffer from a lack of representation in higher education at elite institutions.

³Kane (1998) argues that majority parents and students likely overstate the impact of affirmative action on their admissions likelihoods because of the difficulty people face in understanding small probability events. He likens this effect to that experienced by drivers passing by a parking space reserved for disabled drivers. Every driver who passes the spot might think that he or she could park there if the space was not reserved, whereas in actuality, the existence of a reserved space has at most a small impact on the likelihood of a parking space being open. As a result, affirmative action may generate a belief of having been treated unjustly by a larger set of majority students than those who are actually displaced by URM students.

increase of students from lower academic backgrounds may adversely affect students who were admitted through nonaffirmative action procedures by lowering curricular or teaching standards and inducing negative peer effects.

In addition to the possibility that affirmative action policies negatively impact majority students, opponents of these policies argue that they can harm URM students as well. First, affirmative action can make it difficult for URM students who were not aided by affirmative action to signal their productivity to the labor market if students on average differ in labor market productivity, depending on whether they were aided by affirmative action (Coate & Loury 1993, Altonji & Pierret 2001). Second, the URM students who are the beneficiaries of affirmative action may be harmed by these admissions policies. The mismatch hypothesis posits that affirmative action can negatively affect outcomes of URM students by bringing students who are less academically prepared into more elite schools, where they have trouble competing with their peers who come from stronger academic backgrounds. The existence and extent of mismatch are of fundamental interest from a policy perspective and have subsequently been of much interest to many researchers, as they involve the critical question of whether affirmative action has a positive effect on its intended beneficiaries. We note that the term mismatch refers not simply to the phenomenon in which a student comes to college with less academic preparation than his or her peers, but to the situation in which a student is matched to a school that does not optimize his or her chances for success. Affirmative action policies expand the scope of college options available to its beneficiaries, in this case URM students. In a situation in which students have all the available information regarding the decision at hand, they will not be made worse off by racial preferences in admission, as any school the student would have chosen in the absence of affirmative action is still an option (Arcidiacono et al. 2011a). Mismatch occurs, therefore, when students do not have full access to information regarding their choices (e.g., whether the student has the academic background to do well in the classes offered at a particular school, how the student's social background compares with that of his or her peers).

Understanding the existence and scope of each of the costs and benefits to affirmative action is essential to assessing the desirability of these policies. Indeed, the large volume of state and federal supreme court cases highlights the role of these costs and benefits in determining the legality of institutional race-based preferences. Although the US Supreme Court has ruled that explicit quotas are illegal, it has allowed affirmative action under the argument that it permits schools to fulfill institutional diversity goals. This ruling further supports the need to determine which students are helped and which are hurt by affirmative action, because if diverse learning environments do not provide positive benefits to students, or if they do so at the cost of URM postsecondary outcomes, it may change the amount of race-based admissions preferences institutions find it optimal to practice.

Ultimately, these are empirically founded questions. Consequently, a large literature in economics has arisen that examines the various costs and benefits associated with affirmative action. The focus of this article is on presenting this evidence and reviewing the literature that relates to the following questions with regard to race-based preferences at undergraduate institutions:⁴

1. What is the scope of race-based preferences in admissions in the higher education system?
2. How does affirmative action affect URM postsecondary and labor market outcomes?

⁴There also has been a substantial debate about the merits of affirmative action in law schools (see the debate in the *Stanford Law Review*, Volume 57, issue 6, regarding Sander 2004, as well as Arcidiacono & Lovenheim 2014).

3. How does affirmative action affect majority postsecondary and labor market outcomes?
4. How does affirmative action impact nonmarket outcomes, such as racial attitudes and interracial friendship formation?
5. How do affirmative action policies in other countries relate to the US experience?

Together, these questions encompass the main costs and benefits of affirmative action. However, a main focus of this article is on the identification concerns many of these studies face that in many cases preclude developing a clear understanding of how affirmative action policies affect both majority and minority students.

Section 2 reviews the legal history of affirmative action in the United States. This history is important to understand in order to frame the relevance of the various impacts of affirmative action we consider throughout the rest of the article. Section 3 presents evidence on the scope of preferences. As we highlight in this section, it is very difficult to estimate the extent of affirmative action in the US higher education system, given that admissions decisions are based on several, often unobserved, factors. This is particularly true at elite colleges and universities, where affirmative action is most prevalent.

After assessing the extent of racial preferences, we turn to the effect of these preferences on students. Section 4 reviews the literature on the effect of college quality and affirmative action on a host of college and labor market outcomes among minorities. Section 5 provides a similar review that focuses on the benefits of diversity for majority students. These effects are of high importance, given the legal basis for affirmative action in the institutional desire for diversity. We examine the effect of diversity on postsecondary and labor market outcomes as well as on nonmarket outcomes, such as friendship formation and racial attitudes. Section 6 discusses the international evidence on affirmative action, focusing in particular on India. The Indian system shares many similarities with the US affirmative action system, but the structure of affirmative action and the admissions process in this country makes it much more straightforward to study than the US context. Section 7 concludes with a summary of the evidence and some suggested directions for future research.

2. LEGAL BACKGROUND IN THE UNITED STATES

In 1961, President John F. Kennedy issued Executive Order 10925, implementing the first official affirmative action measures in the United States. This directive emphasized an “obligation of the United States Government to . . . ensure equal opportunity for all qualified persons, without regard to race, creed, color, or national origin” (Exec. Order No. 10925 1961). To ensure the fulfillment of this obligation, the executive order required that government contractors “take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, creed, color, or national origin” (Exec. Order No. 10925 1961). In contrast to earlier antidiscrimination legislation, this policy called for the implementation of proactive measures in addressing intergroup disparities.

Four years later, Executive Order 11246, issued under President Lyndon B. Johnson, reinforced and superseded Kennedy’s original proclamation (Exec. Order No. 11246 1965). The new executive order introduced more stringent and concrete antidiscrimination standards for government contracting agencies and typically is viewed as the start of widespread affirmative action implementation. In 1967, this legislation was amended to include protective measures against discrimination for women as well (Exec. Order No. 11375 1967). These early executive orders, as well as subsequent legislative initiatives, have played a key role in the

development and evolution of affirmative action in the labor market, especially in the practices of government contracting agencies.

In contrast to labor market regulations, the US government has never issued explicit federal policies regulating affirmative action in higher education. However, in the past few decades, selective universities across the country have begun using affirmative action to guide their admissions decisions. In the absence of centralized legislation, the landscape for these race-conscious university policies has been shaped by a confluence of US Supreme Court rulings and voter-mandated, state-specific regulations. The first US Supreme Court ruling on the constitutionality of affirmative action in higher education came under *Regents of the University of California v. Bakke* (1978). The case originated when a white male applicant to the medical school of the University of California, Davis sued the university, alleging that the medical school's special admissions policy of reserving 16 out of 100 entering slots for racial minorities violated the Equal Protection Clause of the Fourteenth Amendment. The US Supreme Court ruled that racial quotas, such as the policy practiced by University of California, Davis were unconstitutional, but it mandated that the use of race as a factor for college admissions was permissible in aiding schools in the interest of establishing a diverse student body.

Nearly two decades later, the US Court of Appeals began to rule against the use of any form of racial affirmative action in university admissions. In 1996, a white female applicant brought her case to court after she was denied admission to the law school at the University of Texas at Austin, despite having a higher grade point average (GPA) and test scores than some minority candidates who ended up gaining admission to the program. In *Hopwood v. State of Texas* (1996), the US Fifth Court of Appeals ruled that the admissions policy for the law school was unconstitutional. This ruling effectively ended the use of affirmative action among public colleges and universities in Texas.

The *Hopwood* ruling was followed by the case of *Johnson v. Board of Regents of the University of Georgia* (2001), which came before the US Eleventh Court of Appeals when three white applicants for undergraduate admission to the University of Georgia were denied admission. At the time, the University of Georgia operated under a points-based admissions system. The students sued the university for violation of Fourteenth Amendment rights based on the fact that the university awarded admission points based on race to members of minority groups. The Court of Appeals ruled that regardless of whether any form of consideration of race in admissions was valid, "a policy that mechanically awards an arbitrary 'diversity' bonus to each and every non-white applicant at a decisive stage in the admissions process, and severely limits the range of other factors relevant to diversity . . . violates the Equal Protection Clause of the Fourteenth Amendment" (*Johnson v. Board of Regents of the University of Georgia* 2001).

More recently, the US Supreme Court rulings in *Gratz v. Bollinger* (2003) and *Grutter v. Bollinger* (2003) have provided universities with more explicit standards for affirmative action in college admissions. In *Grutter v. Bollinger*, a white applicant to the University of Michigan Law School filed a suit against the school citing that the use of race in admissions had unfairly precluded her from gaining admissions over nonwhite students with similar or lower test scores and GPAs. In a decision that overturned *Hopwood v. Texas* (1996), the US Supreme Court ruled that the school did not violate the Fourteenth Amendment because "in the context of its individualized inquiry into the possible diversity contributions of all applicants, the Law School's race-conscious admissions program does not unduly harm nonminority applicants" (*Grutter v. Bollinger* 2003).

In the same year, the court proceedings of *Gratz v. Bollinger* (2003) examined the undergraduate admissions program at the University of Michigan, which used a 150-point scale to rate applicants, with 100 points serving as the cutoff for guaranteeing admissions to the university. Students received points for various metrics of achievement, including GPA, test scores, athletic

ability, geographic residence, and alumni relationships. Additionally, students from URM groups received 20 points based on race. Following a lawsuit by two white students who were denied admission, the US Supreme Court found that the policy employed by the University of Michigan of automatically distributing one-fifth of the points needed for admission to minority students was unconstitutional. In particular, it stated that because the “current freshman admissions policy is not narrowly tailored to achieve respondents’ asserted interest in diversity, the policy violates the Equal Protection Clause” (*Gratz v. Bollinger* 2003). The two landmark cases of *Gratz v. Bollinger* and *Grutter v. Bollinger* marked the first US Supreme Court rulings on affirmative action in higher education since *Regents of the University of California v. Bakke* (1978). The Michigan rulings provided clarification on some of the previous ambiguities for universities regarding the use of race-based admission in promoting diversity in a student body.

The US Supreme Court acted again on affirmative action in *Fisher v. University of Texas at Austin* (2013). Fisher, a white student from Texas, was denied undergraduate admissions to one of the flagship universities in the state, the University of Texas at Austin. Fisher proceeded to sue the university on the grounds that her denial of admission violated the precedent set by *Grutter v. Bollinger* (2003), which mandated that the use of race-based affirmative action must be narrowly tailored to the policy’s specific goals. The lower courts (consisting of the district court and US Court of Appeals) initially ruled in favor of the University of Texas at Austin, at which point Fisher petitioned to have the case heard before the US Supreme Court (*Fisher v. University of Texas at Austin* 2011).

The US Supreme Court ruled in June 2013 that the lower courts had not applied the necessary requirement of “strict scrutiny” in analyzing whether the University of Texas at Austin had acted appropriately and sent the case back to the lower courts to be reanalyzed (*Fisher v. University of Texas at Austin* 2013). As of July 15, 2014, the US Fifth Court of Appeals once again ruled in favor of the University of Texas at Austin, stating that “it is equally settled that universities may use race as part of a holistic admissions program where it cannot otherwise achieve diversity. This interest is compelled by the reality that university education is more the shaping of lives than the filling of heads with facts” (*Fisher v. University of Texas at Austin* 2014).

In addition to federal supreme court rulings, individual states have implemented their own measures to regulate affirmative action in public universities. In 1996, California voted to pass Proposition 209, becoming the first state to institute an explicit ban on affirmative action. According to the official ballot summary, Proposition 209 “prohibits the state, local governments, districts, public universities, colleges, and schools, and other government instrumentalities from discriminating against or giving preferential treatment to any individual or group in public employment, public education, or public contracting on the basis of race, sex, color, ethnicity, or national origin” (Calif. Prop. 209 1996). Two years later, the state of Washington followed suit with the passage of a similar piece of legislation, called Initiative 200. Then, in 1999, Governor Jeb Bush of Florida issued an executive order known as the One Florida plan, which prohibited affirmative action in both education and employment (Natl. Conf. State Legis. 2014).

The next state to outlaw the use of affirmative action through legislative means was Michigan in 2006, with the Michigan Civil Rights Initiative. Much controversy ensued surrounding states’ rights on the issue. In the wake of the *Gratz v. Bollinger* (2003) and *Grutter v. Bollinger* (2003) cases regarding the state’s flagship university just three years earlier, some felt that the initiative was unconstitutional. As a result, a group of special interest groups brought the case of *Schuette v. Coalition to Defend Affirmative Action, Integration & Immigration Rights* before the US Supreme Court in 2013, protesting that the state ban on affirmative action infringed on Fourteenth Amendment rights. Ultimately, the US Supreme Court ruled in favor of allowing Michigan to set its

own laws on affirmative action. The court concluded, “there is no authority in the Federal Constitution or in this Court’s precedents for the Judiciary to set aside Michigan laws that commit to the voters the determination whether racial preferences may be considered in governmental decisions” (*Schuetz v. Coalition to Defend Affirmative Action, Integration & Immigration Rights* 2014). This important US Supreme Court ruling established the right of individual states to ban race- and gender-based admissions standards in public universities.

Following Michigan’s lead, in 2008, citizens in Nebraska approved the Nebraska Civil Rights Initiative, which amended the state’s constitution to impose a ban on race-conscious government policies (Natl. Conf. State Legis. 2014). Arizona then passed Proposition 107, which banned affirmative action in 2010 (Ariz. Prop. 107 2010), after the identically worded Proposition 104 failed to even make it onto the ballot two years earlier (Ariz. Prop 104 2008). In 2012, New Hampshire and Oklahoma became the most recent states to prohibit race-conscious policies in employment and college admissions, through the passage of House Bill 623 (N. H. State Legis. HB 623 2011) and the Oklahoma Affirmative Action Ban Amendment (Okla. Senate Joint Resolut. 15 2011), respectively.

As a potential alternative to affirmative action, some states have introduced percentage plans to try and maintain student diversity levels on campus. These policies guarantee admission to public universities for high school students who graduate with a high-enough class rank. In 1997, the state of Texas passed House Bill 588 in response to the *Hopwood* decision (Tex HB 588 1997). The bill required state universities to admit all Texas public high school students graduating in the top 10% of their class. By 2008, the flagship universities of the state, the University of Texas at Austin and Texas A&M University, were admitting the vast majority of their students through the Top 10% Rule. In response to the university’s protest that it was losing all autonomy in the admissions process, the state passed new legislation in 2009 to allow the University of Texas at Austin to cap its admission of students through the Top 10% Rule to 75% of the class (Tex. SB 175 2009). This new law, which became effective in 2011, does not apply to any other school in the state and has effectively restricted guaranteed admission to the University of Texas at Austin to students in the top 7–8% of their high school class (Hamilton & Batheja 2013, Tex. Tribune 2014).

Similarly, the Florida Talented Twenty program, passed in 2000, guarantees any student graduating in the top 20% of a public high school class admission to at least one of the public universities in the state. California implemented the Eligibility in Local Context Program in 2001, granting admissions to a University of California system school to all students graduating in the top 4% of their high school class. This cutoff percentage increased to 9% in 2011 to include more students in the program. However, unlike the Texas Top 10% Rule, which guarantees admissions to any public university of choice in the state, the Florida and California plans only promise admissions to some school in the State University System of Florida and the University of California system, respectively. Additionally, in Florida, students must have applied and been denied admission to at least three public schools in the state before the Talented Twenty Program comes into play (although their acceptance may not be to one of the universities for which they applied). Marin & Lee (2003) and Long (2007) suggest that the Talented Twenty Program has had minimal effects on enrolling students who would not otherwise have been admitted. In fact, Long (2007, p. 323–24) finds that

in the first year of the new Florida program, of the 16,047 applicants to public Florida universities who were in the top 20 percent, only 711 were rejected by all of the public Florida universities to which they applied. Of these 711, only 30 had applied to more than three public Florida universities, which is a necessary step to triggering the state’s guarantee.

Overall, Long (2004b) shows that percentage plan programs in California, Florida, and Texas have had a minor impact on increasing minority representation in the top state universities and fall short of serving as a proxy for affirmative action.

3. THE SCOPE OF PREFERENCES AT UNDERGRADUATE INSTITUTIONS

In *The Shape of the River*, Bowen & Bok (1998) argue that only 20–30% of four-year colleges practice racial preferences in admissions, as most schools simply are not selective. These results are consistent with those of Kane (1998) and Arcidiacono (2005), who estimate models of admissions using nationally representative data in which students self-report where they have been admitted. Kane (1998) estimates separate probits of the probability that an application is successful conditional on applying to a college of a particular tier, controlling for race as well as a number of observed measures of preparation. One component of Arcidiacono's (2005) structural model of the effects of affirmative action (described more fully in Section 4.5) is the probability of being admitted. College quality is a continuous measure here, with racial preferences allowed to interact with college quality. Controls are implemented for selection both on observables and on unobservables by, for example, allowing the outcomes of applications for the same individual, as well as the decision to apply at all, to be correlated. Both studies find that racial preferences are large at the top schools, with little scope for racial preferences at the bottom schools. Furthermore, Arcidiacono et al. (2011b) show that racial preferences result in a U-shaped relationship between college quality (as measured by average SAT score) and the share of African American students. That is, the schools with the highest shares of African Americans are either at the bottom of the college quality distribution, where colleges are not selective, or at the very top of the college quality distribution. This pattern is consistent with the more selective schools in the United States practicing affirmative action on the basis of race and ethnicity.

The combined effects of racial preferences coupled with large differences in educational experiences prior to college result in substantial differences by race in academic background at elite universities. For example, Arcidiacono & Lovenheim (2014) show that the distribution of academic preparation, measured using a combination of SAT scores and high school grades, for minority (African American, Hispanic, or Native American) admits at the University of California, Berkeley looks like the distribution of academic preparation for white students who applied to any school in the University of California system. Using the 1989 cohort of the College and Beyond data set, which is the same set used by Bowen & Bok (1998), Arcidiacono et al. (2011b) find that the within-school SAT score gap between African Americans and whites at the most elite institutions in the data was 140 points, with even larger gaps seen at schools in the next selectivity tier.

Although these gaps are driven in part by affirmative action, test score differences at elite institutions would arise even if admissions were color-blind. This is because the distribution of test scores for URM students lies to the left of the test score distribution for whites and Asians. Hence, those with the lowest test scores within a school will be more likely to be URM students, all else equal. This underscores the difficulties in measuring the extent of affirmative action.

To illustrate the operation of racial and ethnic preferences, we examine 2005 admissions data from a highly selective public university, the University of North Carolina at Chapel Hill.⁵ Table 1

⁵These data were obtained by Richard Sander following a Freedom of Information Act request. According to *US News & World Report*, in 2014 the University of North Carolina was ranked 13th among research universities and 5th among public research universities.

Table 1 2005 average SAT scores by race and ethnicity conditional on application status at the University of North Carolina at Chapel Hill

	African American	Hispanic	Asian	White
Share admitted	40.9%	52.5%	33.5%	38.2%
SAT (math + verbal) admit	1,180 (141)	1,307 (116)	1,391 (119)	1,345 (115)
SAT (math + verbal) reject	1,026 (133)	1,145 (124)	1,240 (138)	1,241 (123)
Number of observations	1,740	589	1,382	11,053

provides admissions rates and SAT scores by race and ethnicity conditional on whether the applicant was accepted or rejected. Substantial variation exists in the overall admissions probabilities by race/ethnicity. The group with the highest admissions probability was Hispanics, at 52.5%. African Americans were next highest, at 40.9%, followed by whites (38.2%) and Asians (33.5%).

Substantial variation also exists in average SAT scores conditional on whether the applicant was accepted or rejected. The groups with the highest admissions probabilities (Hispanics and African Americans) had significantly lower SAT scores conditional on being admitted. The mean SAT score for African Americans who were admitted was 61 points lower than the mean for white applicants who were rejected, and 165 points (1.4 standard deviations) below the mean for white admits. Again, at least some of this gap is expected from the underlying test score differences that exist across these groups.

To get a better sense of the degree of racial preferences, we estimate a logistic regression, in which the dependent variable is whether the individual was admitted and the covariates are SAT scores, indicators for different high school grade bins, indicators for different racial/ethnic groups, and an indicator for being male. Results are presented in Table 2. Converting the coefficients on race/ethnicity to SAT scores and assuming that any measures of unobserved preparation and character-related aspects of admissions are the same across groups, we find that preferences for African Americans (Hispanics) are equivalent to 352 (241) points on the SAT. Asian students, however, suffer a 46-point penalty. The logit coefficients also allow us to construct an academic index, in which we weight high school grades and SAT scores by treating the logit coefficients as weights that tell us the relative importance of each factor. The median African American (Hispanic) admit had an index value less than the 7.5th (17.5th) percentile of the white admit distribution. We note that preferences are likely understated here owing to selection on unobservables. Given knowledge of racial preferences, weaker minority applicants may apply knowing that they still have a chance of being admitted while nonminority students with the same credentials may not because of the lower probability of a positive outcome. Because our measures of academic preparation are imperfect, this effect biases our coefficients on race/ethnicity downward, understating the degree of racial preferences.

Assuming that the application pool was unchanged with the removal of racial/ethnic preferences, we can calculate what the admissions rate based on test scores and GPA would be in the absence of affirmative action by setting the coefficients on the race/ethnicity indicators to zero. The overall probability of admission for African Americans (Hispanics) would fall substantially, to 13.5% (29%). The median admitted African American (Hispanic) absent racial preferences would have an index value that corresponded to the 25th (43rd) percentile of the white distribution.

Table 2 Logit estimates of 2005 admission decisions for the University of North Carolina at Chapel Hill

Independent variable	Coefficient	Standard error
SAT (000's)	6.815	0.192
African American	2.396	0.081
Hispanic	1.647	0.112
Asian	−0.312	0.077
Male	0.012	0.044

N = 15,580. Coefficients for the constant, grade bins, and other race are omitted.

These simulations suggest that an extensive amount of affirmative action is practiced at this school for URM students.

A substantial gap in index values between admitted African Americans and whites would still remain even absent affirmative action as a result of the large difference in the population distributions across groups. At the same time, endogenous applications likely would lead to a further closing of the index gap while also raising the share of URM students admitted, relative to the case in which applications are fixed. African Americans with lower index values may not find it worthwhile to apply. Furthermore, a broader ban would result in more applications from URM students who currently choose not to apply to the University of North Carolina at Chapel Hill because their chances of being admitted to a higher-ranked university in the presence of racial preferences are sufficiently high.

Although the breadth and depth of affirmative action in the labor market have been demarcated fairly clearly by legislative and judicial policy measures, affirmative action in education does not have such a clear trajectory. There are no official goals and timetables, and individual states and private institutions have their own policies and agendas. For many schools that already embrace a race-sensitive admissions policy, the more relevant affirmative action questions in the near future may be “to what extent” and “how long” rather than “whether,” although these questions have yet to be adequately addressed in the literature. As these questions become more relevant over time, additional research in this area will potentially be very valuable. The existing evidence does point to an extensive amount of preferences being given to URM students under affirmative action, particularly at more selective schools. We now turn to a review of the literature on how these admissions preferences affect minority student outcomes.

4. THE IMPACT OF RACIAL PREFERENCES ON MINORITY OUTCOMES

4.1. Introduction

As discussed in Section 2, court cases surrounding affirmative action in education have solely emphasized the university’s right to promote diversity and have ruled that it is not constitutional to provide race-based admissions preferences for the purposes of undoing structural or historical inequalities. As a result, the legality of affirmative action rests on institutions’ desire to foster a diverse learning environment that they argue will benefit both minority and majority students. Despite the legal basis of affirmative action in promoting institutional diversity, however, it is important to understand the effect of these policies on the postsecondary and labor market outcomes of minority students. From a welfare perspective, impacts of affirmative action policies

on the outcomes of minority students can highlight potential externalities to diversity goals. That is, these policies can have effects on how minority students progress through the higher education system that are over and above any impacts of diversity, *per se*.

These externalities can be positive or negative. Revealed preference indicates that students prefer to attend more selective colleges that have more resources than their less selective counterparts (Long 2004a). Intuitively, it makes sense that the more desirable schools should yield greater benefits to students unless there are systematic information barriers that are not corrected over time. In addition, selective colleges generally have more resources to spend on students, which may positively impact educational outcomes. To the extent that minority students who attend more highly selective schools owing to affirmative action reap any benefits that accrue from college quality, there will be a positive externality associated with race-based admissions preferences.

However, it may be argued that increasing students' access to more selective institutions, without making changes to other parts of the education system, does not necessarily benefit these students. As a result of affirmative action, URM students, in particular African Americans, end up at schools at which they have significantly lower prior academic preparation than that of their white counterparts. One theory, the mismatch hypothesis, argues that admissions preferences can end up hurting many of the supposed beneficiaries by inducing them to attend schools at which they are underprepared for the academic rigor of the course work relative to other students. Under the mismatch hypothesis, these students could actually end up performing better in the absence of race-based admissions policies (Sander 2004). In such a case, affirmative action would lead to a worsening of college outcomes for many minority students, thus producing a negative externality to policies designed to increase diversity on college campuses.

The scope for affirmative action policies to benefit minority students relies in part on whether college quality exerts heterogeneous effects on student outcomes, depending on a student's background. Some studies indicate that students may benefit unilaterally from attending more selective colleges owing to factors such as higher per capita student expenditures (Bound et al. 2010) or peer effects resulting from interactions with higher-achieving students (Sacerdote 2001, D.J. Zimmerman 2003, Stinebrickner & Stinebrickner 2006).

However, it may be that the school that maximizes a student's human capital depends on the background of the student. More selective colleges may introduce material at a higher level, move at a faster pace, and be easier for students from certain backgrounds to adjust to both academically and socially.⁶ This contrasts with the scenario in which students benefit unilaterally from more selective colleges. In such a case, it would never be optimal for a student to select a lower-quality school among his or her choice set.

When students know their academic backgrounds and how these backgrounds translate into outcomes at different colleges, they can optimally sort themselves among the colleges to which they have been admitted. Because racial preferences expand the choice set for URM students, when students have all the necessary information—or as much information as colleges possess—racial preferences in admissions cannot make minority students worse off. Arcidiacono et al. (2011a) show that when students lack information, it is possible that rationally acting minority students end up worse off as a result of racial preferences. The mistakes arise because students do not possess full information regarding their abilities to perform well in school or about the quality of their matches with particular schools. Such information is extremely hard to ascertain by

⁶To the extent that schools adjust their pace to accommodate those with lower levels of preparation, racial preferences may induce an additional cost by slowing down curriculum for other students. To our knowledge, the effect of racial preferences on curriculum choice has not been studied.

students prior to enrolling in a given school, and recent evidence examining low-income but high-performing students points to large information asymmetries that exist across the socioeconomic distribution in how students apply to and enroll in college (Hoxby & Avery 2013, Hoxby & Turner 2013).

Furthermore, colleges, which are potentially able to supply more information to students, do not necessarily have the incentive to fully inform students about the possibility of a mismatch issue. If a college values diversity, enrolling URM students may represent an externality that the individual students would not similarly benefit from. Expanding opportunities for students from minority backgrounds at selective schools without providing them with information about their likelihood of success at these schools thus could lead to students enrolling in colleges that make them worse off. Relatedly, it is important to note that affirmative action is only effective to the extent that it actually changes in-college or postcollege experiences. If professors and employers respond to affirmative action by discriminating against URM students, the intended benefit of affirmative action may no longer be present.

Because of the theoretical ambiguity surrounding how affirmative action will affect college outcomes among minorities, it is essential to examine this question empirically. This section looks at the empirical literature on the effects of affirmative action on the outcomes of minority students. In particular, it addresses the impact of affirmative action on the types of schools at which students enroll, graduation rates, choice of college major, and earnings. We also discuss the effects of percentage plans and whether they serve as a viable alternative to affirmative action. The complex relationship between college quality and fit to student background makes blanket statements of whether students are worse off under affirmative action too simplistic. However, evidence shows that the fit between a student and university matters along multiple dimensions, which suggests that in some circumstances affirmative action could lead to worse outcomes among minority students.

4.2. Enrollment Effects

Fundamentally, an analysis of the impacts of affirmative action on outcomes requires an understanding of the effects of these policies on student enrollment decisions. Any college quality or fit effect is mediated by increasing the selectivity level of colleges and universities at which minority students enroll. Without changes in affirmative action rules, it is difficult to ascertain how these policies impact minority enrollment. This is because any cross-state or cross-institution comparison of schools that practice more or less affirmative action necessarily imposes strong assumptions to achieve identification. Affirmative action policies can influence the type of students who apply and enroll in a school, and postsecondary affirmative action policies can be correlated with other state or institutional policies that differentially affect minority students. These factors make cross-sectional analysis extremely challenging in this setting.

One way to address this challenge is to explicitly model student sorting and then simulate the effects of altering race-based admissions preferences. Both Arcidiacono (2005) and Howell (2010) take this approach by estimating structural models of how students sort into schools. They then predict the effects of the removal of affirmative action on college enrollment both at the extensive margin (i.e., whether students enroll at all) and at the intensive margin (where students 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 an affirmative action ban. But, because many schools are nonselective, they predict little effect on the share of minorities enrolled in four-year colleges overall.

Much of the evidence on how affirmative action impacts minority college enrollment patterns comes from recent state-level affirmative action bans for public colleges and universities. The

enactment of these bans provides quasi-experimental variation in affirmative action policies, and a large portion of studies on which we focus in this and subsequent sections examines these policy changes. As of 2013, eight states enacted one of these bans: Texas (1997), California (1998), Washington (1999), Florida (2001), Michigan (2006), Arizona (2010), New Hampshire (2012), and Oklahoma (2013).⁷ Consistent with the structural predictions, the general consensus from empirical analyses of affirmative action bans is that the elimination of race-based preferences reduced URM student enrollment at flagship and elite public schools but had little impact on the overall likelihood of four-year college enrollment.

Among the set of papers that examine these bans, Hinrichs (2012) is one of the most carefully done and representative in terms of findings. Thus, we focus on this paper here and in Section 4.3. Hinrichs (2012) examines the enactment of bans in four states (California, Florida, Texas, and Washington) and implements a difference-in-differences estimator that compares how URM enrollment shares or enrollment likelihoods change in states that enact bans versus states that do not. In the first part of the paper, Hinrichs uses data from the 1995–2003 Current Population Survey and from the American Community Survey in this difference-in-differences setting to show that affirmative action bans have no effect on the likelihood that a URM student attends any college or a four-year college. This is a sensible finding because affirmative action is practiced most aggressively at more elite schools. As a result, eliminating racial admissions preferences likely alters where students attend rather than whether they attend college.

Hinrichs (2012) then uses data from the Integrated Postsecondary Education Data System, which contains fall enrollments by race and ethnicity by school from 1995 to 2003, to examine the effects of banning affirmative action on minority enrollment shares at different types of schools. The main findings of this analysis are that statewide bans on affirmative action at public colleges and universities lead to a reduction in black enrollment shares at top 50 ranked schools by 1.6 percentage points and at top 50 ranked public schools by 1.7 percentage points, with rankings according to *US News and World Report*. Hispanic shares declined at these school types by 1.8 and 2.0 percentage points, respectively, and white enrollment shares increased at these schools by approximately 3 percentage points. Thus, this study shows clear evidence that affirmative action bans lead to lower school quality among URM students. This is somewhat of a surprising finding because only a small number of states enacted these bans, and there are many comparable out-of-state schools and private colleges that still practice affirmative action. These findings suggest that students do not re-sort in such a way that college quality is kept constant when affirmative action in public colleges and universities is banned.⁸ Furthermore, research on enrollment responses to affirmative action bans shows that most of the enrollment effect comes from changes in admissions behavior, rather than changes in application patterns among minority students (Card & Krueger 2005, Antonovics & Backes 2013). Taken together, these findings suggest that affirmative action bans bind, substantially reducing minority representation at elite public universities in the affected states.

4.3. Graduation

The evidence discussed in the prior section suggests that affirmative action is successful at increasing the enrollment of minority students at more selective postsecondary schools. How does

⁷In 2002, the University of Georgia ceased its affirmative action policy, and many studies count Georgia as a state with an affirmative action ban. However, this change affected only one university in Georgia; other schools in the state were free to use affirmative action in their admissions.

⁸Several other papers have similar findings using a broad set of bans (Backes 2012) or only the ban in Texas (Kain et al. 2005, Long & Tienda 2008).

this sorting affect student outcomes? One of the most important outcomes to consider is whether a student graduates. Only about two-thirds of students attending a four-year school graduate with a bachelor's degree (Bound et al. 2010), and minority college graduation rates lag far behind those of whites (Neal 2006). Thus, understanding what policies can support the postsecondary attainment of URM students is of primary interest. As discussed above, affirmative action policies can influence graduation rates through two conflicting mechanisms: (a) the mismatch effect, in which graduation rates decrease due to students being paired with colleges at which they are less likely to perform well, and (b) the college quality effect, in which graduation rates increase due to access to better colleges and more resources.

There is substantial evidence that attending a higher-quality or higher-resource school leads to a higher likelihood of graduating. Clearly, a first-order concern when undertaking such an analysis is to account for the fact that students with better precollegiate academic training are more likely to sort into these schools. Most of this research attempts to account for this selection by controlling for observable student characteristics (e.g., Bound et al. 2010). With rich-enough controls for student background characteristics, particularly precollegiate academic ability measures, such a strategy is not necessarily flawed. However, without a source of exogenous variation in school resources or college quality, it is difficult to know whether the selection problem has been overcome.

One of the only papers in the literature to employ a credible quasi-experimental design to identify college quality effects on graduation is by Bound & Turner (2007). Their approach rests on the fact that college resources do not respond commensurately when there are short-run demand shocks for enrollment. This is because tuition makes up only a small proportion of total revenues, and state budgets respond slowly to demand changes. They thus use the size of a birth cohort in a state as an instrument for college resources, and they provide extensive evidence that the bachelor's degree attainment rates of a cohort are strongly negatively correlated with the size of the birth cohort. This result comes through two mechanisms, both of which suggest that college quality plays an important role in driving graduation rates. The first is that college demand shocks shift students to more open-access, lower-resource schools because the elite schools are unlikely to change their class sizes in response to short-run demand increases. The second is that these open-access schools experience lower per student resources because the increases in enrollment outstrip any increases in revenue. Although the authors cannot disentangle these two methods, their results point to large effects of college resources (and thus of college quality) on graduation rates.

Even though it is a clear advancement over prior selection-on-observables approaches, the use of birth cohort size as an instrument for collegiate resources is not without its problems. Chief among them is the concern that larger birth cohorts will lead to worse K–12 outcomes as well. Bound & Turner (2007) report evidence that population increases are associated with reductions in per student resources in K–12 schools. However, they argue that this relationship is small. Furthermore, one of the strategies employed by Bound et al. (2010) is to use the birth cohort instrument but control for the precollegiate academic ability measures of students.⁹ They find similar effects to those of Bound & Turner (2007), which suggests that the birth cohort instrument for college resources is not seriously confounded by changes in K–12 resources. Bound & Turner (2007) also show that this instrument is not correlated with demographic shifts at the state level, which is the other potential confounder in their approach.

⁹Bound et al. (2010) use longitudinal data from the NLS72 and the National Education Longitudinal Study of 1988, which allow them to control for a rich set of student background characteristics and student test scores from high school.

Although the evidence consistently points to a large average effect of college quality on graduation, this average effect only is relevant for beneficiaries of affirmative action if the fit effects are small or zero. In other words, just because there is an average effect does not mean that all students will experience this effect. This is the essence of the mismatch hypothesis. Thus, to understand how minority student graduation rates are affected by affirmative action, we need to examine these policies directly. There have been several papers that have analyzed how the graduation rates of black and Hispanic students have been affected by affirmative action bans. Looking at the trade-off between quality and fit in affirmative action, Arcidiacono & Lovenheim (2014) provide an in-depth overview of this literature.

Among these papers, Hinrichs (2012) again is quite representative in terms of his approach and findings. Given the detailed discussion in Section 4.2, we only highlight his graduation rate findings here. Hinrichs finds no evidence that statewide affirmative action bans affect the graduation rates of URM students. In addition, the estimates for whites are very similar in sign and magnitude to those for minority students, suggesting that any graduation effect is more likely a result of underlying trends than a result of affirmative action bans. We note that Hinrichs examines overall graduation rates rather than graduation rates by school type. This is appropriate as we would expect a large part of the effect of these bans on graduation to flow through their effects on the type of schools in which URM students enroll. As a result, examining how affirmative action bans affect graduation rates of differing school types is complicated by the need to adjust for enrollment effects.

That affirmative action bans do not affect minority college graduation rates even though there is a large average effect of college quality on graduation is surprising. There are two potential explanations for these seemingly conflicting sets of results, which are not mutually exclusive. First, the opposing effects of an increase in college quality and decrease in academic match quality may offset each other in the presence of affirmative action. An implication of this explanation is that moving minority students out of the lowest-ranked colleges at which college quality effects dominate (Arcidiacono & Koedel 2015) and practicing mild affirmative action at elite schools at which match effects are more important could increase overall minority graduation rates.

The second explanation flows from the findings of Arcidiacono et al. (2014) that universities spend more resources on minority student postban to help them succeed. Endogenous institutional responses may lead to a smaller (or larger) effect of banning affirmative action that makes it difficult to generalize the findings from these studies to other contexts. If a school responds to a ban in affirmative action by changing the way it treats URM students relative to majority students, one can view this as another form of affirmative action. That is, the school is targeting resources toward URM students to help them succeed (e.g., through tutoring, advising), but now the focus of affirmative action efforts is on the in-college experience rather than on admissions. In such a case, it is no longer clear what outcomes can causally be attributed to affirmative action itself. Institutional responses to affirmative action bans are not well understood, and we view this as an important avenue for future research.

4.4. Major Choice

Studies also have looked at the impact of a university on a student's choice of major. The choice of major can have a large impact on a student's ability to progress through the postsecondary system, as well as on future earnings. Several papers have reported significant differences in wages to different majors, with the evidence suggesting that students who major in more technical majors [e.g., science, technology, engineering, and math (STEM)] earn more after college (see Altonji et al. 2012 for a review of these studies). Estimating the effects of majors on earnings is complicated by

selection into the majors. Typically, this literature has either taken a selection-on-observables approach or estimated a structural model in which the effects of unobserved ability are captured through the correlation of the errors in the various estimating equations. The positive returns in more technical fields also are confirmed from subjective reports of what students believe they would make in both their actual major and their counterfactual major. For example, Arcidiacono et al. (2012b) present evidence that humanities majors at Duke University are well aware that they would receive higher earnings had they chosen a different major.

Affirmative action can influence major choice through two channels: (a) by altering the school at which a URM student attends and (b) by inducing URM students to switch out of more technical to less technical majors because of the difficulty of the majors at highly selective schools and the heavy reliance on precollege skills. The first channel is based on the fact that students can be influenced by the academic strengths of the schools in which they enroll. Enrolling in a school that excels at engineering might make it more likely that a student declares an engineering major. As discussed above, affirmative action alters the enrollment patterns of minority students, and this could therefore impact major choice as well.

The second channel operates through mismatch: Taking students who are less academically prepared for a more selective school makes it less likely that they will be able to be academically successful in the most challenging majors. Different fields place very different demands on students. Majors in STEM as well as in economics have different grading distributions (Sabot & Wakeman-Linn 1991, Johnson 2003), and students in these majors spend more time studying (Brint et al. 2012, Stinebrickner & Stinebrickner 2011). Differences in grading standards and study time have disproportionate effects on students who enter with relatively lower college preparation. Within colleges, there is massive sorting regarding which students persist in the sciences. Those who have higher SAT scores (and, in particular, SAT math scores) are much more likely to continue in a technical major (Arcidiacono 2004). Because affirmative action results in minority students being relatively less prepared than their majority counterparts, differences in difficulty across fields can result in minorities shifting away from the sciences over the course of their college careers.

Arcidiacono et al. (2012a, 2015) show the importance of being well matched if one is interested in majoring in the sciences. Using data on students at Duke University, Arcidiacono et al. (2012a) show that, conditional on gender, African Americans were more likely than white students to have an initial major in the sciences. However, their probability of finishing a major in the sciences was much lower. For example, of those who expressed an initial interest in the sciences, 54% of African American males finished in the humanities or social sciences compared to 8% of white males. Estimating a logit on the probability of staying in the sciences, Arcidiacono et al. (2015) show that this entire racial gap can be accounted for by controlling for academic background measures.

A related question is whether African Americans at Duke University would have been more likely to persist in the sciences had they attended a less selective institution. Using data on the University of California system before Proposition 209 banned the use of racial preferences and taking the initial choice of major and college as given, Arcidiacono et al. (2015) estimate a nested logit model in which in one nest is the choice to graduate in a science major or a nonscience major and in the other nest is the decision to drop out. Colleges are allowed to differ in their major-specific intercepts, as well as in their returns to major-specific ability.¹⁰ Colleges such as the University of

¹⁰Their preferred model takes a Dale & Krueger (2002) approach to accounting for selection by conditioning on a set of colleges to which the student applied as well the outcomes of their applications. Omitting the Dale & Krueger controls attenuates the effects but still points toward less selective schools producing higher graduation rates for relatively less prepared students. The findings in Elliot et al. (1996) and Smyth & McArdle (2004) also point toward relative preparation as being important in the sciences.

California, Berkeley and the University of California, Los Angeles have low intercepts but high slopes compared to colleges such as the University of California, Santa Cruz and the University of California, Riverside, implying that the most selective schools have a comparative advantage in graduating the most prepared students. The differences in slopes and intercepts point toward significant gains in science graduation rates if the bottom half of URM students with an initial major in the sciences at the University of California, Berkeley or the University of California, Los Angeles were shifted to the University of California, Santa Cruz or the University of California, Riverside. These patterns do not hold for nonminorities at the University of California, Berkeley and the University of California, Los Angeles, because they have higher academic preparation on average, which prevents a significant amount of mismatch.

The studies discussed above focus on selective institutions. Arcidiacono (2004, 2005) analyzes the choice of college and major using the National Longitudinal Study of the High School Class of 1972 (NLS72) and shows that increasing college quality has a positive effect on student preferences for majoring in the sciences. However, these studies do not control for initial major and place significant structure on how college quality affects major choice. Nevertheless, the results indicate that there may be different effects of increasing college quality at lower-ranked schools. Arcidiacono & Koedel (2015) find that the least selective four-year institutions in the University of Missouri system have few, if any, STEM majors. It may be the case that at the bottom of the distribution, better schools are better for everyone, and at the top distribution, fit becomes more important.

4.5. Labor Market Outcomes

From a welfare perspective, one of the most important effects of college is its impact on employment and lifetime earnings. Affirmative action policies affect students' college experiences through a variety of channels, including which school a student attends, his or her likelihood of graduation, and the choice of major. All of these factors impact students' labor market outcomes after they leave college. In measuring the impact of affirmative action policies on labor market outcomes, the first challenge lies in estimating the returns to college education in general. However, the propensity for students with higher precollege academic background and ability to sort into higher-quality colleges makes it quite difficult to isolate the independent impact of college quality in determining postcollegiate earnings. Several studies have attempted to take into account such sorting by controlling for observable student characteristics (Brewer et al. 1999, Black & Smith 2004, Andrews et al. 2015). These studies find an overall positive labor market effect due to increased college quality. However, a concern with these studies is that there could potentially exist unobservable characteristics, such as student motivation, which affect both college choice outcomes and labor market outcomes.¹¹

To more credibly identify the returns to college quality, one must isolate variation in the types of schools students attend that is unrelated to underlying student ability. Because of the process by which students sort into schools, it is extremely difficult to find such variation. One of the only papers in this literature to do so is by Hoekstra (2009). He exploits an admissions policy at a large flagship university that admits students through a formula based solely on a combination of high

¹¹Dale & Krueger (2002, 2014) estimate the returns to college quality using a novel identification strategy that compares students who applied to and got into the same set of schools but who made different choices about where to attend. They find no average effect of college quality on earnings, but they do find sizable returns for low-income students. However, it is unclear why students who have the same choice set make different decisions about the quality of school to attend.

school GPA and SAT scores. A student's admission status depends on whether his or her SAT-GPA weighted score meets a specified cutoff, which allows Hoekstra to employ a fuzzy regression discontinuity (RD) design. The RD in this setting is fuzzy because a small set of students below the threshold is admitted (and thus enrolls), and many students who are above the threshold do not enroll in the flagship university.

Hoekstra (2009) identifies the returns to college quality by comparing the subsequent earnings of those just above versus those just below the admissions threshold. His approach assumes that whether a student is just above or below the cutoff is essentially random. This might be a problematic assumption if the cutoffs are well known, but as he makes clear, they change every year and are unlikely to be known to students. Thus, the main identification assumption seems quite reasonable in this setting. He finds a large effect of attending the flagship university on earnings: Students who enroll in the flagship university because they are just above the cutoff earn 22% more than those who do not enroll because they are just below the cutoff. Although this paper represents the cleanest identification of the returns to college quality, the estimates have two significant limitations associated with them. First, the data do not provide information on college attendance behaviors for students who did not attend the flagship university. Thus, the counterfactual is not well defined because one cannot see whether those below the cutoff are enrolling in lower-quality schools or are not enrolling in college. Second, as in all RD studies, the effect Hoekstra estimates is focused on students at the margin of admission.¹² Although Hoekstra's results may be relevant for evaluating racial preferences at the margin at which race serves as a tiebreaker, they are not as informative when evaluating more aggressive preferences.

Arcidiacono (2005) provides the only study in the literature that links racial preferences in admissions to future earnings. Using data from the NLS72, Arcidiacono estimates a dynamic discrete choice model consisting of four stages. First, individuals decide the set of schools to which they will submit applications. Second, schools make decisions about admissions and financial aid. Third, conditional on the admission set and the corresponding financial aid offers, individuals decide whether to enroll in college and, if so, what major to study. Finally, individuals enter the labor market, where earnings depend in part on college quality and major. The model is forward-looking: When individuals make their application decisions, they do so by forming expectations over possible admissions and financial aid outcomes as well as their future major and college choice. Arcidiacono deals with the selection problem by using mixture distributions to connect the various model stages. Mixture distributions allow individuals to be one of a finite set of types. An individual's type is known to the individual but not to the econometrician and hence must be integrated out of the likelihood function. Identification of the type parameters comes from the correlation in the outcomes that is unaccounted for by the observables. For example, those who are admitted to many colleges may be strong on unobservable dimensions, and this may be reflected in their future earnings and their choices as to where to apply to college.

Arcidiacono (2005) allows admissions probabilities and financial aid to vary for blacks and whites in estimation. He then uses the estimates to forecast how black decisions and outcomes would change if they faced the admissions rules that whites faced. The counterfactual simulations show that removing racial preferences reduces the earnings of black students, but the effect is very small. The reason for this is twofold: (a) Similar to the results in Section 4.2, Arcidiacono finds that affirmative action primarily affects where students go to college not whether they go at all, and

¹²S. Zimmerman (2014) looks at the effects of an admissions cutoff rule using a similar methodology on a low-selectivity school in Florida. He finds similarly sized effects on labor market outcomes, suggesting that the monetary returns to college are not limited to high-quality schools.

(b) the estimated returns to college quality are low. Indeed, the estimated returns to being a science or business major are substantially larger than a one-standard deviation change in college quality. Arcidiacono finds a bigger effect on earnings if racial preferences in financial aid are removed, as doing so reduces black college enrollment. One caveat is that college quality is proxied for by the average math SAT score of the student body.¹³ To the extent that this is a noisy measure of college quality, the returns to college quality may be biased downward (for a discussion of this issue, see Black & Smith 2004, 2006).

4.6. Responses to Affirmative Action Bans

Because universities appear to place considerable value on racial diversity, they may look for (legal) ways of adjusting their admissions practices to ensure a racially diverse student body in the wake of an affirmative action ban. Chan & Eyster (2003) were the first to demonstrate this point, showing that in reaction to a ban on racial preferences, colleges would have incentives to ignore qualifications to get a more diverse student body. Eppler et al. (2008) further elaborate on this point by calibrating a model of the US higher education system in which schools maximized quality. Quality in their model is a combination of spending and student test scores, as well as both racial and income diversity. Banning racial preferences in their model results in universities placing more weight on characteristics that are positively correlated with URM status, such as income, and less weight on factors that are positively correlated with being a majority student, such as test scores. Consistent with the empirical literature, their results point toward a substantial decrease in racial diversity at the most selective colleges despite efforts by universities to foster diversity through changing their admissions rules.

Particularly interesting work is provided by Fryer et al. (2008), who also point out that universities that value racial diversity will respond to bans on racial preferences by placing more (less) weight on characteristics that are positively (negatively) correlated with being a URM. But they take the argument one step further and note that the characteristics that are likely to receive less weight (because they are negatively correlated with being a URM) are ones that are endogenous, such as test scores. With less weight placed on factors such as test scores, and under the assumption that the cost of investment is higher for disadvantaged groups, incentives to invest go down, particularly for disadvantaged groups.

This effort response to a ban on racial preferences is explicitly incorporated by Hickman (2013). He estimates a structural model of how students are allocated to colleges when investment in one's test scores is a choice. His model incorporates two margins on which an affirmative action ban may affect investment. First, high-ability minority students increase their investment as they are no longer assured a spot at an elite institution absent investment. Weighed against this, however, is that less talented minority students decrease their investment as the probability of obtaining a spot at an elite institution is sufficiently small that investment is no longer warranted. The estimates of Hickman (2013) suggest that this latter effect dominates, implying a substantial decrease in investment following an affirmative action ban. A caveat to this study is that there are very few controls for selection, effectively only test scores. Taken literally, however, Hickman's results imply that measures such as the black-white test score gap, which is quite large, are substantially understated for what they would be absent racial preferences in admissions.

Given data from before and after a ban on racial preferences, the implications of the models discussed above can be tested directly. Namely, do universities respond to bans on racial preferences

¹³No effects were found for average SAT verbal scores.

by shifting how they weight particular decisions in admissions? If so, how do these bans affect investment decisions? Antonovics & Backes (2014a) examine how the weights placed on particular characteristics changed for schools in the University of California system following California's ban on racial preferences (Proposition 209). They estimate a probit model with interactions between the time periods and the characteristics of the student. The coefficients on these interactions suggest patterns consistent with the theory, particularly at the most selective campuses (University of California, Berkeley and University of California, Los Angeles). Namely, less weight was placed on SAT scores, and more weight was placed on coming from a less educated or lower-income family in the post-Proposition 209 periods.¹⁴ Hence, particularly well-off nonminority students are actually hurt by the change in admissions rules. An interesting feature of the results is that these admissions rule changes do serve to diversify the school along socioeconomic lines.

With less weight placed on SAT scores in the admissions process, the theoretical implications of Fryer et al. (2008) suggest that the racial test score gap may rise. Antonovics & Backes (2014b) investigate this question, again using variation from before and after Proposition 209. Here, they use data from the College Board on SAT test takers, where the key coefficient in the SAT score regression is that on the triple interaction of being a California high school student, being in the post-Proposition 209 period, and being a URM. They find no drop in test scores for blacks but a small drop in test scores for Hispanics, but high school grades for both groups rise. There are, however, some concerns about selection into who takes the SAT as there is a small drop in the number of black students taking the SAT following the ban. Assuming that all these students would score in the bottom percentile does yield negative SAT score effects for blacks as well. One difficulty in interpreting investment results is that it is unclear exactly when the investment decisions take place. Immediately following a ban, there may not be time for individuals to change their investment decisions. The effect of affirmative action bans on student investment behavior is clearly an area that deserves more attention from researchers.

5. THE IMPACT OF RACIAL PREFERENCES ON MAJORITY OUTCOMES

As emphasized at the beginning of the last section, the rationale Justice Powell gave in supporting some forms of racial preferences in *Regents of the University of California v. Bakke* (1978) was not one of reparations for past discrimination but rather that the state had compelling interest in having a racially diverse student body. Thus, the legal basis for affirmative action rests on the idea that diversity benefits all students. Conversely, opponents of affirmative action often argue that race-based preferences are unfair to majority students because they reduce their likelihood of admission. Although this is a serious concern among many students and provides the impetus for several lawsuits challenging affirmative action, the effect of affirmative action on admissions of non-URM students is likely to be small. Although eliminating affirmative action would actually have at most a small impact on the likelihood any one student is admitted, these policies clearly lead to a redistribution of resources away from majority students and toward URM students. Depending on the social welfare function, this change could be either welfare enhancing or welfare reducing for society. However, if affirmative action has benefits for majority students, then these may mitigate the social costs associated with these programs. In this section, we discuss the literature that examines these potential benefits of affirmative action policies to non-URM students.

¹⁴Long & Tienda (2008) examine changes after the ban in Texas and also find less weight placed on SAT scores after the ban. Their results are harder to interpret because of the Top 10% Rule in Texas that went into effect soon after and guaranteed admission of the top 10% of each high school class to any Texas public university.

In particular, we examine the evidence on how affirmative action influences the types of diversity to which one is exposed and the benefits of attending a more diverse campus to nonminority students.

5.1. Earnings

A natural place to look for the benefits of attending a racially diverse school is in labor market outcomes. Attending a more racially diverse school may improve one's skills at communicating across races, which may in turn be rewarded in the labor market. Finding exogenous variation in college racial diversity, however, is difficult. Daniel et al. (2000) employ a selection-on-observables approach to attempt to identify the effect of racial diversity on the returns to college.¹⁵ They use the National Longitudinal Survey of Youth 1979 to examine the effects of the share of African Americans at an institution on the earnings of nonblack men, controlling for a large set of college quality measures and individual characteristics. Although they find a positive association between the share of blacks at a postsecondary school and the future earnings of nonblack students, the identification assumptions that underlie this analysis are strong. The share of students who are African American at an institution might be a characteristic on which students of both races sort, and if a preference for racial diversity is correlated with unmeasured student ability, these estimates could be biased in either direction.

Hinrichs (2011) also investigates how institutional differences in the share of URM students affects future income for whites with a selection-on-observables approach. Using data from the Beginning Postsecondary Students Longitudinal Study 1996/2001, his estimates generally are not significant, but they are imprecise. Because of the difficulties in justifying a selection-on-observables approach in this context, Hinrichs (2011) also explores the sensitivity of his results to assumptions made about selection on unobservables. Following Altonji et al. (2005), he assumes that selection on unobservables is the same as selection on observables. However, because there is little selection on observables in his data, these selection-corrected results are very similar to the baseline. This finding likely masks significant heterogeneity across the college quality distribution: At the top end of the college quality distribution, the relationship between college quality and the share of African Americans is positive, and at the bottom end of the college quality distribution, the relationship between college quality and the share of African Americans is negative. Thus, the finding that there is little selection on observables on average could result from biases that cancel out across the distribution of college quality.

Using College and Beyond data on students at elite private and public institutions at which racial preferences are most salient, Arcidiacono & Vigdor (2010) estimate the relationship between the share of URM students and the future income of white and Asian students. The identification concerns of the previous two papers are present here as well,¹⁶ and their estimates are large and negative, although statistically insignificant. Arcidiacono & Vigdor show that the estimated negative effects are being driven by the concentration of URM students at the bottom of the academic performance distribution. Namely, they split the URM share into three groups: those with SAT scores more than 160 points above the student's own SAT score, within 160 points, and below 160 points. The point estimate on the URM share for those within 160 points of the student's own SAT score is positive but very imprecise. But the share with SAT scores significantly

¹⁵Daniel et al. (2000) summarize the findings on the share of African Americans in Daniel et al. (1995, 1997), which are focused primarily on the effects of college quality on earnings. The former examines female earnings, whereas the latter focuses on male earnings.

¹⁶Arcidiacono & Vigdor (2010) focus on the cohort entering college in 1976.

below the student's own SAT score is negative and significant, suggesting that adding students at the bottom of the distribution is not helping the future earnings of the majority students. Arcidiacono & Vigdor show that these negative effects are driven by the share of URM students with significantly lower SAT scores negatively affecting white and Asian graduation rates.

Arcidiacono & Vigdor (2010) also examine the relationship between perceived gains in diversity capital and earnings for whites and Asians. Students in the College and Beyond study were asked whether their college experiences increased their ability to work effectively and get along well with people from different races/cultures. Controlling for institution and major fixed effects, as well as perceptions about increases in other forms of human capital, shows that students who responded more positively to the diversity capital question had lower earnings. The effects are quite large, with 14% lower earnings for those who gave the highest response compared to those who gave the lowest response. A clear caveat is that the measure of diversity capital might be correlated with the underlying productivity of students. It may be the case that lower-performing (and thus lower-earning) students start out with the lowest levels of diversity capital, and thus they experience the largest increases. If this is the case, these estimates will be biased downward.

5.2. Nonpecuniary Benefits

The benefits of diversity for whites and Asians may arise through other channels besides the labor market, such as engaging in community service and racial attitudes. This topic deserves serious empirical examination, as the benefits of diversity are contingent on more than just admissions decisions, but also depend on student behaviors. For example, if there is a great degree of racial segregation at colleges, students may not actually be exposed to the potential benefits of diverse interactions. Both Arcidiacono & Vigdor (2010) and Hinrichs (2011) examine some of these channels. Overall, the results of these studies do not point to consistent impacts of institutional diversity on these other outcomes. Hinrichs (2011) finds generally positive effects of the share of URM students on satisfaction with the racial climate at the university but negative and significant effects of the share of URM students on the probability of engaging in community service. No significant effects are found on voting behavior or satisfaction with the intellectual climate, although the standard errors on the former do not rule out large effects.

Consistent with their results on earnings, Arcidiacono & Vigdor (2010) find no effect of increasing the overall URM share on job satisfaction, and they find a negative effect on life satisfaction. Splitting the URM share into three groups based on relative SAT scores shows that the negative effects on life satisfaction are being driven by the URM share of those with significantly lower SAT scores; the coefficient on increasing the URM share of those with similar SAT scores is actually positive and significant. This result suggests the possible importance of diversity capital, but only when groups are well matched. As with earnings, perceived increases in diversity capital from the college experience are negatively associated with graduation, postgraduate degree attainment, job satisfaction, and life satisfaction.

More promising for the benefits of diversity are the results of Boisjoly et al. (2006), who also have a much cleaner identification strategy. These authors examine how white students' perceived abilities of interacting with African Americans as well as attitudes toward affirmative action are affected by the race of their randomly assigned roommate. The university they study gave students the option of choosing their own roommates, enrolling in an enrichment dormitory, or being randomly assigned. Random assignment was chosen by 14% of students, although the primary reason for not being randomly assigned was missing the lottery deadline. The percentage of African Americans choosing the lottery was lower, at 5%.

Despite the small number of African Americans in the lottery, in a follow-up survey white students who were randomly assigned an African American roommate were significantly less likely to believe affirmative action should be abolished and significantly more likely to believe affirmative action is justified if it ensures a diverse student body. They also were more likely to report that having a diverse student body is essential for a high-quality education.

One concern with Boisjoly et al. (2006) is the external validity due to the selection of African American students into the lottery. African American students who selected into random assignment likely had a good idea that they would be assigned a white roommate. Hence, these students may have felt more comfortable interacting with white students. African Americans who entered the lottery also had significantly higher incomes, parental education, and test scores than those who did not, a feature not present when comparing white lottery entrants and nonentrants. However, their views on affirmative action and other policies were similar to African American respondents who did not have a randomly assigned roommate.

5.3. Friendships

A potentially important mechanism through which affirmative action–driven diversity can influence student outcomes is through the formation of cross-race friendships. Several studies have examined the extent to which affirmative action impacts such friendships. Camargo et al. (2010) look at friendship formation over time at Berea College, where all students are randomly assigned roommates, thus circumventing the problems associated with selection into the lottery in Boisjoly et al. (2006).¹⁷ The data show substantial friendship segregation: 69.6% of African Americans have African American best friends, whereas only 5.7% of whites have African American best friends in the initial survey. This feature either remains the same or worsens as students advance through college. If best friends were assigned randomly, each would have a 15.8% chance of having an African American best friend.

Camargo et al. (2010) find evidence that being assigned a black roommate, however, has a substantial effect on the share of black friends the white students have throughout college. For those assigned an African American roommate, 15.9% of their four best friends were African American, compared to 5.4% for those with white roommates. Furthermore, the probability of the roommate being one of the four best friends was the same for whites regardless of whether their roommate was African American or white. This is despite also finding that similarity in high school grades is an important determinant in friendship formation. Because a substantial gap in high school grades exists at Berea between African American and white students, one thus would expect a lower rate of black-white friendship formation due to being randomly assigned a black roommate, in contrast to what the data show.

Random assignment of roommates thus can be an effective tool to promote cross-racial contact and understanding. But this likely would hold regardless of whether racial preferences were in place. Arcidiacono et al. (2011b) suggest that a weakening of racial preferences would actually increase cross-racial interaction. Using the College and Beyond database, they show that, within a school, whites with higher SAT scores are more likely to know two or more Asian students well and are less likely to know two or more African American students well. Because racial preferences primarily come into play at top schools and affect where individuals go to college rather than whether they attend at all, diversity at one college comes at the expense of diversity at another

¹⁷Berea College is a small liberal arts school in Kentucky that enrolls only students from low-income backgrounds. There is no tuition for attendance, but all students enrolled must work.

college. With the U-shaped relationship between the share of African Americans and the average college SAT score, a weakening of racial preferences would result in a more even distribution of African Americans across selective colleges. Because the interaction depends both on representation and on similarity of background, the weakening of preferences has the further effect of reducing the gap in African American and white characteristics, potentially resulting in more interaction.

Arcidiacono et al. (2013) also highlight the importance of similarity in background characteristics using the National Longitudinal Survey of Freshmen (NLSF) database, which has much better information on friendships than do the College and Beyond data and focuses on elite public and private institutions.¹⁸ They also examine data from the Campus Life and Learning Survey, which contains panel data on students at Duke University. Similar to Camargo et al. (2010), Arcidiacono et al. find that college friendships are highly segregated: Both data sets show that African Americans on average have at least 58% of their college friends of the same race. As in Arcidiacono et al. (2011b), similarity in academic background is an important determinant of friendship formation. African Americans and Hispanics who have lower SAT scores have a greater share of same race/ethnicity friends than do their counterparts with high SAT scores, even after controlling for the composition of their friends in high school. Furthermore, lower SAT scores are associated with higher rates of African American friendships for those who are not African American but lower rates of friendships with whites and Asians for those who are not white and Asian, respectively. With African Americans and Hispanics having lower test scores than whites and Asians at the same school, this is evidence of similarity in academic backgrounds playing a role in the formation of interracial friendships.

Strikingly, in the NLSF, the share of same-race friends for African Americans is roughly the same in college as in high school, despite the share of African Americans in their high schools being almost five times the share of African Americans in their colleges (34% versus 7%). This could be evidence either that colleges are worse at fostering interracial friendships than are high schools or that there is an optimal fraction of same-race friends and this optimal fraction can be obtained given the shares of the different groups both in high school and in college. Arcidiacono et al. (2013) provide support for the former explanation by examining friendships for those students who attend high schools with similar shares of African Americans as those observed in their colleges in the NLSF. These African American students had a significantly higher fraction of same-race friends (and thus a lower fraction of other-race friends) in college than in high school. That colleges seem to be less conducive to interracial friendship formation is surprising, as students in most colleges live in closer proximity to students of other races and ethnicities than typically was the case in the neighborhoods from which they came. Because of housing segregation, college campuses tend to be more diverse than the areas in which students were raised, and because most students live on campus for several years, one might predict the closer contact would lead to more interracial friendships. That colleges do not tend to foster much interracial friendships thus suggests substantial room for improvement in promoting cross-racial interaction.

The literature on friendship formation suggests that similarity in academic background plays some role in cross-racial interaction, providing a mechanism for the findings of Arcidiacono & Vigdor (2010) that benefits from diversity can be realized when the increases come from students with similar academic backgrounds. Support for the importance of similarity in academic backgrounds also can be found in papers on the Air Force Academy. Carrell et al. (2009) show that

¹⁸The NLSF covers many of the same institutions as does College and Beyond and attempted to get equal numbers of African American, Hispanic, Asian, and white students in the cohort that entered in the fall of 1999.

when students were randomly assigned to peer groups, those with lower levels of academic preparation benefited from being assigned stronger peer groups than those with higher levels of academic preparation. On the basis of this finding, Carrell et al. (2013) were able to get the Air Force Academy to assign peer groups such that the least prepared students were with the most prepared students. Surprisingly, the least prepared students were much worse off under this policy than under random assignment. The differences in preparation created a wedge, such that within-group sorting resulted in little interaction between the most prepared and the least prepared students. This finding is likely to generalize to student interactions with those of other racial and ethnic backgrounds on college campuses, given the large differences in academic performance across groups.

6. INTERNATIONAL EVIDENCE

Group-based affirmative action policies in education also have had a prominent role in efforts to advance historically disadvantaged groups in India. In traditional Hindu society, the caste system played a key role in perpetuating social and occupational inequalities between different groups. The Constitution of India strictly prohibits caste-based discrimination in modern society, and affirmative action measures have been in place for members of the most disadvantaged groups, the Scheduled Castes and Scheduled Tribes, since 1950. One requirement from these policies has been the reservation of a substantial percentage of university seats for these disadvantaged groups. The specific nature of these quotas varies between different states, with some mandating provisions for Other Backward Classes as well. Individuals belonging to Other Backward Classes also are considered to be historically disadvantaged, although less so than those from Scheduled Caste/Scheduled Tribe groups. India's unique reservation policy creates an especially transparent setting for analyzing the impact of affirmative action.

The advantage of the straightforward nature of the Indian affirmative action system is that it allows researchers to circumvent many of the identification challenges faced in the analysis of affirmative action policies in the United States. In the United States, the admissions process considers multiple facets of an applicant's profile for admissions, including high school GPA, extracurricular activities, letters of recommendation, standardized test scores, and student essays. This makes it difficult to compare and quantify the qualification levels of two candidates who differ along various dimensions. Furthermore, each institution has discretion over its own admissions criteria, making it difficult to analyze policies across schools. The extent and scope of affirmative action policies in many institutions also often cannot be observed, as explicit race-based quotas were ruled unconstitutional in *Regents of the University of California v. Bakke* (1978).

Admissions in India differ along key dimensions from the US system. In addition to the use of explicit quota policies for certain types of students, admissions criteria to Indian colleges are based solely off scores from entrance examinations, with uniform policies within states. Additionally, Indian college students are more limited than are their US counterparts in course choices within a major, making analysis of their educational outcomes in college less vulnerable to selection issues. Thus, admissions policies in India make it a very transparent setting in which to study affirmative action. The literature on affirmative action has thus far been limited in scope to engineering colleges. In India, students who "turn down admission to an engineering college in their state would mainly do so because they obtained admissions to medical school or to a better engineering school in another state" (Bertrand et al. 2010, p. 18). As engineering is viewed as a highly prestigious educational track in India, engineering colleges function as a good area in which to study affirmative action. Research on the impact of affirmative action in Indian higher education has focused on a variety of different aspects: (a) the demographics of admitted students,

(b) college performance for minority groups, (c) labor market outcomes for minority groups, and (d) the effects of these policies on groups not explicitly targeted by the policies.

To analyze admissions demographics, Bagde et al. (2014) look at the profiles of all applicants to private engineering colleges in a large state in India. They find that the reservation system of increasing admissions does in fact significantly increase the proportional attendance of students from disadvantaged castes. The magnitude of this effect is greatest for students from the most disadvantaged groups. Furthermore, Bertrand et al. (2010) and Robles & Krishna (2012) find that the students in their studies who are admitted via affirmative action come from lower average socioeconomic backgrounds than do the upper-caste counterparts they displace. Bertrand et al. (2010) examine all applicants to any engineering school within an Indian state in 1996, and Robles & Krishna (2012) study a cohort of graduates of a group of elite colleges in 2008. The findings of both studies reject the notion of a creamy layer problem (i.e., the concern that affirmative action policies result in wealthy students within minority groups displacing poorer students in nonminority groups).¹⁹

Conditional on admittance, the college performance outcomes studied have a less straightforward interpretation and can depend on the metric used to measure performance. The private engineering colleges in the state Bagde et al. (2014) analyze administer a standardized test to all students after their first year of college. In comparing student scores across caste and college, they find that first-year achievement among those in disadvantaged groups improves with the number of reserved enrollment slots, owing to minority students having greater priority in selecting into better colleges. Furthermore, they find no difference between on-time graduation rates between students who got in because of affirmative action and their peers who did not, even though a higher proportion of students from disadvantaged groups major in the most competitive disciplines. Based on these findings, the study does not support the hypothesis that mismatch from affirmative action unintentionally worsens the collegiate outcomes of minority students.

However, in their study of the 2008 graduates of an elite Indian engineering college, Robles & Krishna (2012) find evidence that affirmative action may be harming its intended beneficiaries. Data from this study show that students from Scheduled Caste/Scheduled Tribe groups who gain admission through affirmative action take longer than their nonminority counterparts to graduate, although this result may be idiosyncratic to the particular institution under study. The authors also measure the college performance of minority students, using GPA as a metric. Specifically, they look at a student's GPA percentile, calculated with respect to other GPAs within the student's major. This metric allows for a clear measurement of the performance of minority students over time relative to their nonminority classmates. Results indicate that the performance of minority students relative to nonminority students stays constant over time for those in nonselective majors (although the grade distribution for majority students first-order dominates that of minority students). However, the gap widens for students in selective majors, indicating that minority students in these fields may be struggling more in course work than are their peers. Survey data show that minority students in more selective majors also report feeling higher levels of stress, depression, loneliness, or discrimination than do their peers in less selective majors, a pattern that is not reflected in the nonminority student body.

Bagde et al. (2014) take issue with the findings of Robles & Krishna (2012), owing to what they argue are flaws in the use of GPA for measuring student academic performance. This

¹⁹Francis & Tannuri-Pianto (2012) find a similar result in their study of the effects of racial quotas for black students in the Brazilian higher education system. The introduction of a quota policy raised the proportion of black students at the university; furthermore, these students came from lower socioeconomic backgrounds on average than the students they displaced.

argument stems from the purported existence of discrimination against those from Scheduled Caste groups, which the National Commission for Scheduled Castes has argued is prevalent at elite colleges. Robles & Krishna (2012) also demonstrate that minority students who study more selective majors because of affirmative action have subsequent lower labor market earnings than they would have if they had chosen a less selective major. However, they find some evidence of job market discrimination against students from Scheduled Caste and Scheduled Tribe groups as well. They argue that “minority students tend to start their labor market experience in less lucrative occupations which are also less likely to offer professional development opportunities” (Robles & Krishna 2012, p. 31). These findings could be driven by some combination of mismatch and discrimination, both at the university and in the labor market.

Whereas Robles & Krishna (2012) look at labor market differentials for minority students in different majors at an engineering college, Bertrand et al. (2010) examine labor market differences between attending and not attending an engineering institution. They indicate that students admitted to engineering colleges through affirmative action experience increased labor market returns by 70–124 US dollars a month. Applicants who do not get accepted into an engineering college still attend some type of higher education, but they tend to enroll in less prestigious majors or in two-year technical schools. They also enroll in private engineering colleges, which have less prestige and are more expensive than government-run universities (Bertrand et al. 2010). To the extent that affirmative action applicants tend to come from poorer families than those they displace, the last option may not be as accessible to students from these groups.

Beyond examining impacts on disadvantaged groups, Bertrand et al. (2010) study the effects of affirmative action on those not explicitly targeted by these policies. They find that the upper-caste students who are displaced by affirmative action quotas suffer an income penalty that is larger in magnitude than the income gains experienced by lower-caste students who displace them. Additionally, a caste-based policy may have the inadvertent effect of reducing female enrollment levels. Bertrand et al. (2010) note that 23% of students displaced from engineering colleges as a result of the quota were female, whereas only 16% of the students from disadvantaged caste groups coming in through affirmative action were female. As a comparison, the quota policy in the state studied by Bagde et al. (2014) actually mandated that one-third of reservations for each caste group be allotted to women. Thus, the results indicating increased college attendance among targeted students and positive education outcomes due to affirmative action are robust to (or possibly impacted by) mandatory female representation levels.

7. CONCLUSION

In recent years, race-based affirmative action policies in higher education have been at the forefront of policy debates in the United States. The landscape of affirmative action has been shaped largely by the US Supreme Court ruling under *Regents of the University of California v. Bakke* (1978) and the subsequent court cases that followed. The result has been that affirmative action policies may be implemented in accordance with the institutional goals of establishing and maintaining a diverse student body, provided strict scrutiny is applied. Several individual states have passed legislation limiting the role of affirmative action in college admissions in recent years as well.

Fundamentally, the interest of universities in promoting diversity rests on the implicit assumption that such diversity has positive impacts on students. This is especially of concern because

racial preferences in the United States are concentrated at the top universities, and these policies often result in significant differences in mean test scores and GPAs for admitted students between races. From an economic perspective, affirmative action policies involve a shifting of resources toward URM students and away from majority students. For URM students, affirmative action expands the range of colleges available. In a setting in which students are fully informed of the nature of their choices, this policy will be weakly welfare enhancing for all beneficiaries. Unfortunately, students may not be making decisions with all the necessary information, especially if colleges have incentives, such as increasing diversity, that do not necessarily align with the best interests of individual students. Among majority students, affirmative action could lead to negative effects on educational outcomes through peer effects or by altering the quality of schools these students attend. Furthermore, affirmative action could positively or negatively impact racial attitudes among majority students toward URM students.

Above we review the recent literature on many potential costs and benefits associated with affirmative action. Evidence demonstrates that the scope of affirmative action in selective undergraduate institutions in the United States is large. In addition, there is considerable evidence, the most credible of which comes from affirmative action bans, that race-based admissions preferences have significant impacts on the quality of postsecondary schools attended by URM students. However, despite evidence that attending a higher-quality school increases the likelihood of graduating, there is little evidence from affirmative action bans that they negatively influence URM collegiate attainment rates. These results suggest that mismatch effects may cancel out college quality effects, which leads affirmative action bans to have no impact on URM completion rates. More work separating out these two types of effects is needed.

We also document that affirmative action can affect other URM postsecondary outcomes, the most notable of which is major choice. One response to being mismatched at a college is to switch to an easier major. A consistent pattern is that those who persist in the sciences have substantially stronger academic backgrounds than those who switch out of the sciences. Because affirmative action results in URM students being relatively less prepared than their nonminority counterparts, the effects of college quality on major choice are particularly strong.

We also review the small literature that has arisen examining the effect of affirmative action policies on majority outcomes. In general, this research does not come to strong conclusions, mostly driven by the difficulty of isolating plausibly exogenous variation in minority shares across institutions. The exception is the small set of studies that use random roommate assignment to identify the effect of exposure to minority groups on majority attitudes and friendship formation. These papers tend to find positive effects of such exposure, which could argue for a role of affirmative action in altering majority beliefs and cross-race interactions. But the evidence also suggests that students are more likely to form friendships with students of similar academic backgrounds. By driving a wedge between the academic backgrounds of students of different races at highly selective schools, affirmative action may work against cross-racial interaction for two reasons. First, at the top of the college selectivity distribution, the most selective schools are also the most diverse. Second, affirmative action affects where individuals attend college, not whether they attend at all.

Recently, studies also have emerged on the role of affirmative action on higher education internationally, especially in India. These studies provide a strong empirical setting under which to study affirmative action because the admissions criteria are much less convoluted than in the United States, and the explicit use of quotas removes the ambiguity of the extent to which affirmative action is taking place. However, it is difficult to extrapolate much from India to the US

setting owing to the peculiarity of the caste system and the differences in educational institutions across countries.

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