The Redistributive Efficacy of Affirmative Action:
Exploring the Role of Race and Socioeconomic Status in College Admissions

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Abstract: In this paper, we examine the redistributive efficacy of affirmative action exploring the role of race and socioeconomic status in admissions at the University of Brasilia, which established racial quotas in July 2004 reserving 20% of admissions slots for students who self-identified as black. To evaluate the extent to which the policy might promote racial and socioeconomic diversity in admissions, we compare individuals who were not admitted but would have been if the quota system had not existed with individuals who were admitted but would not have been if the quota system had not existed. We present evidence that displacing applicants are considerably more black than displaced applicants and are, by many measures, from families with significantly lower socioeconomic status. Using data on young men and women living in Distrito Federal and data on university admissions, we find that race and socioeconomic status are both significant determinants of college attendance. Furthermore, first-difference regressions involving pairs of siblings suggest that skin tone may have an independent effect on performance on the university entrance exam. Lastly, we analyze two alternative hypothetical policies, quotas for students who attended public secondary school and quotas for students from low income households, with respect to their likely impact on racial and socioeconomic diversity.
Keywords: Affirmative Action, Higher Education, Redistribution, Brazil.

Resumo: Esse artigo examina a eficácia redistributiva de ações afirmativas, explorando o papel de raça e status socioeconômico na admissão à Universidade de Brasília (UnB), que estabeleceu cotas raciais em julho de 2004, reservando 20% de suas vagas para estudantes que se auto-identificarem como negros. Para avaliar a capacidade dessa política em promover a diversidade racial e socioeconômica nas admissões, comparamos indivíduos que não foram admitidos (deslocados), mas teriam sido se o sistema de cotas não existisse, com indivíduos que foram admitidos (deslocadores), mas não teriam sido caso o sistema não existisse. Apresentamos evidência de que os candidatos deslocadores são consideravelmente mais negros que os deslocados e que são, com base em várias medidas, de famílias com piores condições socioeconômicas. Usando dados de jovens que vivem no Distrito Federal e dados do processo de seleção para a UnB, encontramos que tanto raça quanto status socioeconômico são determinantes do acesso à universidade. Além disso, estimativas em primeiras-diferenças, envolvendo pares de irmãos, indicam que o tom da pele parece ter um efeito independente no desempenho no vestibular. Por fim, analisamos duas políticas hipotéticas alternativas, cotas para alunos que frequentaram escola secundária pública e cotas para alunos de domicílios de baixa renda, relativamente a seus prováveis impactos na diversidade racial e socioeconômica.
Palavras-chave: Ação Afirmativa, Educação Superior, Redistribuição, Brasil.

JEL Codes: I28, J15, J24.

Área 11: Economia Social e Demografia Econômica

I. Introduction

About ten times more slaves arrived in Brazil than in British Mainland North America (Eltis, 2001). As a result, Brazil has had a large black and mixed-race population. In 2007, about 49.4% of Brazil's population of 184 million was *branco*, 42.3% *pardo*, 7.5% *preto*, and 0.8% Indigenous or Asian (IBGE, 2009).[1] Even though the rate of ethnic intermarriage is relatively high, significant racial disparities in education, income, health, and other dimensions continue to exist (Telles, 2004). For this reason, a handful of universities have recently adopted racial quotas in admissions. However, is a race-based university policy an effective way to reduce such disparities? To address this question, it is necessary to raise another. How are race and socioeconomic status related to college attendance?

In this paper, we examine the redistributive efficacy of affirmative action exploring the role of race and socioeconomic status in college admissions. To this end, we study the experience of the University of Brasilia (UnB), which established racial quotas in July 2004 making it the first federal university in the country and the only university in the region to do so. At UnB, 20% of available admissions slots are reserved for students who self-identify as *negro* (black). Individuals who are selected for admission under the quota system are required to attend an interview with a university panel that verifies that they are "black enough" to qualify. In the analysis, we use university admissions records as well as a nationally representative survey. The admissions data include exam scores, sociodemographic variables, and personal information enabling us to identify pairs of siblings.

To determine the extent to which racial preferences in admissions might promote racial and socioeconomic diversity extending disadvantaged individuals an opportunity to attend college, we compare displaced and displacing applicants—those who were not admitted but would have been if the quota system had not existed and those who were admitted but would not have been if the quota system had not existed. Based on admissions data, we find that displacing applicants are considerably more black than displaced applicants and are, by many measures, from families with significantly lower socioeconomic status. We are able to verify these findings using a student survey conducted by the authors. The survey also reveals that, relative to displacing students, displaced students were admitted by higher quality alternative universities and would have had better academic outcomes at UnB.

We then estimate the determinants of educational attainment. For young men and women living in Distrito Federal, socioeconomic status is a better predictor of college attendance than race. However, due to sample size, we are unable to estimate separate effects for *pardos* and *pretos*. In contrast, both race and socioeconomic status are significant determinants of admission to UnB. The results indicate that *pretos* have especially lower entrance exam scores than whites. Exploiting within-family variation in skin tone, we identify the impact of race on entrance exam scores. First-difference and fixed effects regressions involving pairs of siblings imply that, holding constant household characteristics, darker-skinned applicants tend to have lower entrance exam scores than lighter-skinned applicants. Racial discrimination or stereotype threat may explain this finding. Alternative hypotheses are also discussed.

Finally, we consider two alternative hypothetical policies. The first is to reserve 50% of admissions slots for applicants who had attended public secondary school, and the second is to reserve 20% of admissions slots for applicants who had monthly family income equal to or less than R$ 500 (two minimum salaries at the time) . We find that both alternative policies would raise racial diversity, but the actual policy of racial quotas does so to a greater extent. Quotas for public secondary school students would raise socioeconomic diversity to the same degree that racial quotas do, while quotas for low income students would raise it even more. Therefore, if more emphasis is placed on raising socioeconomic diversity than on raising racial diversity, quotas for low income students may be preferred. If more emphasis is placed on raising racial diversity, racial quotas may be preferred.

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[1] Throughout the paper, we use various racial terms in Portuguese. The term "branco" refers to whites, typically individuals with light skin color, "pardo" refers to black-white mixed-race individuals, typically those with intermediate skin color, and "preto" refers to blacks, typically those with dark skin color. The term "negro" is indicative of black racial identity.

This paper contributes to the economics of educational attainment, particularly as it relates to race and socioeconomic status. One subset of the literature examines the socioeconomic determinants of college attendance (Liu et al., 2006; Pallais and Turner, 2006; Stanley, 2003; Vignoles and Powdthavee, 2009). Another subset investigates the sources of racial disparities in college attendance (Cameron and Heckman, 2001; Kane, 1994; Light and Strayer, 2002; Rivkin, 1995). One of the most cited papers, Cameron and Heckman (2001), finds that long-term parental background and family characteristics explain most of the racial disparities in college attendance in the US. Additionally, some studies demonstrate the importance of skin tone—beyond the influence of race—on schooling and labor (Bodenhorn, 2006; Goldsmith, Hamilton, and Darity, 2006, 2007; Hersch, 2006; Loury, 2009; Rangel, 2007). For example, Rangel (2007) finds evidence that Brazilian parents invest less human capital in darker-skinned children than lighter-skinned children.

This paper also contributes to the economics of affirmative action in higher education. Most empirical papers about affirmative action in higher education focus on the US experience (Bowen and Bok, 1998). Several investigate how the elimination of affirmative action and other state-level policy changes might affect the enrollment of minority students in college (Card and Krueger, 2005; Conrad and Sharpe, 1996; Dickson, 2006; Long 2004a, 2004b). Other studies examine the academic performance of minorities and subsequent gains to minorities in the labor market (Arcidiacono, 2005; Loury and Garman, 1993; Rothstein and Yoon, 2008). Some research looks at affirmative action in developing countries like India and Brazil. Bertrand, Hanna, and Mullainathan (2008) evaluate the efficiency of a quota system at an engineering college in India. They find that the program successfully targeted poorer students who, in spite of lower entrance exam scores, enjoyed substantial gains in the labor market. However, the gains for marginal upper-caste students were larger than those for marginal lower-caste students. Like this paper, Bertrand, Hanna, and Mullainathan (2008) is one of the only papers able to identify and compare displaced and displacing applicants.

Other studies specifically address affirmative action in Brazil (Andrade, 2004; Cardoso, 2008; Ferman and Assunção, 2005; Francis and Tannuri-Pianto, 2010a, 2010b, 2010c). Ferman and Assunção (2005) employ a difference-in-difference framework to investigate whether black secondary school students residing in states with a university adopting racial quotas had higher or lower scores on a proficiency exam. They find that scores were lower, which they argue is evidence of decreased effort due to quotas. Francis and Tannuri-Pianto (2010a) characterize the impact of UnB's policy on the racial composition of students at the university, examine the academic performance of quota students, and estimate the effect of quotas on pre-university effort and black identity. They find that racial quotas raised the proportion of black students at the university. Despite much lower entrance exam scores, students admitted under the quota system had only marginally lower academic performance in college. There was no evidence that the policy had reduced effort in secondary school or college admissions, and if anything, it raised effort. Moreover, they find that quotas increased the likelihood that applicants and students self-identified as *negro*. Also, Francis and Tannuri-Pianto (2010b, 2010c) study racial identity among young adults and the racial wage gap.

The remainder of the paper is organized as follows. Section II provides background information on UnB's affirmative action policy. Section III describes the data and empirical strategy. Section IV presents the results, and Section V concludes.

II. Background and Policy

The University of Brasilia (UnB) established racial quotas in July 2004 making it the first federal university in the country and the only university in the region to do so. The policy was announced on June 6, 2003. According to its architects, some of the major objectives of the policy are to fight racial inequalities, compensate for historical injustices, contribute to the diversity of experiences and perspectives on campus, and raise understanding of what it means to be black in Brazil. 20% of available *vestibular* admissions slots are reserved for students who self-identify as *negro*. Individuals who are selected for admission under the quota system are required to attend an interview with a university panel

that verifies that they are "black enough" to qualify. Moreover, UnB provides to those who matriculate as quota students an array of programs and services that reinforce and foster investments in black identity. For example, these include lectures and events on the value of blacks in society; an academic tutoring program for quota students; and a permanent space on campus for quota students to study, meet, and have cultural activities.

UnB is one of the best public universities in Brazil. Public universities are tuition-free and generally better quality than private universities. It is located in Brasilia, a city of about 3.5 million (metro area) and the capital of Brazil. Most undergraduates are from the state (Distrito Federal). Admission is highly competitive. To be considered for admission, candidates select one course of study (major department) to which to apply and take an institution-specific entrance exam called the *vestibular*. While an individual may select only one course of study per attempt, he or she may attempt to pass the *vestibular* any number of times. Two admission exams are offered annually, one in January and another in July. Non-quota and quota students are selected based on their overall score, and they must also achieve a certain minimum score on each of the subsections. A new cohort of undergraduate students enters every semester (twice a year), and the average size of each cohort is approximately 2,200. Every semester, there are approximately 32,000 candidates for admission.

III. Data and Empirical Strategy

Populations of Interest

There are two populations of interest. The first consists of individuals who registered for the UnB vestibular exam two admissions cycles before (semesters of anticipated matriculation 2-2003 and 1-2004) or three cycles after the implementation of the quota system (semesters of anticipated matriculation 2-2004, 1-2005, and 2-2005). We refer to this population as "applicants." The second consists of individuals who were admitted through the vestibular system and matriculated two admissions cycles before (2-2003 and 1-2004) or three cycles after the implementation of the quota system (2-2004, 1-2005, and 2-2005). We refer to this population as "students." We draw on three principal data sources: university records, a student survey conducted by the authors, and a representative survey of Brazilians.

University Records (QSC)

University admissions records, the primary data source in this paper, were provided to the authors by CESPE, the organization that administers every aspect of admissions and selection at UnB. Records encompass all individuals who registered for the vestibular exam during the five admissions cycles from 2-2003 to 2-2005. Records include individuals who were and were not selected for admission and those who took the exam multiple times. There are almost 150,000 entries altogether with about 90,000 unique individuals. For all who took the exam, we have data on semester of anticipated matriculation, course of study, system of admissions (quota/non-quota), gender, place of residence, exam results including sub-scores and overall score, and selection outcome. Using names and other personal information, we are able to link multiple entries corresponding to the same individual as well as identify groups of siblings. Exploiting phenotypic variation within families, we use siblings to distinguish the effect of race from the effect of family socioeconomic status.

Admissions records also include an optional 18-question survey, which applicants submitted upon registration for the vestibular (thus, prior to taking the exam). This survey, the Socio-Cultural Questionnaire (to which we refer by its Portuguese acronym QSC), asks about marital status, family income, family housing, parents' education, labor market participation, public/private secondary school, place of residence, and several questions regarding preparation for the vestibular. It was not until 2004, one semester before the implementation of quotas, that questions about race were added to the QSC. The item "what is your race/color?" has answer choices: *branco*, *pardo*, *preto*, Asian, Indigenous, and "no answer." Another item asks "do you consider yourself black (*negro*)?"

We also had access to university academic records. These data were provided by DAA (Division of Academic Affairs), the organization that manages course registration, graduation, and student transcripts at UnB. Academic data include grades and number of credits by semester of study for all students who had matriculated during the five semesters from 2-2003 to 2-2005. Grades range from zero to five, where five is the best grade possible, and zero is the worst. With this information, we are able to calculate overall GPA, attrition rates, and other statistics.

PSEU

The University Education Survey (to which we refer by its Portuguese acronym PSEU) is a student survey conducted by the authors. We conducted two types of interviews: face to face with an interviewer and online. Data collection is described in Francis and Tannuri-Pianto (2010a). The total number of observations is 2,846. We were also able to obtain 960 photos of respondents who participated in the face to face interviews. The full version of the PSEU questionnaire entailed approximately 200 questions and covered topics including demography/family background, pre-university education, university admissions, university education, employment, future/expectations, and race.

We were especially careful regarding how and when we asked about race and affirmative action, since we wanted to avoid raising awareness of these concepts before it was necessary and wanted to obscure the true purposes of the survey. For example, the title of the survey was intentionally general, and we never mentioned race or affirmative action in any of our contacts with potential respondents. We only asked respondents about race in the final section of the face to face interview and asked about their opinion of affirmative action on a separate, self-administered form at the conclusion of the interview.

PNAD

The PNAD (*Pesquisa Nacional por Amostra de Domicílio*) is a nationally representative cross-sectional survey of Brazilians conducted annually by the national statistical agency, IBGE (PNAD, 2004). It entails a number of questions on income, employment, education, health, and other areas. So that we may examine the impact of race and socioeconomic status on the likelihood of college attendance in the general population, we construct variables comparable to those in the QSC and PSEU and restrict our analysis to 18-24 year olds living with their mothers in Distrito Federal in 2004.

Empirical Strategy

First, we evaluate the redistributive efficacy of UnB's racial quota policy by comparing displaced and displacing applicants–those who were affected by the policy at the margin (Table 1). Following the implementation of quotas, from 2-2004 to 2-2005, the displaced are those applicants who were not admitted but would have been if the quota system had not existed, while the displacing are those who were admitted but would not have been if the quota system had not existed. Identifying the two groups involves certain assumptions. We assume that the counterfactual removal of the quota system would have not affected who applied or performance on the vestibular. We assume that the number of applicants admitted (by semester and course of study) would have remained identical. In this way, 352 displaced and 352 displacing applicants were identified. Bertrand et al. (2008) make the same assumptions but, unlike this paper, must make an additional assumption about enrollment rates and cannot precisely determine course-specific minimum admissions scores.

We also compare displaced and displacing students (Tables 2 and 3). The displaced are those students who were admitted prior to 2-2004 but would not have been if the quota system had existed, and the displacing are those who were admitted after 2-2004 but would not have been if the quota system had not existed. Thus, the displacing students are participants in the PSEU who were identified as displacing applicants as described above. It is more challenging to identify the displaced, since prior to 2-2004 we do not know exactly who would have applied using the quota system if it had existed, and there were no QSC race questions in 2-2003. For this reason, we assume that displaced students are non-black PSEU

participants with the lowest 10.5% of vestibular scores in each course of study. In 2-2004, displaced non-black applicants accounted for 10.5% of non-black applicants admitted if there were no quotas.

As a purely counterfactual exercise, we compare displaced and displacing applicants under alternative quota policies (Table 8). The displaced are those applicants who would have been admitted only if the alternative quota policy did not exist, while the displacing are those who would have been admitted only if the quota policy did exist. To identify the two groups, we rely on the same assumptions underlying Table 1. We consider two alternative policies. The first is to reserve 50% of admissions slots for applicants who had attended public secondary school. 628 displaced and 628 displacing applicants were identified under quotas for public school. The second policy is to reserve 20% of admissions slots for applicants who had family income equal to or less than R$ 500 (two monthly minimum salaries). According to the PNAD, roughly 20% of young adults in Distrito Federal were living in households with income of R$ 500 or less. 482 displaced and 482 displacing applicants were identified under quotas for low income.

Furthermore, we employ regression techniques to examine the effects of race and socioeconomic status on educational attainment as well as college admission. We regress the outcome variable on the respondent's race, gender, and a number of household-level socioeconomic indicators (Tables 5 and 6). Controls for semester and subject area are included in regressions involving UnB applicants. Thus, for individual i living in household h, $y_{ih} = \beta r_{ih} + \gamma z_h + \theta x_{ih} + \epsilon_{ih}$, where β is the effect of race, r_{ih} is the race indicator, γ are the effects of socioeconomic status, z_h is the vector of socioeconomic indicators, and x_{ih} represents other individual characteristics. Additionally, using pairs of siblings in the QSC data, we implement a first-difference estimator (Table 7). We estimate the following regression for siblings i and j living in household h: $(y_{ih} - y_{jh}) = \beta(r_{ih} - r_{jh}) + \theta(x_{ih} - x_{jh}) + (\epsilon_{ih} - \epsilon_{jh})$. This specification differences out observed and unobserved household-specific variables and exploits within-family variation in race to estimate the effect of race on the dependent variable. For comparison, we also implement a sibling fixed effects estimator. Analogously, Rangel (2007) examines how within-family heterogeneity in skin color among siblings may impact investments in education.

IV. Results and Discussion

The Displaced and the Displacing under Racial Quotas

In this subsection, we closely examine those who are affected by racial quotas at the margin in order to determine the extent to which racial preferences in college admissions might promote racial and socioeconomic diversity. Like many affirmative action policies in higher education, UnB's policy is not only intended to compensate for historical injustices but also to reduce inequalities extending disadvantaged individuals an opportunity to attend college. Table 1 compares displaced and displacing applicants. As explained above, the displaced are applicants who were not admitted but would have been if the quota system had not existed, and the displacing are applicants who were admitted but would not have been if the quota system had not existed. To summarize, the table illustrates that displacing applicants are considerably more black than displaced applicants and are, by many measures, from families with significantly lower socioeconomic status. About 71% and 27% of the displacing are *pardo* and *preto*, respectively, while about 31% and 2% of the displaced are. 95% of the displacing are *negros* compared to 16% of the displaced. The family residence of displacing applicants is more likely to lie in Distrito Federal but outside of Brasilia, while that of displaced applicants is more likely to lie in Brasilia or outside of Distrito Federal altogether. This is indirect evidence that the displacing are more disadvantaged than the displaced, since the average household income of families living in Brasilia is multiple times higher than the average income of families living in Distrito Federal outside of Brasilia (PNAD, 2004). Furthermore, the QSC asks applicants directly about family income and parental education. 39.5% of displacing and 19.1% of displaced applicants had family income equal to or less than R$ 1,500, while 8.6% of displacing and 30.3% of displaced applicants had family income greater than R$

5,000. Differences in parental education paint a similar picture. 25.9% of displacing and 9.8% of displaced applicants had a mother with primary school education, whereas 34.6% of displacing and 58% of displaced applicants had a mother with college education. In addition, displacing applicants are significantly more likely to have attended public secondary school.

Table 2 compares displaced and displacing students at UnB. The displaced are those students who were admitted prior to 2-2004 but would not have been if the quota system had existed, and the displacing are those who were admitted after 2-2004 but would not have been if the quota system had not existed. In short, although the sample size is smaller, this table confirms the previous one that the displacing are both more black and more disadvantaged than the displaced. Approximately 61% and 36% of displacing students are *pardo* and *preto*, respectively, while about 43% and 0% of displaced students are. 69% of the displacing are *negros* compared to 1% of the displaced. That the percentage of displacing students who self-identified as *negro* was less than 100% is notable given that the quota system was specifically intended for *negros*. The distributions of place of family residence and family income are comparable to those in Table 1. As before, the displacing are significantly more likely to live in Distrito Federal outside of Brasilia indicating that they are from poorer households. The sample size for family income is lower than the sample size for the other variables because not all PSEU participants completed the QSC. This may account for why there are fewer significant differences between displaced and displacing students. Nevertheless, a significantly larger proportion of displaced students had a family income greater than R$ 5,000. The table also shows that differences in parental education, a variable derived from the PSEU, do exist. For example, 36% of displacing students had a father with some college or college education compared to about 64% of displaced students. Mirroring the finding in Table 1, displacing students are significantly more likely to have attended public secondary school. Furthermore, the PSEU entails a number of measures of socioeconomic status that are not available in the QSC. For some of the measures, e.g. family has a computer, freezer, or washing machine, there are no significant differences. However, other measures suggest that displacing students have lower socioeconomic status than displaced students. In particular, 82% of the displacing live in a family with a car, while nearly 98% of the displaced do. 55% of displacing students live in a family without a domestic worker compared to only 31% of displaced students.

Table 3 compares displaced and displacing students in terms of admissions alternatives, academic performance in college, and attitude towards different types of quota policies. These measures may shed light on how marginal students would fare if they were or were not admitted by UnB. The PSEU asked respondents to name the alternative universities to which they applied and to say whether they were admitted. 31% of displacing and 42% of displaced students were admitted by an alternative university, although the difference is not significant. Of those who were admitted by an alternative university, displaced students were admitted by higher quality institutions than displacing students. To make this comparison, we used a standard rating of university quality published by the Brazilian Department of Education (INEP, 2009). In fact, 66% of displaced students were admitted by an institution with a quality rating above the median quality rating of alternative universities among all PSEU participants, while only 39% of displacing students were admitted by an institution above median quality. We may also compare the effort and academic performance of marginal students at UnB. There is no significant difference in reported study effort between displaced and displacing students. This is consistent with regression results in Francis and Tannuri-Pianto (2010a) that quota students did not exhibit lower academic effort at UnB. Nevertheless, displacing students are significantly less likely to have a GPA in the top 10% or top 50% (median) in their course of study, which may be partly explained by the fact that they had lower scores on the vestibular. This is consistent with evidence in Francis and Tannuri-Pianto (2010a) that quota students had somewhat lower academic performance than non-quota students even conditional on entrance exam score. Not surprisingly, displacing students were considerably more likely than displaced students to support the policy of racial quotas in higher education. Indeed, 57% of the displacing was supportive compared to 22% of the displaced. Support is much higher for quotas based on public school attendance or family income, and there are no significant differences between displaced and displacing students.

The Role of Race and Socioeconomic Status

In this subsection, we estimate the effects of race and socioeconomic status on educational attainment. Table 4 compares young adults who were college students with those who were not college students (and had never previously enrolled in college). According to the PNAD, about 31% of 18-24 year olds living with their mothers in Distrito Federal were attending a public or private university. Young adults attending college are significantly less likely to be brown, black, or indigenous and have significantly higher socioeconomic status. Roughly 43% of college students and 64% of non-college students are brown, black, or indigenous. Only 3.5% of college students come from families with income less than R$ 750 compared to more than 23% of non-college students. Half of all college students have family income greater than R$ 5,000, while only 8% of non-college young adults have. Differences in other socioeconomic indicators are substantial. 73% of college students have access to the internet at home versus 16% of non-college students. Less than 2% of college students lived in a household that went without food recently compared to almost 23% of non-college students. In Table 5, we regress educational attainment on race, gender, and household-level socioeconomic indicators. The relatively low sample size precludes us from breaking race into detailed subcategories. As column 3 indicates, the marginal effect of race on the likelihood of college attendance is not significantly different from zero holding constant a number of socioeconomic measures. Having high family income and having access to the internet at home considerably raise the likelihood of college attendance. Column 6 indicates that race might influence the likelihood that a young adult completes secondary school, since the coefficient on non-white is negative and significant at the 10% level. However, the coefficients on several of the socioeconomic variables are significant and larger in magnitude. Therefore, regressions involving young men and women living in Distrito Federal imply that socioeconomic status may play a more important role than race in determining educational attainment.

Table 6 examines the determinants of admission to UnB in particular. Admission solely depends on performance on the vestibular exam, so we estimate the effects of race and socioeconomic status on overall vestibular score and subscores (language, social science, and science). All regressions include controls for semester and subject area. Interestingly, without holding socioeconomic status constant, *pardos* have lower vestibular scores than whites, but holding it constant, they have somewhat higher scores. *Pardos* also have significantly higher social science and science subscores controlling for gender, family income, mother's education, and other factors. In contrast, *pretos* have significantly lower scores than whites across the board. The gap in subscores is especially large for language and science. This pattern may explain the results in the previous table. If the effects of being *pardo* and *preto* have opposite signs, then it might appear that race does not matter when *pardo* and *preto* respondents are pooled together. Moreover, applicants who were unwilling to choose one of the standard race categories had significantly higher scores on the vestibular. To clarify, these individuals did not omit the race item; they selected the response "without declaration." The PSEU reveals that about half of respondents with no answer to the QSC race question are white and about half are *pardo*. Gender plays a key role as well. The coefficient on female is negative and significant in every regression. After controlling for socioeconomic status, the marginal effect of being female on vestibular score is larger in magnitude than that of being *preto*. Beyond race and gender, socioeconomic status appears to have a significant impact on vestibular performance. Having family income less than R$ 500 is associated with about 22 points less on the vestibular. Having a mother with incomplete primary schooling is associated with 11 fewer points on the exam, while having attended a public secondary school contributes 6 fewer points. Thus, in summary, the evidence indicates that both race (especially *preto*) and socioeconomic status are significant determinants of admission to UnB.

Nevertheless, unobserved household characteristics might make it difficult to distinguish the causal effects of race and socioeconomic status on college admission. For this reason, we take advantage of the fact that the admissions data include a number of pairs of siblings. Using within-family variation, we identify the relationship between race and vestibular performance. First of all, substantial intra-family

phenotypic heterogeneity exists. According to the QSC, about 23% of pairs of siblings were racially discordant, i.e. one sibling was black and the other was not. According to the PSEU, which minimizes the incentive to misrepresent one's race, about 16% of pairs of siblings were discordant. To estimate the effect, we employ a sibling first-difference estimator. The sample is restricted to pairs of siblings who both applied after the implementation of quotas in order to homogenize the institutional environment that they were facing. 483 sibling pairs remain. We also include controls for quota status so that we avoid picking up the influence of those applicants who "became black" just to apply under the quota system. Table 7 displays the regressions.

The evidence suggests that black racial identity and gender have a significant impact on college admission. In the first-difference regressions, having black racial identity is associated with lower scores on the vestibular as well as on the social science and science subsections. Female applicants have significantly lower scores on the vestibular and on all three subsections. These findings are consistent with several explanations. Darker-skinned applicants may have encountered racial discrimination at various points in their life and, as a consequence, have lower (endogenous) ability. In support of this notion, Rangel (2007) finds that Brazilian parents tend to invest less human capital in darker-skinned children than lighter-skinned children. Another causal explanation is stereotype threat. Even if black applicants have the same distribution of ability as non-black applicants, they simply may not perform as well on the exam because the salience of race itself undermines their confidence or effort. However, there are alternative hypotheses. It is possible that, ceteris paribus, those individuals who tend to perform poorly on exams may be more likely to consider themselves black. It is also possible that some applicants might not apply under the quota system but self-identify as black because they expect to use quotas the next time they apply. But while the phenomenon of racial misrepresentation may exist, the presence of racially discordant siblings in the PSEU, as reported above, confirms that there is at least some degree of real heterogeneity in skin tone and/or racial identity within families.

Alternative Quota Policies

In the final subsection, we evaluate two alternative hypothetical quota policies with respect to the extent to which they might promote racial and socioeconomic diversity in a manner consistent with the objectives of UnB's current affirmative action policy. The first alternative policy is to reserve 50% of admissions slots for applicants who had attended public secondary school. It is widely believed that students who attend public secondary school tend to be more black and more disadvantaged than those who attend private school, so perhaps quotas for public school students would achieve the same ends as quotas for blacks. The second policy is to reserve 20% of admissions slots for applicants who had family income equal to or less than R$ 500. According to the PNAD, roughly 20% of young adults in Distrito Federal were living in households with income of R$ 500 or less. Since low income households tend to be more black, perhaps quotas for students from low income households would achieve the same ends as quotas for blacks.

Table 8 compares displaced and displacing applicants under the policies. The displaced are those applicants who would have been admitted only if the alternative policy did not exist, while the displacing are those who would have been admitted only if the policy existed. For public school quotas, 36.4% of the displaced and 43.8% of the displacing are *pardo*; 3.7% of the displaced and 10.3% of the displacing are *preto*; and 23.6% of the displaced and 38.4% of the displacing are *negro*. For low income quotas, 39.5% of the displaced and 44.4% of the displacing are *pardo*; 6.0% of the displaced and 16.9% of the displacing are *preto*; and 29.8% of the displaced and 48.6% of the displacing are *negro*. Thus, both alternative policies may increase racial diversity, especially in the proportion of students who are *negro*, but racial quotas appear to do so to a much greater extent. Quotas for public secondary school students would raise the socioeconomic diversity of the university in a way comparable to racial quotas. For example, 9.7% of displaced and 35.4% of displacing applicants have family income less than R$ 1,500. About 3.5% of displaced and 26.8% of displacing applicants have a mother with primary schooling or less. Relative to quotas for blacks and public school students, quotas for low income students would substantially raise

socioeconomic diversity. For example, 46.9% of the displaced and 74.3% of the displacing have a family residence in Distrito Federal outside of Brasilia. 12.1% of the displaced and 61.6% of the displacing have a mother with primary schooling or less. 38.5% and 76.6%, respectively, have attended public secondary school. Hence, if more importance is placed on raising socioeconomic diversity than on raising racial diversity, then quotas for low income students may be the preferred policy. If more importance is placed on raising racial diversity, then racial quotas may be preferred. Nevertheless, other considerations are relevant. As Francis and Tannuri-Pianto (2010a) demonstrate, racial quotas might induce significant changes in racial identity, particularly among *pardos*. Quotas for public school students might also have unintended consequences, e.g. some students who would have attended private school may instead decide to attend public school. Likewise, quotas for low income students might be challenging to implement given the large proportion of poorer households that participate in the informal economy.

V. Conclusion

In this paper, we studied the redistributive efficacy of affirmative action exploring the role of race and socioeconomic status in admissions at the University of Brasilia. Focusing on those individuals who were affected by racial quotas at the margin, we evaluated the extent to which the policy may have promoted racial and socioeconomic diversity. We presented evidence that displacing applicants were considerably more black than displaced applicants and were, by many measures, from families with significantly lower socioeconomic status. Moreover, displaced students were admitted by higher quality alternative universities than displacing students. While there was no significant difference in study effort between displaced and displacing students, the former enjoyed better academic outcomes at UnB than the latter. Furthermore, we examined the determinants of college attendance. Using data on young men and women living in Distrito Federal, we found that socioeconomic status might play a more prominent part than race in influencing educational attainment. However, using data on applicants, we found that race and socioeconomic status are both significant determinants of admission to UnB. Indeed, first-difference regressions involving pairs of siblings also indicated that black racial identity has a distinct impact on vestibular performance. Finally, we considered two alternative hypothetical policies. Both alternative policies would raise racial diversity, but racial quotas have done so to an even larger extent. Quotas for public secondary school students would raise socioeconomic diversity to the same degree racial quotas have, while quotas for low income students would raise it even more. Future work may be able to investigate the long-term impact of racial quotas on socioeconomic inequality as well as identify the causal mechanism by which race affects the likelihood of college attendance.

References

Andrade, Eduardo C. 2004. "Quotas in Brazilian Public Universities: Good or Bad Idea?" Revista Brasileira de Economia, 58(4): 453-84.

Arcidiacono, Peter. 2005. "Affirmative Action in Higher Education: How Do Admission and Financial Aid Rules Affect Future Earnings?" Econometrica, 73(5): 1477-152.

Bertrand, Marianne, Rema Hanna, and Sendhil Mullainathan. 2008. "Affirmative Action in Education: Evidence From Engineering College Admissions in India." NBER Working Papers 13926.

Bodenhorn, Howard. 2006. "Colorism, Complexion Homogamy, and Household Wealth: Some Historical Evidence." American Economic Review, 96(2): 256-60.

Bowen, William G. and Derek Bok. 1998. The Shape of the River. Princeton: Princeton University Press.

Cameron, Stephen V. and James J. Heckman. 2001. "The dynamics of educational attainment for black, Hispanic, and white males." Journal of Political Economy, 109(3): 455-499.

Card, David and Alan B. Krueger. 2005. "Would the Elimination of Affirmative Action Affect Highly Qualified Minority Applicants? Evidence from California and Texas." Industrial and Labor Relations Review, 58(3): 416-34.

Cardoso, Claudete Batista. 2008. "Efeitos da política de cotas na Universidade de Brasília: Uma análise do rendimento e da evasão." Masters Thesis, Department of Education, UnB.

Conrad, Cecilia A. and Rhonda V. Sharpe. 1996. "The Impact of the California Civil Rights Initiative (CCRI) on University and Professional School Admissions and the Implications for the California Economy." Review of Black Political Economy, 25(1): 13-59.

Dickson, Lisa M. 2006. "Does Ending Affirmative Action in College Admissions Lower the Percent of Minority Students Applying to College?" Economics of Education Review, 25(1): 109-19.

Eltis, David. 2001. "The Volume and Structure of the Transatlantic Slave Trade: A Reassessment." The William and Mary Quarterly. 58(1): 17-46.

Ferman, Bruno and Juliano Assunção. 2005. "Affirmative action in university admissions and high school students' proficiency." Working Paper, Department of Economics, PUC-Rio.

Francis, Andrew M. and Maria Tannuri-Pianto. 2010a. "Using Brazil's Racial Continuum to Examine the Short-Term Effects of Affirmative Action in Higher Education." Working Paper, Department of Economics, Emory University.

Francis, Andrew M. and Maria Tannuri-Pianto. 2010b. "Endogenous Race in Brazil: Affirmative Action and the Construction of Racial Identity among Young Adults." Working Paper, Department of Economics, Emory University.

Francis, Andrew M. and Maria Tannuri-Pianto. 2010c. "Racial Wage Inequality in Brazil: Preliminary Evidence on Quotas in University Admissions." Working Paper, Department of Economics, Emory University.

Goldsmith, Arthur H., Darrick Hamilton, and William Darity, Jr. 2006. "Shades of Discrimination: Skin Tone and Wages." American Economic Review, 96(2): 242-245.

Goldsmith, Arthur H., Darrick Hamilton, and William Darity, Jr. 2007. "From Dark to Light: Skin Color and Wages among African-Americans." Journal of Human Resources, 42(4): 701-38.

Hersch, Joni. 2006. "Skin-Tone Effects among African Americans: Perceptions and Reality." American Economic Review, 96(2): 251-255.

IBGE (Instituto Brasileiro de Geografia e Estatística). 2009. "Tabela 262 - População residente por cor ou raça, situação e sexo." Pesquisa Nacional por Amostra de Domicílios (PNAD) 2007. Online database.

Kane, Thomas. 1994. "College Entry by Blacks since 1970 - The Role of College Costs, Family Background, and the Returns to Education." Journal of Political Economy, 102(5): 878-911.

Light, Audrey and Wayne Strayer. 2002. "From Bakke to Hopwood: Does Race Affect College Attendance and Completion?" The Review of Economics and Statistics, 84(1): 34-44.

Liu, Jin-Tan, Shin-Yi Chou, Jin-Long Liu. 2006. "Asymmetries in Progression in Higher Education in Taiwan: Parental Education and Income Effects." Economics of Education Review, 25(6): 647-58.

Long, Mark C. 2004a. "College Applications and the Effect of Affirmative Action." Journal of Econometrics, 121(1-2): 319-4.

Long, Mark C. 2004b. "Race and College Admissions: An Alternative to Affirmative Action?" Review of Economics and Statistics, 86(4): 1020-33.

Loury, Linda Datcher and David Garman. 1993. "Affirmative Action in Higher Education." American Economic Review, 83(2): 99-103.

Loury, Linda. 2009. "Am I still too Black for you?: Schooling and secular change in skin tone effects." Economics of Education Review, 28(4): 428-433.

Pallais, Amanda and Sarah Turner. 2006. "Opportunities for Low-Income Students at Top Colleges and Universities: Policy Initiatives and the Distribution of Students." National Tax Journal, 59(2): 357-86.

PDAD (Pesquisa Distrital por Amostra de Domicílios). 2004. SEPLAN/CODEPLAN (Companhia de Desenvolvimento do Planalto Central), Brazil.

PNAD (Pesquisa Nacional por Amostra de Domicílios). 2004. IBGE (Instituto Brasileiro de Geografia e Estatística), Brazil.

Rangel, Marcos. 2007. "Is Parental Love Colorblind? Allocation of Resources within Mixed Families." Harris School of Public Policy Studies, University of Chicago, Working Papers: 0714.

Rivkin, Steven G. 1995. "Black-White Differences in Schooling and Employment." The Journal of Human Resources, 30(Fall): 826-852.

Rothstein, Jesse and Albert H. Yoon. 2008. "Affirmative Action in Law School Admissions: What Do Racial Preferences Do?" NBER Working Paper 14276.

Stanley, Marcus. 2003. "College Education and the Midcentury GI Bills." Quarterly Journal of Economics, 118(2): 671-708.

Telles, Edward. 2004. Race in another America: the significance of skin color in Brazil. Princeton, NJ: Princeton University Press.

Vignoles, Anna F. and Nattavudh Powdthavee. 2009. "The Socioeconomic Gap in University Dropouts. B.E. Journal of Economic Analysis and Policy: Topics in Economic Analysis and Policy, 9(1).

Table 1

Comparing Displaced and Displacing Applicants under UnB's Racial Quota Policy

	Displaced	Displacing	Difference in Means
Race/color			
White (branco)	44.40%	0.30%	**
Brown (pardo)	30.9	70.7	**
Black (preto)	1.9	27	**
Asian (amarelo)	3.1	0.7	*
Indigenous	0.6	0.7	
No answer	19.1	0.7	**
Black racial identity (negro)	15.6	94.7	**
Female gender	40.6	44.6	
Family residence			
Brasilia	52	32.1	**
Distrito Federal, not Brasilia	34.1	59.7	**
Outside of Distrito Federal	13.9	8.2	**
Family income			
Less than R$ 500	3.7	9.2	**
R$ 500-1,500	15.4	30.3	**
R$ 1,500-2,500	10.5	18.1	**
R$ 2,500-5,000	27.2	24.7	
More than R$ 5,000	30.3	8.6	**
Don't know	13	9.2	
Father's education			
Primary school incomplete	9.3	17.1	**
Primary school complete	5	10.5	*
Secondary school complete	30.4	32.9	
College	52.2	35.2	**
Don't know	3.1	4.3	
Mother's education			
Primary school incomplete	4.9	16.7	**
Primary school complete	4.9	9.2	
Secondary school complete	30.3	38.6	*
College	58	34.6	**
Don't know	1.9	1	
Public secondary school attendance	38.9	53.3	**

NOTE. A double asterisk indicates significant difference in proportions at the 5% level, and a single asterisk indicates significance at the 10% level. From 2-2004 to 2-2005, the displaced are those applicants who were not admitted but would have been if the quota system had not existed, while the displacing are those who were admitted but would not have been if the quota system had not existed. 352 displaced and 352 displacing applicants were identified; the total sample size in the table is about 466 due to missing socioeconomic data. Data source: QSC.

Table 2
Comparing Displaced and Displacing Students under UnB's Racial Quota Policy

	Displaced	Displacing	Difference in Means
Race/color			
White (branco)	53.20%	2.60%	**
Brown (pardo)	43	60.5	**
Black (preto)	0	36	**
Asian	0	0	
Indigenous	3.8	0.9	
Black racial identity (negro)	1.2	68.7	**
Female gender	45.7	50.4	
Family residence			
Brasilia	51.9	35.9	**
Distrito Federal, not Brasilia	33.3	62.4	**
Outside of Distrito Federal	14.8	1.7	**
Family income			
Less than R$ 500	3.2	9.7	
R$ 500-1,500	19.4	30.1	
R$ 1,500-2,500	8.1	9.7	
R$ 2,500-5,000	27.4	29.1	
More than R$ 5,000	32.3	12.6	**
Don't know	9.7	8.7	
Raised with both parents	81.3	73.5	
Father's education			
Less than seventh grade	11.3	17.5	
Secondary school incomplete	7.5	7.9	
Secondary school complete	8.8	28.1	**
Some college	12.5	4.4	*
College	51.3	31.6	**
Masters or doctorate	8.8	10.5	
Mother's education			
Less than seventh grade	5	12.9	*
Secondary school incomplete	11.3	12.9	
Secondary school complete	20	21.6	
Some college	10	10.3	
College	46.3	35.3	
Masters or doctorate	7.5	6.9	
Public secondary school attendance	31.3	52.6	**
Family has computer	96.2	90.5	
Family has internet	94.9	86.2	*
Family has car	97.5	81.9	**
Family has refrigerator w/ freezer	69.7	69.6	
Family has washing machine	94.9	92.3	
No domestic workers at home	31.3	54.7	**

NOTE. A double asterisk indicates significant difference in proportions at the 5% level, and a single asterisk indicates significance at the 10% level. The displaced are those students who were admitted prior to 2-2004 but would not have been if the quota system had existed, and the displacing are those who were admitted after 2-2004 but would not have been if the quota system had not existed. The total sample size in the table is about 198. Data source: PSEU.

Table 3

Comparing Displaced and Displacing Students under UnB's Racial Quota Policy

	Displaced	Displacing	Difference in Means
Admissions			
Admitted by alternative university	42.00%	30.80%	
Quality rating of best alternative	286	258	*
Best alternative above median quality	65.60%	38.90%	**
Academic performance at UnB			
Average daily study hours	3.6	3.5	
Low study effort	40.00%	38.90%	
High study effort	45	46	
GPA top 10%	4.7	1	**
GPA above median	45.8	26.4	**
GPA bottom 10%	15	20.6	
Attitude toward types of quota policies			
Support for racial quotas	22.1	57	**
Support for public school quotas	71.4	76.3	
Support for low income quotas	64.1	66.7	

NOTE. A double asterisk indicates significant difference in means at the 5% level, and a single asterisk indicates significance at the 10% level. The displaced are those students who were admitted prior to 2-2004 but would not have been if the quota system had existed, and the displacing are those who were admitted after 2-2004 but would not have been if the quota system had not existed. The total sample size in the table is about 198. Data source: PSEU, QSC (GPA).

Table 4
Comparing College and Non-College Young Adults in Distrito Federal

	College	Non-college	Difference in Means (by Education)
Brown/black/indigenous	43.40%	64.00%	**
Female gender	52.5	47.9	
Low family income (<= R$ 750)	3.5	23.5	**
High family income (> R$ 5000)	50.4	8	**
Family has computer	79.7	24.8	**
Family has internet	73.1	16.1	**
Family has washing machine	87.4	50.8	**
Family has refrigerator w/ freezer	63.3	25.2	**
Family went without food recently	1.8	22.5	**

NOTE. A double asterisk indicates significant difference in proportions at the 5% level, and a single asterisk indicates significance at the 10% level. Sample is restricted to respondents aged 18-28 living with their mothers in Distrito Federal in 2004. "College" refers to respondents who were students in college, and "non-college" refers to respondents who were not students and had never previously enrolled in college. The sample size of college is 286 and that of non-college is 626. Data source: PNAD.

Table 5
Racial and Socioeconomic Determinants of Educational Attainment in Distrito Federal

			Dependent Variable			
	College			Secondary School or More		
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Non-white (brown/black/indigenous)	-0.180	-0.022	-0.040	-0.132	-0.028	-0.065
	(0.031) **	(0.026)	(0.034)	(0.028) **	(0.026)	(0.035) *
Female gender	0.032	0.038	0.039	0.148	0.150	0.150
	(0.030)	(0.024)	(0.024)	(0.028) **	(0.026) **	(0.026) **
Low family income (<= R$ 750)		-0.020	-0.035		-0.114	-0.189
		(0.029)	(0.051)		(0.048) **	(0.075) **
High family income (> R$ 5000)		0.265	0.237		0.068	0.028
		(0.042) **	(0.052) **		(0.026) **	(0.031)
Family has computer		0.069	0.064		0.243	0.238
		(0.050)	(0.050)		(0.042) **	(0.043) **
Family has internet		0.293	0.296		-0.016	-0.016
		(0.058) **	(0.058) **		(0.037)	(0.038)
Family has washing machine		0.061	0.061		-0.009	-0.008
		(0.027) **	(0.027) **		(0.034)	(0.034)
Family has refrigerator w/ freezer		0.086	0.086		0.040	0.040
		(0.031) **	(0.031) **		(0.028)	(0.029)
Family went without food recently		-0.075	-0.074		-0.210	-0.212
		(0.026) **	(0.025) **		(0.051) **	(0.051) **
Low income x non-white			0.022			0.111
			(0.057)			(0.088)
High income x non-white			0.067			0.088
			(0.066)			(0.045) *
N	912	912	902	902	902	902

NOTE. Numbers in parentheses are robust standard errors. A double asterisk indicates significance at the 5% level, and a single asterisk indicates significance at the 10% level. Sample is restricted to respondents aged 18-28 living with their mothers in Distrito Federal in 2004. "College" refers to respondents who were students in college, and "secondary school or more" refers to respondents who had at least completed secondary school. Data source: PNAD.

Table 6
Racial and Socioeconomic Determinants of Admission to UnB

| Variable | Vestibular Score | | | Vestibular Subscores | | | | | |
| | | | | Language | | Social Science | | Science | |
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Race/color									
Brown (pardo)	-5.07	3.23	3.91	-0.330	-0.136	0.306	0.408	0.351	0.318
	(1.53) **	(1.54) **	(1.67) **	(0.146) **	(0.160)	(0.143) **	(0.157) **	(0.138) **	(0.149) **
Black (preto)	-28.36	-14.28	-12.15	-1.369	-1.132	-0.848	-0.643	-1.244	-1.164
	(2.22) **	(2.24) **	(2.45) **	(0.232) **	(0.256) **	(0.220) **	(0.238) **	(0.197) **	(0.217) **
Asian (amarelo)	-9.97	-0.83	-0.28	-0.631	-0.567	-0.850	-0.788	0.688	0.696
	(3.54) **	(3.51)	(3.72)	(0.336) *	(0.357)	(0.323) **	(0.342) **	(0.319) **	(0.337) **
Indigenous	-6.37	-4.19	-4.70	-0.814	-0.914	-0.043	0.068	-0.438	-0.530
	(7.54)	(7.42)	(8.18)	(0.717)	(0.787)	(0.655)	(0.734)	(0.674)	(0.733)
No answer	14.79	17.99	17.21	0.692	0.854	1.579	1.563	1.222	1.094
	(2.35) **	(2.32) **	(2.53) **	(0.226) **	(0.252) **	(0.214) **	(0.237) **	(0.210) **	(0.230) **
Female gender	-19.36	-18.69	-18.76	-0.417	-0.380	-0.685	-0.739	-2.045	-2.039
	(1.43) **	(1.42) **	(1.51) **	(0.135) **	(0.144) **	(0.133) **	(0.141) **	(0.127) **	(0.134) **
Family residence									
DF, not Brasilia		-16.10	-14.50	-1.842	-1.647	-0.787	-0.627	-1.372	-1.288
		(1.61) **	(1.73) **	(0.153) **	(0.165) **	(0.151) **	(0.163) **	(0.144) **	(0.155) **
Outside of DF		-9.32	-6.37	-2.566	-2.327	-0.752	-0.499	-0.408	-0.214
		(2.20) **	(2.33) **	(0.191) **	(0.204) **	(0.196) **	(0.209) **	(0.199) **	(0.212)
Family income									
< R$ 500		-22.83	-22.24	-1.464	-1.650	-1.950	-1.816	-1.559	-1.550
		(2.73) **	(2.99) **	(0.305) **	(0.342) **	(0.279) **	(0.307) **	(0.236) **	(0.259) **
R$ 500-1,500		-16.88	-17.33	-0.735	-0.846	-1.323	-1.346	-1.389	-1.413
		(2.00) **	(2.06) **	(0.201) **	(0.207) **	(0.191) **	(0.197) **	(0.177) **	(0.182) **
R$ 1,500-2,500		-9.20	-9.92	-0.676	-0.738	-0.658	-0.724	-0.797	-0.836
		(2.03) **	(2.05) **	(0.196) **	(0.198) **	(0.190) **	(0.192) **	(0.181) **	(0.183) **
> R$ 5,000		16.56	18.82	2.038	2.368	1.150	1.320	1.119	1.243
		(2.14) **	(2.33) **	(0.184) **	(0.198) **	(0.192) **	(0.209) **	(0.195) **	(0.211) **
Don't know		-0.47	0.00	0.681	0.000	-0.631	0.000	0.189	0.000
		(2.51)	(0.00)	(0.226) **	(0.000)	(0.227) **	(0.000)	(0.225)	(0.000)
Mother's education									
Primary sch incomp		-10.49	-10.70	-0.394	-0.325	-0.320	-0.364	-1.217	-1.234
		(2.01) **	(2.08) **	(0.234) *	(0.241)	(0.205)	(0.213) *	(0.173) **	(0.179) **
Primary sch comp		-7.93	-7.91	-0.373	-0.211	-0.357	-0.393	-0.882	-0.892
		(2.43) **	(2.51) **	(0.264)	(0.274)	(0.243)	(0.254)	(0.211) **	(0.217) **
College		12.60	12.45	1.254	1.211	0.805	0.767	0.968	0.976
		(1.60) **	(1.71) **	(0.149) **	(0.160) **	(0.147) **	(0.157) **	(0.144) **	(0.154) **
Don't know		3.22	3.80	1.140	0.768	0.100	0.439	0.282	0.156
		(6.35)	(8.63)	(0.581) *	(0.816)	(0.601)	(0.867)	(0.549)	(0.713)
Public secondary sch		-6.94	-6.41	-0.191	-0.202	-0.161	-0.087	-0.957	-0.940
		(1.60) **	(1.69) **	(0.159)	(0.169)	(0.152)	(0.162)	(0.143) **	(0.151) **
Low income x negro			-3.97		-0.001		-0.580		-0.083
			(2.79)		(0.326)		(0.291) **		(0.238)
High income x negro			-8.13		-1.154		-0.610		-0.455
			(4.19) *		(0.367) **		(0.369) *		(0.399)
N	24560	24228	21493	24228	21493	24228	21493	24228	21493

NOTE. Numbers in parentheses are robust standard errors. A double asterisk indicates significance at the 5% level, and a single asterisk indicates significance at the 10% level. All regressions also include controls for semester and subject area. Data source: QSC.

Table 7
Racial Determinants of Admission to UnB Using Siblings

Variable (First Difference)	Dependent Variable (First Difference Between Siblings)							
	Vestibular Score		Lang Subscore		SocSci Subscore		Sci Subscore	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Black racial identity	-36.87	-36.39	-1.613	-1.863	-2.671	-3.024	-3.000	-2.447
	(12.85) **	(15.57) **	(1.270)	(1.357)	(1.257) **	(1.432) **	(1.191) **	(1.460) *
Female gender	-32.90	-32.87	-1.655	-1.672	-1.786	-1.810	-2.852	-2.815
	(10.50) **	(10.49) **	(0.919) *	(0.928) *	(0.887) **	(0.886) **	(1.023) **	(1.022) **
Quota status		-0.94		0.491		0.692		-1.084
		(15.71)		(1.548)		(1.460)		(1.494)
N	483	483	483	483	483	483	483	483

NOTE. Numbers in parentheses are robust standard errors. In the bottom panel, standard errors are adjusted for clustering on sibling group. A double asterisk indicates significance at the 5% level, and a single asterisk indicates significance at the 10% level. Sample is restricted to siblings who applied after the implementation of quotas. Data source: QSC.

Table 8
Comparing Displaced and Displacing Applicants under Alternative Quota Policies

	Quotas for Public School		Quotas for Low Income		Difference in Means	
	Displaced	Displacing	Displaced	Displacing		
Race/color						
White (branco)	47.1%	31.1%	39.5%	25.0%	**	**
Brown (pardo)	36.4	43.8	39.5	44.4	**	
Black (preto)	3.7	10.3	6.0	16.9	**	**
Asian (amarelo)	2.7	3.4	3.1	5.3		
Indigenous	0.6	0.6	0.4	0.4		
No answer	9.4	10.9	11.4	8.0		*
Black racial identity (negro)	23.6	38.4	29.8	48.6	**	**
Female gender	46.3	41.1	45.6	44.2	*	
Family residence						
Brasilia	44.4	35.4	39.2	13.1	**	**
Distrito Federal, not Brasilia	35.8	53.0	46.9	74.3	**	**
Outside of Distrito Federal	19.8	11.6	13.9	12.6	**	
Family income						
Less than R$ 500	1.6	7.2	0.0	100.0	**	**
R$ 500-1,500	8.1	28.2	19.7	0.0	**	**
R$ 1,500-2,500	14.3	21.2	19.1	0.0	**	**
R$ 2,500-5,000	27.1	23.1	26.1	0.0		**
More than R$ 5,000	36.6	13.0	23.9	0.0	**	**
Don't know	12.3	7.4	11.2	0.0	**	**
Father's education						
Primary school incomplete	4.3	18.7	8.9	52.3	**	**
Primary school complete	3.0	8.8	5.6	9.5	**	**
Secondary school complete	27.8	32.8	29.7	21.4	*	**
College	63.3	36.1	52.0	9.0	**	**
Don't know	1.6	3.7	3.7	7.8	**	**
Mother's education						
Primary school incomplete	2.1	17.1	7.1	45.0	**	**
Primary school complete	1.4	9.7	5.0	16.6	**	**
Secondary school complete	26.3	38.5	34.6	29.1	**	*
College	69.1	34.0	51.0	8.3	**	**
Don't know	1.1	0.6	2.3	1.0		
Public secondary school	0.0	100.0	38.5	76.6	**	**

NOTE. This table considers an alternative policy reserving 50% of admissions slots for applicants who had attended public secondary school and an alternative policy reserving 20% of admissions slots for applicants who had family income equal to or less than R$ 500. A double asterisk indicates significant difference in proportions at the 5% level, and a single asterisk indicates significance at the 10% level. The first column of asterisks refers to quotas for public school, and the second column refers to quotas for low income. The displaced are those applicants who would have been admitted only if the alternative quota policy did not exist, while the displacing are those who would have been admitted only if the quota policy did exist. 628 displaced and 628 displacing applicants were identified under quotas for public school, and the total sample size is about 1250 due to missing socioeconomic data. 482 displaced and 482 displacing applicants were identified under quotas for low income, and the total sample size is about 954 due to missing socioeconomic data. Data source: QSC.