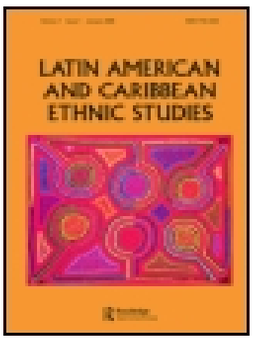

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The impact of race and social economic status on university admission at the University of São Paulo

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ABSTRACT

This paper explores the relationship between race, class, and access to higher education by analyzing the characteristics of students admitted to the University of São Paulo (USP) in Brazil from 2004 to 2008. Employing novel data, the logistic regression results indicate that those accepted at USP are more likely to be white, from affluent families, to have studied in private high schools, to have enrolled in prep courses, and to have a mother who attained higher education. The findings posit that the lack of accessibility for nonwhites and lower income status students to higher education in Brazil, as exemplified by this case study, is an impediment to social mobility. The implications of these findings for future research and policy are discussed.

KEYWORDS

Affirmative action; social class; race; university admissions; University of São Paulo; FUVEST; vestibular admission

Introduction

An incongruity of the Brazilian educational system is the fact that while well-regarded institutions at the primary and secondary levels are in the private sector, at the university level, it is public institutions that are seen as superior. Consequently, admission to public universities is a rigorous, competitive process. Poor students who cannot afford a private high school education perform worse in the *vestibular*[1] than students from private schools. Furthermore, since Afro-descendants have been disproportionately situated at the bottom of the socioeconomic ladder, the majority of nonwhite students are enrolled in public schools. This creates an intergenerational cycle of socioeconomic stagnancy, where social mobility is practically unattainable for poor and nonwhite[2] students with little access to higher education. This theoretical framework, advanced by Hasenbalg (1979), posits cumulative racial disadvantage over the life cycle, which influences socioeconomic position in the labor market, and thus an individual's status during adulthood.

Affirmative action policies have been implemented in Brazilian universities since 2004 with the objective of reducing inequality of access (Johnson and Heringer 2015; Telles 2004). In 2012, the Brazilian government passed into law the Lei das Cotas, or Affirmative Action Law, which prescribes admission quotas based on social and racial indicators for all federal universities. This law was surrounded by an intense public debate on whether affirmative action is appropriate as a mean to promote equitable access to higher

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education in the Brazilian case.[3] Many assumptions have been made for and against affirmative action policies, yet empirical research indicating the actual relationships between class, race, and access to higher education in Brazil is not voluminous.

Most studies on higher education accessibility have focused on the effects of affirmative action policies after its implementation and whether these policies have effectively expanded access of nonwhite students. Francis and Tannuri-Pianto (2012a), for example, analyzed the effect of racial quota at the University of Brasilia (UnB) and found that affirmative action policies significantly raised the proportion of black and dark-skinned students. Golgher, de Lima Amaral, and Coelho Neves (2014) analyzed the performance of quota students after admission to the Federal University of Minas Gerais (UFMG) for the year of 2009 and 2010, and found that affirmative action had the desired effect of including nonwhites and poor students without diminishing educational quality. Valente and Berry (forthcoming) analyzed the performance of quota students at the national level using the Exame Nacional de Desempenho dos Estudantes (ENADE) [4] exam from 2009 to 2012, and found that affirmative action students perform at similar levels of students admitted through traditional methods in public universities. These studies conjecture that affirmative action policies have been an effective mechanism for expanding access of nonwhites and poor youth to universities in Brazil – without compromising the quality of education. However, while valuable insight is provided into the effectiveness of affirmative action policies, these studies fail to analyze the *individual* effects of race and socioeconomic status on the traditional admission process. Such analysis is critical to justify the application and measure the impact of *racial* and *social* quotas in the context of the Brazilian higher education system.

Few studies have focused on the empirical relationship between class, race, and access to higher education in Brazil. Francis and Tannuri-Pianto (2012b), found evidence that race, socioeconomic status, and gender were considerable barriers to college admission to college attendance and achievement at the UnB. Likewise, Guimarães and Sampaio (2013), when examining the Federal University of Pernambuco (UFPE), found that native Brazilians and blacks performed worse than white students in the *vestibular* exam of 2005. They also found that students from higher income families who attended private school performed much better in the exam. Similarly, Griner, Bezerra Sampaio, and Bezerra Sampaio (2015), when examining the Federal University of Rio Grande do North (UFRN) *vestibular* of 2010, found that nonwhite and poor students performed worse, reducing their chances of admission. More recently, Valente (forth-forthcoming) used the Exame Nacional do Ensino Médio (National Secondary Education Exam, or ENEM) to analyze the relationship between race and access to higher education nationwide between 2004 and 2008. The results indicate that race and socioeconomic status are significant predictors of university acceptance in Brazil – nonwhites and students from lower socioeconomic background perform worse on the ENEM and are therefore less likely to be admitted into college.

This paper contributes to the literature by employing *novel data* to quantify the inequitable distribution of access to higher education in the University of São Paulo (USP), the largest and most prestigious Brazilian university. Our analysis provides the actual metrics (odds ratio) of racial discrimination in the university admission process, and captures for the first time the likelihood of being admitted to USP. This study uses a

high-quality dataset in combination with data provided by Fundação Universitária para o Vestibular (FUVEST, or the University Foundation for Vestibular)[5] to analyze whether socioeconomic status and race influence students' chances of being admitted to USP. This case study shows that Hasebalg's theory of cumulative racial disadvantage is valid and applicable in understanding how race and class inequalities impact the advancement of nonwhites in Brazil by impeding their ability to pursue higher education.

This study also advances our comprehension of the economics of educational attainment, particularly as it relates to race and socioeconomic status in Brazil – most studies do not provide empirical evidence for racial disparities in university admission, employing only descriptive statistics or theoretical frameworks (see Guimarães 2007; Hasenbalg and Valle Silva 2013; Osório 2009; Queiroz 2003). The probability distributions predicted by the models presented in this study indicate a significant racial disparity for acceptance at USP, providing support for an argument in favor of racial affirmative action and corroborating Hasebalg's theory of racial disadvantage among nonwhites in Brazil.

This paper is organized as follows. Section 2 briefly explores the inequality in educational opportunity in Brazil and the *vestibular* exam. Section 3 focuses on the proposed case study, discussing the dataset, key hypotheses, model, and variables description. Section 4 presents the logistics and analyzes the results for each year, and Section 5 provides a discussion of these results. Section 6 addresses the limitations of our study, and Section 7 draws together the main conclusions and presents implications for future research.

Race and education in Brazil

Educational opportunity in Brazil

Institutions created during Brazil's Iberian colonization gave rise to a style of governance in which only few European descendants had power and wealth while Afro-descendants, despite being the majority, were exploited by the elite through slavery (Stohl and Lopez 1984).[6] Despite rhetoric of inclusion (Freyre 1933; Pierson 1945), racial discrimination has persisted and race has been consistently used to exclude nonwhites throughout Brazil's history from social, economic, and political positions (Bastide and Fernandes 1959; Cardoso and Ianni 1960; Costa Pinto 1952; Nascimento 1989; Nogueira 1985; Telles 1992, 2004). This phenomenon is observed in the educational system, which is not equally accessible to all racial groups; the per centage of whites, blacks, and browns in private high schools is respectively 56.58 per cent, 5.63 per cent, and 32 per cent. Conversely, in public high school, the observed distribution is 34 per cent for whites, 13.6 per cent for blacks, and 45 per cent for browns (Guimarães and Sampaio 2007). Similarly, when analyzing institutions of higher education, one finds that, although nonwhites make up 50.7 per cent of the Brazilian population, they represent fewer than 35.8 per cent of the students attending Brazilian universities (IBGE 2010).

This disparity is accentuated when looking at individual universities. For example, even though nonwhites represent 44.3 per cent of the population in Rio the Janeiro, they correspond to a mere 20 per cent of students enrolled at the Federal University of Rio de Janeiro. (IBGE 2000; Telles 2004) Comparably, in the state of Bahia, where 75 per cent of the population is nonwhite, there are only 42.6 per cent nonwhite students at

the Federal University of Bahia (IBGE 2000; Vogt 2003). A greater discrepancy can be observed in the state of São Paulo, where nonwhites represent 34.3 per cent of the population, yet only 8.3 per cent of students at USP are nonwhites (USP 2002).

Nonwhite students have historically had educational disadvantages partly due to their inability to pay for costly private education and to the dreadful conditions of the free education offered in public primary and secondary schools.[7] The overall academic performance of students in public schools is much inferior compared to students in private schools due to many flaws, including lack of infrastructure, lack of good and qualified teachers, lack of funding, and a feeble curriculum (Akkari 2001; Guimarães and Sampaio 2007). Since private education is extremely expensive in Brazil, the simple fact of pursuing a private school education is a direct indication of one's higher economic status, which is also positively related to the level of their parents' education. The family income of a student at a private school is on average three times the family income of a student in a public school, and parents of children in a private school have on average 4 or more years of education than the parents of children in a public school (Guimarães and Sampaio 2007; de Castro 1997).

These factors result in a favorable environment for the intellectual development of higher status students, who have much greater chances of being admitted to *free*, public universities (de Castro 1997). On the other hand, the inadequate provision of public primary and secondary education hampers the ability of poor and nonwhite populations to compete for places in public universities, and therefore gain the benefits of a university education (Beltrão and Novellino 2002; Cunha 1986; Cury 1989; Guimarães and Sampaio 2007, 2009; Saviani 2011; Telles 2004). In addition, the lack of financial resources to afford private college education and the fierce competition of the *vestibular* exam in public universities make access to higher education unreachable to most nonwhite students (Carvalho 2005; Feres and Zoninsein 2006, 2008; Guimarães 2003; Telles 2004; Paixão 2011).

Race and higher education in Brazil: the vestibular

University access in Brazil is a competitive process. Public universities are not only free, but are also the most prestigious universities in the country. It is estimated by the Ministry of Education that 5,181,699 students struggled to get access to one of the 2,629,598 available university slots in 2006 (INEP 2008). For some majors, such as Medicine, Engineering, and Law, the ratio of students to available places can be as high as 20 or more in public universities (Carvalho and Magnac 2010). Different from other countries, such as the United States, which uses multiple criteria for admission, Brazil until very recently only used an objective-grading exam called the *vestibular*.[8]

The *vestibular* has the following general features. Students must choose a single undergraduate major before taking the test and will compete against students who made the same choice (Carvalho and Magnac 2010). The exam comprises of many subexams, each one evaluating knowledge in a specific subject, for example, Mathematics, Physics, Chemistry, Biology, Portuguese, History, Geography, and a Foreign Language (Carvalho and Magnac 2010). In general, the *vestibular* consists of two stages. The first stage is common to all majors and the second stage is more specific to each major. The different departments within the university that provides the

undergraduate major courses can weigh the subexams differently in order to reflect their priorities. All candidates must pay a fee before taking the *vestibular*, which varies depending on the university. Some universities waive this fee for students based on financial needs. Once the students take the exam, the various departments rank all their applicants by grade and reject those exceeding the number of seats for each major (Carvalho and Magnac 2010). Generally, students can have up to three choices of major. If they are not accepted into their primary choice, they can be considered for their other secondary choices, if the *vestibular* grade makes the cut for those majors.

The *vestibular* is not equally fair to all students. Cavalcanti, Guimarães, and Sampaio (2010) quantified the difference in performance of public and private school students in the *vestibular* of a major public university in Pernambuco, Brazil. They established that the Brazilian higher education system is an important channel for the persistence of inequality, and that going to a private high school versus a public high school matters tremendously when taking the *vestibular*. This creates a cruel paradox because given the highly competitive nature of the *vestibular*, it is hard to enter a public university and receive a free college education without having previously received a private high school education (McCowan 2007). Thus, access to high-quality, free higher education is limited to the higher socioeconomic groups, resulting in great racial inequity, with low representation of African Brazilians and indigenous peoples (INEP 2003; McCowan 2007; Paixão 2011). A study by Tomelin (2002) analyzed the opportunities for higher education in Brazil from the colonial period to 2000 and found that there is a long-lasting limitation on access to higher education for segments of the Brazilian society on the basis of race and social class. Other researchers have argued that education is one of the foundations of the economic and social development of a society because it results in the growth of the individual's economic and social status in the society, and the economic growth of the country as a whole (de Castro 1997; Castro and Guimarães 1993; Guimarães and Sampaio 2009; Paixão 2011; Telles 2004). This is the reason why it is important to understand whether the admission process is a fair tool for admission used by universities, or if it is an impediment to social mobility in Brazil. Our work builds upon these studies by testing the relationship of both race and socioeconomic status to the admission process. It seeks to provide insights to the following questions: are nonwhite students not admitted to college because of their socioeconomic status and lack of access to private high school, or does race also play a role in the admission process? How much of these inequalities are associated with race and not only socioeconomic status? Are affirmative actions based on race and socioeconomic status justifiable?

According to Hasenbalg's (1979) theory of cumulative racial disadvantage over the life cycle, race is an additional factor to class when analyzing inequality in Brazil and access to education plays a central and vital role in this process. Nonwhite children have higher odds of being born poor and are more likely to suffer poverty than white children. In addition, their odds of attending school are smaller than that of white children, and when they do, they attend public schools, which are not as good as the private ones. As a result, they are less likely to pass the *vestibular* and attend university (Paixão 2011; Telles 2004). Accordingly, their low educational achievement will lead to lower pay and depleted jobs, mainly in the informal sector. When a new cohort of nonwhites gets to the labor market, the differences between their educational standards and that of whites in the same cohort is so severe that is impossible for them to

compete and move up the socioeconomic ladder. This cycle perpetuates for future generations as educational opportunity is stratified by race and social class.

Given this theoretical framework, two hypotheses are proposed:

(1) Student's admission to university, or 'passing the *vestibular*,' will be predicted by the student's socioeconomic status and by the student's race.
(2) Students from low-income households, and nonwhite students, are less likely to be admitted to university in comparison with high income, white students.

Exame Nacional do Ensino Médio

The Exame National do Ensino Médio (ENEM) is a nationwide exam given yearly to graduating seniors and high school graduate students in Brazil to assess the quality of precollege education. The exam was created in 1998 by the Instituto Nacional de Estudos e Pesquisas Educacionais (National Institute of Studies and Educational Research, or INEP). It is divided into two parts: an *objective* part with 63 multiple choice questions, and an *essay* part. Since 1999, many universities have used the ENEM as a complement to the *vestibular*.[9] In 2009, the Ministry of Education proposed the Sistema de Seleção Unificada (SISU), which is a system that selects candidates to Federal Universities and Federal Institutes based on their ENEM score, thus abolishing the *vestibular*.[10] Since then, 101 institutions of higher education have adopted the ENEM exam instead of the *vestibular* for their admission processes[11] (Brazilian Ministry of Education 2011). Currently, about 8 million students take the ENEM exam every year.

Method

Data

In order to test these hypotheses, the admission process at USP was analyzed. USP's *vestibular* is prepared and administered by a federal agency called FUVEST, which also gives a socioeconomic questionnaire to all applicants of the *vestibular*.[12] The only data publicly available are the summary statistics for each major. After contacting FUVEST, we obtained the mean ENEM score and standard deviation for the *objective* part of the ENEM exam for each admitted class at USP during the years of 2004–2008 by major.[13] Since the ENEM socioeconomic questionnaire[14] is available online and contains the characteristics for all students who took the ENEM exam during 2004–2008, dummy variables (based on the average objective ENEM score of admitted students) were created to indicate whether the respondents would have the same ENEM score of admitted USP students on average. The maximum score on the objective part of the ENEM exam was 63 for all years analyzed.

INEP provides online microdata using each student taking the ENEM exam as unit of analysis. The dataset of students who took the ENEM does not indicate whether a student actually applied to the *vestibular* at USP. Thus, the data were filtered to include only students in the state of São Paulo in order to increase the likelihood that the observed data would overlap students who actually took the USP *vestibular*. An

important law of geography states that, 'everything is related to everything else, but near things are more related than distant things' (Tobler 1970). Although it might reduce statistical significance due to a decrease in the number of students, it is well known in the literature that the quality of education, both in public and private high schools in São Paulo, is superior to that in all other states, as is the case for other variables, such as standard of living and income. In addition, the majority of students who apply to USP are from the state of São Paulo. Hence, it is fitting to consider just the students from this state in this analysis.

Instead of looking at majors exhaustively[15] for each year, we analyzed the major with the highest average ENEM score and the major with the lowest average ENEM score. Thus, two dummy variables were created in the main dataset to indicate threshold for acceptance at USP in these two categories. The data were filtered to include only students who answered all questions relevant to the study. Each year was analyzed individually and logistic regression models were used. Table 1 provides a summary and a description of variables used in the analysis. Table 2 presents a small subset of majors at USP, including the most and least competitive ones, with their respective average ENEM scores and standard deviations. Throughout the analyzed period, the highest ENEM scores were observed in the Medicine major, and the lowest, in the Natural Sciences[16] (2006–2008) and Fonoaudiology[17] (2004–2005) majors.

Explanatory variables

Race

Dummy variables for race (i.e., *black, brown, indigenous*, and *Asian)* were created to analyze the effects of each particular race, using *white* as the reference category. In order to better describe these racial categories, it is important to provide a brief context of

Table 1. Student-level variables.

Variable	Definition and source
Race	
White	1 (yes); 0 (no) – (reference category)
Black	1 (yes); 0 (no)
Brown	1 (yes); 0 (no)
Asian	1 (yes); 0 (no)
Indigenous	1 (yes); 0 (no)
Female	1 (female); 0 (male)
Age	Student's age
Family income	All wages by monthly minimum wage: 0 (low) to 7 (high)
Public school	Type of high school attended: 1 (public); 0 (private)
Prep course	Attended *cursinho* for the *vestibular*? 1 (yes); 0 (no)
Mother education	
Less than high school	1 (yes); 0 (otherwise) – (reference category)
High school graduate	1 (yes); 0 (otherwise)
Some college	1 (yes); 0 (otherwise)
Bachelor degree	1 (yes); 0 (otherwise)
Unknown	1 (yes); 0 (otherwise)
Escore	ENEM score: min 0, max 63
ENEM score thresholds	
Pmed	Meets threshold for acceptance in Medical School at USP
Pnsci	Meets threshold for acceptance in Natural Sciences at USP
Pfono	Meets threshold for acceptance in Fonoaudiology at USP

Source: Instituto Nacional de Estudos e Pequisas and FUVEST.

Table 2. ENEM Scores for students accepted at USP, 2008–2004.

	2008		2007		2006		2005		2004	
Major*	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Medicine	60.05	1.95	56.63	2.26	58.51	2.07	59.65	1.92	59.01	2.12
Engineering (POLI)	58.40	2.60	53.88	3.24	56.00	2.89	57.88	2.71	57.11	3.12
Law	58.97	2.27	54.00	3.13	56.20	3.05	58.24	2.56	57.59	2.92
Social Science	55.93	3.32	50.05	4.79	53.34	3.82	55.33	3.42	54.63	4.62
Dentistry	54.33	4.39	48.08	4.50	51.02	3.81	53.54	3.33	52.28	4.21
Physical Education	54.98	3.02	45.76	4.32	51.12	3.85	53.14	3.22	53.26	3.60
Literature Studies	52.70	4.63	44.31	5.68	47.64	5.15	50.97	4.82	50.81	5.16
Arts and Technology	51.10	3.57	42.83	5.24	46.37	4.86	50.46	5.00	na	na
Natural Sciences	45.83	7.14	33.87	7.04	40.45	5.61	38.31	8.05	na	na

* There were a total of 107 majors in 2008, 105 majors in 2007, 101 majors in 2006, 98 in 2005, and 86 in 2004.

race classification in Brazil. One of the most unique distinctions of Brazilian race relations in comparison with other interracial systems is the plethora of racial terms,[18] and the abstract and referential ambiguity surrounding their usage (Harris 1964). In the United States, for example, race identity is defined by descent, while in Brazil it is a much complicated concept that involves mostly physical appearance (hair texture, shape of lips, and nose) and skin color or pigmentation, but can also be subjected by class criteria (education and wealth). Since race is not purely defined on biological grounds, it is open to interpretation (Skidmore and Smith 1997). This concept of Brazilian race allows for multiple interpretations of certain characteristics that complicate the distinguishing of those on the border of whiteness and brownness (Reiter and Mitchell 2010). For example, to be black in Brazil one has to be at the dark end of the color spectrum, while partially black in ethnic origin means being black in the United States. Thus, many *mulatos* (mixed of black and white) escape negative stigmatization through 'passing' as white (Marcus 2012; Skidmore 1993; Telles 1992). As Telles wrote, 'persons identifying as white or black often are not "racially pure" but are "relatively white or relatively black," and there is a tendency for persons on the border of a color category to "pass" into the lighter category' (Telles 1992, 187). Passing allows for further economic and social mobility in light of the *mulato*'s physical approximation to 'looking white.' Many scholars have argued that the social and economic position of black and *mulatos* in Brazilian society is not the same (Daniel 2006; Marx 1998; Nogueira 2006). Holding an intermediary position between whites and blacks, some argue that *pardos* face less prejudice and have advantages over blacks both socially and economically in Brazil (Daniel 2006; Degler [1971] 1986; Nogueira 2006; Wade 1997). Nevertheless, a significant and growing number of social scientists, such as Carvalho (2005), Guimarães (1997, 1998, 1999, 2002, 2003, 2002), Paixão (2003, 2006), Santos and Silva (2005), Silvério (2003, 2002) and many others, claim that both groups suffer from similar discrimination and prejudice in Brazil, and that the *mulato* does not have a privilege status over blacks, as previously argued by Degler ([1971] 1986) and others.

Therefore, in this study, the same racial categories employed by FUVEST are used, despite the fact that other studies have merged students who self-identify as blacks (*negros*) and browns (*pardos or mulatos*)[19] under one category.[20] Thus, both black, brown, as well as indigenous people and Asians (yellow) are included as different race categories. Although indigenous and Asian groups are very small in Brazil, we can anticipate that indigenous students suffer the same or worse disadvantage as black

and brown students. On the other hand, Asians-descendant students likely have an advantage over the other racial groups, as they tend to be from socioeconomically privileged families. It is important to note that due to the complex racial system in Brazil, a claim for blackness must be accepted, as there is no rule about who is black (Telles 2004). Thus, in this study, we accept the students' race claim.

Type of school and cursinho cursinho pré vestibular

Given the great racial disparity among students from public and private schools, we control for type of school (de Castro 1997). In addition, wealthier students are able to afford preparatory courses that are specifically designed to prepare students to take the *vestibular* exam. These prep courses, *curso pré-vestibular*, or just *cursinho*, can be very expensive albeit some might be provided to disadvantaged students by volunteers for free.[21] In either case, having access to prep courses greatly increases the chances of passing the *vestibular* in a public university. Therefore, we also control for attendance in prep courses.

Other personal and family background characteristics

Other explanatory variables include gender, age, mother's educational level, and family income (both measurements of socioeconomic status). Mother's education contains dummy variables for each educational level, which has 'less than high school' as its reference category. Whenever mother's education was listed as unknown, a dummy variable was created for the missing data.

In Brazil, household income is reported monthly and is set by monthly minimum wage: one monthly minimum wage was equivalent to R$260 in 2004, R$300 in 2005, R $350 in 2006, R$380 in 2007, and R$415 in 2008 (Guia Trabalhista 2014). Thus, instead of using a nominal value, the logit analyses use the categories set by the ENEM questionnaire as following: no income; less than one minimum wage; between one and two minimum wages; between two and five minimum wages; between five and 10 minimum wages; between 10 and 30 minimum wages; between 30 and 50 minimum wages; and more than 50 minimum wages. As a result, we can comparatively analyze income for each year.

Results of logistic analyses

The logistic results are presented in Tables 3 and 4. The coefficients in these models are odds ratios, where a value greater than one indicates a positive relationship and a value less than one points to a negative relationship. For each year, the odds ratios indicate which characteristics have the most influence for being accepted into USP at the highest and lowest ENEM threshold criteria. The odds ratios for a unit increase of each covariate of the response variable in all models (per cent change in odds) are included to ease the interpretation of the logit results.

The results in Table 3 indicate that most interactions are significant for black and brown students, revealing that nonwhite students are less likely to be accepted into the highest ENEM threshold criteria (Medicine) than white students for each year analyzed. The odds ratio for a unit increase of the response variable in model H1 indicates that the odds of being accepted into Medicine are 36 per cent less for black students and 90 per

Table 3. Logit regression outputs (odds ratio and percent change in odds) – highest criteria.

	H1		*H2*		*H3*		*H4*		*H5*	
	Year 2008		*Year 2007*		*Year 2006*		*Year 2005*		*Year 2004*	
Variables	*pmed*	*%*	*pmed*	*%*	*pmed*	*%*	*pmed*	*%*	*pmed*	*%*
Race										
Black	0.640*	−36.0	0.655***	−34.5	0.510*	−49.0	0.839	−16.1	0.652***	−34.8
Brown	0.100*	−90.0	0.461***	−53.9					0.229***	−77.1
Indigenous	1.250	25.0	0.973	−2.7			1.047	4.7	0.508	−49.2
Asian	1.841***	84.1	1.469***	46.9	2.092***	109.2	1.849***	84.9	1.603***	60.3
Female	0.369***	−63.1	0.428***	−57.2	0.251***	−74.9	0.320***	−68.0	0.311***	−68.9
Age	1.235***	23.5	0.883***	−11.7	0.995	−0.5	0.947	−5.3	0.962	−3.8
Public school	0.144***	−85.6	0.192***	−80.8	0.0408***	−95.9	0.057***	−94.3	0.133***	−86.7
Prep course	1.791***	79.1	2.079***	107.9	1.418*	41.8	2.003***	100.3	2.214***	121.4
Income	1.656***	65.6	1.522***	52.2	1.588***	58.8	1.580***	58.0	1.459***	45.9
Mother education										
High school	0.649*	−35.1	1.121***	12.1	0.774	−22.6	0.645**	−35.5	0.966	−3.4
Some college	0.868	−13.2	1.315***	31.5	1.085	8.5	1.321	32.1	1.524***	52.4
Bachelor's	1.348*	34.8	1.619***	61.9	1.570**	57.0	1.506***	50.6	1.663***	66.3
Unknown	0.194	−80.6	0.516***	−48.9	0.956	−4.4			0.392***	−60.8
N	300,870		256,684		282,653		247,329		252,142	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 4. Logit regression outputs (odds ratio and percent change in odds) – lowest criteria.

	L1		*L2*		*L3*		*L4*		*L5*	
	Year 2008		*Year 2007*		*Year 2006*		*Year 2005*		*Year 2004*	
Variables	*pnsci*	*%*	*pnsci*	*%*	*pnsci*	*%*	*pfono*	*%*	*pfono*	*%*
Race										
Black	0.658***	−34.2	0.720***	−28.0	0.698***	−30.2	0.745***	−25.5	0.725***	−27.5
Brown	0.518***	−48.2	0.648***	−35.2	0.505***	−49.5	0.662***	−33.8	0.492***	−50.8
Indigenous	0.422***	−57.8	0.520***	−48.0	0.549***	−45.1	0.587***	−41.3	0.666***	−33.4
Asian	1.460***	46.0	0.876***	−12.4	1.419***	41.9	1.015	1.5	1.266***	26.6
Female	0.535***	−46.5	0.751***	−24.9	0.421***	−57.9	0.684***	−31.6	0.438***	−56.2
Age	0.967***	−3.3	0.928***	−7.2	0.832***	−16.8	0.863***	−13.7	0.844***	−15.6
Public school	0.258***	−74.2	0.197***	−80.3	0.198***	−80.2	0.215***	−78.5	0.218***	−78.2
Prep course	2.348***	134.8	1.342***	34.2	2.052***	105.2	1.479***	47.9	2.003***	100.3
Income	1.526***	52.6	1.406***	40.6	1.460***	46.0	1.350***	35.0	1.377***	37.7
Mother education										
High School	1.313***	31.3	1.430***	43.0	1.365***	36.5	1.487***	48.7	1.384***	38.4
Some college	1.684***	68.4	1.737***	73.7	1.661***	66.1	1.987***	98.7	1.722***	72.2
Bachelor's	1.797***	79.7	1.716***	71.6	1.886***	88.6	2.061***	106.1	1.980***	98.0
Unknown	0.725***	−27.5	0.711***	−28.9	0.618***	−38.2	0.621***	−37.9	0.641***	−35.9
N	300,870		256,684		282,653		271,183		252,142	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

cent less for brown students than for white students, *ceteris paribus*. The term '*ceteris paribus*' implies that when holding all other students' characteristics such as socioeconomic status constant, black and brown students have a significantly lower chance of being admitted than a white student, meaning that these students are identical in relation to all other variables, with the exception of race. The same relationship is observed for each year analyzed. For the years of 2005 and 2006, no brown student met the threshold for acceptance in Medicine, thus these variables were omitted from the analysis. In 2006, we observe the same phenomenon among indigenous students.

Measures of socioeconomic status displayed by students' income, mother education, and attendance of public school influenced the chances of admission as well. The odds of being accepted are reduced by 85.6 per cent for students from public schools in model *H1*. Likewise, the higher the income, the higher the odds of acceptance, and having a mother with a bachelor's degree significantly increases the odds of acceptance. These indicators are significant throughout all years analyzed.

When analyzing the model results in Table 4 for the lowest ENEM threshold criteria, all interactions are significant for black and brown students, and even though the threshold was much lower, the results show that nonwhite students are less likely to be admitted into the lowest criteria than white students for every year. Holding constant socioeconomic status, gender, and age, black and brown students have significantly lower odds of being admitted than white students. Model *L1* shows that the odds of being accepted are 34.2 per cent less for black students than for white students and 48.2 per cent less for brown students than for white students.

Likewise, socioeconomic status plays a significant role. For every single year, the higher mother's education, the higher the odds of being accepted. Similarly, the higher one's income, the higher the odds of acceptance, whereas studying in a public high school significantly decreases the odds of acceptance for every single year. One interesting finding is that the Asian racial category is negative for Natural Science in 2007 and not significant in 2005. This is in sharp contrast to the highly significant effect in the highest criteria major shown in Table 3. A possible reason could be due to the fact that a greater number of students were able to meet the threshold in 2007, in comparison to other racial groups, since the threshold was much lower in comparison to other years. Another possible explanation is that Asian students who are high performers concentrate in the most prestigious majors such as Medicine and Engineering, while the weakest students of this same group tend to aim for less prestigious majors with less competition. Future research is needed to better understand this finding.

Figures 1 and 2 show the modeled probability of being accepted for the highest and lowest criteria, respectively, against race for the students in the two models across the 5 years period analyzed in this study, *ceteris paribus* (i.e., subject to controls). They illustrate the continuities in the admission process, which vary monotonically across race and show a great and constant disparity between racial groups. The relationship is not necessarily causal[22] but there is other evidence that bears on causality. When comparing the racial distribution of the actual students admitted to USP, the results are comparable to the logistic models. The racial differentials found in this study are analogous to the actual racial distribution of students admitted to USP between 2004 and 2008, as indicated in Tables 5 and 6. Black and brown students are admitted at a much lower per centage than white students. Likewise, the proportion of students

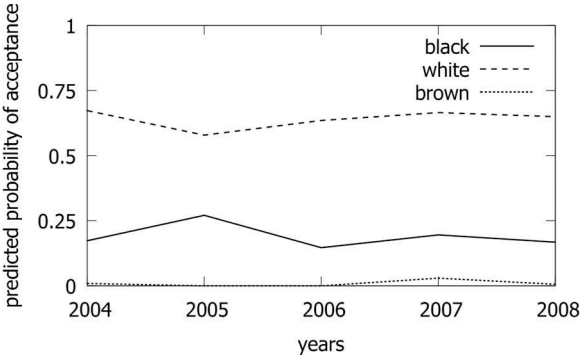

Figure 1. Predicted probability of acceptance in highest criteria by race.

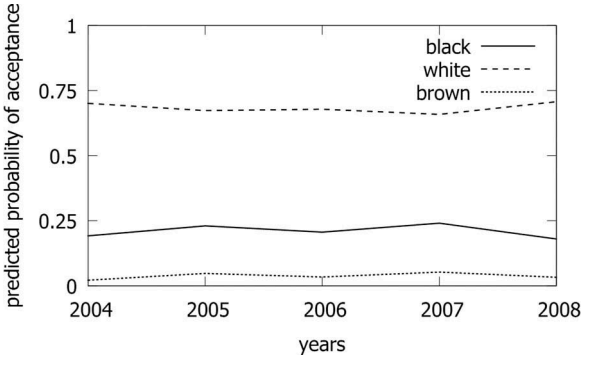

Figure 2. Predicted probability of acceptance in lowest criteria by race.

Table 5. All majors acceptance by race at USP, 2008–2004.

Race	2008	2007	2006	2005	2004
White	8683 (77.7%)	8743 (77.2%)	8866 (77.4%)	8565 (77.1%)	8064 (79.8%)
Black	220 (2.0%)	217 (1.9%)	180 (1.6%)	175 (1.6%)	162 (1.6%)
Brown	1219 (10.9%)	1193 (10.5%)	1154 (10.1%)	1162 (10.5%)	864 (8.5%)
Indigenous	26 (0.2%)	42 (0.4%)	40 (0.3%)	37 (0.3%)	27 (0.3%)
Asian	1024 (9.2%)	1137 (10%)	1209 (10.6%)	1176 (10.6%)	993 (9.8%)
Total	11,172*	11,332*	11,449*	11,115*	10,110*

*The response rate for this question was roughly 99.0% for all years.
Source: [Fuvest Questionário de Avaliação Sócio-Econômica- Candidatos Matrículados após a última chamada pela carreira em que se inscreveu, Total das Carreiras – Questão 16: Entre as alternativas abaixo, qual é a sua cor? 2004–2008].

admitted at USP by type of high school attended is comparable to the findings of this study, as indicated in Tables 7 and 8.

Discussion

The effects of race on admission

The primary conclusion drawn from the analyses is that race and socioeconomic indicators pose a substantial barrier to admission at USP. Of particular significance is the role that race plays *independently* of socioeconomic status and other variables. The logistic

Table 6. Medicine acceptance by race at USP, 2008–2004.

Race	2008	2007	2006	2005	2004
White	276 (76.2%)	281 (78.3%)	289 (77.1%)	285 (75.8%)	292 (78.3%)
Black	1 (0.3%)	5 (1.4%)	1 (0.3%)	2 (0.5%)	0 (0%)
Brown	19 (5.2%)	23 (6.4%)	23 (6.1%)	27 (7.2%)	24 (6.4%)
Indigenous	2 (0.6%)	1 (0.3%)	2 (0.5%)	1 (0.3%)	0 (0%)
Asian	64 (17.7%)	49 (13.6%)	60 (16.0%)	61 (16.2%)	57 (15.3%)
Total	362*	359*	375*	376*	373*

*This represents roughly 99% of students accepted into this major

Source: [Fuvest Questionário de Avaliação Sócio-Econômica – Candidatos Matrículados após a última chamada pela carreira em que se inscreveu, Total das Carreiras – Questão 16: Entre as alternativas abaixo, qual é a sua cor? 2004–2008].

Table 7. All majors acceptance by type of school at USP, 2008–2004.

Type of school	2008	2007	2006	2005	2004
Private	7823 (69.7%)	8029 (70.6%)	8313 (72.2%)	7878 (70.6%)	7261 (71.6%)
Public	2757 (24.6%)	2806 (24.7%)	2559 (22.2%)	2687 (24.1%)	2297 (22.6%)
Abroad	64 (0.6%)	23 (0.2%)	16 (0.1%)	18 (0.2%)	21 (0.2%)
Mostly private	340 (3.0%)	291 (2.6%)	304 (2.6%)	276 (2.5%)	301 (3.0%)
Mostly public	194 (1.7%)	172 (1.5%)	216 (1.9%)	201 (1.8%)	179 (1.8%)
Other	46 (0.4%)	56 (0.5%)	111 (1.0%)	100 (0.9%)	87 (0.9%)
Total	11224*	11377*	11519*	11160*	10146*

*The response rate for this question was 99.0% for all years.

Source: [Fuvest Questionário de Avaliação Sócio-Econômica- Candidatos Chamados para Primeira Matrícula pela carreira em que se inscreveu, Total das Carreiras – Questão 7: Onde você realizou seus estudos de ensino médio? 2004–2008].

Table 8. Medicine acceptance by type of school at USP, 2008–2004.

Type of school	2008	2007	2006	2005	2004
Private	325 (88.8%)	316 (86.8%)	340 (90.9%)	355 (93.9%)	346 (92.5%)
Public	22 (6.0%)	42 (11.5%)	18 (4.8%)	17 (4.5%)	18 (4.8%)
Abroad	1 (0.3%)	0 (0%)	1 (0.3%)	0 (0%)	0 (0%)
Mostly private	15 (4.1%)	4 (1.1%)	11 (2.9%)	3 (0.8%)	7 (1.9%)
Mostly public	3 (0.8%)	2 (0.5%)	4 (1.1%)	3 (0.8%)	2 (0.5%)
Other	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (0.3%)
Total	366*	364*	374*	378*	374*

*This represents roughly 99.5% of students accepted into this major.

Source: [Fuvest Questionário de Avaliação Sócio-Econômica- Candidatos Chamados para Primeira Matrícula pela carreira em que se inscreveu, Carreira Medicina e Ciências Médicas – Questão 7: Onde você realizou seus estudos de ensino médio? 2004–2008].

regression results display disturbing racial disparity in the probability of acceptance at USP – black and brown students have a much lower chance of being accepted at USP than white students. Race, regardless of the student's class, is a statistically significant factor in determining admission at USP. This is important as it provides support for arguments in favor of racial quotas.

Interestingly, the logistic regression analyses suggest that brown students have lower odds of acceptance than black students for all models. Why should this be? A recent work by Marteleto (2012) sheds some light on this trend. When analyzing the Pesquisa Nacional de Amostra por Domicílo (PNAD) from 1982 and 1987 to 2007, she found that younger cohorts of black adolescents had higher levels of schooling than their *pardo* counterparts. This educational advantage of blacks over *pardos* could be due to a phenomenon that Marteleto (2012) coins as 'darkening with education.' Recent cohorts of highly educated Brazilians may be labeling their children as black rather than either

white or *pardo*, a process that mirrors the concept of 'whitening' with money (Hasenbalg 2005; Ianni 1987; Marteleto 2012; Schwartzman 2007). This elucidation is consistent with analyses of the 2000 Brazilian census, which indicated a growing preference for the polarized classification of black and white, suggesting a change in racial classification with increasing number of blacks (Telles 2004). Future research on racial labeling and racial perception is needed to further evaluate this phenomenon and test whether darkening with education is indeed the reason why black students seem to have an advantage over *pardos* when seeking admission at USP.

The effects of socioeconomic status on admission

The results also indicate that poor students are less likely to be admitted to USP, and other socioeconomic factors, such as mother's education, income, and type of school play a significant role in acceptance as well. The more educated the student's mother is, the more likely the student is to score higher in the ENEM exam and be admitted to USP. Income seems to have the same influence as mother's education (as both variables are highly correlated), since more resources are available for the student's educational purposes. Most importantly, attending private school and prep courses significantly increases students' likelihood of being admitted. This suggests that high-income students, due to their economic status, will experience a better quality of education, will score higher on the ENEM exam and will greatly increase their odds of being admitted at USP or at other public universities. The results therefore posit that there is a relationship between socioeconomic status and *vestibular* acceptance. For all the years analyzed, socioeconomic indicators (type of school, income, prep course, and mother's education) also had a strong impact on students' chances of meeting the threshold for admission to USP.

Among other sociodemographics that negatively influence acceptance at USP are the age and gender of the student. These differentials suggest that compared with all students seeking university education in Brazil, those accepted at USP are more likely to be white, to come from high-income families, to come from private high schools, to enroll in a *vestibular* prep course, and to have a mother with high educational attainment. Additional studies with better data design are needed to measure these relationships directly and to confirm these findings.

Limitations

The results of this study should be considered in light of several methodological limitations. First, USP is the best university of Latin America,[23] thus the characteristics of students admitted at this university might differ greatly from students admitted at others public universities in Brazil. Further research is needed to generalize these findings to other Brazilian universities. Second, due to data limitation, it was not possible to use multilevel modeling to account for the variability associated with the clustering of students within a given school. Thus, we did not control for school-level influences because individual school data were not available. Third, the ENEM score analyzed corresponded to the objective part of the exam and many studies have shown that women tend to perform worse than men on objective exams. Although the ENEM exam

has an essay part, this was not included in the analysis because the grading is subjective to the person grading the exam. Hence, a gender bias should be accounted for when interpreting the results, particularly because it is known that women actually comprise 56 per cent of undergraduate students enrolled in Brazilian institutions of higher education and this predominance at the university level seems to be a lasting trend (Tomelin 2002). Finally, a proxy for acceptance was used due to the inherent limitation of the data available; whether or not a student actually took the *vestibular* exam at USP and was admitted cannot be determined. As a result, even though a student might have taken the ENEM exam, he/she may not have taken the USP *vestibular* and therefore should not have been considered in the analysis. Nevertheless, the results achieve a significant degree of fit with patterns that emerged from the descriptive statistical data provided online by FUVEST, which shows the racial and economic characteristics of students admitted in the same years analyzed in this study (see Tables 5–8).

Conclusion

Despite these limitations, this study has important implications for research and policy. The statistical evidence suggests that the relationship between class, race, and access to higher education observed in this case study support Hasenbalg's theory of cumulative racial disadvantage over the life cycle – nonwhite students are at a major disadvantage when taking the *vestibular* at USP, not only because of their socioeconomic status, but also because of their race. Thus, the inability to access higher education due to race directly influences the position in the labor market that will determine a person's social status in adulthood, and contributes to the persistent social, political, and income inequality in Brazil.

Several policy implications can be drawn from these findings. The public educational system in Brazil is of poor quality and does not meet the rigorous requirements for admission in public institutions of higher education. As the results suggest, attending public school reduces the odds of being accepted in the most competitive degree of Medicine at USP by an average of 88.66 per cent, and in the least competitive majors, Natural Sciences and Fonoaudiology, by 78.28 per cent. Therefore, policies to improve the quality of public high schools are urgent, as it will ensure that poor families will have the incentive, condition, and satisfactory welfare to send their children to public school, knowing that public college will be accessible in their future. In addition, the magnitude of the demand for higher education vis-à-vis supply is not being met and creates an additional problem. As in the case of USP, in November of 2012, about 159,000 people registered for the *vestibular*, and only 10,982 students were selected at the USP campus with an additional 100 students for the major of Medicine at the Medical School at Santa Casa São Paulo (USP 2012). Thus, it is imperative that the government also allocates more resources to public universities in order to help them grow and build more institutions of higher education to meet the growing demand of students, especially from poor nonwhite candidates coming from public high schools.

Most importantly, the results posit that racial quotas for black, brown, and indigenous groups are essential to reduce the racial disparity observed in this case study. In 2012, the Brazilian government took an important first step by signing into law Lei das Cotas, (or Quota Law) reserving 50 per cent of slots in federal universities to students from

public high schools[24] (Carvalhaes, Daflon, and Júnior 2013). Within this quota, half of the slots will be allocated to students whose family income is lower or equal to 1.5 minimum wage per person in the household, and within this quota slots will be reserved for blacks, browns, and indigenous people in proportion to the per centage of these groups within the state where the university is located (Carvalhaes, Daflon, and Júnior 2013). According to this new law, if specified racial groups do not fill the quota slots, then the available slots will go to students who studied only in public high school. The law was put into effect in 2013, although federal universities have 4 years (until 2016) to implement the necessary changes.

Lei das Cotas is only applicable to federal institutions of higher education. State universities, such as USP, can choose whether or not to adopt any form of affirmative action. Although USP and many other public state universities provide small bursaries[25] for students coming from public schools in the *vestibular*, they are not required to implement racial affirmative action. Recently, black movement activists have protested at USP, invading classes to bring attention to the racial disparity of the student body. A recent article in the *Folha* de *São Paulo* newspaper reported that USP has more African students than Afro-Brazilian students and that the only black professor in the entire university, who was also from Africa, has already retired (Bergamim 2012). In a society as diverse as Brazil, this is disconcerting news. If approved by USP, an affirmative action policy based on race indicators will be a significant step toward equality and diversity.

This study calls for the development of more policies to promote access to higher education for underrepresented groups and to the creation of new institutions of higher education to meet a growing demand. In particular, affirmative action policies are effective mechanisms for democratizing access to higher education and for expanding access of nonwhite and poor youth to universities in Brazil. Given the controversial debate over affirmative action programs in Brazil, the findings presented in this paper are significant and certainly lend credence to arguments in support of affirmative action, particularly of racial quotas, albeit a combination of race- and social-based quotas may be the most effective tool for university accessibility. Future research testing the effectiveness of this law in creating equity and diversity in institutions of higher education and whether it will result in an overall diminishment of social and economic inequality in Brazil are vital in determining its success. Providing access to higher education to all racial groups in Brazil is essential toward reducing and ensuring social, political, and economic equity.

Notes

1. The *vestibular* is a competitive exam that is the primary entrance system used by Brazilian universities to select their students. Admission is based on students' performance in this exam alone. Recently, the National Secondary Education Exam (ENEM) is being used as the main criteria for admission by most universities through the Unified Selection System (SISU). The University of São Paulo, however, continues to use solely the *vestibular* for admission. As an experiment, in 2016, the university will make 13 per cent of its slots available through SISU – whether this will continue remains to be seen.
2. In this paper, the term nonwhite is used to refer to those who are a mixture of white, black, and native Indian, classified as *pardo* in Brazil, but also to *negro* (black) or to *mulato* or *moreno* (mixed of black and white).

3. Race in Brazil is based on skin color and not racial identity, as a result of the high levels of miscegenation and multiracial ancestry of most Brazilians. Thus, Brazil has a very complex concept of racial categories. This will be discussed later, but for an in-depth discussions see Harris (1964); Hasenbalg (1979); Ianni (1960); Schwartzman (2007); Telles (2004, 2014); Telles and Lim (1998).
4. ENADE is one of the assessment procedures of the National Higher Education Evaluation System (*Sistema Nacional* de *Avaliação da Educação Superior*, or SINAES). ENADE is conducted by the *Instituto Nacional* de *Estudos e Pesquisas Educacionais Anísio Teixeira* (INEP) and was created in 2004 by the Ministry of Education. The exam assesses the development and acquisition of abilities and knowledge of students at the college level nationwide.
5. FUVEST is a federal agency that prepares and administers the *vestibular* of the University of São Paulo.
6. Brazil was the last country in the western hemisphere to abolish slavery in 1888.
7. Low levels of educational attainment among nonwhites are also a result of structural problems, lack of access to schools, and high fertility levels (Barros and Lam 1996; Birdsall and Sabot 1996; Lam and Levison 1991). For more, see also Marteleto (2012).
8. In 2010, with the implementation of the Sistema de Seleção Unificada (SISU), most public institutions are now using the Exame National do Ensino Médio (ENEM) as mode of admission, which we discuss in the next subsection.
9. USP no longer uses ENEM to provide bonuses on the *vestibular*. Since 2010, the sole criterion for admission is the FUVEST exam (*vestibular*).
10. In 2009, 53 universities and institutes adhered to SISU. They are listed in Appendix. On 24 June 2015, USP agreed to allocate 1489 slots to students to be selected through SISU for the admission process of 2016, while the remaining 9568 slots will continue to be allocated through the FUVEST vestibular. This will be an 'experiment,' and only applies to certain schools at USP and selected majors in Math and Sciences, Humanities, and Biological Sciences (USP 2015).
11. In addition, some universities including the University of São Paulo use the student's ENEM score as supplement to their *vestibular* score depending on the student's performance.
12. See FUVEST (2012).
13. These are the only data available to test these relationships. Ideally, data for all students who took the *vestibular* exam are needed to compare those who passed and those who did not directly. However, after several attempts, FUVEST declined my requests to provide such dataset and were only able to provide the average ENEM score and standard deviation of each admitted class by major. Using the ENEM dataset, the datasets and matched student's characteristics were aligned to determine what students would have the ENEM scores of those admitted at USP. As such, causality cannot be established. Nevertheless, as discussed later, the data yield very similar results to the actual social and racial distribution of students admitted to USP.
14. The ENEM Socioeconomic Questionnaire can be found at http://portal.inep.gov.br/basica-levantamentos-acessar
15. For the years of 2004, 2005, 2006, 2007, and 2008, there were a total of 86, 98, 101, 105, and 107 majors available at USP, respectively.
16. The Natural Sciences major offers an integrated degree in Mathematics, Natural Sciences, and Education, and is designed to prepare science teachers for the elementary and primary education levels. Graduates are also qualified to teach at the secondary education level in Biology, Physics, and Chemistry or to work in museums, centers of science, parks, NGOs, etc.
17. The Fonoaudiology major is equivalent to a speech therapy major.
18. In 1976, IBGE conducted an interview to determine how to define those who were not white, black, Asian, or indigenous (DataFolha 1995) and the result showed that Brazilians self-classified in 135 different colors. Several of the expressions used described physical attributes beyond skin color such as *crioula* and *agalegada* (for the complete list, see Levine and Crocitti (1999, 386–390). However, as pointed out by Petruccelli (2002) and

Valle Silva (1994), despite the great number of terms, just seven categories corresponded to 95 per cent of the answers, and most of these are the same as the official terminology. Based on this survey, it was decided to use *pardo* for those who did not fit in the other racial categories.

19. *Pardo* is the official category used by IBGE to identify those who are a mixture of white, black, and native Indian. The terms *pardo* and *mulato* are used interchangeably in this study, as they represent someone of a mixed inheritance.
20. See for example, Hasenbalg (1988); Marteleto (2012); Telles (2004).
21. During the period of this study, there was a strong presence of volunteers, mainly former undergraduate students, who provided prevestibular courses to low-income students in poor areas (Maggie 2001; Santos 2007). Nonetheless, being part of any prevestibular course can influence admission, and is therefore an important control variable.
22. Given that the dataset is a cross-sectional survey based on subjective assessments, selection bias and unobserved variable bias can be potential limitations to the analysis.
23. See http://www.topuniversities.com/university-rankings/latin-american-university-rankings/2015
24. The selection of students within this quota system will be determined by their score on the ENEM exam.
25. Through the Programa de Inclusão Social da USP (Inclusp) program, students who attended both public middle and high schools receive 15 per cent bonus on their vestibular score, students who attended public high school receive 12 per cent bonus, and nonwhite students receive an additional 5 per cent bonus. This program is started in 2011.

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Appendix

List of the first institutions to start using the *Sistema* de *Seleção Unificada* (SISU) as admission criteria instead of the *vestibular*:

(1) Universidade Federal do Amazonas
(2) Universidade Federal de Mato Grosso
(3) Universidade Federal do Piauí
(4) Universidade Federal de São João del Rei
(5) Universidade Federal do Maranhão
(6) Universidade Federal Rural do Rio de Janeiro
(7) Universidade Federal Rural de Pernambuco
(8) Universidade Tecnológica Federal do Paraná
(9) Universidade Federal Rural do Semi-Árido
(10) Universidade Federal de São Paulo
(11) Universidade Federal de Lavras
(12) Universidade Federal de Alfenas
(13) Universidade Federal dos Vales do Jequitinhonha e Mucuri
(14) Universidade Federal de Itajubá. Unifei
(15) Universidade Federal do Recôncavo da Bahia
(16) Universidade Federal de Pelotas
(17) Universidade Federal do Estado do Rio de Janeiro
(18) Fundação Universidade Federal de Rondonia
(19) Fundação Universidade Federal de Ciências da Saúde de Porto Alegre
(20) Fundação Universidade Federal do Tocantins
(21) Fundação Universidade Federal do Vale do São Francisco
(22) Fundação Universidade Federal do ABC
(23) Fundação Universidade Federal do Pampa (Unipampa)
(24) Instituto Federal de Educação, Ciência e Tecnologia da Bahia
(25) Instituto Federal de Educação, Ciência e Tecnologia do Maranhão
(26) Instituto Federal de Educação, Ciência e Tecnologia do Rio Grande do Sul
(27) Instituto Federal de Educação, Ciência e Tecnologia Farroupilha
(28) Instituto Federal de Educação, Ciência e Tecnologia do Rio Grande do Norte
(29) Instituto Federal de Educação, Ciência e Tecnologia Fluminense
(30) Instituto Federal de Educação, Ciência e Tecnologia da Paraíba
(31) Instituto Federal de Educação, Ciência e Tecnologia Goiano
(32) Instituto Federal de Educação, Ciência e Tecnologia do Espírito Santo

(33) Instituto Federal de Educação, Ciência e Tecnologia de São Paulo
(34) Instituto Federal de Educação, Ciência e Tecnologia de Goiás
(35) Instituto Federal de Educação, Ciência e Tecnologia do Pará
(36) Instituto Federal de Educação, Ciência e Tecnologia do Piauí
(37) Instituto Federal de Educação, Ciência e Tecnologia de Alagoas
(38) Instituto Federal de Educação, Ciência e Tecnologia de Santa Catarina
(39) Instituto Federal de Educação, Ciência e Tecnologia do Rio de Janeiro
(40) Instituto Federal de Educação, Ciência e Tecnologia do Triângulo Mineiro
(41) Instituto Federal de Educação, Ciência e Tecnologia de Sergipe
(42) Instituto Federal de Educação, Ciência e Tecnologia de Roraima
(43) Instituto Federal de Educação, Ciência e Tecnologia do Norte de Minas Gerais
(44) Instituto Federal de Educação, Ciência e Tecnologia do Sudeste de Minas Gerais
(45) Instituto Federal de Educação, Ciência e Tecnologia de Brasilia
(46) Instituto Federal de Educação, Ciência e Tecnologia Baiano
(47) Instituto Federal de Educação, Ciência e Tecnologia do Tocantins
(48) Instituto Federal de Educação, Ciência e Tecnologia Catarinense
(49) Instituto Federal de educação, Ciencia e Tecnologia do Tocantins
(50) Instituto Federal de educação, Ciencia e Tecnologia Catarinense
(51) Cefet Celso Suckow da Fonseca (RJ)
(52) Escola Nacional de Ciências Estatísticas (RJ)
(53) Universidade Estadual do Norte Fluminense Darcy Ribeiro (RJ)