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The vicious circle: effects of race and class on university entrance in Brazil

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ABSTRACT

Brazil has high levels of socio-economic inequality and an inequitable distribution of access to higher education. How much of this inequality is associated with race or class is an important question in light of the current debate over affirmative action and the suitability of race and social targeted policies. There are those who claim that racial disparities in the educational system are a result of students' social status and not a result of racism, while others believe race is an important factor that superposes the effect of class. This study uses national survey data from Brazil's *Exame Nacional do Ensino Médio* (National Secondary Education Exam [ENEM]) to examine the relationship between race and access to higher education of high school students between 2004 and 2008. The results document a vicious circle which connects the schooling of the young with their race, socio-economic status, and university attendance.

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1. Introduction

Brazil has a paradoxical position on race relations despite the fact that it is a multi-racial society. On the one hand, it has been argued to be a racial democracy,[1] where intermixture of Native, African, and European descendants gave rise to a multi-racial society where racism[2] is claimed to be non-existent (Bastide 1944; Campos 2004; Freyre and Putnam 1964; Wagley 1952). On the other hand, a closer examination of Brazil's historical development reveals the true discriminatory nature of its social, cultural, political and economic anatomy (Nascimento 1989). Historically, the white elite promoted the myth of racial democracy to obscure concrete forms of racial oppression and discrimination (Skidmore 1993).

In the Brazilian school environment two types of racial discrimination can be observed. First, there is underrepresentation of *nonwhites*[3] at the university level and in the nation's private schools; Afro-Brazilians represent less than 35.8% of students in universities while representing more than 50.7% of the country's population (IBGE 2010). The private and public high school percentages for *nonwhite* students are, respectively, 38% and 59% (Guimarães and Sampaio 2007). Second, race is considered an element of inferiority, resulting in pejorative name-calling and other forms of racism (Botelho 2000; Cabral 2007; dos Santos Cavalleiro 2000; Lima and Romão 2002; Neves 2002). In what follows, I use a socio-economic questionnaire created by the *Instituto Nacional de Estudos e Pesquisas Educacionais* (National Institute of Studies and Educational Research [INEP]) to explore two resulting issues:

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1) The connection between race and a negative high school experience among those students who aspire to go to university.
2) The accompanying connection between race, weaker performance on the National Examination of Secondary Education (ENEM), and failure to gain admission to quality university education.

The theoretical underpinning is that a vicious cycle links the schooling of the young with their race, socio-economic standing, and university attendance. An anomaly of the Brazilian educational system is that while prestigious institutions at the primary and secondary levels are in the private sector, the situation is reversed at the university level. As a result, admission to a public university is a rigorous, competitive process. Poor students who cannot afford a private high school education perform worse in the vestibular and ENEM exam than students from private schools. Since *nonwhite* Brazilians have been disproportionately located at the bottom of the socio-economic distribution, this hinders their ability to get into college, and in turn affects their social status, resulting in an intergenerational cycle of socio-economic stagnancy. As Hasenbalg (1979) argued, social origins have an impact on educational achievement, which influences the position in the labor market that determines status in an individual's adult life. To be sure, there are those who are able to break away from this vicious cycle, but for many it imposes constraints that persist from one generation to the next.

This study's main contribution is to document this Brazilian reality, using a high-quality nationally representative data set that has never before been used to analyze the interaction of race, racial discrimination, and higher education. There are several reasons why it is important to better understand these relationships. First, Brazil has high levels of socio-economic inequality and an inequitable distribution of access to higher education. How much of this inequality is associated with race and racial discrimination is an important question in light of the current debate over affirmative action and the suitability of race and social targeted policies in Brazil (Campos, Júnior, and Daflon 2013; de Carvalho 2005; Fry 2007; Gomes 2002; Guimarães 2003; Kaufmann 2012; Moreira 2011). In addition, although many assumptions are made, there is a dearth of research providing empirical evidence of a relationship between race and access to higher education. Osório (2008) provides the first and only attempt to test whether social origin or racial discrimination were the underlying causes of persistent racial inequalities. Using data from the *Pesquisa National por Amostra de Domicílios* (National Household Survey), Osório finds a non-negligible and statistically significant effect of the race parameter in the educational gap between whites and *nonwhites* who obtained higher education. He argues that both socioeconomic factors and racial discrimination are preponderant in perpetuating racial inequality in institutions of higher education. However, his analysis only considers respondents of the cohort born between 1973 and 1977, and the models were fitted for the probability of educational outcomes based on observed educational gaps. Clearly, much more research is needed to test these relationships. This study provides important evidence of the vicious circle linking race, socioeconomic status, and access to higher education in Brazil.

This article is organized as follows. Section 2 briefly explores race relation theories in Brazil. Section 3 and 4 describe the data set, the models, and cross-sectional analyses using micro-data from the ENEM socio-economic questionnaire. In Section 5, the initial statistical evidence is presented as well as the results for ordered logit (OLRM) regressions, which are used to investigate the relative effect of race on perceived quality of education experience. The OLRM and ordinary least squares (OLS) regressions used to examine the effect of race on ENEM scores are presented in Section 6. Finally, Section 7 summarizes the findings and highlights their significance.

2. Racial discrimination in Brazil: theories and measurements

2.1. Theoretical framework

The debate regarding racial inequality in Brazil is between two schools of thought. Some endorse the thesis of Pierson, which denies the existence of racial prejudice and racism, claiming that what

black activists and some intellectuals deemed to be racial inequalities are in fact class inequalities (de Azevedo 1996; Frazier 1942; Harris 1952; Landes 1947; Pierson 1945; Wagley 1952). On the other side, Bastide and Fernandes (1959), Pinto (1953), Nogueira (1985), and Cardoso and Ianni (1960) defend the position that there is racial prejudice in Brazil and it is far from being insignificant. In the attempt to join the two, sociologist Fernandes (1964), who shared Pierson's interpretation of the integrative influences of modernization and economic development to racial equality, also saw racial prejudice to be present and strong in Brazilian society. He argued that racism emerged as an ideology to legitimize slavery but did not disappear with abolition, remaining as an archaic legacy. The incompatibility between the rationality of the new industrial society and the irrationality of racism, he thought, would result in racial equality, because under the pressure of modernization, race would lose its significance and racism would disappear. Fernandes' theory failed to explain the socio-economic disparity among racial groups in Brazil, however. Later, Hasenbalg (1979) revisited the work, supplementing it with empirical evidence to explain inequalities in social mobility among racial groups. His findings led him to formulate a theory of cumulative racial disadvantage over the life cycle. The theory states that race is an additional factor that superposes class. As a result, *nonwhite* children have higher odds of being born poor and are more likely to suffer poverty than white children, their odds of attending school are less than those of white children, and when they do attend they attend public schools which are not as academically strong as the private ones attended by white children. As a consequence, they are less likely to pass the *vestibular* and attend university. The resulting low educational achievement leads them towards low paying jobs, mainly in the informal sector, making it impossible for them to compete and move up the socio-economic ladder. This cycle perpetuates for future generations.

There have been a number of attempts to validate Hasenbalg's thesis (Hasenbalg 1988; Hasenbalg and do Valle Silva 1990; Hasenbalg, do Valle Silva, and Lima 1999; Rosemberg 1987, 1990; Soares et al. 2005) but data limitations have prevented investigation of the relation of race to higher education access. Most studies focus on the labour force, and indicate that, *ceteris paribus*, race explains around 10 to 30% of income disparity (Arias, Yamada, and Tejerina 2005; Beltrão et al. 2003; Campante, Crespo, and Leite 2004; Hasenbalg 2006; Osório 2006; Soares et al. 2005). However, many Brazilians still argue that racial disparities are a result of socio-economic status, perpetuating the notion that racial inequality is a matter of social issue and not racism in Brazil (Fry 2007; Kamel 2006; Van den Berghe 2000). As university education is an intrinsic determinant of socio-economic status, it is thus imperative to analyze the relationship between race and accessibility to higher education empirically, particularly in a multiracial society such as Brazil.

2.2. Classifying and measuring race in Brazil

In this work, the main independent variable is *nonwhite*, grouping blacks and browns (i.e. *mulatos*, *pardos*) together. This choice is motivated by the complex racial classification system in Brazil, which differs from those of other countries. One of the most unique distinctions of Brazilian race relations in comparison to other interracial systems is the plethora of racial terms and the abstract, referential ambiguity surrounding their usage (Harris 1964). In the US, for example, racial identity is defined by descent while in Brazil it is a complicated concept, which amalgamates physical appearance (hair texture, shape of lips, nose, skin pigmentation) and class criteria (education and wealth) (Harris 1964; Schwartzman 2007). Thus, since race is not purely defined on genealogical grounds, it is open to interpretation (Skidmore and Smith 1997). This concept of Brazilian race blurs the racial distinction of those on the border of brownness and whiteness (Reiter and Mitchell 2010; Telles 2004) – to be black in Brazil one has to be at the dark end of the color spectrum, in contrast to the US where partly black in ethnic origin means being black. Thus, many *mulatos*, neither white nor black, escape negative stigmatization through 'passing' as white (Marcus 2013; Skidmore 1993). Passing allows for further economic and social mobility in light of the *mulato*'s physical approximation to 'looking white.' Nevertheless, this self-classification does not always correspond to societal judgment. Studies have found that *mulatos* and *pardos*, even those of much lighter skin tone, endure similar discrimination

and prejudice suffered by blacks[4] (Osório 2008; Ribeiro 2006; Telles 2004). In light of this complexity, a claim for blackness must be accepted since there are no clear standards for racial classification (Telles 2004; Telles and Lim 1998). Therefore, this study accepts the student's race claim and merges students who self-identify as blacks (*negros*) and browns[5] (*pardos* or *mulatos*) under the same category. Many other studies have merged these two groups as well, since their statistical socio-economic characteristics are very similar and they suffer from similar prejudice (Hasenbalg 1988; Hasenbalg, do Valle Silva, and Lima 1999; Osório 2008; Ribeiro 2006; Schwartzman 2007; Telles 2004). The racial classification *nonwhites* should, in theory, also include indigenous people and Asians (yellow). However, because these groups are statistically small in Brazil and since the Asian group tends to be privileged in its socio-economic characteristics, they were excluded from the analysis.

3. Data description – a closer look at the ENEM

In 1998, the *Exame National do Ensino Médio* (ENEM) was created by the *Instituto Nacional de Estudos e Pesquisas Educacionais* (INEP) in cooperation with the Brazilian Ministry of Education to assess the performance of students as they conclude high school, analyze the quality of their education, and determine whether or not the schools had prepared their students for college.

ENEM is given yearly to graduating seniors and high school graduate students. From 1998 to 2008 the exam was divided into two parts: an objective part with 63 multiple-choice questions and an essay part. In 2009 the ENEM changed and it now has 180 multiple-choice questions given in five different exams covering five main areas (natural sciences, social sciences, math, Portuguese, foreign language) and an essay (Brazilian Ministry of Education 2011). A new feature of the exam is the score calculation, which now uses the Item Response Theory (*Teoria de Resposta ao Item* [TRI]). In this new model, different questions have different weight according to level of difficulty. Thus, a student can get 42 questions correct in the natural science exam and still score lower than a student who only had 39 questions correct, if the latter got more difficult questions correct than the former. The main criticism to the new ENEM exam is that it is unclear how to interpret an average grade, or sum of points, between different subjects (Borges 2010; Moreno 2013). Likewise, it is unclear what the final average score means; students are either below or above the exam's average of the previous year, which is used as comparative reference. Prior to this change, the exam grading was clearly set by the ENEM Grading Committee, which determined performance ranges based on students' scores on the objective exam as follow: insufficient (0–20), regular (20–55), good (55–85) and excellent (85–100). This rubric provided a clear assessment of students' performance across years. Given the drastic change in the exam and grading assessment, and the fact that for the years of 2004 to 2008 all questions relevant for this study were exactly the same, this time frame was selected.

Once the student registers to take the ENEM, a socio-economic questionnaire along with a student manual is sent to the candidate's home. The students are asked to fill out the questionnaire and turn it in at the site of examination before taking the ENEM exam. The data for this analysis derive from this questionnaire.[6] The questionnaires for the years of 2004–2008 have a total of 223 multi-choice questions, divided into five sections titled: 'You and Family', 'You and Work', 'You and School', 'Values', and an extra section only for students who had already graduated from high school. In 2010, the socio-economic questionnaire was drastically changed and reduced to only 25 questions (INEP 2012).

Many universities use the ENEM score as a supplement to their admission exam, while others use it as the sole criterion for admission. Thus, although not mandatory, the ENEM has a high turnout rate of students seeking to secure a university spot. In 2012, about 6.5 million students took the exam INEP (2012). The individual students who took the examination are the units of analysis.[7]

4. Model specification and variable selection

Using the ENEM data set two null hypotheses are tested using two models:

1) There is no difference in the relationship between race and perceived quality of education in high school, other things equal.
2) There is no difference in the relationship between race and ENEM performance, other things equal.

Thus, the main independent variable is race, a binary variable that analyze the effects of being *nonwhite* (i.e. blacks, *pardos* and *mulatos* combined), using white as the reference category.

The dependent variable *quality* in the first model is measured on a scale of 1 (low) to 8 (high) based on individual responses to the question 'Score for evaluation of secondary education received.'[8] The dependent variable is ordinal: it is unknown what the relative difference between perceived quality of education is and as such the answers are only ordinally comparable. Thus, the proper model is ordered logit (Scott Long 1997).[9] [10] [11] Hence, the main structural model for the first model tested has the following form:

$$y_i^* = \beta_0 + \beta_1 nonwhite_i + \beta_i \boldsymbol{X_i} + \varepsilon_i$$

Where:

$$y_i = \begin{cases} 1 \, if \; \tau_0 = -\infty \leq y_i^* < \tau_1 \\ 2 \, if \; \tau_1 \leq y_i^* < \tau_2 \\ 3 \, if \; \tau_2 \leq y_i^* < \tau_3 \\ 4 \, if \; \tau_3 \leq y_i^* < \tau_4 \\ 5 \, if \; \tau_4 \leq y_i^* < \tau_5 \\ 6 \, if \; \tau_5 \leq y_i^* < \tau_6 \\ 7 \, if \; \tau_6 \leq y_i^* < \tau_7 \\ 8 \, if \; \tau_7 \leq y_i^* < \tau_8 = \infty \end{cases}$$

and i is the observation, vector $\boldsymbol{X_i}$ contains a set of exogenous independent variables controlling the model, and ε_i is a random error.[12] Control variables in $\boldsymbol{X_i}$ include gender, income, education,[13] parent's education and others listed in Table 1.

In the second model, the dependent variable *score* was composed of four categories of scores set by the ENEM Grading Committee to determine performance range: insufficient (0–20), regular (20–55), good (55–85) and excellent (85–100). Hence, ordered logit was used and the main structural model had the following structure:

$$y_i^* = \beta_0 + \beta_1 nonwhite_i + \beta_i \boldsymbol{X_i} + \varepsilon_i$$

Where:

$$y_i = \begin{cases} 1 \rightarrow insufficient & if \; \tau_0 = -\infty \leq y_i^* < \tau_1 \\ 2 \rightarrow regular & if \; \tau_1 \leq y_i^* < \tau_2 \\ 3 \rightarrow good & if \; \tau_2 \leq y_i^* < \tau_3 \\ 4 \rightarrow excellent & if \; \tau_3 \leq y_i^* < \tau_4 = \infty \end{cases}$$

and i is the observation, vector $\boldsymbol{X_i}$ contains a set of exogenous independent variables controlling the model listed in Table 1, and ε_i is a random error. In order to check for robustness, OLS were also estimated for the raw individual's score on the objective part of the ENEM exam (63 questions) worth a total of 100 points.

For both analyses regional differences are controlled as fixed effects by including a regional dummy in all models. Since the ENEM data come from different years all models also include time fixed effects.

Table 1. Student-level variables included in X.

Variable	Mean	S.D.	Definition
Nonwhite	.52	.50	*Nonwhite* (black, *Pardo* or *Mulato*): 1(yes); 0(white)
Female	.59	.49	1(female); 0(male)
Age	18.90	2.67	Student's age
Family Income			All wages and other incomes by monthly minimum wage*:
Less than 2 MW	.54	.50	1(yes); 0(otherwise); Reference Category
2 to 5 MW	.32	.47	1(yes); 0(otherwise)
5 to 10 MW	.10	.30	1(yes); 0(otherwise)
10 to 30 MW	.04	.19	1(yes); 0(otherwise)
More than 30 MW	.01	.09	1(yes); 0(otherwise)
Public School	.89	.31	Type of high school attended: 1(public school); 0(private school)
Prep Course	.12	.32	Did you do a preparatory course for the vestibular examination? 1(yes); 0(no)
Father's education			
Less than high school	.66	.47	1(yes); 0(otherwise); Reference Category
High school graduate	.16	.37	1(yes); 0(otherwise)
Some college	.03	.16	1(yes); 0(otherwise)
College graduate	.05	.22	1(yes); 0(otherwise)
Graduate school	.01	.12	1(yes); 0(otherwise)
Unknown	.09	.28	Student does not know father education 1(yes); 0(otherwise)
Mother's education			
Less than high school	.66	.47	1(yes); 0(otherwise); Reference Category
High school graduate	.19	.39	1(yes); 0(otherwise)
Some college	.03	.17	1(yes); 0(otherwise)
College graduate	.06	.24	1(yes); 0(otherwise)
Graduate school	.02	.15	1(yes); 0(otherwise)
Unknown	.03	.17	Student does not know mother education 1(yes); 0(otherwise)
Married	.09	.28	1 (married or living together as married); 0(otherwise)
Children	.11	.32	1(have children); 0(no children)
Work	.68	.47	Did you work while in high school? 1(yes); 0(no)
Southeast	.51	.50	If students are from the following states: SP, RJ, MG and ES 1(yes); 0(no)
Urban	.98	.13	Location of school is in urban area 1(yes); 0(otherwise)
Favela dweller	.03	.17	Comprises the following:
Pavement			Is your house on a paved street? 1(no); 0(yes)
Water			Does your house have running water? 1(no); 0(yes)
Location			Do you live in an urban area? 1(yes); 0(otherwise)

Note: *The monthly minimum wage is equivalent to R$724 or $281 dollars as of December 2014.

Such a specification simply tests whether there are contextual effects unaccounted for by regional and yearly differences. A multicollinearity test was run for the models and all variables had very low *vif* coefficients, well below the threshold that would indicate multicollinearity. The *vce* (variance – covariance) robust option was utilized to produce results that do not assume homoscedasticity and normality of the random error terms.

The complete data set comprises a total of $i = 7.4$ million students who registered for the ENEM exam throughout the 27 Brazilian states during the years of 2004 – 2008.[14] The data were filtered to include in the study only students who graduated from high school in the three years prior to taking the exam or graduated in the year of the exam. Many older students who joined the work force take the ENEM exam later when they decide to return to school and get into college. These were excluded to enable focus on a consistent student cohort.

As with many large data sets, missing data is present. In this case, sources of missing data include: (1) about one-third of students who registered for the exam and did not take it; (2) students who did not complete the socio-economic questionnaire; (3) students who did not fully answer the questionnaire; and (4) imputation errors.[15]

Conventional methods for dealing with missing data are listwise deletion, pairwise deletion, and replacing missing data with means or other imputations (Allison 2002). Listwise deletion for the different models was used. Thus only cases with no missing data were included. Although listwise deletion can discard large portions of data, it is more appropriate than other conventional methods for

handling missing data, as other methods may result in biased estimates of the models (Allison 2002). The consequence is that roughly 2.5 million students were included in the analyses.

5. Effects of race and class on perceived quality of education

The ordered logit results for Model 1 are shown in Table 2. Although logit results are interpreted in a similar way to OLS with respect to its sign and significance, they are much easier to interpret viewing by the percentage change in odds ratios. A ratio greater than one indicates a positive relationship and a value less than one points to a negative relationship. Converting, the third column of Table 2 provides the percentage of change in odds for a unit increase of each covariate of the response variable, signed appropriately. Considering the large N, most coefficients are statistically significant at the 0.001 level. The results reveal that *nonwhite* students are less likely to give a higher score to perceived quality of education than white students. The difference, albeit small, is statistically significant at $p < 0.001$.

As parents' level of education rises, students become less critical of the quality of their education. A student whose father's highest level of education is graduate school, is 3.5% more likely to give a higher score for perceived quality of education than a student whose father's highest level of education is less than high school. This is explained by the fact that parents' level of education is directly related to income and students whose parents' have high levels of education are more likely to go to a private school which provides a better quality of education than a public school. For the remaining categories, although there is a slight decrease in percentages as educational levels increases, students' whose father highest level of education was less than high school were more likely to give higher scores for perceived quality of education. This same pattern can be observed for mother's education. Interestingly, students whose parents' education was less than high school evaluated their perceived quality of education in higher categories. This same phenomenon is observed when looking at students from rural areas and from the favelas. Students who live in favelas evaluated their perceived experience in high school much more positively than other students, perhaps because their perception of quality of education has a much lower threshold compared to other students. This is also true for rural areas, where the odds of giving a higher score for perceived quality of education are 26.3% higher in comparison to students from urban areas. This indicates that the student's point of reference plays an important role in perception of quality of education.

As family income rises, students become more satisfied with the quality of their education. Students whose family income was more than 30 minimum wages were 12.6% more likely to give a higher score for perceived quality of education than students whose parents' income is less than 2 minimum wages. However, students at the lowest income category were more likely to give a higher score for perceived education than students whose family income was in the middle categories.

The variable that had the most influence on students' perception of quality of education was type of school. The odds of a student from the public sector having a higher perceived quality of school experience is 55.5% less than a private school student, holding all other variables constant. This reflects the poor quality of education in the public sector throughout the country. Working students evaluated their secondary education in lower categories than non-working students. Additionally, females and older students gave a higher evaluation to quality of education experience than males and younger students.

6. Effects of race and class on ENEM performance

Model 2 examined how students' race affected their ENEM scores. The results for Model 2 are shown in Table 3. Along with OLRM results testing different tests categories, OLS was also run for the raw scores of the exam. *Nonwhite* students scored 1.9 points less than white students, indicating non-negligible and statistically significant explanatory power left for the race parameter. The results also show that a *nonwhite* student is 25% less likely to score in a higher category of the ENEM exam compared to white students.

Table 2. Ordered logit and OLS results for Model 1 – quality of high school education.

	Odds Ratio	% Change in Odds	OLS Robust
Non-white	0.964***	-3.6	-0.0297***
	(0.00224)	(1.8)	(0.00194)
Female	1.146***	14.6	0.105***
	(0.00265)	(7.0)	(0.00193)
Age	0.976***	-2.4	-0.0194***
	(0.000593)	(6.3)	(0.000534)
Income			
2 to 5 MW	0.860***	-14.0	-0.113***
	(0.00226)	(6.8)	(0.00220)
5 to 10 MW	0.846***	-15.4	-0.127***
	(0.00362)	(4.8)	(0.00356)
10 to 30 MW	0.951***	-4.9	-0.0425***
	(0.00668)	(0.9)	(0.00583)
More than 30 MW	1.126***	12.6	0.0318**
	(0.0157)	(1.1)	(0.0120)
Public school	0.445***	-55.5	-0.644***
	(0.00195)	(22.1)	(0.00356)
Prep course	1.036***	3.6	-0.000152
	(0.00368)	(1.1)	(0.00306)
Father's education			
High school graduate	0.882***	-11.8	-0.102***
	(0.00294)	(4.5)	(0.00277)
Some college	0.831***	-16.9	-0.151***
	(0.00602)	(2.9)	(0.00601)
College graduate	0.921***	-7.9	-0.0685***
	(0.00548)	(1.8)	(0.00494)
Graduate school	1.035**	3.5	0.0132
	(0.0109)	(0.4)	(0.00859)
Unknown	0.822***	-17.8	-0.159***
	(0.00353)	(5.4)	(0.00367)
Mother's education			
High school graduate	0.867***	-13.3	-0.114***
	(0.00270)	(5.5)	(0.00259)
Some college	0.860***	-14.0	-0.121***
	(0.00590)	(2.5)	(0.00567)
College graduate	0.940***	-6.0	-0.0490***
	(0.00508)	(1.5)	(0.00445)
Graduate school	1.033***	3.3	0.0218**
	(0.00823)	(0.5)	(0.00640)
Unknown	0.876***	-12.4	-0.115***
	(0.00639)	(2.2)	(0.00645)
Married	1.060***	6.0	0.0486***
	(0.00561)	(1.6)	(0.00464)
Children	0.952***	-4.8	-0.0545***
	(0.00499)	(1.6)	(0.00467)
Work	0.829***	-17.1	-0.151***
	(0.00204)	(8.4)	(0.00205)
Southeast	0.812***	-18.8	-0.191***
	(0.00186)	(9.9)	(0.00191)
Urban area school	0.737***	-26.3	-0.238***
	(0.00656)	(3.8)	(0.00711)
Favela dweller	1.155***	15.5	0.0803***
	(0.00772)	(2.5)	(0.00573)
cons			6.644***
			(0.0129)
N	2,547,992	2,547,992	2,547,992
R-sq			0.033

Note: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Table 3. Ordered logit and OLS results for Model 2 – ENEM performance.

	Odds Ratio	% Change in Odds	OLS Robust Score Categories	OLS Robust Raw Scores
Non-white	0.751***	-24.9	-0.0419***	-1.854***
	(0.00266)	(13.3)	(0.000520)	(0.0158)
Female	0.609***	-39.1	-0.0736***	-2.955***
	(0.00213)	(21.6)	(0.000533)	(0.0161)
Age	0.885***	-11.5	-0.0162***	-0.722***
	(0.000829)	(28.0)	(0.000130)	(0.00385)
Income				
2 to 5 MW	1.586***	58.6	0.0592***	2.820***
	(0.00656)	(24.0)	(0.000579)	(0.0179)
5 to 10 MW	1.880***	88.0	0.0915***	3.837***
	(0.0116)	(20.6)	(0.00106)	(0.0321)
10 to 30 MW	2.465***	146.5	0.171***	6.210***
	(0.0223)	(18.4)	(0.00198)	(0.0576)
More than 30 MW	2.658***	165.8	0.199***	6.753***
	(0.0440)	(9.1)	(0.00410)	(0.117)
Public school	0.317***	-68.3	-0.223***	-8.438***
	(0.00180)	(29.8)	(0.00120)	(0.0353)
Prep course	1.436***	43.6	0.0567***	2.099***
	(0.00726)	(12.4)	(0.000878)	(0.0263)
Father's education				
High school graduate	1.333***	33.3	0.0418***	1.797***
	(0.00657)	(11.2)	(0.000782)	(0.0239)
Some college	1.820***	82.0	0.108***	4.161***
	(0.0175)	(10.2)	(0.00196)	(0.0573)
College graduate	1.862***	86.2	0.122***	4.443***
	(0.0145)	(14.5)	(0.00162)	(0.0477)
Graduate school	2.281***	128.1	0.180***	6.190***
	(0.0293)	(10.3)	(0.00308)	(0.0876)
Unknown	1.053***	5.3	0.00747***	0.301***
	(0.00703)	(1.5)	(0.000891)	(0.0270)
Mother's education				
High school graduate	1.328***	32.8	0.0390***	1.708***
	(0.00623)	(11.8)	(0.000721)	(0.0221)
Some college	1.624***	62.4	0.0787***	3.209***
	(0.0152)	(8.6)	(0.00179)	(0.0530)
College graduate	1.692***	69.2	0.0952***	3.505***
	(0.0123)	(13.3)	(0.00144)	(0.0426)
Graduate school	1.748***	74.8	0.106***	3.900***
	(0.0181)	(8.9)	(0.00223)	(0.0650)
Unknown	0.730***	-27.0	-0.0433***	-1.986***
	(0.00813)	(5.2)	(0.00150)	(0.0438)
Married	1.244***	24.4	0.0306***	1.362***
	(0.0101)	(6.3)	(0.00106)	(0.0313)
Children	1.214***	21.4	0.0271***	1.200***
	(0.00964)	(6.4)	(0.00109)	(0.0322)
Work	1.210***	21.0	0.0269***	1.380***
	(0.00445)	(9.3)	(0.000549)	(0.0164)
Southeast	1.212***	21.2	0.0293***	1.220***
	(0.00420)	(10.1)	(0.000514)	(0.0156)
Urban area school	1.135***	13.5	0.0183***	0.709***
	(0.0157)	(1.6)	(0.00195)	(0.0584)
Favela dweller	0.687***	-31.3	-0.0480***	-2.220***
	(0.00695)	(6.3)	(0.00138)	(0.0389)
cons			2.537***	57.23***
			(0.00338)	(0.101)
N	2,547,992	2,547,992	2,547,992	2,547,992
R-sq			0.205	0.317

Note: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Socio-economic variables also had an impact on students' performance. As income increases, students perform better on the ENEM exam. A student whose parents earn more than 30 minimum wages score 6.8 more points than a student whose family income is less than 2 minimum wages. The odds of scoring in a higher category on the ENEM exam, is drastically increased as family income increases. Students educated at a public high school scored 8.4 points less than students from private school, and the odds of scoring in a higher category is 68.3% less for public school students. The variables for father's and mother's education indicate a clear positive relationship that is statistically significant: the more educated a student's parents are, the more likely the student is to score higher in the ENEM. Students whose fathers' highest level of education is high school scored 1.8 points more on the ENEM exam than students whose fathers had less than a high school education. Having a father with a college degree increased the score by almost 4.4 points. Students who did not know their mothers' education, scored almost 2 points less on the ENEM than students whose mothers' education was less than high school. Students whose mothers had a college degree scored 3.5 points more on the exam in comparison with the reference category.

Although students who live in favelas were more likely to give a high score for perceived quality of education, they scored 2.2 points less on the ENEM exam than students not living in the favelas. Students from the southeast region and from urban areas were also at an advantage compared to students from other regions and from rural areas. This reflects the fact that the quality of education in the southeast region is superior to other regions of the country. Being married, having children, and having a job had a positive effect on how a student performs in the ENEM exam. Also, female students[16] and older students scored 3 points and 0.7 points less on the ENEM than male students and younger students.

The OLS raw score coefficients are additive. Thus, it is possible to predict ENEM scores in specific scenarios. For example, the predicted ENEM score of a student who is white (+1.9), male (+3.0), attends private school (+8.4), attends prep course (+2.1), whose parents' highest level of education is college (+7.9), and whose family income is more than 30 minimum wage (+6.8) is approximately 30 points higher than someone who is *nonwhite*, who is female, attends public school, does not attend prep course, whose parents' education is less than high school and whose family income is less than 2 minimum wages. From the results in Table 3, there seems to be little difference between running an ordered logit model on the score categories set by the ENEM committee or a simple OLS on the raw scores. That is, the sign of the coefficients and whether it was statistically significant are the same. Interpreting the ordered logit results simply indicates the odds of scoring in a higher category versus the lower categories of the ENEM exam.

7. A vicious circle: perpetuating inequalities

The findings reveal that *nonwhite* students have lower ENEM scores and rate their overall quality of high education more negatively than white students. Even when parents' education, household income, and region of residence were accounted for, there was a non-negligible, statistically significant effect of the race parameter when analyzing quality of high school education and performance on the ENEM exam. Differences among racial groups in perceived quality of education and ENEM performance affect the ability of Afro-descendants to get into college and perpetuate the inequality cycle in Brazil.[17]

Socio-economic factors were also statistically significant. Parents' level of education plays a key role in the student's performance and perceived quality of education, particularly the education of the mother. The more educated the student's parents are, the more likely the student is to score higher in the ENEM exam. Income has the same influence. Parents' education and income are highly correlated, resulting in more available resources to the student for educational purposes. Likewise, the type of school (private or public) was especially important to students' overall quality of education and performance on the ENEM exam. The odds of scoring in a higher category of the ENEM exam are lowered by 68.3% for students from public school. Hence, a white student from high socio-economic status will experience a better quality of education, will score higher on the ENEM exam, and will greatly

increase his or her odds of being admitted to a good public university. In the educational achievement process, the differentials between *nonwhite* and white students behaved in congruence to Hasenbalg's theory of cumulative racial disadvantages. There are differences due to social origins (represented by the education of parents, family income and type of school) to which further differences due to race are superposed. Race is important for stratification, nevertheless other determinants of social position are similarly substantial to understand racial inequalities in accessibility to higher education.

Presently, 131 institutions of higher education use the ENEM as admission exam and the differentials observed in the scores of *nonwhites* students directly contribute to racial disparity in Brazilian universities (Brazilian Ministry of Education 2016). Given the continuing debate over affirmative action programs in Brazil, these findings lend credence to arguments in support of affirmative action, particularly of racial and social quotas combined (Valente forthcoming; Valente and Berry forthcoming). The analysis indicates that the affirmative action law implemented in 2012 is a much needed mechanism for democratizing access to higher education and for expanding access of *nonwhite* and poor youth to universities in Brazil.

Notes

1. For an interpretation of the genesis of the idea of 'racial democracy' refer to Bastos (2001). Although 'racial democracy' is attributed to Freire, he did not coin the term but the idea. For further discussion, see Guimarães (2005).
2. Although there are conceptual differences between discrimination, racism, prejudice and negative stereotyping, in this study racial discrimination and racism will be used without any distinction.
3. Following Hasenbalg (1988) and many other scholars, I define nonwhites as the combination of *negros, pardos*, and *mulatos*, which is sometimes referred to as Afro-Brazilians.
4. As stated by do Valle Silva (1999), 'blacks and *pardos*, contrary to expectations, displayed striking similar profiles. This was particularly true with regard to patterns of economic returns to experience and schooling. Significantly, the claim that blacks and *pardos* compose a homogeneous *nonwhite* racial group apparently does not contradict reality. Rather than being a mere simplification, in some contexts, the analysis of blacks and *pardos* together appears to be a sensible approach to the study of racial discrimination in Brazil' (68).
5. *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 ethnicity.
6. Since, the data set is based on questionnaire answers, it is important to acknowledge that reporting biases are likely present.
7. The rough data can be found at: http://portal.inep.gove.br/basica-levantamentos-acessar INEP (2012).
8. Original in Portuguese: '*Nota para a formação que obteve no ensino médio*.' This was the last question after a series of 45 questions regarding the quality of the school in relation to teacher's performance, course curriculum, school infrastructure, student's relations, etc.
9. 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, school level influences could not be controlled for as individual school data was not available.
10. Since quality is measured from 1 (low) to 8 (high) the order of categories are meaningful, but the distances between them are arbitrary. Using OLS with an ordinal dependent variable violates many of the OLS regression assumptions and may lead to model errors and incorrect data interpretation, as it assumes that the distance from 1 to 2 equals that from 7 to 8 for example.
11. For more on using OLRM versus OLS see Peel, Goode, and Moutinho (1998) and Ferrer-i Carbonell and Frijters (2004).
12. For a detailed overview of the ordinal regression model using a latent variable, see Long and Freese (2006).
13. There is clear evidence that the performance of students in public schools is much inferior to students in private schools, and that the quality of public schools are inferior to private schools (Guimarães and Sampaio 2007; Sampaio and Guimarães 2009; Telles 2004). Thus, I control for type of school. In addition, wealthier students are able to afford preparatory courses (curso pré-vestibular) that are specifically designed to prepare students to take the vestibular exam and can be very expensive. Thus, I also control for attendance in prep courses.
14. Although the data set covers five years, this is not a panel study as individual students vary each year. Increasingly, micro data sets in the form of a series of repeated cross-section sample surveys are available to researchers and generally are grouped together for analysis.

15. Excluding students who did not fully answered the ENEM socio-economic questionnaire is a limitation. Students who did not respond fully could be inherently different than the students who answered the whole questionnaire: in survey research refusal or inability to respond all of the questionnaire's questions may be correlated with such things as education, income, and geographic location. Nevertheless, when comparing ENEM results for students who did not answer the socio-economic questionnaire and whose information was missing, with those who answered the questionnaire, I found the overall percentages for each ENEM category to be similarly distributed.
16. Since only the objective part of the exam was used in this study, a gender bias should be accounted for when interpreting the results. Further analysis looking at both the essay and objective part of the ENEM exam is necessary, since female students tend to do much better on essay exams than male students and are the majority group in higher education in Brazil.
17. It is important to acknowledge that due to the complex racial classification in Brazil and the fact that many *mulatos* of lighter skin self-identity as white, the results could be indicating a weaker relationship, when in fact it should be much stronger.

Disclosure statement

No potential conflict of interest was reported by the author.

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