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Performance of Students Admitted through Affirmative Action in Brazil

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Following the implementation of the Lei das Cotas (Affirmative Action Law) in Brazil, there has been debate as to whether students who were admitted through affirmative action perform at the same level as students admitted through traditional methods. This article examines the results of the Exame Nacional de Desempenho dos Estudantes (ENADE) from 2009 to 2012 to determine whether there is a relationship between students' performance at the university level and the manner of their admittance. We find that students admitted to public universities under affirmative action perform at similar levels to students who were not, whereas quota students in private universities perform slightly better than students admitted through traditional methods.

Com a implementação das Lei das Cotas no Brasil, tem se debatido se estudantes admitidos através de ação afirmativa demonstram o mesmo nível acadêmico dos estudantes admitidos através de métodos tradicionais. Este artigo analisa os resultados do Exame Nacional de Desempenho dos Estudantes (ENADE) durante o período de 2009 á 2012 para determinar se existe uma relação entre o desempenho dos alunos no âmbito universitário e as modalidades da sua admissão. Nossa análise revela que os estudantes que foram admitidos em universidades públicas através de ações afirmativas têm o mesmo desempenho acadêmico de estudantes que não se beneficiam de ações afirmativas, enquanto alunos cotistas em universidades privadas têm um desempenho ligeiramente melhor do que alunos admitidos através de métodos tradicionais.

Introduction

Affirmative action policies have been implemented in Brazilian universities in the past decades with the objective of reducing inequality of access, mainly through social and racial quotas (Johnson and Heringer 2015; Telles 2014; Valente 2013). After the Brazilian Supreme Court deemed affirmative action to be legal and constitutional in 2012, much of the debate on the merits of affirmative action shifted to focus on its effectiveness and whether it is appropriate as a means to promote equitable access to higher education or merely a palliative measure. Historically, disadvantaged groups (i.e., indigenous, low income, landless settlers, and nonwhites) have been subjected to many forms of discrimination and prejudice, including lack of access to higher education (Osorio 2008; Soares et al. 2005; Heringer 2015; Valente 2013, 2016a, 2016b; Valente and Berry 2015). Most people agree that students who study in public primary and secondary schools—particularly nonwhites—are harmed in the admission process of public universities because of the low quality of their prior education (Birdsall and Sabot 1996; Guimarães 2003; Telles 2004; Arias, Yamada, and Tejerina 2004; Schwartzman 2004; Soares et al. 2005).[1] Without affirmative action policies, the perverse

[1] Given the subjective nature of race and racial identity in Brazil, the term *nonwhite* refers to those identified as black (*negros*) or brown (those of mixed race, *pardos*, or *mulatos*). For a general analysis of racial identity in Brazil, see Harris (1964), Skidmore and Smith (1997), Skidmore (1993), Levine and Crocitti (1999), Schwartzman (2007, 2008), Reiter and Mitchell (2010), Marcus (2012), and Guimarães (2013).

consequence is that society ends up paying for the free, prestigious college education of the children of affluent families.[2]

However, with admission through affirmative action, there is the issue of competence.[3] Students who qualify for affirmative action (i.e., nonwhites from public schools of lower socioeconomic status) perform worse on the *vestibular* exam and Exame National do Ensino Médio (or ENEM) (Costa Ribeiro and Klein 1982; Mascarenhas 2001; Guimarães 2003; Velloso 2005, 2006; Valente 2013, 2016a, 2016b),[4] thereby leading some professors and administrators at public universities to argue that affirmative action diminishes and degrades the quality of education (Pacheco and Silva 2007; Sander and Taylor 2012). In fact, some believe that university slots should be reserved for the most able students, those who are able to pass the entrance exam (Goldemberg and Durham 2007). The argument follows that students entering through affirmative action quotas are not able to follow professors' lectures, read and interpret texts, participate in seminars and lab research, or write scientific reports, thus forcing professors to lower expectations of the curriculum or delay delivery of curricular material, which would impair qualified students who were selected through traditional methods (Pacheco and Silva 2007). Others claim that affirmative action policies contribute to the declining quality of university education, as they violate the merit criterion for admitting students (Goldemberg et al. 2013; Goés 2004; Castro 2004). To what extent are these arguments correct?

There is a dearth of research about the relationship of affirmative action and students' academic performance in Brazil, with only a few studies addressing this relationship to some extent (Childs and Stromquist 2015; Francis and Tannuri-Pianto 2012; Queiroz and Santos 2007; Cardoso 2008; Waltenberg and Carvalho 2013). While Childs and Stromquist (2015), Cardoso (2008), and Queiroz and Santos (2007) found that quota students have comparable grades to those of nonquota students, except in selective majors, Francis and Tannuri-Pianto (2012) found that quota students have lower grade point averages than do nonquota students. These studies allow for only limited generalization: Francis and Tannuri-Pianto (2012) and Cardoso (2008) analyzed only students in the University of Brasília; Childs and Stromquist (2015) examined three universities—the University of Brasília, the Federal University of Bahia, and the State University of Campinas—and Queiroz and Santos (2007) examined students in the Federal University of Bahia. Waltenberg and Carvalho (2013) were the only ones to examine performance at a national level by using the 2008 data set for the Exame Nacional de Desempenho dos Estudantes (ENADE; National Survey of Student Performance). They found that in public universities, affirmative action students performed slightly worse than others students, and they did not find a statistical significant difference in private universities. There are, however, several statistical limitations in this study, which could bias their results.[5]

More rigorous research is needed to examine the effect of affirmative action on students' performance in college. The main contribution of this study is to fill this gap by testing whether affirmative action students perform at the same level in college than other students using a national data set, as well as proper statistical models, analyses, and methods. We first provide a brief review of why affirmative action is important in Brazil. We then discuss the data set utilized, derived from the ENADE, followed by the results obtained from our analysis.

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[2] An incongruity of Brazil's education system is that well-regarded institutions at the primary and secondary levels are in the private sector, but at the university level the most prestigious universities are public, with free tuition. As a consequence, admission to a public university is a rigorous competitive process, whereby nonwhite, poor students who cannot afford private high school education cannot compete on equal footing for university admission. For more, see Valente (2016b).

[3] There are several other issues being debated in connection to possible effects of affirmative action. These include reverse racism, racial identity–related complications in determining who qualifies for affirmative action, and the American provenance of the policy (created in response to a distinct US racial experience that does not resemble that of Brazil). Another concern is that it will benefit only an elite group within a minority group. For more on this, see Feres Júnior and Daflon (2015). For the purpose of this article, however, we focus only on the issue of competence.

[4] The *vestibular*, a competitive exam, was the only criteria for admission to Brazilian universities until 2010. Recently, the Exame National do Ensino Médio (ENEM) is used as the main criteria for admission by many universities through the Sistema de Seleção Unificada (Unified Selection System, or SISU), which was created in 2009 and allows for federal and state universities to select their students through this system. Through this system students can apply to two different public institutions in any region of the country, competing for admission on the basis of their ENEM score. For more, see Johnson and Heringer (2015).

[5] Waltenberg and Carvalho (2013) excluded several important control variables from the regression analysis, and the exclusion of income, age, working students, and regional differences can bias results. Without these controls, the regression coefficient estimates for model variables tend to be too high or too low. Another problem is coding of parents' education; mother's and father's education were merged into one variable ranging from 0 to 30, instead of being analyzed separately, as is the norm (otherwise, it is impossible to distinguish if the effect and significance, or lack thereof, is a result of the father's education, the mother's education, or both). In addition, majors were merged on the basis of their prestige (i.e., low, medium, high), instead of being analyzed individually. Finally, Waltenberg and Carvalho (2013) used only the 2008 data set, and looked only at the Specific Knowledge section score. Thus, their results should be interpreted with caution.

Historical Context

For many years the Brazilian government has argued that Brazil is a racial democracy, in which racism is nonexistent (Freyre 1933; Pierson 1945). However, racial inequality has persisted, and race has consistently been used to exclude nonwhites throughout Brazil's history (Telles 2004; Ribeiro 2005; Schwartzman 2006). About one in four nonwhite Brazilians are illiterate, compared to one in ten white Brazilians (Lloyd 2009). When examining access to higher education, we have found that Afro-Brazilians do not have a fair opportunity to attend an institution of their choice. Although nonwhites make up 50.7 percent of Brazil's population, they represent fewer than 35.8 percent of students attending Brazilian universities (Instituto Brasileiro de Geografia e Estatística 2010). This is problematic because higher education is the most effective tool for social mobility: the inability to attend university hampers African descendants' chances of upward mobility (Valente 2013, 2016b).

Some scholars argue that the debates on the merits of racial affirmative action started during the presidency of Fernando Henrique Cardoso in 1995, when the federal government started to take more initiative and contemplated affirmative action for the first time (Htun 2004).[6] President Cardoso created the Interministerial Working Group to Valorize the Black Population, and a similar group within the Ministry of Labor. In the following months, many state agencies at all levels began announcing affirmative action policies. The National Human Rights Program started in 1996 proposed specific public policies for nonwhite Brazilians, including measures to increase access to universities. Nonetheless, the then minister of education, Paulo Renato Souza, was a strong opponent of affirmative action policies despite the fact that blacks made up only 2 percent of university students at the time (Htun 2004). Over the following few years, black activists,[7] politicians, scholars, and students were among the key political forces for the implementation of affirmative action in selected universities across Brazil.[8] In 2001, a state law was passed in Rio de Janeiro reserving 50 percent of university slots in that state for students from public high schools. A few months later, another state law provisioned 40 percent of slots in the two state universities in Rio de Janeiro for black and brown students. Other universities in other states, such as the University of Brasília (UNB) and the University of Bahia State (UNEB), also introduced racial and socioeconomic quotas.[9] Between 2002 and 2009, affirmative action policies spread rapidly among state universities (Feres Júnior and Daflon 2015). In federal universities, however, the implementation of such policies was a bit slower. Federal institutions did not start enacting affirmative action programs in greater numbers until 2008 with the launching of the Programa Nacional de Apoio ao Plano de Reestruturação e Expansão das Universidades Federais, known as REUNI (Feres Júnior and Daflon 2015).

By 2010, more than 70 percent of public universities in Brazil were offering quotas, bonuses, or a combination of both, targeting mainly poor students from public high schools (Feres Júnior, Daflon, and Campos 2010).[10] The implementation of racial quotas in the UNB was challenged, appealed, and ultimately brought before the Brazilian Supreme Court, which in 2012 unanimously deemed that affirmative action was constitutional and necessary. Justice Joaquim Barbosa (2012) stated in the deliberation: "Affirmative actions are defined as public policies directed to fulfill the constitutional principles of material equality and to neutralize the pervasive effects of discrimination of race, gender, age, national origin or disability. . . . These measures aim to fight not only flagrant manifestations of discrimination, but de facto discrimination, that is so absolutely rooted in our society, so well rooted, that [most] people do not perceive it."

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6 Before 1995 a few state officials suggested implementing affirmative action for nonwhites. According to Andrews (1991), during Sarney's government (1985–1990), Minister of Culture Celso Furtado proposed the idea of affirmative action in Brazilian schools and universities for black students. Likewise, in 1968 a few Labor Ministry officials voiced support for legislation requiring businesses to hire a certain percentage of black employees in response to labor market discrimination (Guimarães 1999). Many black legislators and senators of the 1980s and 1990s emphasized racial inequality. Congressman Abdias do Nascimento, for example, proposed several measures in the 1980s, including racial affirmative action (Benedito 2015).

7 Black movement activists have fought for racial equality in the educational system since the 1940s and were fundamental in advocating and pressuring the state to implement affirmative action policies. For more, see Johnson and Heringer (2015), Santos (2006), and Telles (2004).

8 Several other affirmative action measures and policies were implemented by municipal and state governments and nongovernmental organizations in Brazil in the mid-1990s, including social programs targeting poor neighborhoods, job-training programs, preparatory courses for university admission, and support for black-owned business (Heringer 2001).

9 For a detailed historical overview of affirmative action in Brazil, see Htun (2004), Telles (2004, 2014), Schwartzman (2008, 2009), and Johnson and Heringer (2015).

10 University of Campinas, for example, adds additional points (bonuses) to the admission exam of students who studied in public high school and students who are nonwhite or indigenous.

Following the Supreme Court decision, then president Dilma Rousseff, on August 29, 2012, signed into law an affirmative action policy reserving 50 percent of slots in federal universities for students from public high schools ("Dilma sanciona" 2012). There are sixty-five federal universities in Brazil. Within this quota, half of all slots are allocated to students whose family income is less than or equal to 1.5 minimum wages per person in the household. Within this quota, slots are reserved for black, brown, and indigenous students in proportion to the percentage of these groups in the state where the university is located. In the state of São Paulo, for example, approximately 30 percent of the population is black, brown, or indigenous, whereas in Bahia this number is close to 76 percent. According to this new law, if the specified racial groups do not fill the quota slots, then the available slots should go to students who studied only in public high school. The implementation of quotas has occurred progressively: federal universities were to reserve 12.5 percent of total slots in 2013, 25 percent in 2014, 37.5 percent in 2015, and 50 percent in 2016. However, federal universities were free to implement the 50 percent quota before these deadlines.

Presently, about 80 percent of state universities and 100 percent of federal universities have adopted some form of affirmative action, either quotas or bonuses to minority students in their admission processes (Johnson and Heringer 2015). Universities have different criteria for admission based on affirmative action. The most common criterion is that the student must have studied at a public high school.[11] Other universities provide a combination of racial and social quotas: the candidate must be nonwhite and from a public high school. Some universities instituted income criteria as well, by which students must provide evidence of family income indicating social need. Few institutions provide affirmative action for students with disabilities, women, and others (Feres Júnior, Daflon, and Campos 2010). Alongside these initiatives, in 2004 the Brazilian government implemented the Programa Universidade para Todos (PROUNI), which provides scholarships to private institutions of higher education for poor and nonwhite students from public high schools (Instituto de Pesquisa Econômica Aplicada 2008). Essentially, PROUNI requires that private universities with tax exemptions grant full or partial scholarship to low-income students in all of their courses. Students are selected by their ENEM scores, and there are quotas for black, brown, indigenous, and disabled students (Johnson and Heringer 2015). It is estimated that between 2004 and 2015 PROUNI awarded 1.6 million scholarships to low-income students to attend private universities (Palácio do Planalto 2015). The federal government also created in 2007 the REUNI program, which involved social inclusion mechanisms to ensure equal access and retention of all students in public universities (MEC 2007). Other important measures in REUNI include increasing the number of slots in public universities and number of students per professor, expanding and offering night courses, reducing cost per student, offering a flexible course schedule, and combating students' risk of evasion. The program is designed to generate better conditions for improving access and retention in higher education through improved infrastructure and human resources in federal universities (Johnson and Heringer 2015). The combination of these programs and policies has significantly affected the configuration of the Brazilian public higher educational system.

Data

The data we use to test whether there is a relationship between affirmative action and students' performance come from the Exame Nacional de Desempenho de Estudantes (ENADE), one of the assessment procedures of the National Higher Education Evaluation System (Sistema Nacional de Avaliação da Educação Superior). 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 college-level students nationwide.[12] Its main goal is to access students' progress in college by assessing the learning potential of first-year students and the competence of graduates. To assess academic abilities and professional competences, the exam consists of two components: General Education (Formação Geral) and Specific Knowledge (Conhecimento Específico). The General Education section is common to all majors and aims to assess general knowledge both nationally and internationally to investigate whether students are well rounded and engaged in global and national issues pertaining to the society they live in. The Specific Knowledge section assesses knowledge specific to the students' majors and careers. From 2004 to 2008 students were selected by stratified random sampling to take the exam; after 2009 all students were required to take the exam

[11] According to Daflon, Feres Júnior, and Campos (2013), public school students are the greatest targets of these policies, followed by nonwhites and indigenous students.

[12] Some have argued that a more complex multidimensional scoring system is needed (Pedrosa, Amaral, and Knobel 2013). However, until other assessments become available, ENADE remains the single data set for assessing higher education learning outcomes in Brazil nationwide.

during the first and last year of their degree programs; otherwise, their diplomas would be withheld until they fulfilled the requirement.[13] In 2008, the ENADE's socioeconomic questionnaire first asked whether students were admitted under affirmative action. Because this particular question was changed in 2009 to include different categories of affirmative action (e.g., race, income, public school), we analyze only the years 2009–2012, which provide the most recent data available for research.[14] We were interested in analyzing students' performance in the last year of their degree program. Thus, the data set has a total of 1,076,940 students: 298,086 in 2009, 138,928 in 2010, 278,279 in 2011, and 361,647 in 2012. The vast majority of students, 75.60 percent, were from private universities. The lesser number of students in 2010 is due to a fraud scandal at the Universidade Paulista: In 2010, the Ministry of Education accused the university, the fourth largest private university in Brazil, of preventing lower-performing students from taking the exam to ensure a higher university ranking. The sudden drop in the number of students sitting for the ENADE in 2010 raised red flags, and after investigation, it was confirmed that the university had withheld students from taking the exam purposely (Pompeu, Lordelo, and Silva 2012).

Models and Method

The purpose of this article is to determine whether affirmative action students have the same academic performance in college than others admitted through traditional methods. As educational performance on the ENADE also may be affected by other variables, the effect of affirmative action is explored in the context of several control variables, including race, age, gender, family income, geographic region, parents' educational level, and type of high school education (public versus private). Because the ENADE comprises two parts, we run the model twice to address two tentative hypotheses:

H_1: There is no difference in specific knowledge scores for affirmative action students and those admitted through traditional methods, other things equal.
H_2: There is no difference in the total ENADE score for affirmative action students and those admitted through traditional methods, other things equal.

These hypotheses allow us to examine the effect of affirmative action on both the total ENADE score and the Specific Knowledge portion.

The first model (M1) tested therefore has the following form:

$$\mathit{SpecificK}_i = \alpha + \beta_1 X_1 + \beta_i E_i + \varepsilon.$$

The dependent variable $\mathit{SpecificK}_i$ is a measure ranging from 0 to 100 and is based on thirty questions on the Specific Knowledge section. This first model analyzes the performance of students within their majors, controlling for the set of exogenous independent variables in E_i. The main independent variable X_1, representing type of admission, is measured on the basis of the answer to the question, "Was your entrance into undergraduate degree through policies of affirmative action?" We run several regressions examining the individual effect of each type of affirmative action (racial, social, combination of racial and social, other type) and one for all types combined.

The second model (M2) is:

$$\mathit{TotalENADE}_i = \alpha + \beta_1 X_1 + \beta_i E_i + \varepsilon.$$

The dependent variable $\mathit{TotalENADE}_i$ is constructed from forty questions, ten on General Education and thirty on Specific Knowledge. The total score is a combination of scores from both sections (General Education, 25 percent; Specific Knowledge, 75 percent), worth 100 points. **Table 1** includes a summary and description of the variables in the models.

The models were estimated using ordinary least squares (OLS).[15] Because institutions of higher education have different characteristics in terms of infrastructure, quality of education or curriculum, and professors,

[13] Since 2013, first-year students have been exempted from this requirement.

[14] These raw microdata can be downloaded from the website of the Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira, at http://portal.inep.gov.br/basica-levantamentos-acessar.

[15] Ideally, the models should have been adjusted with hierarchical linear modeling (HLM), given that individual universities are a large component in any educational process. However, the data do not identify the university or its administrative categories (i.e., federal, state, or municipal). As a consequence, we adjusted standard errors using variance-covariance matrix of the estimators (VCE) (robust).

Table 1: Variables and definitions.

Type	Variable	Definition
Action	All affirmative action	1 (yes) admitted by any form of affirmative action; 0 (no)
	Racial	1 (yes) admitted by racial quota; 0 (no)
	Social	1 (yes) admitted by income or public school quota; 0 (no)
	Combination	1 (yes) admitted by a combination of racial, income, and public school quota; 0(no)
	Other	1 (yes) admitted by other type of quota; 0 (no)
Exogenous	Nonwhite	1 (nonwhite) includes *negro*, *pardo*, and *mulato*; 0 (white)
	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)
	Mother education	No schooling to graduate degree: 0 (low) to 6 (high)
	Father education	No schooling to graduate degree: 0 (low) to 6 (high)
	Southeast	If students are from the following states: São Paulo, Rio de Janeiro, Minas Gerais, and Espírito Santo 1 (yes); 0 (no)
	Working	Do you currently work? 1 (yes); 0 (no)
Dependent	Specific Knowledge	Min. 0, max. 100
	Total ENADE score	Min. 0, max. 100

Source: ENADE 2009–2012.
Note: Many studies have merged the racial categories of "black" and "brown" on the basis that the socioeconomic characteristics of these groups are similar (see Hasenbalg 1988; Telles and Lim 1998; Telles 2004, 2014; Osorio 2008).

which affect students' performance, regressions were estimated separately for public and private universities. A multicollinearity test was run for the models, and all variables had very low coefficients for the variance inflation factor, well below the threshold that would indicate an issue of collinearity. In all models, we use robust standard errors to control for possible effects of unobserved heterogeneity among students.

Although the data set covers four years, it is not a panel study, as individual students vary each year. For the first model analysis, the data set was simply appended and included time fixed effects; such a specification simply tests whether there are contextual effects unaccounted for as a result of year differences. The first model controls for degree differences, as the Specific Knowledge section is tailored to the student's major. For the second model, we analyzed each year individually to account for major variances, then analyzed the combined data.

Performance of Students in Public Universities

We begin by looking at the performance of students admitted to public university. About 11 percent of students in our sample were admitted through some form of affirmative action, public high school being the most popular (appendix A). Analysis of the characteristics of graduates who were admitted to public universities through affirmative action policies shows that the majority came from public high schools (87.21 percent), had family income of up to 4.5 minimum wages monthly (71.33 percent), and had a father with less than a high school diploma (65.49 percent) (see appendix B). Of those admitted through affirmative action, only 10.95 percent had a father with a higher education degree, compared to 28.50 percent of those admitted through traditional methods.

Table 2 shows OLS regressions of pooled data from ENADE. Several models with alternative measurements of affirmative action were analyzed. In model A1, affirmative action is a dummy that indicates acceptance through any type of affirmative action. In model A2, affirmative action accounts for only students admitted through racial quota. In model A3, affirmative action indicates students admitted through income quota and model A4 indicates students admitted on the basis of public high school attendance. Model A5 introduces a dummy variable for a student admitted through a combination of racial and social quota, and model A6 a dummy for students admitted through other types of affirmative

Table 2: Model 1 (Specific Knowledge Score): public universities.

	(A1)	(A2)	(A3)	(A4)	(A5)	(A6)
All affirmative action	–0.0378					
	(0.112)					
Racial AA		0.241				
		(0.272)				
Income AA			**−5.599*** **			
			(0.287)			
Public HS AA				**2.604*** **		
				(0.174)		
Combination AA					**3.473*** **	
					(0.313)	
Other AA						**−2.569*** **
						(0.196)
Nonwhite	–0.788***	–0.867***	–0.869***	–0.925***	–0.847***	–0.889***
	(0.0772)	(0.0828)	(0.0822)	(0.0807)	(0.0824)	(0.0813)
Age	–0.162***	–0.142***	–0.143***	–0.145***	–0.145***	–0.139***
	(0.00589)	(0.00640)	(0.00637)	(0.00633)	(0.00642)	(0.00621)
Female	0.145	0.0971	0.0742	0.0778	0.0575	0.123
	(0.0746)	(0.0787)	(0.0789)	(0.0775)	(0.0789)	(0.0781)
Public HS	–1.511***	–1.805***	–1.799***	–1.739***	–1.760***	–1.857***
	(0.0887)	(0.0927)	(0.0926)	(0.0920)	(0.0928)	(0.0916)
Income	0.777***	0.772***	0.762***	0.779***	0.761***	0.772***
	(0.0242)	(0.0253)	(0.0253)	(0.0249)	(0.0253)	(0.0251)
Father education	0.686***	0.692***	0.687***	0.696***	0.696***	0.676***
	(0.0367)	(0.0387)	(0.0388)	(0.0381)	(0.0388)	(0.0384)
Mother education	0.347***	0.351***	0.358***	0.351***	0.352***	0.350***
	(0.0361)	(0.0383)	(0.0383)	(0.0376)	(0.0384)	(0.0380)
Working	–3.503***	–3.405***	–3.454***	–3.406***	–3.456***	–3.399***
	(0.0804)	(0.0850)	(0.0852)	(0.0835)	(0.0852)	(0.0846)
Southeast	0.648***	0.501***	0.569***	0.524***	0.555***	0.532***
	(0.0835)	(0.0874)	(0.0875)	(0.0861)	(0.0873)	(0.0870)
_constant	43.02***	42.57***	42.69***	42.64***	42.70***	42.54***
	(0.253)	(0.270)	(0.270)	(0.267)	(0.271)	(0.266)
Year dummies	yes	yes	yes	yes	yes	yes
Major dummies	yes	yes	yes	yes	yes	yes
N	218,014	195,486	194,628	201,138	194,343	198,423
R^2	0.102	0.103	0.106	0.103	0.104	0.105

Source: ENADE 2009–2012.
Note: Standard errors in parentheses. HS = high school.
$^{*}p < 0.05$. $^{**}p < 0.01$. $^{***}p < 0.001$.

action, excluding social and racial criteria (e.g., women, students with disabilities, children of police officers or firefighters killed on duty). All interactions, except models A1 and A2, were significant.

The results in **Table 2** suggest that students admitted through public high school quotas (model A4) or through a combination of racial or social quotas (model A5) have a significantly higher score in the Specific

Knowledge section than other students, holding everything else constant; these results range from 2.60 to 3.45 points higher in models A4 and A5, respectively. Students admitted through income affirmative action (model A3) or students in the "other" category (model A6) score 5.6 and 2.6 points lower, respectively. Coming from a public high school, being nonwhite, and working while in school all had a negative impact on students' performance.

In model A4 there is an offsetting effect of mode of admission on coming from a public high school. For model A2, being admitted through a racial quota is not significant and does not affect students' performance; other variables such as race, public school, income, father's education, and whether the student has a job, explain students' performance to a much greater extent than does mode of admission. Overall, model A1 indicates that affirmative action is not a significant factor in explaining students' performance in the Specific Knowledge section of the ENADE, whereas coming from a public high school and working reduces students' scores by 1.5 points and 3.5 points, respectively.

In model 2 (M2), we analyze students' performance on the ENADE overall. The dependent variable is a combination of the General Knowledge exam given to every student and the Specific Knowledge exam. To understand the relationship within majors, we first divided the data set by years and ran regressions for each major separately, as follows:

- 2009—administration (I), archival (II), librarianship (III), accounting sciences (IV), economic sciences (V), media (VI), design (VII), law (VIII), statistics (IX), music (X), psychology (XI), international relations (XII), executive secretary (XIII), theater (XIV), and tourism (XV)
- 2010—agronomy (I), biomedicine (II), physical education (III), nursing (IV), pharmacy (V), physiotherapy (VI), speech pathology (VII), medicine (VIII), veterinary (IX), nutrition (X), odontology (XI), social service (XII), occupational therapy (XIII), and zootechnics (XIV)
- 2011—architecture and urbanism (I), visual arts (II), biology (III), social science (IV), computer technology (V), physical education (VI), philosophy (VII), physics (VIII), geography (IX), history (X), arts and humanities (XI), mathematics (XII), music (XIII), pedagogy (XIV), chemistry (XV), engineering group 1 (XVI), engineering group 2 (XVII), engineering group 3 (XVIII), engineering group 4 (XIX), engineering group 5 (XX), engineering group 6 (XXI), engineering group 7 (XXII), and engineering group 8 (XXIII)[16]
- 2012—administration (I), law (II), economic sciences (III), psychology (IV), accounting sciences (V), design (VI), tourism (VII), executive secretary (VIII), international relations (IX), journalism (X), and publicity and marketing (XI).

The main independent variable *RS AA* is a dummy that indicates whether students were admitted through racial, social (public school and income), or a combination of racial and social affirmative action. For most majors in 2009, we find that being admitted through this form of affirmative action is not statistically significant, suggesting similar scores regardless of mode of admission (see appendix C).[17] The exceptions are for students in administration, archival, and media majors, who scored −1.54, −9.18, and +3.62 points than non–affirmative action students, respectively. For competitive and high prestige majors (following Velloso 2005), such as international relations, economic sciences, and law, being accepted through affirmative action did not significantly affect students' performance on the ENADE.

The results for the year 2010 indicate the same patterns. Being admitted through affirmative action is not significant for most majors, except agronomy, medicine, social service, and occupational therapy, in which students admitted through affirmative action scored −2.09, −2.39, −1.36, and +9.63 points, respectively. When analyzing the agronomy major, we found that being nonwhite has a larger effect on performance than does being admitted through affirmative action. Similarly, for the social service major, the effect of affirmative action on student performance is lower than the effect of having studied in a public high school. For medicine, one of most competitive majors in public universities, affirmative action reduces the score by only 2.39 points. Given the high prestige of this major, we would expect a much greater differential between quota and nonquota students' scores.

The results for the year 2011 indicate that affirmative action is a significant factor in determining performance in only four of twenty-three majors. In mathematics, pedagogy, chemistry, and engineering

[16] The engineering groups are determined by the ENADE committee. Subgroups categories are available at the website of Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira, http://portal.inep.gov.br/basica-levantamentos-acessar, after downloading the 2011 ENADE 2011 data set, under *Dicionário_de_ Dados 2011*.

[17] See the regression output results by majors for model 2, public universities, in supplemental files.

G2, affirmative action students scored −1.40, −1.05, −2.14, and −3.07 points on the ENADE compared with other students. For the majors of mathematics, pedagogy, and chemistry, the effect of affirmative action is offset by that of race. Notably, for engineering G2, gender has a more negative effect on exam performance than does being admitted through quota.

For the year 2012 the results show that affirmative action is a significant factor in four majors—law, economic sciences, psychology, and international relations—where affirmative action students scored +1.40, +1.52, +2.89, and −8.9 points, than non–affirmative action students, respectively. The positive effect of affirmative action is offset by other characteristics, such as coming from a public high school for law and psychology majors, or being nonwhite for economic sciences majors.

Combining the data for all years, we then ran several regressions examining the individual effect of each type of affirmative action on total ENADE score for all majors combined (**Table 3**). To control for observed and unobserved heterogeneity, all models include dummies for majors plus time fixed effects. In model B1, affirmative action is a dummy that indicates acceptance through any type of affirmative action. Model B2 includes a dummy indicating students admitted through racial, social (income or public high school), or a combination of both types of affirmative action.

In model B3, affirmative action includes only students admitted through racial quota. In model B4, affirmative action indicates students admitted through income quota and model B5 indicates students admitted on the basis of public high school attendance. Model B6 introduces a dummy variable for a student admitted through a combination of racial and social quota, and model B7, a dummy for students admitted through other types of affirmative action excluding social and racial criteria.

The results indicate that students admitted through affirmative action score 0.70 points less on the total ENADE score than do students admitted through traditional methods (model B1). However, subsequent models reveal that this result is largely influenced by the negative performance of students admitted through the income affirmative action (model B3, −5.285) and the other category (e.g., students with disabilities) (model B7, −2.991). Students admitted through public high school quotas (model B5) and students admitted through a combination of racial and social quotas (model B6) actually perform better than do students admitted through traditional methods, by +1.85 and +2.43 points, respectively.

Performance of Students in Private Universities

Do the results differ for students admitted to a private university? About 14.25 percent of students admitted to private universities were admitted through affirmative action (appendix D). The majority of these came from public high schools (86.28 percent), had a family income of up to 4.5 minimum wages (68.54 percent), and had a father with less than a college degree (90.00 percent). Most were white (56.59 percent) and admitted through forms of affirmative action other than race (appendix E). About 13.86 percent of students admitted through racial affirmative action reported being white. This is due to the complex and amorphous Brazilian definition of race: many African descendants who are of mixed heritage, and might be "on the border" of whiteness, self-report as white.

For private universities the results for the first model, analyzing performance on the Specific Knowledge portion of the exam, indicate that all interactions between affirmative action and students' performance were significant. Students admitted through affirmative action perform better on this exam than do students admitted through traditional methods, except for two categories: "income" and "other" categories where students performed 1.41 and 1.76 points lower than traditional students, respectively. Given the large sample size, all variables are statistically significant.

The results are presented in **Table 4**. Overall, model A1 indicates that in private universities, at the conclusion of the bachelor's degree, affirmative action students achieve slightly better scores on the Specific Knowledge section of the exam than do other students. The offsetting effects of mode of admission and race are interesting; whereas being admitted through racial affirmative action increases a student' score by 3.91 points, being nonwhite reduces it by 1.15 points. Likewise, the positive effect of being admitted through a combination of racial and social affirmative action (model A5) is reduced by having studied at a public high school, being nonwhite, and working.

The results from the second model, analyzing performance on the total ENADE exam, contrast with the findings for public universities. Whereas for public universities most results are not significant, for private universities we find the opposite (see appendix C).[18] For 2009, being admitted through affirmative action was a positive, significant indicator for most majors, except librarianship, statistics, music, and theater. In

[18] See the regression output results by majors for model 2, private universities, in supplemental files.

Table 3: Model 2 (Total ENADE Score): public universities (2009–2012).

	(B1)	(B2)	(B3)	(B4)	(B5)	(B6)	(B7)
All affirmative action	**−0.697*** **						
	(0.0931)						
RS AA		0.103					
		(0.108)					
Racial AA			**−1.230*** **				
			(0.227)				
Income AA				**−5.285*** **			
				(0.244)			
Public HS AA					**1.847*** **		
					(0.144)		
Combination AA						**2.429*** **	
						(0.276)	
Other AA							**−2.991*** **
							(0.159)
Nonwhite	−0.961***	−0.997***	−0.999***	−1.010***	−1.045***	−0.990***	−1.017***
	(0.0644)	(0.0657)	(0.0691)	(0.0686)	(0.0672)	(0.0688)	(0.0677)
Age	−0.219***	−0.212***	−0.197***	−0.200***	−0.203***	−0.200***	−0.197***
	(0.00507)	(0.00529)	(0.00549)	(0.00548)	(0.00543)	(0.00552)	(0.00533)
Female	−1.696***	−1.692***	−1.693***	−1.711***	−1.728***	−1.702***	−1.707***
	(0.0679)	(0.0690)	(0.0716)	(0.0718)	(0.0705)	(0.0719)	(0.0710)
Public HS	−0.771***	−0.826***	−1.109***	−1.081***	−1.044***	−1.063***	−1.144***
	(0.0751)	(0.0766)	(0.0785)	(0.0785)	(0.0780)	(0.0787)	(0.0776)
Income	0.825***	0.818***	0.810***	0.804***	0.817***	0.798***	0.818***
	(0.0207)	(0.0210)	(0.0216)	(0.0217)	(0.0213)	(0.0217)	(0.0215)
Father education	0.431***	0.443***	0.442***	0.440***	0.447***	0.445***	0.431***
	(0.0309)	(0.0314)	(0.0326)	(0.0326)	(0.0320)	(0.0327)	(0.0323)
Mother education	0.232***	0.238***	0.238***	0.238***	0.234***	0.232***	0.231***
	(0.0301)	(0.0307)	(0.0319)	(0.0319)	(0.0314)	(0.0320)	(0.0316)
Working	−1.926***	−1.919***	−1.845***	−1.866***	−1.852***	−1.871***	−1.827***
	(0.0698)	(0.0708)	(0.0737)	(0.0740)	(0.0725)	(0.0740)	(0.0734)
Southeast	−0.0665	−0.0652	−0.122	−0.0932	−0.0953	−0.101	−0.133
	(0.0735)	(0.0743)	(0.0768)	(0.0770)	(0.0757)	(0.0769)	(0.0765)
_constant	55.42***	56.70***	56.75***	57.07***	56.77***	54.62***	57.06***
	(0.528)	(0.804)	(0.844)	(0.858)	(0.820)	(0.584)	(0.857)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Major dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	217,868	210,948	195,355	194,499	201,000	194,216	198,294
R^2	0.224	0.222	0.224	0.226	0.223	0.223	0.226

Source: ENADE 2009–2012.
Note: Standard errors in parentheses. HS = high school.
*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

Table 4: Model 1 (Specific Knowledge Score): private universities.

	(A1)	(A2)	(A3)	(A4)	(A5)	(A6)
All affirmative action	**1.570*** **					
	(0.0533)					
Racial AA		**3.910*** **				
		(0.222)				
Income AA			**−1.414*** **			
			(0.0884)			
Public HS AA				**3.661*** **		
				(0.112)		
Combination AA					**7.624*** **	
					(0.107)	
Other AA						**−1.760*** **
						(0.0925)
Nonwhite	−0.911***	−1.147***	−1.169***	−1.174***	−1.165***	−1.178***
	(0.0403)	(0.0441)	(0.0428)	(0.0433)	(0.0432)	(0.0430)
Age	0.0645***	0.0967***	0.0883***	0.0950***	0.0899***	0.0961***
	(0.00255)	(0.00276)	(0.00270)	(0.00273)	(0.00273)	(0.00267)
Female	0.681***	0.703***	0.757***	0.706***	0.690***	0.775***
	(0.0395)	(0.0426)	(0.0416)	(0.0420)	(0.0420)	(0.0418)
Public HS	−1.233***	−1.630***	−1.549***	−1.610***	−1.556***	−1.615***
	(0.0471)	(0.0497)	(0.0489)	(0.0493)	(0.0494)	(0.0488)
Income	0.674***	0.801***	0.761***	0.784***	0.768***	0.791***
	(0.0129)	(0.0137)	(0.0135)	(0.0136)	(0.0136)	(0.0134)
Father education	0.308***	0.335***	0.324***	0.336***	0.337***	0.319***
	(0.0192)	(0.0206)	(0.0202)	(0.0204)	(0.0204)	(0.0202)
Mother education	0.324***	0.346***	0.326***	0.350***	0.338***	0.342***
	(0.0190)	(0.0205)	(0.0200)	(0.0202)	(0.0202)	(0.0201)
Worker	−2.776***	−2.440***	−2.530***	−2.472***	−2.516***	−2.432***
	(0.0436)	(0.0468)	(0.0459)	(0.0462)	(0.0461)	(0.0460)
Southeast	0.191***	0.181***	0.214***	0.145***	0.187***	0.186***
	(0.0374)	(0.0404)	(0.0395)	(0.0399)	(0.0398)	(0.0396)
_constant	32.38***	31.00***	31.38***	31.11***	31.32***	31.01***
	(0.128)	(0.138)	(0.135)	(0.136)	(0.136)	(0.135)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Major dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	697,763	592,173	619,544	607,446	611,649	613,027
R^2	0.076	0.083	0.084	0.083	0.087	0.084

Source: ENADE 2009–2012.
Note: Standard errors in parentheses. HS = high school.
$^{*}p < 0.05$. $^{**}p < 0.01$. $^{***}p < 0.001$.

some majors, such as international relations, affirmative action students scored 7.7 points higher on the ENADE than did students admitted through traditional methods. Similarly, for the majors of psychology and tourism, affirmative action students scored 4.1 and 5.2 points higher than students admitted through traditional methods, holding everything else constant. For most majors, the positive effect of affirmative action was offset by race, gender, and a public high school education. The statistics major yielded a notable result: students from public high schools score 16.8 points less on the ENADE, holding everything else constant. This is possibly due to sample-size bias.

The results for 2010 indicate a strong interaction between mode of admission and ENADE performance. This interaction is significant for all majors except one, zootechnics. In all other majors, the impact of affirmative action was positive, ranging from 2.12 to 7.15 points; even in competitive majors such as medicine and odontology, quota students performed better than did nonquota students, holding all else constant. In contrast, race was significant in only four majors, having a lesser impact on students' performance than that observed in public universities. Likewise, parents' education was not a significant factor in determining students' performance for most majors, which also indicates a much lesser interaction than that observed in public universities.

In 2011, affirmative action students' performance was positive and significant for the majority of majors. Only six of twenty-three majors were not significant, and for these, the effects of race seemed to largely counteract the positive effect of being admitted through quota. In other majors, such as biology, history, and computer technology, being from a public school also neutralizes the effect of affirmative action. For the engineering majors, we found that female students were at a greater disadvantage than quota students regarding performance on the ENADE. For the engineering group 2 major, being female completely counterweighted the effect of affirmative action.

The results for 2012 suggest a positive, significant effect between affirmative action and students' performance on the ENADE for all majors, with scores ranging from +1.94 to +4.75 points higher than traditional students. Even in competitive majors such as law and international relations, quota students scored 3.62 and 3.40 more points than did students admitted through traditional methods. Some of these positive effects were neutralized for female students; in international relations, if the quota student was a woman, the positive effect of mode of admission was completely offset by gender (+3.40 versus –4.89). Overall, quota students in private universities score much higher on the ENADE than do students admitted through traditional methods. For most majors, the interaction of affirmative action and exam performance was overwhelming positive and significant. Not a single major indicated a negative and significant relationship.

When analyzing the combined data set and different measurements of affirmative action (**Table 5**), we found that quota students scored 1.84 points more than traditionally admitted students on the ENADE overall, holding all else equal (model B1). All interactions were significant, and only two were negative: income (model B4) and other (model B7). Students admitted through public high school affirmative action scored 4.03 more points (model B5), and students admitted through a combination (model B6) scored 7.8 points more on the ENADE overall than did students admitted through traditional methods.

Discussion and Conclusion

These results indicate that students in public universities finish their degree at comparable levels of ENADE scores, regardless of manner of admission, with the exception of students admitted through the "income" and "other" affirmative action categories who underperform relative to students admitted through traditional methods. This is not surprising given the challenges these students face: to qualify for income-based affirmative action, students' family income must not be more than 1.5 times the monthly minimum wage, which positions them in the lowest socioeconomic stratum of Brazil. Similarly, the "other" category comprises largely of students with disabilities, who must overcome many obstacles to earn a degree. However, it is important to note that these two affirmative action categories are not offered in most public universities—most offer affirmative action policies based on social criteria, attendance in public high school being the most common, and some use a combination of race and social quotas. Our analyses show that students admitted through public high school quotas or a combination of racial and social quota perform slightly better than do students admitted through traditional methods in both models (see models A4 and A5 in **Table 2**; models B5 and B6 in **Table 3**). Public universities therefore appear to be good performance equalizers.

Table 5: Model 2 (Total ENADE Score): private universities (2009–2012).

	(B1)	**(B2)**	**(B3)**	**(B4)**	**(B5)**	**(B6)**	**(B7)**
All affirmative action	**1.835*** **						
	(0.0451)						
RS AA		**2.983*** **					
		(0.0520)					
Racial AA			**3.819*** **				
			(0.190)				
Income AA				**−1.060*** **			
				(0.0747)			
Public HS AA					**4.030*** **		
					(0.0949)		
Combination AA						**7.786*** **	
						(0.0897)	
Other AA							**−1.594*** **
							(0.0771)
Nonwhite	−1.017***	−1.069***	−1.239***	−1.262***	−1.272***	−1.259***	−1.281***
	(0.0340)	(0.0348)	(0.0371)	(0.0361)	(0.0365)	(0.0364)	(0.0362)
Age	−0.091***	−0.0819***	−0.059***	−0.067***	−0.061***	−0.065***	−0.060***
	(0.00225)	(0.00232)	(0.00243)	(0.00238)	(0.00240)	(0.00240)	(0.00235)
Female	−1.423***	−1.426***	−1.406***	−1.384***	−1.414***	−1.415***	−1.375***
	(0.0358)	(0.0365)	(0.0386)	(0.0377)	(0.0381)	(0.0380)	(0.0378)
Public HS	−0.349***	−0.453***	−0.787***	−0.686***	−0.774***	−0.717***	−0.773***
	(0.0404)	(0.0412)	(0.0426)	(0.0419)	(0.0422)	(0.0423)	(0.0417)
Income	0.852***	0.881***	0.972***	0.936***	0.957***	0.944***	0.964***
	(0.0111)	(0.0114)	(0.0119)	(0.0116)	(0.0117)	(0.0117)	(0.0116)
Father education	0.103***	0.119***	0.132***	0.120***	0.130***	0.132***	0.120***
	(0.0163)	(0.0167)	(0.0176)	(0.0172)	(0.0173)	(0.0173)	(0.0172)
Mother education	0.0887***	0.0948***	0.114***	0.095***	0.118***	0.106***	0.113***
	(0.0161)	(0.0164)	(0.0174)	(0.0170)	(0.0171)	(0.0171)	(0.0170)
Working	−0.555***	−0.517***	−0.280***	−0.348***	−0.311***	−0.336***	−0.279***
	(0.0385)	(0.0392)	(0.0414)	(0.0406)	(0.0409)	(0.0407)	(0.0407)
Southeast	0.416***	0.406***	0.427***	0.460***	0.381***	0.431***	0.427***
	(0.0320)	(0.0327)	(0.0345)	(0.0337)	(0.0341)	(0.0340)	(0.0338)
_constant	47.16***	42.51***	41.35***	46.47***	46.33***	41.64***	46.25***
	(0.375)	(0.292)	(0.303)	(0.403)	(0.406)	(0.299)	(0.408)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Major dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	697,696	671,190	592,109	619,479	607,382	611,585	612,961
R^2	0.189	0.191	0.194	0.196	0.195	0.199	0.196

Source: ENADE 2009–2012.
Note: Standard errors in parentheses. HS = high school.
*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

Moreover, our results show that private university students admitted through quotas score higher than nonquota students on the Specific Knowledge (Model 1) component of the ENADE and on the total score of the exam (Model 2), except for students in the “income” and “other” categories. When comparing these results with public universities by individual majors, we found that while in private universities fifty-one of sixty-two majors (82.3 percent) revealed a positive and significant relationship between affirmative action and ENADE performance, in public universities only fifteen of sixty-three majors (23.8 percent) were significant, with ten majors indicating a negative relationship and five indicating a positive relationship between affirmative action and students’ performance. For 76.2 percent of public university majors, affirmative action was not a significant factor, with no difference in scores between quota and nonquota students. The differences observed between public and private university students’ performance are evidenced by the observation that most quota students admitted to private universities participated in PROUNI scholarships. PROUNI students are required to have high scores during their studies to continue receiving the scholarship, so this incentive may positively influence their performance in college and on the ENADE.

Many other variables can influence students’ performance on exams. When controlling for race, public high school education, income, and parents’ education, it is evident that in most cases socioeconomic and racial characteristics play an important role in students’ performance, in public and in private universities. The impact of socioeconomic and racial factors thereby seems to further reinforce the need for affirmative action policies. We may learn more as additional data become available. It is still early to establish a relation between the effects, if any, of this particular law on students’ performance.

This work is a preliminary effort to challenge the theory that quota students perform at levels inferior to those of students admitted through traditional methods. Affirmative action policies have been an effective mechanism for democratizing access to higher education and for expanding the access of nonwhite and low-income youth to universities in Brazil without compromising quality of education. Given the continuing debate over affirmative action programs in Brazil, our findings are important, and they certainly lend credence to arguments in support of the effectiveness of affirmative action, particularly that of affirmative action policies that combine social and racial considerations.

Additional Files

The additional Files for this article can be found as follows:

- **Supplemental Material.** Tables: Regression outputs, 2009–2012. DOI: https://doi.org/10.25222/larr.50.s1
- **Appendix A, B, C, D, and E.** Student profiles, socioeconomic characteristics, and performance of quota students by major, 2009–2012. DOI: https://doi.org/10.25222/larr.50.s2

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