DO PUBLIC UNIVERSITY QUOTAS LOWER THE QUALITY OF ENTRANTS?

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ABSTRACT

This article uses microdata from the National High School Exam (ENEM) and the Higher Education Census to make simulations of the effects of quotas, and quantifies and qualifies their estimated effects on the access of students to federal universities, including the distribution of ENEM scores as well as the cutoff and average scores for quota and non-quota students. The results show that the greater diversity (in terms of public school, poor and minority students) in federal universities caused by the introduction of the quota system has not led to the admission of students with significantly lower scores when compared to the scenario without quotas. This is due to the existence of potential quota students whose scores are in the highest score decile in sufficient numbers to fill the reserved places.

KEYWORDS QUOTAS • PUBLIC UNIVERSITIES • PUBLIC POLICY • ACADEMIC PERFORMANCE.

AS COTAS NAS UNIVERSIDADES PÚBLICAS DIMINUEM A QUALIDADE DOS INGRESSANTES?

RESUMO

Este artigo utiliza os microdados do Exame Nacional do Ensino Médio (Enem) e do Censo da Educação Superior para, através de simulações sobre os efeitos das cotas, quantificar e qualificar estimativas do impacto causado pela política de cotas para acesso às universidades federais sobre a distribuição de notas do Enem de cotistas e não cotistas, as notas de corte e as médias de notas dos ingressantes. Os resultados mostram que a maior diversidade (de categoria administrativa do ensino médio, de renda e de raça) nas universidades federais, introduzida pelas cotas, não acarreta ingresso de alunos com notas significativamente menores quando comparado com o cenário sem cotas. Isso ocorre devido à existência de potenciais cotistas cujas notas se encontravam acima do último decil (décimo) de notas em número suficiente para preencher as vagas reservadas.

PALAVRAS-CHAVE COTAS • UNIVERSIDADES PÚBLICAS • POLÍTICAS PÚBLICAS • DESEMPENHO ESCOLAR.

¿LAS CUOTAS EN LAS UNIVERSIDADES PÚBLICAS DISMINUYEN LA CALIDAD DE LOS INGRESANTES?

RESUMEN

Este artículo utiliza los microdatos del Examen Nacional de la Enseñanza Media (Enem) y del Censo de Educación Superior para, a través de simulaciones sobre los efectos de las cuotas, cuantificar y calificar estimaciones del impacto causado por la política de cuotas para acceso a las universidades federales sobre la distribución de notas del Enem de cuotistas y no cuotistas, las notas de corte y los promedios de notas de los ingresantes. Los resultados muestran que la mayor diversidad (de categoría administrativa de la enseñanza media, de renta y de raza) en las universidades federales, introducida por las cuotas, no acarrea ingreso de alumnos con notas significativamente menores cuando es comparado con el escenario sin cuotas. Esto ocurre debido a la existencia de potenciales cuotistas cuyas notas se encontraban por encima del último decil (décimo) de billetes en número suficiente para llenar las vacantes reservadas.

PALABRAS CLAVE CUOTAS • UNIVERSIDADES PÚBLICAS • POLÍTICAS PÚBLICAS • RENDIMIENTO ESCOLAR.

INTRODUCTION

With broader access to primary and secondary education in Brazil for those with lower income, the demand for higher education has grown intensely. Despite the considerable growth in the number of places available in universities, poor and black children still represent a small proportion of those entering public universities – which in general are the most competitive institutions.

These population groups, blacks and the poor, that are often combined, usually do not have the financial resources to receive good preparation for university – which is mainly private. After concluding public high school, they are less well prepared than others to compete for places in higher education.

Given this reality, affirmative action in education has been discussed for over a decade in Brazilian society. Affirmative action is of a compensatory nature, because it seeks to compensate for historically accumulated inequality to guarantee equal opportunity.[1] It seeks to restore what has been broken or never existed in the first place (MOEHLECKE, 2002).

1 For a theoretical framework of equality of opportunity, see Barros and Mendonça (1996).

The debate over affirmative action took on greater dimensions after the introduction of a quota system for blacks in the University of Brasília (UnB) in July 2004.[2] The quota system initiated by the UnB foresaw reserving 20% of the places for each major for black students. Since then, other public institutions have adopted affirmative action, and in 2012 the federal government instituted it for all federal universities with the enactment of the Quota Law – Law n. 12,711 (BRASIL, 2012b) –, which reserves 50% of the places in federal higher education institutions based on a quota system. These places are allocated to students who have studied exclusively at public high schools, differentiating them based on their income and color.

The most important critique of this mechanism to include the poorer classes is that the students who enter through this quota system do not have sufficient education, which means a lowering of the quality of higher education. Another critique is that affirmative action through quotas does not deal with the main issue: the inequality of primary and secondary education. According to Durham (2005), one of the deficiencies of the proposal is that it deals with just one of the consequences of racial discrimination and educational inequality, without really correcting for them.

The advance of this quota policy has had broad repercussions in the academic literature, with there being historical, cultural, legal, philosophical and pedagogical discussions of this subject (MOEHLECKE, 2002; SEGATO, 2006; GUARNIERI; MELO-SILVA, 2007). Even though some of these works have been empirical in nature (QUEIROZ; SANTOS, 2006), few are the empirical studies that have analyzed the performance of the students who benefit from these quotas.

Ferman and Assunção (2005) state that there is a negative relationship between affirmative action and incentives for effort and the acquiring of abilities, finding that students favored by quotas in the states of Bahia and Rio de Janeiro (which implemented a racial quota system in 2003), had worse college entrance exam scores between the years of 2001 and 2003. Comparing the individuals included by the

[2] Three universities had already introduced affirmative action programs in 2002: the State University of Rio de Janeiro (UERJ), the State University of Northern Rio de Janeiro (UENF) and the University of the State of Bahia (UNEB). See Ferman and Assunção (2005).

quotas with those excluded by the quotas[3] in the UnB, Francis and Tannuri-Pianto (2012) observed that those included has a greater proportion of blacks and those with low income. They also noted that those excluded were approved by other universities of higher quality, and that they probably would have demonstrated better performance than those included by the quotas if they had entered the program.

Velloso (2006), on the other hand, states that the results for the first semester of study of those accepted by UnB in 2004, reveal that in terms of the entire student body, more than a third of the quota students were in the upper half of academic performance in their respective majors, alongside the best students approved by the universal system.

This article seeks to contribute to the analysis of the performance of quota and non-quota students by paying attention to the difference between the students in the step that occurs prior to higher education: the college entrance exam. We intend to verify the impact of quota policies by analyzing the grades of the entering students in distinct situations: without quotas and with various types of quotas. We will perform simulations of potential applicant approval, considering the individuals who would have been approved by each type of quota. Moreover, we will analyze the decile distributions of the scores of the students who took the entrance exam.

This work is divided into seven sections besides the introduction. The second section will present how the Quota Law functions. The following section will describe the college entrance exam known as the National High School Exam (ENEM), as well as the modifications that have been made to it. In the fourth section we will talk about the incentive structure to take the exam and its impact on the choice of the years considered in this study. The fifth section will present the database and the methodology used to make our simulations. The sixth section will present and evaluate the results of the simulations in terms of relative participation and scores. The seventh section will analyze the decile score distributions, and the last section will present our conclusions.

QUOTA LAW (LAW No. 12,711/12)

Law no. 12,711 (the Quota Law), sanctioned on August 29, 2012, determined that 50% of the places in federal higher education institutions would be reserved for students who had studied exclusively at public high schools (BRASIL, 2012b). The law was regulated by Decree no. 7,824/2012 and by Normative Ordinance no. 18/2012 of the Ministry of Education (MEC). Figure 1 presents the distribution of the quotas.

FIGURA 1 – Reservation of places in accordance with the Quota Law of 2012
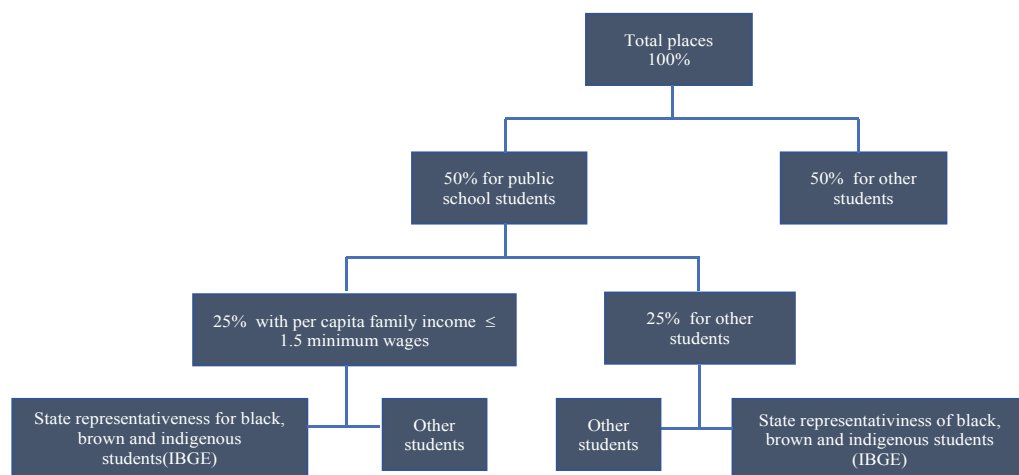
Source: Prepared by the authors.

The quotas are divided into four types:[4] non-eligible students (in other words, those who did not study at public schools), public school students, students with per capita family income of less than one and a half minimum wages, and black, brown and indigenous students. The places reserved for quotas are divided in two: (i) half for public school students with gross per capita family income equal to or less than one and a half minimum wages; and (ii) half for public school students with per capita family income greater than one and a half minimum wages. In both cases, a minimum percentage is reserved that corresponds to the sum of black, brown, and indigenous residents of the state

4 The quota types are understood to be based on groups with given socio-economic characteristics.

according to the latest Census conducted by the Brazilian Institute of Geography and Statistics (IBGE).[5]

A four year interval was defined for federal higher education institutions to comply with the law, with the mandatory requirement that 25% of the total places to be reserved would be implemented each year.

NATIONAL HIGH SCHOOL EXAM

The National High School Exam (ENEM) was created in 1998 by the National Institute of Educational Studies and Research (INEP) with the objective of evaluating student performance at the end of secondary education. The exam is designed for students who have concluded high school. Even though participation is voluntary, the number of participating students has grown considerably over the years. This has made it possible to use the exam as a diagnostic tool for evaluating the country's educational system.

Up until 2008, the exam was made up of an objective test of interdisciplinary questions and an essay. With the reformulation of the ENEM in 2009, the exam featured four objective tests, subdivided into four areas of knowledge[6], each with 45 questions, and an essay.

The main change in the exam was the adoption of the Item Response Theory (IRT) as a correction methodology (BRASIL, 2012c). This methodology, unlike the previous one, is not limited to totaling the number of correct answers on the test, but qualifies the item according to three parameters: (i) the capacity of the item to distinguish students who have the required proficiency from those who do not; (ii) the question's degree of difficulty; and (iii) the possibility of getting the correct answer by chance. The advantage of using this methodology is that it permits the comparison of results between different years and makes it possible to apply the exam more than once a year.

The main consequence of the reformulation of the ENEM was that it made it possible to use it as a college entrance exam. Up until 2008, the exam mainly served as a complement to the score of the main college entrance

exam, known as the vestibular. Beginning in 2009, it began to be used as a selection mechanism for public teaching institutions through the Unified Selection System (Sisu).[7]

Respecting the autonomy of the universities, the use of ENEM scores as a basis for acceptance to higher education institutions can occur in a single selection phase or combined with the university's own selection processes. There are four possibilities in terms of using the ENEM score: (i) as a single phase, as in the unified selection system, which is computerized and online; (ii) as a first phase; (iii) combined with the institution's vestibular; and (iv) as a single phase for the places remaining after considering the scores of the vestibular.

In addition, the ENEM began to offer the possibility of certifying secondary education for individuals over 18 who have not finished their secondary schooling. In addition, the exam is required to access programs offered by the Federal Government, such as the University Program for Everyone (Prouni) and Student Financing for Higher Education (Fies).

CHOICE OF YEARS AND INCENTIVES FOR TAKING THE EXAM

Since the exam's creation, there have been two important events that have altered the incentive structure for students who take the test: (i) the reformulation of the ENEM in 2009; and (ii) the Quota Law of 2012.

The positive effect of the reformulation of the ENEM on student incentives may be divided into two parts. The first, which is more direct, is simply the possibility of using the exam as a way to be accepted to study in higher education institutions. The second considers broadening the possibilities of access to this level of learning. Before the reformulation, institutions administered their own selection processes, usually through a vestibular. In general, these exams were offered in the same city as the institution, and non-resident students – especially those from other states – had to foot the cost of travel which could be high enough to dissuade them from participating in these

[7] This is a computerized system, managed by the Ministry of Education, through which first year places in colleges are made available by participating public institutions of higher education.

selection processes,[8] reducing their chances of entering a higher education institution. The unified nature of the post-reformulation ENEM has broadened these opportunities, given that the exam is offered in every state in the country.

The alteration promoted by the promulgation of the Quota Law in 2012 has affected the incentives of the individuals contemplated by this policy.[9] With the reservation of places in university admissions, this has created a situation in which access to higher education, which had previously been considered out of reach, is now attainable. (FRYER; LOURY, 2005).

These two events have probably affected the composition of the students who take the ENEM. It is reasonable to suppose that, in addition to this, it has also affected the effort made by these students, given the competitive nature of college entrance exams. Thus, depending on the year analyzed, there are differences in the incentive structure as well as the composition of the students who take the ENEM.

We have opted in this article to use data for the ENEM of 2011. Since this is after the changes of 2009, the exam results of this year are already subject to the incentives created by the possibility of using this exam score to enter federal universities. Moreover, because it is before the adoption of the Quota Law, the data from this year is not affected by the changes in incentives resulting from the law, or in other words, at this point there was still not any self-selection effect on the part of would be quota students taking the ENEM in terms of the distribution of scores, therefore it is possible to simulate the effects that are only due to the changes in the selection and admission rules under the Quota Law.

DESCRIPTION OF THE DATABASE AND METHODOLOGY

This article uses two databases, both published annually by INEP. The first is composed of ENEM microdata for 2011 (BRASIL, 2011b), consisting of the scores and socio-economic information of the students who took the exam. The second is composed of microdata from the Higher Education Census of 2012 (BRASIL, 2012a), which contains information about

the number of places available in the admissions process.

In addition, we analyzed the years 2009 and 2010 respectively. Since 2009 is the last year in which it is possible to perform a disaggregated analysis per major, we have opted to include it.[10] To make sure that the analysis does not become too extensive, only two areas will be examined, Education, and Biological Sciences and Health, which represent opposite extremes in terms of the competition for places.

The students[11] considered in the analysis were separated by state. It was assumed that all of the students of a given state were interested in entering that state's main federal university.[12] The state of São Paulo was not included because there are state universities that are at least as sought after as the federal universities – the University of São Paulo (USP), the State University of Campinas (Unicamp) and the "Júlio de Mesquita Filho" São Paulo State University (Unesp).

We only analyzed the data of students who could enter higher education institutions. In order for the results to be comparable for all analyzed situations, student data was used only for those who identified: (i) their color; (ii) their family income; (iii) the number of inhabitants per home (to obtain the per capita family income); and (iv) where they completed their secondary education.[13]

Since family income is divided into salary ranges in the socio-economic questionnaire, per capita family income was obtained by dividing the average of this range by the number of inhabitants per home. For example, a student with a family income ranging from 2 to 5 minimum wages with five inhabitants at home would have a per capita family income of 0.7 minimum wages (3.5 m.w./5 people).

SIMULATIONS

The performed simulations were disaggregated by federal university. The results of the most populous states – according to IBGE estimates for 2013 – in each of the five large regions of Brazil will be presented: Goiás (Central-West), Bahia (Northeast), Pará (North), Minas Gerais (Southeast) and Rio Grande do Sul (South).

10 To establish the correspondence between candidates and places per area, we used the intended profession variable, which is divided into professional areas that are reasonably close to the broad areas of knowledge (Q220).

11 For notation purposes, the term student will be used to denote the individual who took the ENEM exam.

12 For example, all of those registered in the state of Rio de Janeiro were allocated as interested in entering the Federal University of Rio de Janeiro (UFRJ).

13 Respectively, the variables TP_COR_RACA, Q4, Q1 and Q33.

The simulations use the rules of the Quota Law. They consider four categories, due to the gradual implementation of the various types of quotas (as described in Figure 1): (i) without quotas; (ii) including a 50% quota for public schools; (iii) including a 25% quota for per capita family income less than or equal to one and a half minimum wages; and finally (iv) including quotas based on the percentage of the black, brown and indigenous population per state.[14]

For each of these four categories, we have analyzed statistics regarding the students who would have been approved by the universities, given the number of total places. This was compared with the percentage participation of the three groups contemplated by the quotas: (i) those who declare themselves to be black, brown or indigenous; (ii) those with per capita family income that is less or equal to 1.5 minimum wages; and (iii) those who study exclusively in public high schools. We also compared low and average scores.

To obtain the distribution for those approved in the simulation, the students were ordered by their scores. We did not calculate, in terms of filling the reserved places, the students eligible for any of these quotas who would have been approved. In other words, half of the places were allocated to students with the highest scores independent of the quota system, and the other half was reserved for those candidates eligible under the quota system. The score given to each student was the sum of the objective test scores and the essay.

DISTRIBUTION BY SCORE DECILES

In addition to the simulation, an analysis was performed of the students based on score deciles. With the score information and the number of students in each decile, it is possible to identify which deciles would contain the approved students under the simulation.

TABLE 1 – Number of participants in the 2011 ENEM in the five states selected for this study

| 2011 ENEM PARTICIPANTS	PA	BA	MG	RS	GO
Total of registrations	208,950	355,629	510,100	251,917	125,286
Total excluding absent candidates	159,417	243,841	377,916	194,490	90,882

Source: Prepared by the authors with data from INEP/MEC (BRASIL, 2011b).

Only students who took at least one test were considered. Table 1 presents the alterations in the 2011 sample, due to the removal of those absent. Even though this appears unnecessary, the use of these students in the sample would distort the distribution of the scores, since those absent receive a score of zero.

ANALYSIS OF THE SIMULATIONS

Next we will present the simulations for the federal universities for 2011 (Federal University of Goiás, Federal University of Bahia, Federal University of Pará, Federal University of Minas Gerais and the Federal University of Rio Grande do Sul). The simulations realized for 2011 used the average of all the test scores, giving them equal weight. To simplify the description, the following notation will be adopted: black, brown and indigenous students will be denominated BBI; students who studied exclusively at public schools will be denominated PS; and individuals with gross per capita family income less to or equal to one and a half minimum wages will be denominated as poor.

FIGURE 2 – Simulations for the Federal University of Goiás
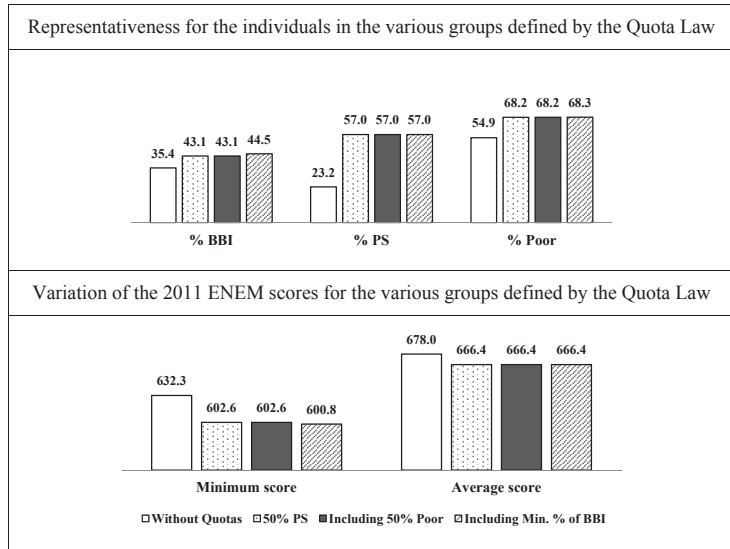
Source: Prepared by the authors, based on data from INEP/MEC (BRASIL, 2011b).

As we can observe in Figure 2 which considers the Federal University of Goiás, the inclusion of any one of these three types of quotas increases the participation percentage of the BBI, SP and poor groups. The initial alteration with the general PS quota, generates the greatest change in the percentages of each group. For the PS and poor groups, their percentages do not change with the subsequent modifications. This result indicates that the PS and poor individuals, who would enter university based on the specific quotas for these groups, would have already been accepted through the general PS quota.

Among the variations due to the PS quota, the most significant ones occurred in the PS group itself, with an increase in this group's participation of over 100%. On the other hand, the participation of BBI and poor students varied relatively little with the inclusion of quotas of any type. In terms of the BBI quota, it only significantly alters the proportion of the corresponding group.

In contrast to the changes in the composition of the entrants, the inclusion of all the types of quotas does not have a significant effect on the average score, a decrease of 11.6 points (a decline of 1.7%). This occurs even though

there is a decrease of 31.5 points (a decline of 5.0%) in the minimum score.

FIGURE 3 – Simulations for the Federal University of Bahia
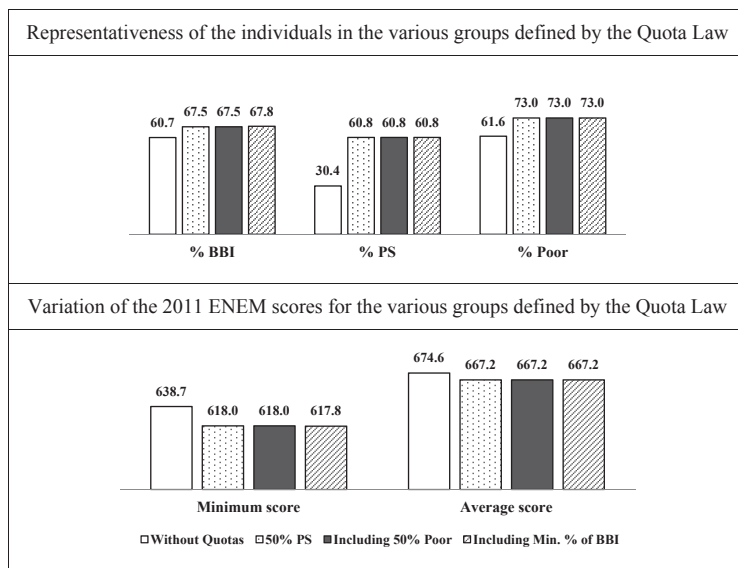
Source: Prepared by the authors based on data from INEP/MEC (BRASIL, 2011b).

As you can see in Figure 3 which presents the data for the Federal University of Bahia, the participation of the BBI and poor groups was already elevated before the inclusion of quotas. For any type of these quotas, the participation of these groups becomes even more elevated. As in the case of the Central-West, the most significant change occurs with the PS quota, which leads to a 30 percentage point (pp) rise in participation, doubling this group's participation. When the implementation of the BBI and poor quotas was simulated, no changes were found. In fact in this case, the PS quota covers almost every individual covered by the other quotas.

The inclusion of the three types of quota in this case also does not have a significant impact on the average score, which decreased by 7.4 points (a decrease of 1.1%). The reduction of the minimum score is less significant in Bahia – 21 points (a decline of 3.3%).

As can be seen in Figure 4, once again the participation of the BBI, PS and poor groups was already relatively elevated

without the inclusion of quotas – with percentages even greater than Bahia. Probably for this reason, the impact on the participation due to the inclusion of quotas is smaller than in the previously examined states. The most significant variation observed occurs again with the PS, which rises 25 pp with the participation of this group.

FIGURE 4 – Simulations for the Federal University of Pará

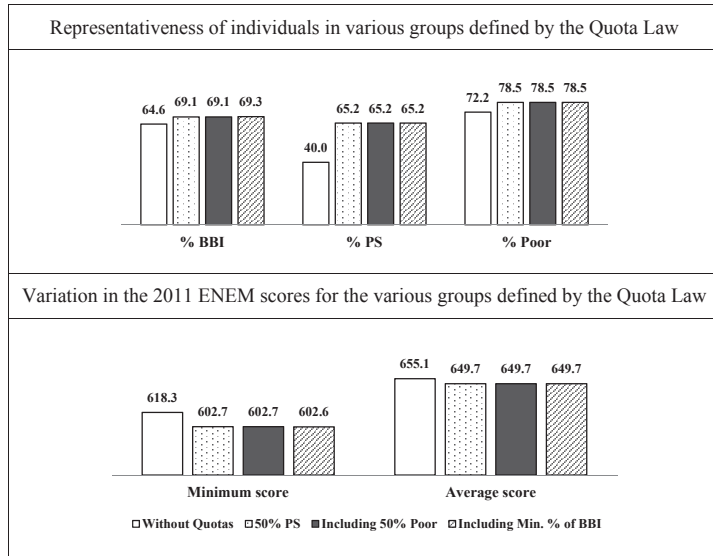Source: Prepared by the authors based on data from INEP/MEC (BRASIL, 2011b).

The average score remained practically constant, with a small reduction in the case of the PS quota – of 5.4 points (a decline of 0.8%). For this same quota, the minimum score presented its greatest alteration here – just 16 points (a decline of 2.5%).

The analysis of Figure 5 indicates that in Minas Gerais, unlike Pará and Bahia, the percentage of BBI and PS participation was not as elevated without quotas. Thus, the impact of including quotas is significant. The greatest increase was observed in PS participation, which increased almost three times for this group. The BBI quotas just affected the participation of this group itself in a relevant manner, with an additional impact of 3.4 pp.

The effects on average scores again were not great, with a decrease of 11 points (a decline of 1.5%). The alteration of the minimum score is considerably greater – a variation of 34 points (a decline of 4.8%).

FIGURE 5 – Simulations for the Federal University of Minas Gerais
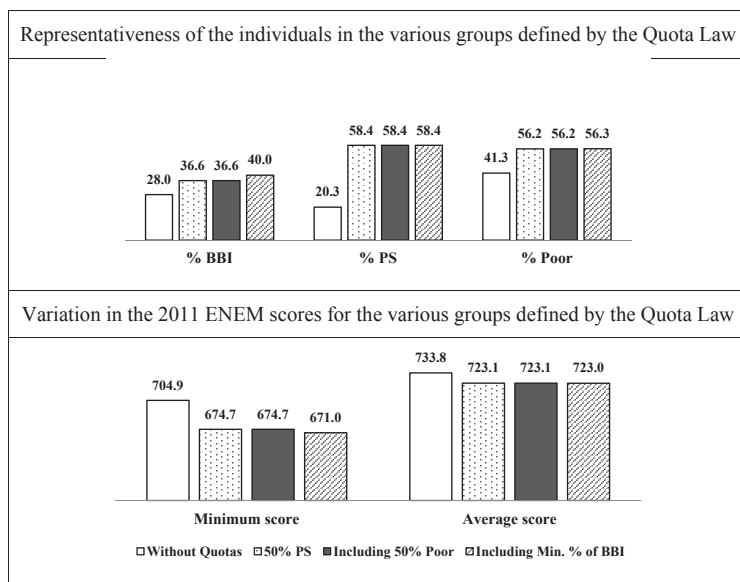
Source: Prepared by the authors based on data from INEP/MEC (BRASIL, 2011b).

For the Federal University of Rio Grande do Sul, as we can see in Figure 6, there is a notable difference between the participation of the various groups contemplated by the quotas. Without quotas, the participation of PS and poor students is relatively high, but the participation of BBI students is significantly low. This probably occurs due to the state of Rio Grande do Sul not having a large BBI participation in terms of its population. Thus, even though relevant impacts occur with the inclusion of PS quotas (29 pp for this group), the largest observed variation for the BBI students occurs with the quota for this group, which elevates this group's participation by 5.9 pp (103%).

FIGURE 6 – Simulations for the Federal University of Rio Grande do Sul
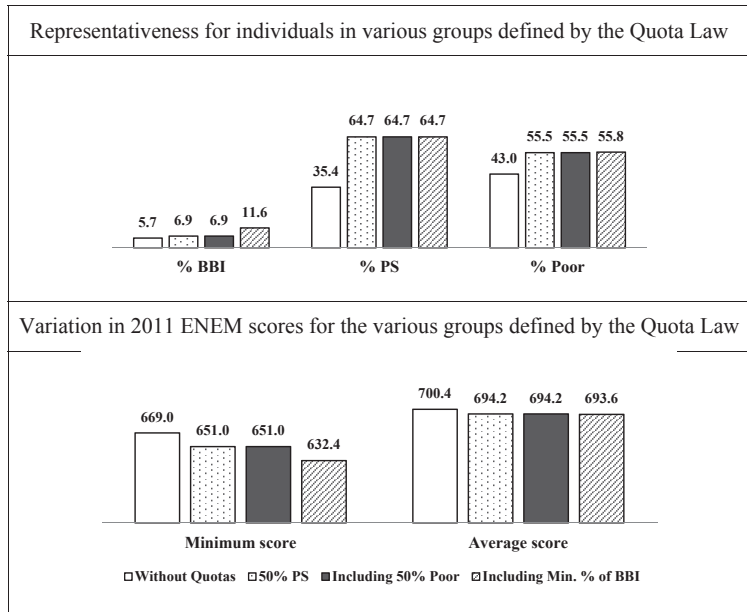
Source: Prepared by the authors based on data from INEP/MEC (BRASIL, 2011b).

For the quotas destined for public school and poor students, the average and minimum scores represented a decrease of 6.2 points (0.9%) and 18 points (2.7%), respectively. However, for the BBI quota, we observe a greater reduction in the minimum score, with an additional reduction of 18.5 points (which represents 2.8% of the minimum score in the scenario without quotas). In total, therefore, the minimum score was reduced by 36.5 points (5.5%) in the scenario with the BBI quota, as compared to the scenario without quotas.

The simulations were repeated with data from 2009 and the overall results obtained were similar to 2011. A simulation with a disaggregation of the areas of knowledge, for the areas of Education and Biological Sciences and Health was also performed with the 2009 data. In relation to Education, the percentages for PS, PPI and poor students were already quite high without quotas in all states. In general, there were changes of some relevance in the percentage of PS students (between 3 pp in Pará and 8 pp in Minas Gerais). In Minas Gerais, the implementation of the quota system also generated an increase of 5.5 pp in the proportion of BBI

students and 2.3 pp in the percentage of poor students. By contrast, the reduction of the average score of the students entering college is very small (between -0.1% in Bahia and -0.4% in Goiás).

The area of Biological Sciences and Health presents considerably lower percentages for PS, poor and BBI students. For this reason, the implementation of these quotas creates much more significant increases for these three groups (5.4 pp, 27 pp and 9 pp in Pará, which presents the smallest magnitudes). The average score of the students entering college here is reduced more than in the case of Education, but with an even lower magnitude (a maximum of 3% in Goiás).

DISTRIBUTION BY DECILES

This section seeks to identify, through the distribution of deciles, the location of students who would be approved by the simulation. To simplify the description, the application of the PS quota will be denoted as PS, the gradual application of the PS and poor quotas will be denoted as PS|Poor and the gradual application of quotas for SP, poor and BBI students will be denoted as PS|Poor|BBI.

DESCRIPTIVE STATISTICS

In order to properly analyze the score deciles, it is important to understand the participation of the individuals eligible for quotas throughout the distribution of the scores. The 10% with the lowest scores are referred to as the lowest decile, while the 10% with the highest scores are referred to as the highest decile.

TABLE 2 – Proportion of individuals eligible for quotas per decile of 2011 ENEM scores

STATE	DECILES									
	1º	2º	3º	4º	5º	6º	7º	8º	9º	10º
PA	96.0	94.2	93.1	91.5	89.9	88.0	85.0	80.6	72.3	50.2
BA	97.5	96.8	95.6	95.1	93.7	92.3	90.4	86.2	78.6	49.6
MG	95.7	94.8	93.4	92.4	90.7	88.3	84.9	78.8	66.9	39.2
RS	87.4	87.9	87.7	87.1	86.4	85.7	84.0	80.7	73.6	51.6
GO	94.8	92.9	91.8	89.6	87.9	85.9	81.7	76.5	64.3	31.5

Source: Elaborated by the authors based on data from INEP/MEC (BRASIL, 2011b).

Table 2 presents the relative participation within each score decile of the students eligible for quotas, or in other words, those who at least are PS students. The proportion of quota students is elevated in most of the deciles[15] – remaining above 70% through the 8th decile; while we can see that there is a smaller participation by this group in the highest score deciles.

The disaggregation by area for 2009 allows us to observe some differences in relation to the aggregate data. In the area of Education, even though the proportions of quota students are reduced for the highest deciles, they present values above 80% even in the highest decile. By contrast, in the area of Biological Sciences and Health, the percentages decrease more dramatically in most of the score deciles, with the highest decile having values of 46% in Pará, values between 30% and 35% in Bahia, Minas Gerais and Rio Grande do Sul, and only 15% in Goiás.

Table 3 presents the relative participation in terms of deciles for the various types of quotas. Analyzing non-quota students (Table 3a), we can observe that most of the students are concentrated in the two highest score deciles. In Bahia, for example, 40.5% of the non-quota students are in the highest score decile.

In analyzing quota students, we can see that for all of the groups (Tables 3b, 3c and 3d), there is a small asymmetry, indicating greater participation on the part of quota students in the lowest score deciles with the highest decile showing proportions that are furthest away from 10%, which would be the expected percentage for a uniform distribution.

15 A large percentage should not be confused with elevated participation in each type of quota. A hypothetical case of 90% participation of quota students can be obtained with 90% of the students being poor, but also white.

TABLE 3 – Distribution of the groups defined by the Quota Law for each decile of 2011 ENEM scores for the states considered in this study

Table 3a – Proportion of non-quota individuals

STATE	DECILES									
	1º	2º	3º	4º	5º	6º	7º	8º	9º	10º
PA	2.5	3.6	4.4	5.3	6.3	7.6	9.4	12.2	17.4	31.3
BA	2.0	2.6	3.5	3.9	5.0	6.2	7.8	11.1	17.2	40.5
MG	2.5	3.0	3.8	4.3	5.3	6.7	8.6	12.1	18.9	34.7
RS	6.7	6.4	6.6	6.9	7.2	7.6	8.5	10.3	14.0	25.8
GO	2.5	3.5	4.0	5.1	6.0	6.9	9.0	11.6	17.6	33.8

Table 3b – Proportion of public school individuals

STATE	DECILES									
	1º	2º	3º	4º	5º	6º	7º	8º	9º	10º
PA	11.4	11.2	11.1	10.9	10.7	10.5	10.1	9.6	8.6	6.0
BA	11.1	11.1	10.9	10.9	10.7	10.5	10.3	9.8	9.0	5.7
MG	11.6	11.5	11.3	11.2	11.0	10.7	10.3	9.6	8.1	4.8
RS	10.8	10.8	10.8	10.7	10.6	10.6	10.3	9.9	9.1	6.3
GO	11.9	11.7	11.5	11.2	11.0	10.8	10.3	9.6	8.1	4.0

Table 3c – Proportion of poor individuals

STATE	DECILES									
	1º	2º	3º	4º	5º	6º	7º	8º	9º	10º
PA	10.4	10.3	10.3	10.3	10.3	10.2	10.2	10.0	9.7	8.3
BA	10.4	10.4	10.3	10.3	10.3	10.2	10.2	10.1	9.8	8.0
MG	10.9	10.8	10.8	10.7	10.6	10.5	10.2	9.9	9.0	6.7
RS	11.0	10.9	10.7	10.7	10.5	10.4	10.2	9.8	9.0	6.8
GO	10.7	10.7	10.7	10.6	10.5	10.4	10.3	10.1	9.3	6.7

Table 3d –Proportion of black, brown and indigenous individuals

STATE	DECILES									
	1º	2º	3º	4º	5º	6º	7º	8º	9º	10º
PA	10.4	10.3	10.3	10.3	10.2	10.1	10.1	9.9	9.7	8.7
BA	10.3	10.3	10.3	10.2	10.2	10.2	10.1	10.0	9.7	8.6
MG	12.2	11.5	11.1	10.8	10.5	10.1	9.7	9.2	8.4	6.5
RS	14.8	13.3	12.1	11.3	10.4	9.6	8.9	8.1	6.8	4.7
GO	11.5	11.1	11.0	10.7	10.5	10.3	9.9	9.4	8.7	6.8

Source: Prepared by the authors based on data from INEP/MEC (BRASIL, 2011b).

In relation to the 2009 data, in performing the disaggregated analysis for the areas of Education and Biological Sciences and Health, the same patterns appear with slight differences. For the Education area, all of the distributions are relatively uniform in each case, with percentages close to 10%. For the Biological Sciences and Health area, the distributions are similar to those for all of the majors.

Thus, in our initial analysis, we can see a high concentration of non-quota students in the highest score deciles, combined with a relatively uniform distribution of quota students between the various deciles. In terms of analyzing areas of knowledge, the same patterns appear.

DECILE ANALYSIS

In the absence of quotas, the students approved in the simulation are, by definition, those with the best scores within each state. Therefore, since they are at the top of the distribution, they should belong to the highest decile[16] (or in other words, the group of 10% of the students with the highest scores). This is in fact what happens as is shown in Table 4.

For all the states analyzed, the number of students in the highest decile is greater than the number of places available in the university. This proves in fact that all of those approved in the simulation, in a scenario without quotas, would be part of the 10% with the best scores.

TABLE 4 – Number of places in federal universities in the study and the students in the last decile of 2011 ENEM scores

STATE	Nº OF PLACES	Nº OF STUDENTS IN THE HIGHEST DECILE
PA	8,147	15,464
BA	8,191	23,487
MG	6,752	36,539
RS	5,320	18,729
GO	5,954	8,795

Source: Prepared by the authors based on data from INEP/MEC (BRASIL, 2011b).

16 It is important to note that it is possible for this not to occur if the number of places in the federal university is greater than the number of students in the highest decile.

Once the quota system has been introduced, the analysis is no longer clear. It is not possible to know beforehand which decile that the students approved by the quotas belong to. The lower half (those with lower scores) of those approved without quotas – who belong to the highest decile as we have seen in Table 4– have been removed to include the quota students. Do these quota students also belong to the highest decile?

Table 5 presents the number of spaces reserved by the quota system, as well as the number of students remaining in the highest decile – that is, after removing those who would have been approved in open competition – who are eligible for some type of quota. Whenever the number of places is less than the number of eligible students in some category of quota, we conclude that the potentially approved students for this category of quota are also from the highest decile.

TABLE 5 – Number of spaces reserved by the Quota Law for federal universities in this study and the remaining[17] students in the highest decile of 2011 ENEM scores

STATE	PLACES RESERVED (PS)	PLACES RESERVED (PS|POOR)	PLACES RESERVED (PS|POOR|BBI)	STUDENTS REMAINING IN 10º DECILE (PS)	STUDENTS REMAINING IN 10º DECILE (PS|POOR)	STUDENTS REMAINING IN 10º DECILE (PS|POOR|BBI)
PA	4,074	2,037	1,601	6,527	6,148	4,906
BA	4,096	2,048	1,608	10,769	10,247	8,228
MG	3,376	1,688	908	13,767	11,562	5,734
RS	2,660	1,330	242	8,877	7,140	719
GO	2,977	1,489	844	2,352	2,135	1,163

Source: Prepared by the authors based on data from INEP/MEC (BRASIL, 2011b).

The number of students in the highest decile exceeds the number of places for all of the quota categories in all of the states analyzed, except Goiás. In this state, the number of places exceeds the number of eligible students in the case of PS quotas. Thus, for this state, the approved students in this quota simulation belong to the highest and the second highest score deciles.[18] In the other types of quotas, the number of places is smaller than the number of students, which means that it contains only students within the highest decile.

[17] This does not consider those approved in open competition, meaning the upper half of the places filled.

[18] This is analagous to the case of Rio Grande do Sul. There are 5,652 PS students, 5358 PS and poor students, and 3,036 poor students in the second highest decile, all in numbers greater than the number of remaining places (2977, 1489 and 896 respectively).

Is there a considerable difference between the scores in the highest and the second highest deciles? Tables 6 and 7 present the minimum, average and maximum scores for these deciles per state, as well as the cutoff score in the simulated scenario with quotas. As can be observed in analyzing the average scores, there is a considerable difference between the two top score deciles. The greatest difference (72.5 points, or 11% of the average of the highest decile) occurs in Goiás, while the smallest occurs in Rio Grande do Sul (57.5 points or 8.8% of the average of the highest decile). In addition, the maximum and minimum scores present an ample difference between these two deciles.

The observed amplitude of the scores in the two highest deciles could suggest that the scores approved by the quota system which are in the second highest decile are significantly lower than the other approved scores. However, this does not occur. In comparing the scores for the two highest deciles (Table 6) with the scores of the simulated cutoff (Table 7), by quota type, we can see that in the cases in which the approved students belong to the second highest score decile – as in Goiás –, the cutoff score is closer to the highest score in the second highest decile. Or in other words, these students, even though they belong to the second highest decile, are in the top of this group, with scores not far from the lowest scores in the highest decile. With the PS|Poor|BBI category, the maximum reduction in the cutoff score occurs in Rio Grande do Sul (-5.5% in relation to the scenario without quotas).

With the introduction of quotas, the students approved, in the worst of cases, belong to the second highest decile. Moreover, even in the worst scenario, they are the students with the highest scores in the second highest decile. These students belong, therefore, to the top of the distribution of scores in each state. Even though the quota system removes students with higher scores, the difference in the scores is marginal, and there are poor, black and public school students in the highest and second highest deciles with good scores, and they are sufficient in number so that there is not a significant reduction in the average score.

TABLE 6 – Average scores for the 2011 ENEM for the two highest deciles in each state considered in this study

STATE	DECILES	AVERAGE SCORE	MINIMUM SCORE	MAXIMUM SCORE
PA	10º	630.2	589.0	825.5
	9º	568.7	551.6	588.9
BA	10º	632.7	588.5	820.2
	9º	568.0	550.6	588.5
MG	10º	673.9	631.2	848.5
	9º	609.8	592.0	631.1
RS	10º	656.0	616.8	824.7
	9º	598.5	583.0	616.8
GO	10º	659.4	609.9	830.1
	9º	586.7	567.8	609.8

Source: Prepared by the authors based on data from INEP/MEC (BRASIL, 2011b).

Table 7 – Simulated cutoff scores for the groups defined by the Quota Law in each state considered in this study

STATE	WITHOUT QUOTAS	PS	PS|POOR	PS|POOR|BBI
PA	618.3	602.7	602.7	602.6
BA	638.7	618.0	618.0	617.8
MG	704.9	674.7	674.7	671.0
RS	669.0	651.0	651.0	632.4
GO	632.3	609.9	609.9	609.9

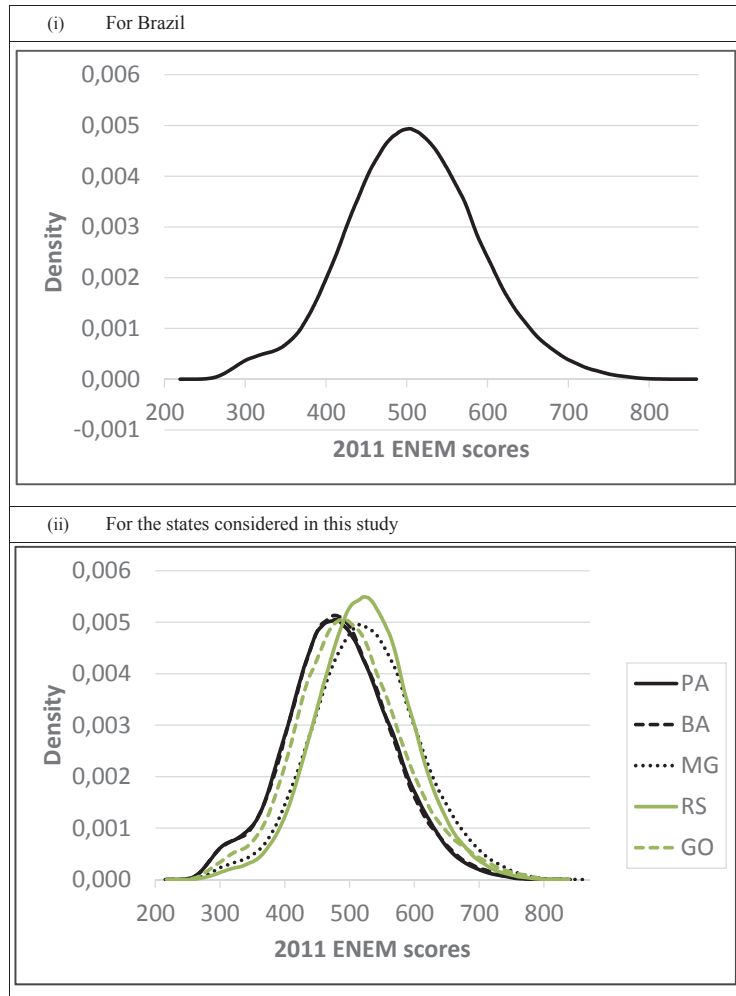Source: Prepared by the authors based on data from INEP/MEC (BRASIL, 2011b).

The existence of quota students with notes close to non--quota students could be explained by the "flattening" of the scores at the top of the distribution, meaning a distribution of scores that is strongly asymmetric to the left. In this case, students at the top of the distribution would have scores close to each other. So any difference – or absence thereof – in the exam scores would not be representative of the quality of the student, and therefore the maintenance of the observed average score in the simulations could be due to the incapacity of ENEM to properly differentiate the best students.

However, this is not what occurs. Analyzing the densities of the scores for Brazil and for the given state, we can see that ENEM permits the differentiation of scores in the highest deciles. As can be seen in Figure 7, there is no

"flattening" at the top of the distribution. In other words, the existence of quota students with high scores, close to those of the non-quota students, is not due to the incapacity of the exam to differentiate the best students adequately, but is rather due to the merit of these students.

FIGURE 7 – Distribution of the Score Density for the 2011 ENEM

Source: Prepared by the authors based on data from INEP/MEC (BRASIL, 2011b).

When we repeat the analysis for the area of Biological Sciences and Health considering the 2009 data, we obtain similar results to the results for all majors. Tables 8 and 9

present a synthesis of the results for these two areas, in scenarios without quotas and scenarios with all of the quotas.

In the area of Biological Sciences and Health, in the absence of quotas, the places will all be filled by students in the highest decile, except in Goiás, where there are entering students with scores from the second highest decile. With the inclusion of the quota system, in Bahia, Minas Gerais and Rio Grande do Sul the places would be filled by students from the highest decile for every type of quota. In Pará, the PS quota will feature some students from the second highest decile. In Goiás, in the place of students from the highest decile, students from the eighth and ninth deciles will enter through the PS quota. Consequently, as shown in Table 8, the cutoff score would fall 8.5% in Goiás with the PS|Poor|BBI quota, in relation to the scenarios without quotas. Even though the magnitude of this reduction is greater than that for all of the majors in 2011, the average score decreased only 3% and the changes in the participations of the groups are comparatively greater: an increase in 40 pp in the proportion of PS students, 17 pp for poor students, and 9 pp for BBI students.

TABLE 8 – Proportions of individuals and 2009 ENEM scores in the area of Biological Sciences and Health, considering different scenarios under the Quota Law

STATE	SCENARIOS	% BBI	% PS	% POOR	CUTOFF SCORE	AVERAGE SCORE
PA	Without Quotas	65.8	36.7	68.7	642.4	684.1
	PS|Poor|BBI	71.2	63.6	77.6	622.9	677.2
BA	Without Quotas	64.1	18.9	47.8	665.6	708.4
	PS|Poor|BBI	71.6	55.5	63.4	630.7	694.6
MG	Without Quotas	33.8	17.8	40.9	724.8	754.8
	PS|Poor|BBI	44.1	56.4	57.9	679.5	740.8
RS	Without Quotas	5.0	26.6	32.1	714.3	746.6
	PS|Poor|BBI	12.0	62.8	45.1	659.6	734.8
GO	Without Quotas	37.9	14.3	43.1	666.6	718.7
	PS|Poor|BBI	47.0	54.1	60.2	609.6	697.5

Source: Prepared by the authors based on data from INEP/MEC (BRASIL, 2009).

TABLE 9 – Proportions of individuals and 2009 ENEM scores in the area of Education, considering different scenarios under the Quota Law

STATE	SCENARIOS	% BBI	% PS	% POOR	CUTOFF SCORE	AVERAGE SCORE
PA	Without Quotas	86.0	91.1	97.6	479.4	542.4
	PS|Poor|BBI	85.9	94.1	97.8	475.7	541.5
BA	Without Quotas	84.5	90.2	94.4	545.5	548.7
	PS|Poor|BBI	84.8	93.9	94.6	543.7	584.2
MG	Without Quotas	45.0	79.5	82.6	626.8	662.3
	PS|Poor|BBI	50.5	87.4	84.9	620.2	661.1
RS	Without Quotas	15.3	81.1	83.4	602.4	636.7
	PS|Poor|BBI	15.9	89.1	84.0	596.9	635.6
GO	Without Quotas	64.4	91.0	95.0	411.9	508.5
	PS|Poor|BBI	64.7	94.5	95.4	369.9	506.5

Source: Prepared by the authors based on data from INEP/MEC (BRASIL, 2009).

In relation to the area of Education, we observe a very different situation. Since there is a relative scarcity of students for the available places, the scenario without quotas only would be completely filled by students from the last decile in Minas Gerais. In the other states, the students would come from lower deciles, even reaching the third decile in Goiás. Within this context of low competition, the cutoff scores are not altered in a relevant manner by the introduction of a quota system, as we can see in Table 9. With the PS|Poor|BBI quota, there would be a 3.6% reduction in this score in Goiás in relation to the scenario without quotas, and a decrease of at most 1% in the other states. In addition, the average scores would decrease by at most 0.4% in relation to the scenario without quotas, when considering Goiás.

CONCLUSION

This work has sought to perform an empirical exercise in terms of the potential acceptance of college students to analyze the performance of quota and non-quota students in

the step that precedes their entrance into higher education: the college entrance exam. Beginning with a scenario without quotas, simulations were performed that sequentially introduced the various types of quotas as envisaged by the Quota Law: with (i) 50% of the places being reserved for students who studied exclusively in public schools (PS); (ii) 50% of the PS quotas being allocated to students with gross per capita family income less than or equal to one and a half minimum wages (poor); and (iii) proportions of the PS and poor quotas allocated to black, brown and indigenous (BBI) students, in a manner equivalent to the proportions of the BBI population in the corresponding state. In these simulations, it is assumed that in each of the examined states all the candidates are competing for the main federal university in that state. Thus, the results do not exactly reflect the situation in all of the states, since some of them have more than one federal university, or state and private universities which also offer places in higher education that would attract competition from these candidates.

Observe that the results were very similar in all of the locations analyzed (Pará, Bahia, Minas Gerais, Rio Grande do Sul and Goiás). In general, the inclusion of the PS quota produced the greatest alterations in the composition of students who managed to be accepted by these universities, broadening the participation of PS, poor and BBI students, especially the former. In the case of Bahia, the proportion of PS students among entering students doubled, while in Minas Gerais and in Goiás it more than doubled. The subsequent applications of quotas for poor students did not present relevant effects, and the BBI quotas only altered the proportions for BBI students in Minas Gerais (from 36.5% to 40%) and in Rio Grande do Sul (from 7% to 11.5%).

The most important result of this work has to do with the variation of the scores. We can see that the inclusion of the quotas does not have a significant impact on the average score of those who were accepted in the simulation in proportional terms (varying from -0.8% in Pará to -1.7% in Goiás). This absence of a significant impact occurs because there are students who are eligible for quotas with good

scores and in great enough numbers so that they do not reduce the average score. These students, as we have seen, belong, in the worst scenario, to the second highest decile, and in this scenario they have the highest scores in this decile.

The same exercise was performed for 2009 data and we verified that the results obtained for 2011 were maintained. In addition, a simulation with 2009 data was implemented specifically for the areas of Education and Biological Sciences and Health, which represent very different areas in terms of competition. In the area of Education, the proportions of entering PS, poor and BBI students were already relatively high in the scenario without quotas, so the implementation of the system did not generate great changes. With increases of at most 8 pp in terms of the PS students (which occurs in Rio Grande do Sul), there is a reduction of 0.2% in the average scores of entering students. In the area of Biological Sciences and Health, which is comparatively more competitive, the implementation of the quotas leads to a considerable increase in the percentages for the PS, poor and BBI groups (with respective minimum values of 5.4 pp, 27 pp and 9 pp in Pará), while the average scores of the entering students do not demonstrate large alterations in comparison to the scenario without quotas (a maximum reduction of 3% was recorded in Goiás).

Thus, the analysis of our obtained results suggests that the quota system does not imply a reduction in the average score of students entering federal universities. On the other hand, the participation percentages of the contemplated groups would increase for any type of quota, fulfilling the goals sought by affirmative action programs of this nature. Even though college entrance exams are not the most appropriate proxy for academic performance during higher education, given the obtained results it does not seem reasonable to suppose that using the quota system necessarily reduces the quality of education at this level.

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APPENDIX – SIMULATIONS FOR DISAGGREGATIONS PER AREA IN 2009

The Higher Education Census of 2010 presents the classification of majors according to the manual produced by Eurostat in partnership with the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the Organization for Economic Cooperation and Development (OECD) (BRASIL, 2009). The manual is based on the International Standard Classification of Education – ISCED). Table A presents the compatibility between the OECD and ENEM classifications.

TABLE A – Compatibility of OECD and ENEM Classifications

ENEM DIVISION (Q220)	OECD DIVISION (HIGHER EDUCATION CENSUS)
Primary and Secondary School Teacher	1 Education
Profession linked to the Arts	2 Humanities and Arts
	• 21 Arts
Profession linked to the Human Sciences	2 Humanities and Arts
	• 22 Humanities and Letters
	3 Social Sciences, Business and Law
Profession linked to Engineering/ Technological Sciences	4 Sciences, Mathematics and Computer Science
	• 44 Physical Sciences
	• 46 Mathematics and Statistics
	• 48 Computer Science
	5 Engineering, Production and Construction
	6 Agriculture and Veterinary Medicine
	• 62 Agricultural, Forest and Fishing Resources
	◦ 623 Forest Engineering – Forestry
Profession linked to the Biological Sciences and Health	4 Sciences, Mathematics, and Computer Science
	• 42 Life Sciences
	6 Agriculture and Veterinary Medicine (Except 623)
	7 Health and Social Well-Being

Source: Prepared by the authors based on data from INEP/MEC (BRASIL, 2009).