Entry into public higher education - differences highlighted with UFPE data between open competition and quota students

Ingresso no ensino superior público - diferenças evidenciadas com os dados da UFPE entre a ampla concorrência e os cotistas

Admisión a la educación pública superior - las diferencias evidenciadas con los datos de UFPE entre una amplia competencia y estudiantes de cuota

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ABSTRACT
The Quota Law for Higher Education in Brazil, implemented as in the entry of 2013, was designed to facilitate access for students from public schools to higher education, in universities and federal institutes, and promote social inclusion. The law provided that within ten years, counting from the date of publication, a review of the special program for access to higher education institutions would be promoted. This work seeks to contribute to the analysis of law enforcement, especially by observing admission scores comparing quota and non-quota students.

We analyzed data from students entering courses in the Basic Area of Entry (ABI – Engineering), Law and Medicine at UFPE, at Campus Recife, which are courses in different areas of knowledge. To analyze performance in the admission process, based on the SiSU grades, all students entering the aforementioned courses in the period from 2016.1 to 2020.2 were considered, totaling 5145 students. The results reveal that there is evidence that the SiSU grades of students in open competition are higher than the grades of quota students, for the three courses analyzed (Medicine, Law and ABI-Engineering at UFPE), throughout the study period, namely 2016.1 to 2020.2, and also that among the quota students, those self-declared as black, brown or indigenous entered with lower average grades than the other quota students, in all years.

Keywords: affirmative action policies, higher education, quota law, racial quotas.

RESUMO
A Lei de Cotas para o Ensino Superior no Brasil, implantada a partir do ingresso em 2013, foi concebida para facilitar o acesso de estudantes oriundos de escolas públicas ao ensino superior, em universidades e institutos federais, e promover a inclusão social. A lei previa que no prazo de dez anos, a contar da data de publicação, seria promovida a revisão do programa especial para o acesso às instituições de educação superior. Este trabalho busca contribuir com a análise da aplicação da lei, especialmente observando as notas de ingresso comparando cotistas e não cotistas. Foram analisados os dados dos alunos ingressantes nos cursos da Área Básica de Ingresso a ABI – Engenharia, Direito e Medicina na UFPE, do Campus Recife, cursos de áreas do conhecimento distintas. Para a análise de desempenho no processo de ingresso, a partir das notas do SiSU, foram considerados todos os alunos ingressantes no referido curso no período de 2016.1 a 2020.2, totalizando 5145 alunos. Os resultados revelam que existem evidências que as notas do SiSU dos alunos da ampla concorrência são maiores que as notas dos cotistas, para os três cursos analisados (Medicina, Direito e ABI-Engenharias da UFPE), em todo período do estudo, qual seja 2016.1 a 2020.2, e ainda, que dentre os cotistas, os autodeclarados pretos, pardos ou indígenas ingressaram com notas médias inferiores aos demais cotistas, em todos os anos.

Palavras-chave: políticas de ações afirmativas, educação superior, lei de cotas, cotas raciais.
RESUMEN
La Ley de Cuotas para la Educación Superior en Brasil, implementada a partir de su entrada en 2013, fue diseñada para facilitar el acceso de los estudiantes de las escuelas públicas a la educación superior, en universidades e institutos federales, y promover la inclusión social. La ley disponía que en un plazo de diez años, contados a partir de la fecha de su publicación, se promovería una revisión del programa especial de acceso a las instituciones de educación superior. Este trabajo busca contribuir al análisis de la aplicación de la ley, especialmente mediante la observación de los puntajes de admisión que comparan a los titulares de cuotas y a los no titulares de cuotas. Se analizaron datos de estudiantes que ingresan a carreras del Área Básica de Ingreso al ABI – Ingeniería, Derecho y Medicina de la UFPE, en el Campus Recife, de carreras en diferentes áreas del conocimiento. Para analizar el desempeño en el proceso de admisión, con base en las calificaciones del SiSU, se consideró a todos los estudiantes que ingresaron al mencionado curso en el periodo 2016.1 al 2020.2, totalizando 5145 estudiantes. Los resultados revelan que hay evidencia de que las calificaciones del SiSU de los estudiantes en competencia amplia son superiores a las de los estudiantes de cuota, para los tres cursos analizados (Medicina, Derecho y ABI-Ingeniería de la UFPE), a lo largo del período de estudio, es decir, de 2016.1 a 2020.2, y también que entre los cuotistas, los autodeclarados negros, pardos o indígenas ingresaron con notas promedio inferiores a los demás cuotistas, en todos los años.

Palabras clave: políticas de acción afirmativa, educación superior, leyes de cuotas, cuotas raciales.

1 INTRODUCTION

Out of over 20 bills that navigated the Brazilian National Congress for over a decade, aiming to implement affirmative actions in Higher Education institutions, one Law Project number 73 (1999), finally materialized into Law number 12,711, dated August 29, 2012, commonly referred to as the Quota Law (Brasil, 2012a). This legislative measure was conceived to facilitate students' entry from public schools into higher education, specifically in federal universities and institutes, thereby addressing social inclusion issues arising from the lack of opportunities for quality education in their foundational years. The Quota Law for Higher Education, Law number 12,711 (Brasil, 2012a), regulated by Decree number 7,824 (Brasil, 2012b), mandates that Brazilian federal educational institutions reserve 50% of their slots for these students. This is further divided into halves: one for students from public schools with a gross family income equal to or less than one and a half times the minimum wage per capita and another for students from public schools with a family income exceeding one and a half times the minimum wage per capita. In both cases, the minimum percentage corresponding to the sum
of self-identified black, brown and indigenous individuals in the state, as per the latest Instituto Brasileiro de Geografia e Estatística (IBGE, 2010) demographic census, is considered. (Ministério da Educação e Cultura, (MEC, 2012)).

In addition to its comprehensiveness in addressing various facets of social disparities, the Quota Law holds potential significance as a strategy to mitigate social stratification in educational access.

The Federal University of Pernambuco (UFPE) partially aligned itself with this law one month after its enforcement in 2012 through the 2013 entrance examination, which offered 6,961 slots, with 870 of them reserved for quota students, constituting 12.5% of the total. This was by the law, which stipulated that by 2016, federal universities should achieve 50% exclusive slots for quota students. In 2016, UFPE fully complied with the quota system, with 50% of spaces exclusively reserved for students from public schools. (UFPE, 2013, through Resolution nº. 5/2013 - CCEPE – UFPE).

Since 2012, UFPE began adopting the SISU- Unified Selection System as an entry method for some courses. However, in 2015, it extended SISU as the entry method for all classes and for the four types of quota students who completed their high school education entirely in public schools. Until 2018, these quotas were subdivided into L1 - candidates with a gross family income per capita equal to or less than 1.5 times the minimum wage; L2 - self-declared black, brown, or indigenous candidates with a gross family income per capita similar to or less than 1.5 times the minimum wage, L3 - candidates with any payment, and L4 - self-declared black, brown, or indigenous candidates regardless of income, in addition to AC - Open Competition.

On January 29, 2019, some types of UFPE quotas were updated, and quota types for people with disabilities were added to comply with Law number 13,409 (Brasil, 2016), which has been in effect since December 29, 2016. The importance of including quotas for individuals with disabilities stems from the need to train qualified professionals for the companies that employ them.

In addition to racial quotas based on income for students from public schools and percentages for people with disabilities, UFPE has the Regional Inclusion Argument, approved by Resolution 17/2014 (UFPE, 2014). This affirmative action policy was applied from SISU 2015 for candidates for courses offered at campuses in the state's interior in Caruaru and Vitória de Santo Antão. Candidates who opt, during registration, for the Regional Inclusion Argument
receive a 10% bonus on the score obtained in the ENEM - National High School Exam. It is worth noting that this bonus is not cumulative with any quota; hence, the candidate must choose whether to compete as a quota student or to have the regional prize.

Regarding the repercussions of the application of Law number 12,711 of August 29, 2012 (Brasil, 2012a), they must be monitored mainly in accordance with Article 7 of the same law, namely:

(…) within ten years from the date of publication of this Law, a review of the special program will be promoted for access to higher education institutions for black, brown and indigenous students and people with disabilities, as well as those who completed their high school education entirely in public schools.(author translation)

In light of this article, it is evident that there is a need to analyze the impact of the implementation of this law, as the revision of this unique program for access to higher education institutions in public institutions in Brazil was scheduled for August 2022. In November of 2023, the Law 14,723 (Brasil, 2023) was sanctioned, which revised Law 12,711 from 2012 as established in the 7th article. The main changes are as follows:

a) in the admission process, candidates will initially compete for open competition seats—contested by all. If they do not achieve the required scores in this category, they will compete for seats reserved by the Quota Law;
b) update in the socio-economic criterion. Reduction of the per capita family income of students eligible for reserved seats based on socio-economic criteria to one minimum wage—rather than 1.5 minimum wages, as it stands today;
c) inclusion of quilombolas in the reservation. The project includes quilombolas among the profiles entitled to the allocation of seats in the same proportion they represent in the population of each state.

From the implementation of these changes, public universities will undoubtedly admit more than 50% of students from public schools.

Therefore, this work aims to contribute to a quantitative analysis of specific indicators after implementing the quota policy at UFPE, especially regarding admission scores through the SISU.

1 Art. 7º A cada 10 (dez) anos a contar da data de publicação desta Lei, será promovida a avaliação do programa especial para o acesso às instituições de educação superior de estudantes pretos, pardos, indígenas e quilombolas e de pessoas com deficiência, bem como dos que tenham cursado integralmente o ensino médio em escola pública.
2 THEORETICAL FRAMEWORK

Several studies have been published evaluating the outcomes of implementing the Quota Law for admissions to public higher education institutions in Brazil through the SISU, often analyzing the performance of quota and non-quota students comparatively. Some studies have also examined differences among various types of quota. Some have focused on students from different institutions, others on all courses within an institution, and others on specific courses within the same institution.

From a methodological perspective, the studies generally utilized means and, in some cases, the cutoff score. As many courses exhibit outliers in the distribution of admission scores through the SISU, both at shallow and high values, we dismissed the option of analyzing cutoff scores and opted to use means and medians.

Before the existence of the Federal Quota Law, number 12,711 (Brasil, 2012a) and the SISU, some public universities in the country already had admission processes benefiting quota students through specific state regulations, such as in Law number 5346/08 (Brasil, 2008) of Rio de Janeiro and Brasília.

Initially, we highlight some works that analyzed data from various universities, such as.

Vilela et al. (2017) studied ENEM data (microdata from 2011) before implementing the Quota Law for courses in Education, Biological Sciences, and Health from five universities in the most populous state in each region of Brazil. They simulated the application of the Quota Law for this year using the simple average of scores from all exams with equal weights. They concluded that the quota system would not reduce the average scores of entrants to federal universities. After the implementation of the Quota Law, it is questioned whether this conclusion has been validated, and the authors suggest repeating the analysis with post-implementation data.

On the other hand, Campos, Feres Junior and Dafilon (2014), using a database containing information on the admission of students to nearly four thousand courses at federal universities and institutes obtained through access to information law from the Ministry of Education, concluded that the gaps in scores between quota and non-quota students tend to increase with the combination of variables. In other words, candidates who suffer from socioeconomic, racial and educational exclusions tend to have a score that is further away from those who compete through open competition, even if it is low.
The analysis indicates that the race variable has a more significant impact on reducing the average than the income variable, demonstrating that candidates facing socio-economic, racial, and educational exclusions tend to have a lower score than candidates experiencing only one of these exclusions (social, racial, or academic).

Giardili (2018) studied six consecutive cohorts of incoming students in higher education between 2010 and 2015. He showed that the representation of quota students in federal universities significantly increased, rising from about 11% in the 2010 cohort to 33% in the 2015 cohort. Regarding the scores obtained in ENEM during 2010-2015, he found that the average scores of quota students are consistently lower than those of non-quota students. It is worth noting that the author studied all courses at all federal higher education institutions in Brazil. Moreover, Giardili (2018) presented the distributions of ENEM scores for students enrolled in federally funded institutions by analysis cohort. It was evident that, although there is substantial overlap, the allocation for quota students is to the right of the distribution for non-quota students, and the gap becomes more pronounced in 2013-2015.

Using ENEM data for all universities in Brazil and the same analytical period as Giardili (2018), from 2010 to 2015, Mello (2022) analyzed how the adoption of the Unified Selection System (SISU) and the expansion of Affirmative Action (AA) policies implemented in Brazil by Law 12,711 (Brasil, 2012a) impacted the enrollment of students with low socio-economic status in federal and state universities. This article utilized data from the Higher Education Census (CES) for 2010 to 2015, focusing on incoming students in on-site undergraduate programs at federal and state universities. Data from the National High School Exam (ENEM) from 2009 to 2014 were also employed. The results demonstrated that the full adoption of Affirmative Action increased enrollments for students who completed high school entirely in public schools, non-white students who attended public high schools, and low-income students who completed high school in public schools. On the contrary, the total adoption of SISU acted in the opposite direction, decreasing enrollments for these groups. The interaction between both policies created an additional effect that increased registrations for all vulnerable groups.

Similarly to the works of Giardili (2018) and Mello (2022), Leal and Choi (2023) used ENEM data from the period 2010 to 2016. Comparing the average ENEM scores of private school candidates and white candidates from public schools, they showed that, from 2013 onwards, the averages of white students from public schools are higher than the averages of
students from private schools. On the other hand, they also showed that non-white students from public schools achieved higher standards than white students from public schools.

In his master's dissertation, Pinto (2020) examined ENEM scores from 2009 to 2017 for all courses offered by public higher education institutions (HEIs) in Brazil that confer bachelor's and teaching degrees and participated in National Exam of Student Performance (ENADE), an exam applied for higher education students. The author also explored the relationship between ENEM and ENADE scores. Pinto (2020) concluded that quota students consistently showed lower average scores overall years compared to non-quota students. The primary justification reflected a better basic education cycle for more privileged students, facilitated by family background, parental education, and family income.

Subsequently, several articles analyzing all courses within a single HEI are highlighted. Biembengut, Pacheco, and Conick (2018) analyzed the academic performance of quota and non-quota students at the Federal Technological University of the State of Paraná-UTFPR, who enrolled from 2013 to 2015 at the Curitiba campus. The choice for this period was due to the fact that as of 2013 the university's selection process already complied with Law number 12,711 (Brasil, 2012a). The study covered 15 courses, and the analysis used the Performance Coefficient, an index at UTFPR considering grades in courses taken by the student, weighted by their respective workloads. A comparison was made between the averages of performance coefficients and admission grades for quota and non-quota students. In academic performance, the statistical test for comparing standards revealed no significant difference in mean performance between quota and non-quota students in nine of the analyzed courses. Significant performance differences were observed in only six courses, including three engineering courses, one teaching course, and two bachelor's degree programs. Regarding ENEM performance, in all evaluated studies, average scores significantly differed between quota and non-quota students, with non-quota students demonstrating better performance.

Analyzing admission to the Federal University of Acre - UFAC, Gatinho and Queiroz (2019) concluded, the averages presented by quota candidates contradict the discourse and expectations of part of society that opposed quotas. The average performance of quota students in the 2013 and 2014 selections in the analyzed courses was very close to that of non-quota candidates, ranging from 2.54% in 2013 to 4.77% in 2014. In general, the averages were
Also, in the Medicine course at UFAC, traditionally the most competitive at the institution, despite the higher cutoff scores in the 2013 and 2014 selections in all competition modalities, the difference between non-quota and quota candidates was almost the same as found in the overall average of the ten other analyzed courses.

Using data from the Federal University of Viçosa - Campus Rio Paranaíba - UFV-CRP, which offers bachelor's degree programs in various knowledge areas, Silame, Martins Júnior and Fonseca (2020) compared the performance of entrants from 2013 to 2016 between quota and non-quota students considering their access scores to the institution and their performance in the offered courses.

The results revealed, for some courses, candidates from the open competition present statistically significantly higher average scores due to their competitiveness. In less competitive courses, no statistically significant difference was found between averages, except for quota students with low income, from public schools, and who declare themselves black, brown, or indigenous. (Silame; Martins Júnior; Fonseca, 2020, p. 32). (authors’ translation).

Continuing, we present some studies where authors analyzed specific courses at the same university.

To measure the effects of the Quota Policy on courses such as Pedagogy, Administration, Medicine, Dentistry, Law, Chemical Engineering, Literature, and Mathematics on the performance and socialization of students at the Federal Fluminense University - UFF, Bezerra et al. (2020) conducted a study based on the collection and tabulation of data on ENEM performance of 1364 students who entered the first and second semesters of 2013 in these courses. When evaluating ENEM grades using the Mann-Whitney Test, they identified that the null hypothesis (H0) was not rejected only in Pedagogy classes, meaning no significant differences were found in this course between quota and non-quota students in the class that
entered in 2013. In other courses, the highest exam score corresponded to students from the open competition group.

To investigate the university trajectory of quota students after enrollment in face-to-face undergraduate courses at the Federal University of Ouro Preto - UFOP, Pena, Matos, and Coutrim (2020) studied entrants in 2013 in courses such as Medicine, Nutrition, Civil Engineering, Computer Engineering, Law, and Social Work. In the analyzed courses, students from the open competition obtained higher averages than quota students, except for Nutrition and Computer Engineering courses, which showed no statistically significant difference in ENEM scores among participants in different competition modalities.

Considering the ten most demanded courses by SISU in 2016 at the Federal University of Ceará - UFC, namely Medicine, Physical Education, Administration, Law, Civil Engineering, Pedagogy, Accounting Sciences, Agronomy, Biological Sciences, and Mathematics, Andriola and Araújo (2023) also found significant differences in admission scores between quota and non-quota students.

Galvão et al. (2023) analyzed the difference in academic performance between quota and non-quota students who entered the twelve undergraduate courses at the Federal University of Viçosa Campus Rio Paranaíba - UFV-CRP between 2016 and 2020, using non-parametric statistical tests to compare the averages of the ENEM score, the accumulated performance coefficient, and the number of rejections. The Kruskal-Wallis test for independent samples and the Mann-Whitney post hoc analysis were employed since the variables under study did not follow a normal distribution. The presented results indicated that non-quota students' average admission scores were higher than those of students from quotas. The authors stated,

In the civil engineering course (the most competitive on the campus), the average ENEM scores of students from the open competition were statistically superior to the average scores of students from quotas 1, 2, 3, 4, and aggregate quotas. While in the food science and technology course (less competitive on the campus), there is no statistically significant difference between the average ENEM scores of students from quotas 2, 3, 4, and open competition. (Galvão et al., 2023, p. 17). (authors’ translation).

It was also highlighted that, among quotas, the best average admission scores were
presented by students belonging to quota 4 (students from public schools who do not declare themselves black, brown, or indigenous, with a monthly family income higher than 1.5 times the minimum wage per capita). The lowest averages belonged to students who entered through quota 1 (students from public schools, self-declared black, brown, or indigenous, with a monthly family income equal to or less than 1.5 times the minimum wage per capita).

Considering the high dropout rate in the Medical Physics course at the Federal University of Rio de Janeiro - UFRJ, Alvarenga, Almeida, and Gonçalves (2020) conducted a descriptive characterization of undergraduates, along with some statistical tests regarding their admission scores and performance. The primary purpose was to compare these undergraduates and those taking the physics course at the same university. It was observed in Medical Physics that students entering through the open competition had significantly higher admission scores than quota students in all categories. In the Physics course, the only category where the difference was insignificant was for quotas regardless of color and income (L3).

In fact of this scenario, this study aims to compare SISU admission scores between quota and non-quota students, focusing on racial quotas (L2 and L4). A temporal trend analysis of the differences in mean admission scores between quota and non-quota students is conducted.

3 METHODOLOGY

Data from students entering courses in the Basic Area of Entry (ABI) - Engineering, Law, and Medicine at UFPE, Recife Campus, were analyzed. These courses represent diverse knowledge areas and were chosen due to high demand and competition through SISU. Notably, these courses are considered of "high social prestige" (Mendes Júnior; De Mello e Souza, 2014, p. 17-18).

The concept of ABI-Engineering at UFPE refers to students completing a basic set of disciplines (referred to as the "basic cycle") during the first year. At the end of this year, students must choose which engineering discipline to pursue regardless of completing the cycle. Depending on their academic performance, measured by the Coefficient of Performance (CR), they enter their preferred engineering course in the third academic period. This coefficient serves as a ranking, and to enter more competitive engineering courses, students must have a high rank. The engineering courses at UFPE that are part of ABI-Engineering include Civil Engineering,
Mechanical Engineering, Mining Engineering, Food Engineering, Chemical Engineering, Naval Engineering, Control and Automation Engineering, Electronic Engineering, Electrical Engineering, and Energy Engineering. This form of ABI-engineering entry is abolished since the beginning of 2024.

The Pro-Rectorate provided data for analysis for Planning, Budget, and Finance (PROPLAN) of UFPE, stored in the institution's academic system. The variables used in this study, available in UFPE's educational system, include SISU admission scores, Quota: yes/no, and Quota type: L1, L2, L3, L4.

Overall, information was analyzed by course. For the analysis of performance in the admission process, based on SISU scores, all students entering these courses from 2016.1 to 2020.2 were considered, totaling 5,145 students, with 3,210 from ABI-Engineering, 1,240 from Law and 695 from Medicine.

For descriptive analysis of the data, tables and figures were created, and the main descriptive measures were calculated. Kruskal-Wallis and Mann-Whitney tests were used to compare SISU scores, and a trend line was fitted for temporal analysis. In all cases, a significance level of 5% was adopted. All statistical analysis was performed using the R programming language.

4 RESULTS AND DISCUSSIONS

A total of 5,145 students entering the three courses, Medicine, Law, and ABI-Engineering, at UFPE from 2016 to 2020 were analyzed.

Observing the distribution of SISU scores by course, as illustrated in Figure 1, it is noted that the scores of entrants in ABI-Engineering are lower than in the other courses. However, there are outliers both above and below the median of entry scores for this course. For Law and Medicine, the outliers are below the median. The median SISU score for ABI-Engineering was 666.95. For the Law course, scores were higher than those for ABI-Engineering. On the other hand, for Medicine (median = 775.2), the distribution is very similar to Law (median = 747.5), but with higher values.
Figure 1. Boxplots of entry scores by course. Entrants from 2016.1 to 2020.2. Courses in Medicine, Law, and ABI-Engineering at UFPE Recife Campus.

Source: Elaboration of the authors with research data.

The greatest observed scores for Medicine are due to the large competition for the entrance in this course. This competition happens because the medical career has a lot of prestige and greater remuneration.

Analyzing the SISU scores of UFPE students by course and their quota status, as illustrated in Figure 2, it is easy to see that the boxplots representing the SISU scores of quota students are always below those of non-quota students, indicating their inferior performance in SISU. This justifies adherence to the Quota Law, as without quotas, these students with lower scores would not be in the federal university. Undoubtedly, one of the main reasons for the lower scores of quota students is the difference in public and private schools in Brazil.

Figure 2. Boxplot of entry scores by course, separating AC - Open Competition and quota students. Entrants from 2016.1 to 2020.2. Courses in Medicine, Law, and ABI-Engineering at UFPE Recife Campus.

Source: Elaboration of the authors with research data.
To verify whether the performance of non-quota students in SISU is statistically higher than that of quota students, a median comparison test, the Mann-Whitney test, was applied, given the non-normal distribution of scores by course for the groups (quota and non-quota). The results indicate that the median entry scores of non-quota students are statistically higher than those of quota students in all three courses analyzed. This finding collaborates with the results of various authors who studied a single course or multiple courses at the same university or at various universities (see, for example, Biembengut, Pacheco, and Conick. 2018, Pena, Matos, and Coutrim, 2020, Pinto 2020, among others).

To analyze the temporal evolution of the mean entry scores by course, Figure 3 was constructed. It can be concluded that:

a) the highest averages, in all years, are for the Medicine course, followed by the Law course and then ABI-Engineering. This happens, as already explained, due to the high prestige/remuneration of medical career;

b) the mean entry scores in the second semester of each year are always lower than those in the first semester. This pattern happens because the students with greater grades entry in the federal university in the first semester, and the students with smaller grades in the second semester, in each year;

c) there is a tendency for a decrease in means over time for the three courses analyzed. This reason to this trend needs to be further investigated, and it is necessary to elucidate whether it happens also for other courses / institutions.
Figure 3. Means of entry scores by course, separated by AC - Open Competition and quota students. Entrants from 2016.1 to 2020.2. Courses in Medicine, Law, and ABI-Engineering at UFPE Recife Campus.

Upon the implementation of the Quota Law, the expectation was for the government to take action to improve the quality of high school education in public schools. As a result of this investment, the knowledge level of candidates from public schools would be closer to that of private school candidates over time. If this had occurred, it would be expected that the percentage differences in means between open competition and quota students would decrease over time.

The data illustrated in Figure 4 reveal that there is a tendency for an increase in this difference over time for Medicine and Law courses. On the other hand, for ABI-Engineering, the trend is a slight decrease. One likely reason for these differences is that the competition for Medicine and Law is greater than for Engineering.
Figure 4. Percentage difference in means of entry scores between AC - Open Competition and quota students, by course. Entrants from 2016.1 to 2020.2. Courses in Medicine, Law, and ABI-Engineering at UFPE Recife Campus.

![Graph showing percentage difference in means of entry scores between AC - Open Competition and quota students, by course.](image)

Source: Elaboration of the authors with research data.

Focusing on the analysis of racial quotas, the data illustrated in Figure 5 reveal that, for all three courses, in all years, the mean scores of entrants through the racial quota are lower than those of entrants through other quotas, which, in turn, are lower than those of AC.

Figure 5. Mean scores from students of AC – Open Competition, racial quota and other types of quota.

![Graph showing mean scores from students of AC – Open Competition, racial quota and other types of quota.](image)

Source: Elaboration of the authors with research data.

Differences in racial quotas had already been detected by Campos, Feres Junior and Daflon (2014) in a study conducted with entrants from 2013 for all Federal Institutions of Higher Education (IFES). These results also support the conclusion of the study by Melo et al. (2021), based on ENEM-2018 data, 2018 school census micro data, and 2018 IBGE statistics for the whole of Brazil, which identified race as one of the relevant variables for performance on ENEM,
a factor of strong influence on the cultural and economic capital of the group, since it is known that Brazil is marked by a historical context of racial exclusion, in which brown and black subjects have lower financial income than the hegemonic white culture. Therefore, the superior performance of white students compared to those of other racial groups can be explained (Heringer, 2002). For scientific studies in the area, the educational process often reinforces the inequality of performance between whites and browns/blacks, growing in favor of the former (Basso et al., 2012), as our data also points out. (Melo et al., 2021, p. 1288). (...) The results corroborate studies in the sociology of education, as they reflect educational inequality in terms of student performance. They are linked to Bourdieu’s 1998 concepts of cultural capital, as students’ performance depends on their social origin. (Melo et al., 2021, p. 1290). (authors’ translation).

These findings differ from those obtained in the article by Leal and Choi (2023), which studied, from 2010 to 2016, for all universities in Brazil, ENEM data and found that, from 2013, non-white public school students obtained higher averages than white public school students. This difference can be explained by the fact that the Medicine, Law, and Engineering courses analyzed in this study are in high demand.

Social inequality in Brazil happens accordingly to the individuals’ color, which is a common conclusion in social scientific literature. Racial inequality still reaches significant proportions, even after 130 years after slavery abolition in the country. This racial inequality is due to social and cultural situations and due to Brazilian historic formation, which discriminates opportunities for black, brown and indigenous people from the opportunities to white people, since the primary and secondary education systems access.

5 CONCLUSION

The primary conclusions of this study are as follows:

a) the median scores obtained for admission to Medicine are higher than those for Law, which, in turn, are higher than those for ABI-Engineering;

b) there is evidence that SISU scores for open competition students are higher than those for

5 (...) fator de forte influência no capital cultural e econômico do grupo, já que é sabido que o Brasil é marcado por um contexto histórico de exclusão racial, no qual sujeitos pardos e negros têm rendimento financeiro inferior à cultura hegemônica branca. Explica-se, então, o desempenho superior dos estudantes brancos em comparação com os de outros grupos raciais (Heringer, 2002). Para os estudos científicos da área, o processo educacional, por muitas vezes, reforça a desigualdade de desempenho entre brancos e pardos/negros, crescendo em favor dos primeiros (Basso et al., 2012), assim como também apontam nossos dados. (Melo et al., 2021, p. 1288). (...) Os resultados corroboram os estudos da sociologia da educação, já que refletem a desigualdade educacional quanto ao desempenho estudantil. Eles estão atrelados aos conceitos de capital cultural de Bourdieu (1998), pois o rendimento dos estudantes depende de sua origem social. (Melo et al., 2021, p. 1290).
quota students across all three courses and throughout the analyzed period;
c) the percentage differences in median scores between quota and non-quota students in Medicine and Law show an increasing trend over time, unlike ABI-Engineering, which exhibits a decreasing trend;
d) the percentage differences in median scores between quota and non-quota students, in almost all analyzed semesters, varied between 6 and 10%;
e) racial quota students obtain lower average scores on ENEM compared to other quota students in all analyzed years for the three courses.

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