Affirmative Action in Higher Education:
Literature Review

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1. Introduction

Few issues arouse as much controversy in public debate as public or private affirmative action programs that aim to confer resources or special rights to members of a social group. It is central to affirmative action advocates that such resources or rights have a compensatory effect on historically gestated inequalities of access to human development opportunities and contribute to creating a fairer scenario for underrepresented groups in the more varied social spaces. Critics, in turn, tend to point out that the redistribution of resources induced by affirmative action is inconsistent with meritocratic values. They focus on potential trade-offs between equity and efficiency in the allocation of scarce resources.

Such controversies in the public debate arise not only because affirmative action alters the allocation of scarce resources – an essential feature of any public policy – but also because they do so in a way that is particularly salient to civil society. In higher education, for example, the preferential admission of a student to a specific vacancy that is not accompanied by an increase in the total number of vacancies offered necessarily results in the exclusion of another student. Another factor that contributes to the controversial character of the issue is the various ways in which it can be evaluated normatively. Put more simply, it seems clear that there are many possible answers to the question, "What do we want to achieve with affirmative action in higher education?" It is quite common, for example, that the goal is to increase representation of minority groups in the student body. This objective is usually justified by several reasons, such as a moral imperative that the university reflect more closely the real composition of social and ethnic-racial groups, the importance of plurality in innovation processes, and the cultural recognition of specific groups vis-à-vis society.

However, there are many other possible answers to the question enunciated in the last paragraph. In an article discussed in detail below, Brotherhood et al. (2022), for example, consider the design of affirmative action for higher education that aims to maximize the value of added human capital or well-being of Brazilian society in a multi-generational context. In this case, the objective of such public policies would be to increase the allocative efficiency of human development opportunities offered at this stage of education. Otero et al. (2021), another article discussed in detail in this document, present results that allow judging affirmative action as an instrument of redistribution, that is, as an instrument capable of inducing changes in the aggregate income of those who enter higher education because of policies. The changes in aggregate income of this group can be compared to changes in the aggregate income of those who fail to enter university. There is also the possibility of focusing on the very long term, which would lead us to consider affirmative action for its ability to increase intergeneration social mobility, education, or both. All these possible perspectives on the problem contribute to its

normative complexity.

Given these fundamental difficulties, it is perhaps surprising that, in 2014, approximately 1 in 4 countries in the world used affirmative action as a way to increase the number of students from groups with low representation in higher education (Jenkins and Moses, 2014). Such policies, most of which have been implemented since 1990, differ greatly in their design specificities, such as: (i) priority groups— defined, for example, by race, group of social origin, socioeconomic stratum, gender, among others; (ii) type of instrument used to increase the representation of priority groups – for example, bonuses in admission tests, direct quota using one- or multi-dimensional criteria or preferential admission of students based on characteristics of their period of basic education; (iii) ways of verifying claimants' eligibility to priority access — for example, self-declaration, or verification through commissions; (iv) the existence of other forms of support to the students contemplated by affirmative action, such as academic follow-up programs and income or in kind transfers (food or housing, for example); (v) the expected time to discontinue the policy.

In Brazil, after a series of institutional experiences in public universities during the 2000s, the Quota Lawof 2012 (Law No. 12,711) instituted as a public policy the reservation of vacancies for access to federal institutions of higher education and federal institutes of technical education of secondary level linked to the Ministry of Education (MEC). More specifically, the law and subsequent decrees establish, firstly, that 50% of the vacancies per institution, course and shift must be reserved for students who have studied in public schools throughout high school (3 years).[1] Next, it establishes that the list of students selected for the vacancies reserved for high school graduates from public schools had to meet two additional conditions: a minimum of 50% of students had to come from families whose gross monthly *per capita* income was equal to or lower than 1.5 minimum wages – more than 90% of students enrolled in National High School Examination (ENEM) between 2012 and 2016 met this condition – and the percentage of students who declared themselves black, mixed race or indigenous (PPI) had to be equal to the percentage of these groups in the population of the state where the university is located according to the 2010 Census. [2]families The choice of competition category is made by the Unified Selection System (Sisu), which uses a digital platform where public universities can offer vacancies in different courses and students can apply for them using their grades from ENEM without financial cost.[3]

[1] Decree No. 7,824, of October 11, 2012, students who had obtained a certificate of completion of high school through state or national certification exams were also eligible for the reserved vacancies , provided that they had not attended private schools throughout high school.

[2]Law No. 13,409, of December 28, 2016 created an additional criteria: the list of students selected for the reserved seats must have a percentage of persons with disabilities similar to that of the reference state.

[3]Normative Ordinance N. 1,117 of 2018 eliminated the possibility that candidates eligible for a quota with performance greater than or equal to that of broad competition occupy vacancies intended for priority groups.

The Law determined that the institutions had a four-year deadline to fully comply with the provisions described above, increasing the number of reserved seats by at least 25% of the target number each year. In addition, Article 7 of the Quota Law established that, within 10 years, it should undergo a review process, which would be completed in 2022. Although arguments for and against affirmative action are widespread in the public debate, it is reasonable to say that in Brazil, as well as in most countries of the world, "*many people* [...] *who are against affirmative action or for it are primarily for or against its theory*." (Sowell, 2017, p. 1). This document is intended to feed the evidence-informed debate on affirmative action in the context of the Quota Law review process. The scope of the analysis is that of the quantitative scientific literature that attempts to identify causal impacts of experiences of implementation or discontinuation of affirmative action in higher education. The text gathers the information on the already substantial literature that focuses on the causal effects of the Quota Law. In addition, we analyze studies on other affirmative action in Brazil and around the world to gather subsidies to discuss potential impacts of such a policy, forms of monitoring them and relevant new topics of research.

The document is divided into three sections, in addition to this Introduction and a final comments section. Section 2 addresses the impacts of affirmative action policies in higher education on the profile of the student body. This analysis is motivated by the fact that affirmative action policies alter the probabilities of entry into higher education for priority and non-priority groups, Section 3 shows the evidence on how students adjust to these changes during basic schooling. In this section, we consider the potential adverse effects identified in the literature. In other words, we consider if students change their level of preparation for admissions exams or take deliberate actions to fit into the priority profile. Section 4 discusses the effects documented in the empirical literature on the educational trajectories and labor market of priority groups and non-priority after the implementation of affirmative action. All sections begin with paragraphs of conceptual and thematic framing, so as to motivate reflection on the evidence and situate the empirical contributions discussed in the following sub-section. The Final Comments section takes stock of the lessons of literature and identifies the areas in which there is less consensus. Areas are also presented in which it would be important to accumulate more evidence, with emphasis on the Brazilian case. [4]

[4] Annex A provides detailed and systematized information on historical experiences of implementation or discontinuation of affirmative action in higher education, which were used as inputs in the elaboration of the document.

2. How Does Affirmative Action Affect the Student Profile in Higher Education?

2.1. Conceptual Framework

As discussed above, one of the central objectives of affirmative action in higher education is to increase, at this stage of education, the access of groups considered historically underrepresented and that are established as priorities. [5] Thus, the analysis of the effects of policies of this type involves, initially, the careful consideration of their effect on the profile of the student body in higher education.

While this may seem like a mechanical effect of any affirmative action in higher education, it is important to recognize that there are reasons why such policies might have null effects, or very small ones, on the admission rates of members of the priority groups. Note, first, that there are opportunity costs associated with attending higher education institutions, and it is plausible that these opportunity costs are unevenly distributed between priority and non-priority groups (see Tannen, 1978, for example). In particular, the choice to attend higher education necessarily involves the total or partial postponement of entry into the labor market. Second, there are direct costs resulting from the decision to attend an institution of higher education outside the city of origin. It seems plausible that these costs have a different meaning for the young people who constitute the target group of these policies. It is not necessarily the case that university becomes economically feasible for minority members with the highest expected gains in the labor market from having a college degree. If the prioritization criteria targets students from poor families or include other variables that are highly correlated with income and wealth, credit constraints can make the decision to move to the city where the university is located and/or postpone work unfeasible even when it makes economic sense. Third, it is possible that the potential beneficiaries of the policy are precisely those who face important informational barriers. They might have less information about about their potential prospects in higher education, before and after the establishment of affirmative action, and about their expected gains in the labor market (Hoxby et al., 2013).

As a consequence, many of the critics of affirmative action argue that students from priority groups would be doomed to have poor focus and the policy would only affect the most privileged members (the elite or the "cream", see Sowell, 2017, for example), a phenomenon called “creamy layer or creaming”.

In the limited case in which these members are more privileged than the less privileged

[5] In the following discussion, we use the terms "priority group", "preferential group" or "target group" to denote the set of individuals to whom special resources or rights have been conferred through a public or private instrument that establishes some affirmative action policy at a given historical moment.

of the non-priority groups, affirmative action policies could have an undesirable effect, deepening inequalities of opportunity. Thus, it is important to consider, as much as possible, the existing information on observable characteristics of individuals who gain a place in higher education as a consequence of the establishment of affirmative action. In particular, the characteristics of individuals and their family nuclei not directly contemplated by the policy in the definition of priority groups gain special importance.

Finally, a crucial question about the design and effectiveness of affirmative action policies is whether a neutral design with respect to ethnic-racial criteria has the same effectiveness in increasing the representation of ethnic-racial minorities as designs that explicitly address race or ethnicity (see Darity et al., 2011, for example, for an introduction to this debate). The discussion of the substitutability of criteria is closely linked to the argument that, given the great overlap between race and class, these could be two alternative ways of focusing on essentially the same set of individuals.

2.2. What Does Empirical Literature Say?

2.2.1. What are the impacts of affirmative action on the representativeness of target groups in higher education?

As suggested by the discussion above, the question of whether, and in what way, a determined affirmative action has an effect on the student profile of students who end up enrolling in higher education is an empirical question.

Mello (2022a) addresses, in a systematic way, the changes in representation of priority groups that resulted from the adoption of the Quota Law in Brazil. To this end, we use microdata from the Brazilian Census of Higher Education, from ENEM, and primary data on the number of places reserved in each of the public institutions of higher education in the country between 2010 and 2015. The causal identification strategy is based on the fact that the partial or full adherence of different institutions to the minimum percentage of reserved places – in particular, of 50% for public school students – happened at different points in time. Thus, the author explores this variation to compare the evolution of the enrollment rates of students belonging to priority groups in courses of institutions that reached more and less quickly the criteria stipulated by the Law. Because the timing of the adoption of the quota is exogenous from the student's perspective, this approach rules out a myriad of factors that could influence both adherence and enrollment at the same time. An example of such a factor, to which special attention is paid in empirical exercises, is the number of vacancies being offered by each course in the period considered. A second factor is the set of pre-existing trends in the mobility of groups considered *ex post* as priorities which may have increased the demand for affirmative action policies in places

where diversity would have increased even in the absence of the Quota Law. [6][7]

The article showsthat complete adherence to a reservation system such as that determined by the Quota Law was associated with an increase of 9.9 percentage points, on average, in the enrollment rate of students from public schools.[8] Considering that, in 2012, 54% of students enrolled in higher education institutions came from public schools, this effect would be equivalent to an average increase of approximately 18%. In addition, and in line with the intention of the creators of the policy with regard to the priority group of graduates of public schools, this effect on representativeness was greater in courses where the enrollment rates of public-school students were lower in 2012, the year the policy was established. Senkevics and Mello (2022) argue, in this sense, that "the *courses most transformed by the Quota Law were precisely those that hadthe smallest contingent* of *students of* vulnerable *social origin, that is, the most competitive, selective, prestigious courses.*" (p. 214).

Otero *et al.* (2021) present evidence that allows to qualify even more precisely the last part of this statement: between 2012 and 2016, there is an increase in the share of students enrolled in federal institutions of higher education from priority groups in *all* courses, but these increases are *particularly pronounced* in the courses of highest selectivity, captured by the course cutoff score in 2016, considering the modality of wide competition. Thus, in 2012, the group formed by the 10% most selective courses had 35% of students from priority groups enrolled in the first year, while in 2016, this share increases to 52%, just above the minimum criterion stipulated by the Law. In the group formed by the 10% less selective courses, in turn, the increase is only 2 percentage points, from 86 to 88% (see Figure B.2 below). Mello's exercise (2022a) also shows that the quota has positive effects on enrollment rates even in courses and institutions where the 50% threshold had already been reached. This result suggests that the positive effects of quotas on enrollment are not only a "mechanical" by-product of the reserve. On the contrary, as argued by Senkevics and Mello (2022), the results suggest that the Law "*also generated incentives for students from beneficiary groups to compete for vacancies, possibly revealing a pent-up demand for higher education or even altering the incentive structure for these individuals to apply for positions for which they previously would not take risks.*

Addressing in a sequential way all the prioritization criteria used by the Quota Law, Mello (2022a) also considers the causal impacts on the representation of students who were either poor or declared themselves PPI, in addition to having studied in public schools during high school. For the first group, the study considered the total household income

[6] This point, and many examples of the phenomenon, are discussed in Sowell (2017). For example, in the United States, the proportion of the black population in universities doubled in the two decades leading up to the civil rights movements in the 1960s.

[7] Senkevics and Mello (2019) address the same topic but using descriptive analysis of historical series. We consider Graph 1 (reproduced in Figure B.1) particularly interesting, which also appears in (Senkevics and Mello, 2022), where a huge accumulation of courses is shown in institutions fulfilling, very closely, the percentage of 50% of public school freshmen in 2016, stipulated as a minimum for this year by federal legislation

[8] It should be noted that, already in 2010, more than 20% of public institutions of higher education had some system of reservation of vacancies.

cutoff of 1 minimum wage, and not the cutoff used by law of 1 and a half *per capita* minimum wages. The fact that 90% of graduates from public high schools between 2012 and 2016 were below the 1 1/2 *per capita* minimum wage cutoff makes this exercise particularly important (see Senkevics and Mello, 2022). The article documents, a 34% increase in enrollment rate for students below the income cutoff of 1 total household minimum wage, and who studied in public schools, as a result of the quota (or 2.4 percentage points, up from 7% in 2012). For students who, in addition to having studied in public schools during high school, declared themselves as PPI in Sisu, this increase was 29% (or 7.0 percentage points, over the average of 24% in 2012). In the article, as in the case of the results on public school students described in the last paragraph, additional empirical exercises confirm that these increases in enrollment rates do not appear to reflect movements in composition that precede variation in adoption or the speed of adoption of the reserve system, which reinforces confidence in the causal interpretation of estimates.

When looked at together, these results strongly suggest that the Quota Law increased the representation of the target groups of the policy, the public school students and PPI public school students. In addition, using a more restrictive criterion of income than the law itself, Mello (2022a) shows that students from poor families have also increased their representation in higher education as a result of the implementation of the policy.

The fact that affirmative action has the potential to affect the student profile of higher education students, particularly in the most selective courses, tends to be corroborated by the literature on institutional experiences in Brazil during the 2000s, whether when considered individually (Estevan et al., 2018, 2019; Melo, 2021) or together (Vieira and Arends-Kuenning, 2019). In addition, these results are also in line with the literature on the historical experiences of countries such as the United States (Backes, 2012; Bleemer, 2022), India (Bertrand et al., 2010; Bagde et al., 2016) and Israel (Alon and Malamud, 2014). We discuss in detail some of this supplemental evidence in the following paragraphs.[9]

Estevan et al. (2018) study the affirmative action policy at the State University of Campinas (Unicamp), implemented as of 2005, which created the possibility that candidates who attended the 3 years of high school in public schools and declared themselves PPI to receive bonus points in the entrance exam. More specifically, candidates who declared that they had studied the three years of high school in public schools received a bonus of 30 points onto their test score, which amounted to, at the time, approximately 30% of a standard deviation of the empirical distribution of grades. If these candidates additionally declared themselves PPI, they received an additional 10 points, totaling 40 points. It should be noted that the implementation of the policy at Unicamp used a very specific method to fix these parameters. The bonus design was inspired by a descriptive

[9] Because of the centrality occupied in some of the cited surveys of questions that we will address below, we postpone the approach of experiences in India and Israel to the next sections.

study that showed that graduates of public high school had better performance in the university's undergraduate courses than those of private schools (Pedrosa et al., 2007), which was interpreted as a sign that these students could be subject to a lower admission threshold without significantly compromising their performance at the university. Following closely the study cited, the bonus values were chosen to match the relative average differences in performance in the entrance exam in previous years.

The authors use microdata from 2004 and 2005 for all those enrolled in the institution's selection process, and base their identification strategy on comparing the evolution of admission rates of priority groups over time with the evolution of admission rates of non-priority groups.10 The fundamental hypothesis for this type of causal identification strategy, called differences-in-differences (see, for example, Roth et al., 2022), is that, in the absence of the quota, the admission rates of non-priority groups would have followed a similar trend before and after the year of adoption of the policy. One of the advantages of the research is to be able to observe, in addition to the performance in the Unicamp entrance exam, the grade of these students in the ENEM, which are incorporated as controls in the regression, increasing the plausibility of this hypothesis of identification. The article documents an effect of 26% increase (2.8 percentage points, up from an average of 10.5% in 2004) on the admission rate among enrollees who attended the three years of high school in public schools, and a 14% (1.5 percentage points) increase in the admission rate of public school students who also declared themselves PPI. In further research, Estevan et al. (2019) present evidence that these effects of representativeness were particularly pronounced in more selective courses, with an increase of 63 to 93% (from 0.6 to 0.8 percentage points) in the rate of students from public schools accepted after registering for the entrance exam opting for Medicine, Computer Engineering, Control and Automation Engineering, and Electrical Engineering.11

In a study on the affirmative action policy of the Federal University of Espírito Santo (UFES), Melo (2021) finds results that are quantitatively and qualitatively similar. The policy, implemented as of 2008, consisted of the reservation of 40% of the vacancies of each course for candidates who had completed high school in a public school and had studied for 4 years, in total, in public schools. Using an empirical strategy very similar to that used for Unicamp in Estevan et al. (2018) and Estevan et al. (2019), Melo (2021) documents a causal effect of 9.4% (2.8 percentage points, over an average of 29.7%) increase in the probability of students from public schools who registered for the entrance exam opting for one of the 5 courses with the highest cutoff scores in the UFES (Medicine, Pharmacy, Computer Engineering, Environmental Engineering, and Law). Furthermore, there was an increase of approximately 11.5% (2.2 percentage points, on an average of 2.1%) in the percentage of

[10] Estevan et al. (2018) show that the results reported above are qualitatively and quantitatively similar when the analysis period is extended until 2008, and not limited to the first year of implementation, 2005.
[11] These effects, moreover, were more pronounced for students with higher ENEM scores, more specifically those in the top quartile of the distribution of exam scores.

students who met the quota criteria who were accepted to one of these courses.

Vieira and Arends-Kuenning (2019) evaluate the implementation of affirmative action in a set of 48 public institutions of higher education in Brazil during the 2000s and early 2010s. To do so, they collect data from the National Examination of Student Performance (ENADE) and primary data on the year of adoption of affirmative action in each of the institution between 2004 and 2012. Their results are consistent with the evidence from the historical institutional experiences described above and corroborate the impacts described by Mello (2022a) for the 2012 Quota Law. More specifically, the paper The article finds that the adherence of a public institution in the period to a policy of affirmative action increased by 3.1, 4.0 and 2.8 percentage points the enrollment rates of public school students, black students and students whose parents had not completed high school, respectively. These estimates would translate into effects of 9.8%, 11% and 15%, respectively, on the enrollment rate in periods prior to the adoption of affirmative action. Moreover, consistent with the results presented above, these effects are more pronounced in the most competitive courses.

The evidence on institutional experiences in the United States tends to be less conclusive about the potential of affirmative action in higher education to increase student representation of target groups. However, it tends to find similar results for more selective institutions and courses. However, it is important to highlight three fundamental differences with respect to the functioning of these policies in the country. First, the emphasis of affirmative action in the United States has always been primarily on ethnic-racial criteria of those enrolled in the selection processes. Second, there was never an explicit quota-based policy in place for American universities, and the decision-making bodies of institutions of higher learning had complete freedom over how to consider ethnic-racial criteria when weighing their admission choices. Third, the best evidence actually comes from the systematic institutional experiments of discontinuation that followed the famous case *Regents of the University of California v. Bakke* (1978), the first affirmative action case to reach the U.S. Supreme Court.

Impact evaluations of the discontinuation of quotas over time in the states of Texas, California, Washington, Florida, Georgia, and Michigan used causal identification strategies quite similar to those described above in Vieira and Arends-Kuenning (2019) and Backes (2012). They document that the average institution does not appear to have been affected in terms of enrollment rates of African Americans and Hispanics. However, when considering only institutions with a high degree of selectivity, the authors find a negative effect of 1 to 1.7 percentage points for blacks (or 21% to 35%) and from 1.3 to 2.9 (or from 13% to 28%) for students of Hispanic origin.

2.2.2. Is there evidence of creaming?

As discussed above, one of the central criticisms of the adoption of affirmative action

is that it would have effects only on the most privileged members of the groups defined as the target. An illustrative exercise in this sense, widely used in the empirical literature, is to compare students who entered higher education because of a specific affirmative action policy with those who would have been admitted in the absence of the policy. Exercises of this type that incorporate characteristics the students' household may inform the debate about the potential impacts of affirmative action on social mobility.

Estevan et al. (2018), for example, show that, in Unicamp, 53% of the mothers of candidates who would have been admitted without the bonuses in grades had a university degree. This fraction drops to only 25% among the group of enrollees who were admitted because of the increase in grade. Similarly, Melo (2021) documents that 58% of the candidates in UFES who would have been admitted in the absence of policies (but were not due to policies) had some relative who had gone to university. This percentage drops to 16% among the group of enrollees who were admitted due to the policy.

In the international literature, Bertrand et al. (2010) study, with similar methodology, the targeting of Indian quota programs for some lower castes in public engineering schools in the country. The authors show that candidates who would have been admitted in the absence of policies lived in households 46% richer than those admitted due to policies. In addition, 24% of the heads of household of the candidates who would have been admitted without the quotas did not have a university degree, and this number rises to 47% among the group of enrollees who were admitted because of the quotas.

These results suggest that the increased representation of the target groups in the above cases did not end up systematically focusing the gains on a privileged portion of their potential beneficiaries. We found no study in the literature that systematically compares of observable characteristics of students who entered higher education because of the Quota Law of 2012 and those who would have been admitted in the absence of the policy, such as those presented by Estevan et al. (2018) or Bertrand et al. (2010). It would be particularly important for the debate on quotas to understand in detail how these students' families differ in terms of human capital and positioning in the labor market. This exercise could be done using information from the ENEM on the educational attainment of parents and their occupation in the labor market. Exercises of this kind, which contemplate the full distribution of characteristics of those who gain and lose from policies, would provide a more complete picture for civil society of the effects of policies.

2.2.3. What is the relative importance of ethnic-racial prioritization criteria?

As discussed above, a crucial question about the design and effectiveness of affirmative action policies is whether a design that is neutral with respect to ethnic-racial criteria would have the same effect on the representation of ethnic-racial minorities as designs that explicitly address race or ethnicity. This issue was addressed, through different methodologies, both in the context of the Quota Law and in the context of institutional

experiences in Brazil during the 2000s, when considered individually (Francis and Tannuri-Pianto, 2012b) or together (Vieira and Arends- Kuenning, 2019).

In the case of the Quota Law, this issue has also been addressed by Mello (2022a), discussed at length above.[12] The causal identification strategy, in this case, is based on the time variation in the level of compliance of different institutions to the established minimum seat reservations by the race-ethnic criteria and by the race neutral criteria. Thus, the author studies the difference in the evolution of enrollment rates of students belonging to PPI and non-PPI priority groups in different majors in institutions that complied with the established quota at different speeds. The results presented are consistent with an independent importance of each of the reserve criteria in increasing the representativeness of the target groups.[13]

Vieira and Arends-Kuenning (2019) consider the same issue in a broad set of public institutions of higher education in Brazil during the years 2000. The database used is particularly suitable for considering the problem of substitutability between ethnic-racial preference criteria and others because, contrary to what happened with the Quota Law, the 48 institutions considered were free to set these criteria. The results suggest that the institutional experiences of implementing neutral quotas with respect to ethnic-racial criteria had no impact on the enrollment rates of PPI students. On the other hand, , and perhaps surprisingly, the affirmative action with emphasis on ethnic-racial criteria (and not the public school education criterion) was statistically significantly associated with increases in enrollment rates of public-school students and students whose parents had not completed high school.

In the case of UnB, Francis and Tannuri-Pianto (2012a) approach the issue with a different methodology. Above, we said that a common empirical exercise in the literature is to compare students who entered higher education because of a specific affirmative action policy with those who would have been admitted in the absence of the policy. UnB's quota policy changed the racial profile of the entrants: while 1.8% of the candidates who would have been admitted in the absence of policies (but were not due to policies) were black and 31% were mixed race, these numbers rise to 27% and 71% among the group of enrollees who were admitted due to the policy. To study the issue of the importance of the race criterion in achieving a more racially-diverse student profile, Francis and Tannuri-Pianto (2012b) perform counterfactual exercises with alternative systems of reservation of places – for example, a nominally similar reservation of 20% of the vacancies that contemplated students with family income of less than 500 reais (2004 values). In this case, the authors describe smaller effects on ethnic-racial representation than those described above—the

[12] The main results discussed below are presented in the appendix to the article (Table E.1. Mello, 2022a)

[13] In particular, the estimate associated with the PPI criterion is close to 4 times higher than the estimate associated with the public school criterion in the regression model that uses the enrollment rate of public school PPI students as the dependent variable.

percentage of blacks went from 6% to 18%, and the fraction of mixed race students went from 42% to 47%. Thus, the article suggests that a policy based on income criteria would have less effect on ethnic-racial representation than the policy of quotas effectively implemented in the university.

Outside Brazil, Long (2004) discusses the issue of substitutability of racial and non-racial criteria using the experience of the United States during the 90s. He compares institutions that have replaced ethnic-racial affirmative action policies for preferential admission programs for high-achieving students during high school relative to their cohort of peers from class (the so-called top-x% programs). He concludes, through simulations, that implementing such programs would have much smaller effects on the rates of African-American and Hispanic students, because a very small portion of the top-x % consists of students belonging to these groups. In this sense, Durlauf (2008) states, about American institutional experiences in California, Florida and Texas, that "*it* [...] *appears that efforts simultaneously to eliminate affirmative action and introduce different admissions criteria so as to preserve minority enrollment have not been successful* [...] *Nor is it clear that there are as yet untried policies that might be employed to bolster minority enrollment without explicit attention to race.*" (p. 132).

3. Does Affirmative Action Affect the Behavior of Priority and Non-Priority Groups Before Entering Higher Education? On what margins?

3.1. Conceptual Framework

Although the target group of affirmative action in higher education is the set of students in public high schools , policies of this type affect all students who attend the previous years of basic education, both those who belong to the priority groups and those who do not. A fundamental decision among the members of these groups that can be influenced by affirmative action is whether to continue in school during the previous stage of basic schooling. This may occur, in the first place, because the introduction of the policy alters the probabilities of admission to higher education. Although calculating how these probabilities are affected can be challenging (Kosse et al., 2022), it is reasonable to expect that the subjective perceptions of priority students, and of their families, about their chances of being accepted for collegewill adjust upwards and that the reverse will occur for non-priority students. Under the hypothesis that individuals attribute a positive expected value to the future act of attending higher education institutions, these adjustments may lead some individuals, especially those already at risk of dropping out of school, to change their choices to continue enrolled in school.[14]

Second, the exposure of older students to the effects of policies can generate "models of inspiration," as discussed and formalized in Chung (2000), affecting younger students' preferences for entering higher education or increasing the information available about the pecuniary and non-pecuniary returns of higher education.[15]

An additional possible margin of effects is engagement with school life during high school. Note that it is not immediately clear whether affirmative action policies will have a positive or negative effect on this margin. As discussed above, such policies have the potential to affect the subjective perceptions of students from priority and non-priority groups about the relationship between investments in human capital prior to college applications and the objective probabilities of admission. The literature tends to emphasize, in particular, the possibility that students with better academic performance may respond particularly differently to policy changes. In addition, the average effects and performance distribution depend crucially on the aggressiveness of the policy adopted (Coate and Loury, 1993).

[14] In Brazil the institutions covered by the Quota Law are particularly selective and enjoy a higher quality than alternatives in the public and private sector, as argued by Mello (2021) and Otero et al. (2021).

[15] The idea of spillovers in preferences or information in the field of educational decisions related to higher education is supported by the literature that studies the problem using samples of siblings (see Altmejd et al., 2021).

The discussion in the previous paragraphs does not consider the possibility that students may take action to fit into the priority groups contemplated by affirmative action policies. These decisions, of course, depend on the details of the policy in question and the groups considered as priorities. From an economic point of view, decisions of this kind can be analyzed from two different angles. In the first place, and as already mentioned above, falling into a priority group alters the objective probability of college acceptance. On the other hand, an extensive branch of literature documents behaviors consistent with people assigning direct value to their personal identity. Traits of group identity are an important part of personal identity and can be consequential to individual decisions (Akerlof and Kranton, 2000). In the next part, we will show that, together, these two mechanisms guide the literature that empirically studies changes in identification patterns that follow the adoption of affirmative action policies in higher education.

3.2. What does the empirical literature say?

3.2.1. Does affirmative action have effects on school abandonment and dropout during Elementary School, Junior High School, and High School?

We discuss the effects of affirmative action policies on the schooling of groups that, in the absence of such policies, would have dropped out of the school system before completing basic education. This analysis is of fundamental importance to adequately map the benefits of affirmative action in groups that are not directly targeted, but that constitute a significant portion of the young population. No studies addressing this subject in Brazil directly were found in the literature. Therefore, we focus on the existing evidence on international experiences.

Khanna (2020) explores the variation in the timing of affirmative action adoption in states of India, considering both quotas for universities and reservations of public job postings. The central idea is that affirmative action of this kind has eligibility criteria that include aa minimum level of educational attainment, which encourages schooling. Using a differences-in-differences model that compares age groups and priority and non-priority groups over time, the paper shows that adherence to a reservation system increases the total number of years of schooling of eligible minorities by 0.8 years.[16] However, after incorporating into the analysis the intensity of the policies – that is, the percentage of vacancies reserved for minorities in each locality – the article characterizes a concave relationship between the intensity of exposure to affirmative action and the number of years of schooling. Thus, although the affirmative action policies had positive impacts on the number of years of schooling of minorities on average, the places that implemented particularly aggressive policies appear to have been negatively affected. This possibility is interpreted in the article as evidence that very high levels of reserve can lead to a

[16] The average number of years of schooling achieved is not reported in the article.

"patronizing equilibrium" (in the jargon of Loury, 1992) or take away the incentives of students with lower performance to use education as a signaling instrument in the labor market (Bedard, 2001).

3.2.2. Does affirmative action influence effort and engagement with studies in the preparation stage for college entrance exams?

To our knowledge, there are no studies that evaluate the impact of the Quota Law in Brazil on students' effort and preparation for college entrance exams. Thus, the empirical evidence on the subject will be discussed based on individual institutional experiences in Brazil and abroad.

Ferman and Assunção (2015) jointly address the first three experiences of affirmative action implemented since 2002 in Brazil: the State University of Rio de Janeiro (UERJ) and at the Universidade Estadual do Norte Fluminense (UENF) in the state of Rio de Janeiro and at the Universidade Nacional do Estado da Bahia (UNEB). These experiences were different in the intensity of the fraction of reserved slots.[17] To do so, they used school performance microdata in diagnostic evaluations of the National System of Evaluation of Basic Education for 2001 and 2003. Identification was based on a differences-in-differences model that compares students from Rio de Janeiro and Bahia with students from the rest of Brazil before and after the implementation of the affirmative action policies. The authors document that affirmative action has a negative impact of 27% of one standard deviation on the scores of the standardized tests of Mathematics and Portuguese in the last year of high school for self-declared black students from public schools in Rio de Janeiro. These results suggest that the intensity of the quota policy for this group reduced the effort in the year of preparation for the entrance exam.[18] However, there was no evidence of a negative effect of affirmative action on the performance of Bahian students contemplated by the seat reservation in UNEB. This result can be attributed to the lower intensity of affirmative action in that context compared to Rio de Janeiro.

Estevan et al. (2018) and Francis and Tannuri-Pianto (2012b), in articles already discussed about the experiences of Unicamp and UnB, respectively, also address the issue of the effects of affirmative action on school effort before the entrance exam. Importantly,

[17] For example, in 2003 there were approximately 20,800 black students in the 3rd year of high school in the state of Rio de Janeiro. The number of places reserved for these students at UERJ and UENF added together were approximately 1,200. Thus, if all these students tried to join UERJ and UENF, there would be, for the group, a ratio of candidates per vacancy of 17. On the other hand, the total number of students in the 3rd year of high school in public schools was approximately 144,000, leading to a ratio of 120 candidates per vacancy. In the same year, there were about 106,000 black or mixed-race high school students in Bahia studying in public schools. The number of places reserved for these students at UNEB was 1,440. If all black high school students would try to get admitted, they would face a candidate/vacancy ratio of 74.

[18] On the other hand, no similar effects were found for self-declared white public school students, indicating that groups less aggressively affected by the vacancy reservation system were not affected in a manner similar to that described above. Nor were effects found for white or private school students, which could have occurred if, for example, the new rules generated disincentives to prepare for college entrance exams.

the policies studied by Ferman and Assunção (2015), Estevan et al. (2018) and Francis and Tannuri-Pianto (2012b) differ greatly in the type of instrument used and, more essentially, in the differences in competitiveness they induced for priority and non-priority groups. Estevan et al. (2018) use a differences-in-differences approach to compare eligible and ineligible students before and after the implementation of affirmative action at Unicamp and find no significant impacts of the policy on the effort of priority students. Thus, in this case, the results suggest that there was no discernible effect of encouragement or discouragement on the performance of public school applicants (PPI or not) in relation to private school applicants. Francis and Tannuri-Pianto (2012b), in turn, used a similar empirical strategy to evaluate the impact of the affirmative action policy in UnB. They use data on the number of times students took the UnB entrance exam and the rate of students who took a preparatory course and finds no evidence that the policy of racial quotas has had a negative impact on the effort of black students in the stage of preparation for admission to the university.

In Latin America, a study on the *Programa de Acompañamiento y Acceso Efectivo a la Educación Superior* (PACE, Kosse et al., 2022), implemented in Chile in the 2010s, explicitly discusses the importance of students' subjective perceptions of their probabilities of admission to higher education after the implementation of affirmative action policies. The PACE is a national policy of preferential admission in public institutions of higher education that targets applicants whose GPA is among the top 15% of their cohorts in schools with a high percentage of students from low socioeconomic status.

The results described by Kosse et al. (2022) refer to a group of students affected by the program as of 2016 in the context of an experimental impact study involving 221 schools in the country. The authors document that the introduction of PACE had an effect of reducing performance on a standardized test at the end of high school by 10% and an indicator of effort during high school by 9%. They find no evidence of encouraging effects on students at the top of the empirical distribution of performance at the end of the 2nd year of high school, who had high chances of making up the group of eligible students. To understand these results, the authors use information collected from the target audience about the students' subjective perceptions of their chances of being accepted for college after the introduction of the policy. More than 40% of the students in the eligible schools covered by the program believed, at the beginning of the year, that they would finish high school in the top 15% and thus guarantee a place in higher education by PACE. Indications of exacerbated confidence were found for *all* students, regardless of the position they occupied in the empirical distribution of performance in the 1st or 2nd year of High School.

In a next step, Kosse et al. (2022) estimate a structural model to better understand the role of subjective perception biases, and compare observed variables of interest to what would be observed in a scenario of perceptions aligned with reality. The main result is that these biases play a central role in determining the performance of students in higher

education even before the introduction of PACE. However, the program exacerbates the negative effects of these biases. Intuitively, this is because such errors of perception induce high-skill students to take admission for granted and reduce their effort, and low-skill students with high confidence to consider it within their grasp and to increase their effort. Together, both processes decrease the admission of students in the first group (high ability) and increase the probability of admission of the second group (low ability).

Akhtari et al. (2020), in turn, study the experience of affirmative action readoption in Texas, from 2003 onwards. As described above, systematic institutional experiences of discontinuation during the 1990s occurred because of plebiscites in several states and the result of *Regents* of *the University of California v. Bakke*, the first affirmative action case to reach the U.S. Supreme Court. In 2003, the Supreme Court's decision in *Grutter v. Bollinger* ruled that racially conscious admissions processes that do not amount to quota systems are constitutional. That reversed a 1996 lower court decision that prohibited the use of race in admissions to public universities in Texas. Using two different methodologies, of differences-in-differences, as in previous articles, and synthetic control (see Firpo and Possebom, 2018 , for example), the authors report that both priority and non-priority groups obtained an increase in their math scores on the Stanford Achievement Test (SAT) as a response to the readoption of affirmative action. The gains of the first group would be twice as large as those of the second, and more pronounced for those students who already had better academic performance. These students were therefore more likely to be admitted to universities as a result of their effort and, therefore, more likely to benefit from additional prior investments in human capital. In support of the interpretation that these effects mediated by changes in effort, the authors also report positive effects (of 10%) on the time spent by priority students doing homework and on school attendance.

The evidence presented above is consistent with the indeterminations predicted by theoretical models on discrimination and affirmative action. In other words, the conclusions corroborate the conclusion of Fryer Jr and Loury (2005) in their assertion that "*confident a priori assertions about how affirmative action affects incentives are unfounded [...] economic theory provides little guidance on what is ultimately a subtle and context-dependent empirical question*." The empirical papers presented indicate that the impacts of affirmative action on effort are crucially dependent on the instruments used to increase representation and on the changes in competitiveness of the college admission processes introduced by the policies. Understanding the impacts of the Quota Law of 2012 on student effort is an important avenue for future research.

3.2.3. Does affirmative action create incentives to take action to become part of a priority group?

As described in Section 2, the most important eligibility criterion of the 2012 Quota

Law is the student's past schooling in public school during high school. Mello (2021) uses microdata from the School Census between 2008 and 2016 to investigate transfer patterns of 9th graders from private schools to public schools, and whether they appear to have been affected by the introduction of the law. The paper documents a 31 percent effect (or 4.7 percentage points on an average of 15 percent) on the transfer rate of students at this stage, from private schools to public schools, for those who were exposed to the variation induced by the complete adoption of the reservation system. Such an increase is particularly pronounced among non-whites, who would have the most to benefit from transferring to a public school system.

In a second step of the analysis, Mello (2021) more accurately characterizes the students who choose to change schools at this stage and the changes in teaching quality induced by the reform. She shows that these movements occur among students from private schools that are worse in terms of grades and of lower socioeconomic status. In this sense, the analysis suggests that the individuals who change are precisely those who, most likely, would benefit least from continuing schooling in the private system. In addition, these students choose to move to schools that are even worse than the schools in which they studied, effectively trading school quality for prioritizing the use of the vacancy reserves induced by the Quota Law.

Francis and Tannuri-Pianto (2012b) and Francis and Tannuri-Pianto (2013) study the historical experience of UnB and the potential impacts of a quota policy on students' racial self-identification. The policy, which was implemented by the university's own initiative, consisted of a reservation of 20% of the vacancies in each course for those that self-identified as "black" at the time of registration. To prevent fraud, quota applicants were interviewed by a hetero-identification commission for the verification of racial identity. Finally, in the years they attended the university, quota students had access to programs designed to support their academic and social development, including tutoring services, public seminars on the value of blacks in society, and a meeting space on campus in which to study and interact.

A particularly interesting element of the study is that the authors submitted photos of the students enrolled in the selection process to external observers, who objectively judged the skin color of these students. Thus, the authors observe, for the same student, self-revealed racial identity, and an objective measure of skin color, as judged by an impartial third party. Consistent with the incentives generated by the policy, the authors find evidence of increased self-declaration as black, especially among students judged by an impartial third party as darker in terms of skin color. However, even among the 20% darkest students according to the race measure obtained from an impartial third party there are positive effects of the introduction of affirmative action on the rate of students who declared themselves black. This finding is interpreted by the authors as a potential sign that the policy influenced the inclination of the individuals contemplated to identify themselves with their own race.

The idea that affirmative action can have effects on the prevalence of characteristics that define priority groups in the population tends to be confirmed by the international literature, which we now discuss briefly. Cullen et al. (2013), for example, study the Texas Top Percent Plan, implemented in 1998, an affirmative action of preferential admission to public institutions of higher education for students who were, at the end of high school, among the top 10% of their cohort in terms of cumulative overall grade. Analyzing student transfer patterns, the authors show that a portion of students changed schools to increase their chances of being in the top decile of distribution and securing a place at the university. Moreover, in doing so, it is documented that these students end up pushing minority students to relatively inferior positions in their schools, which decreases their chances of being contemplated by affirmative action.

4. What are the Effects of Affirmative Action on the Educational and Labor Market Trajectories of the Target Group?

4.1. Conceptual Framework

The potential for affirmative action to increase equity of access to higher education was discussed at length in Section 2. It seems indisputable that policies of this type increase the representativeness of target groups in higher education and do so in a particularly pronounced way in the most selective courses. It is also clear that, in the period of basic schooling, students potentially affected by affirmative action alter their behavior because of these policies if their probability of being accepted to higher education changes greatly, as evidenced in Section 3. It is less obvious — and therefore the subject of discussion in public and academic debate — whether, and in what way, the implementation of affirmative action affects the ability of higher education institutions to train students while maintaining their previous quality standards.

From an economic point of view, this discussion focuses on potential trade-offs between equity in the chances of access and efficiency in the allocation of scarce public resources. For students who are not in priority groups, the central concern is the reduction of the quality of their college training as a result of having peers with less accumulated human capital or because of adjustments in the courses so that these peers can keep up. Students in priority groups could be harmed by affirmative action if they are placed in institutions they are ill-prepared to attend, creating a situation the literature calls a mismatch. The beginnings of this discussion trace back to the debate on the implementation of affirmative action in law schools in the United States (Sander, 2004; Ayres and Brooks, 2004; Rothstein and Yoon, 2008). Sander (2004), in this context, even argued that eliminating any kind of consideration for race in the admission process of these universities would lead to an increase in the training of successful black lawyers. However, the discussion on mismatch goes beyond law schools and is crucial to understand how affirmative action impacts the educational future and labor market trajectory of priority and non-priority groups.

The basic argument attached to the mismatch hypothesis is that students with poor academic preparation may progress poorly in the challenging environment of a selective course or institution of higher education. They could, however, have higher labor market and educational returns from attending less selective courses or institutions. A key conceptual distinction in the literature is if the mismatch is a local or global phenomenon (see Arcidiacono and Lovenheim, 2016 in particular). In the first case, the "marginal" student admitted through affirmative action – that is, the individual on the margins of being invited or not to enter higher education after entrance tests – would have a more successful educational and labor market trajectory in a counterfactual scenario where affirmative action policies did not exist. However, the existence of local mismatch does not imply that

the priority group as a whole is adversely affected. When this is the case, affirmative action is said to be associated with a global mismatch. This distinction, as we will see, has consequences on the methodologies used by the authors to characterize the impacts of affirmative action. In addition, it signals that there could be an optimal level of affirmative action, from which local mismatch and eventually global mismatch would be incurred.

4.2. What Does the Empirical Literature Say?

4.2.1. What are the effects of affirmative action in higher education on the educational trajectories of priority and non-priority groups?

Otero et al. (2021), in an article already discussed in Section 2, evaluates the medium and long-term impact of the Quota Law on the educational trajectories of the groups defined as priority and non-priority by the normative framework. To this end, the authors focus on the cohort of applicants who applied for college in 2016, the year in which, as we saw above, the Quota Law was fully implemented.

The causal identification strategy of the article differs from the other strategies discussed so far as it uses students' ENEM grades and grade cutoffs specific to each course. This information allows the authors to implement a regression in discontinuity (see Cattaneo et al., 2019, for a systematic exposure to the method). Intuitively, the regression in discontinuity compares future outcomes of students just below and just above the ENEM grade cutoff score for entry into higher federal educational institutions. The students just below and just above the cutoff tend to be very similar, except for the fact that the former were accepted for enrollment. This allows us to approximate the causal effects of admission on the educational trajectory of the "marginal" enrollees—that is, individuals on the margins of being accepted to a federal university the following year. Thus, the method allows a formal test of the local mismatch hypothesis, explained in the paragraphs above. An empirical question is whether, and in what form, these effects would be similar in other sub-groups of the population of interest. We will return to this point in the following paragraphs and discuss how Otero et al. (2021) deal with this limitation of their empirical strategy to assess other long-term effects of the policy. However, as discussed in depth in the influential study by Kirkeboen et al. (2016) on the returns on investments in higher education courses, "such intention-to-treat estimates can be of interest for a variety of reasons, such as informing policy that marginally expands or contracts a particular degree program. However, we need to be cautious when extrapolating the payoffs we estimate to the population at large or inframarginal applicants." (p. 1061).

In the article, the discontinuity regression exercise described above is used to study the impacts of admission to a federal institution of higher education for priority students and for those who participated in the selection process by wide competition. In an important empirical exercise, Otero et al. (2021) compare the percentage of students enrolled in a federal university 4 years after the ENEM of 2015, used for college admissions in 2016.

The results indicate that the priority students marginally above the cutoff had an average 10 percentage points increase in the likelihood of enrollment in a federal university within 4 years. This increase is equivalent to that experienced by the students of non-priority groups. In addition, the priority marginal student just above the cutoff had an average increase of 8.9 percentage points in a measure of quality of the higher education course attended four years after the 2015 ENEM examination. The non-priority marginal student, in turn, saw a 6.5 percentage point increase in the same quality indicator, but the effect was statistically less significant than the gain experienced by the priority marginal student.

Two key conclusions emerge from these exercises. The first is that priority students tend to have greater educational benefits from being accepted to federal universities: as we have seen, both have similar permanence rates in federal institutions, but the increase in quality of the courses attended by priority students is 37% greater than for non-priority students. This is rationalized in the article by the existence of alternative options available to the second group (such as private universities), which are not accessible to the first group. The second conclusion is that, among priority students just below and just above the cutoff score, these results are inconsistent with the local mismatch hypothesis. It should be noted that all priority students are studied as a unitary group in this article, and no distinctions are made between public school students, public school students who are PPI, or even PPI public school students from families with *per capita* income below 1.5 minimum wages. In addition, the study does not consider heterogeneous effects on universities in different states or on courses with different acceptance rates.

Francis-Tan and Tannuri-Pianto (2018) employ the same strategy to study the causal impact of the racial quota policy at UnB on priority students, also based on the discontinuity regression method. The results indicate that the priority marginal student above the cutoff has a gain of 10 percentage points in the probability of completing higher education course at UnB, on average. Interestingly, all this increase comes from the sub-group of young men considered as priorities. In this context and for young males, the results are inconsistent with the empirical validity of local mismatch. To analyze the heterogeneity of the effect, Francis-Tan and Tannuri-Pianto (2018) also construct measures of selectivity, at the course level, finding some evidence of mismatch in the group of young women who joined UnB because of the implementation of racial quotas.

Oliveira et al. (2022), in turn, study the quota policy of the Federal University of Bahia (UFBA). The policy was implemented in 2005 and consisted of reserving 45% of the vacancies of each university course for candidates who had studied three years in a public high school and at least one year in a public school during elementary or junior high school. The policy also established that 85% of the slots reserved for students with this profile had to be filled by self-declared PPI students[19].

[19] As in the case of the Quota Law, which was only amended in this respect in 2018, even in cases where the student who met any of these criteria achieved a grade in the entrance exam that was sufficient for him

The authors use, for the period from 2003 to 2006, administrative microdata of all students who took the entrance exam of UFBA, including the grade in the college entrance exam, the eligibility to reserved vacancies , detailed information about grades in college courses and whether each student graduated in the selected major. In addition, to study the heterogeneity of the impacts of the policy, the authors also use information on whether the grade in the entrance exam of students eligible for quotas would be sufficient for their selected courses in the absence of the quota policy. To identify causal parameters, the authors use, as in several cases discussed above, an empirical strategy of differences-in-differences, which compares students eligible for quotas and a group of ineligible students, before and after the introduction of affirmative action. In particular, as the maximum percentage of students from private schools under affirmative action would be 55%, the authors restrict the sample of ineligible students in prior years to those among the 55% highest grades in the entrance exams for comparability.

In a first stage of the analysis, Oliveira et al. (2022) study the impact of quotas on the academic performance and the graduation rate in the majors offered by UFBA for students who enrolled between 2003 and 2006. Authors also use information on failures in courses students registered to when they attended the university to measure academic performance. After controlling for grades in entrance exams, the authors find no evidence that the policy had an effect on academic performance. However, using the same empirical strategy, the authors document a 6% (or 4.6 percentage point) reduction in the graduation rate of students targeted by the policy, and these effects are particularly pronounced in the majors Architecture and Urbanism, Engineering, Computer Science, Physics, Geophysics, Geography, Mathematics, Oceanography, Chemistry, and Information Systems. In addition, as expected, such effects are more pronounced in the sub-group of quota students whose performance in the entrance exam would not have been be sufficient for them to have entered the courses in which they enrolled in the absence of the quota policy. It seems, then, that the experience at UFBA was associated with some degree of mismatch, in global terms, in the first years of implementation. .

After documenting that the policy had negative effects on the graduation rates of the target groups, Oliveira et al. (2022) focus their analysis on the students who graduated in the majors they enrolled in. At this stage, the authors' intention is to describe, in detail, the adjustment margins used by students targeted by affirmative action after observing their performance at the university. In particular, the authors have an interest in comparing their adjustment process to the adjustment in the US, where students choose a major but have the freedom to change it during the course after observing their performance in the early years. The authors point out that, because Brazilian students do not have the same freedom

entering without using the reservation of places, he still competed only with students who could take advantage of the reservation. Thus, after the implementation of the affirmative action policy, there was no more competition in the admission process between future students from public and private high school.

to change their majors, they are more likely to drop out of college when they become frustrated with their performance. This decision is particularly costly to both the student and the higher education institutions. The authors present descriptive evidence on the academic differences between students from priority and non-priority groups in college: for example, quota students struggle more in the first semesters, failing more courses and having completed less credits required for their majors between the second and fourth semesters. However, this difficulty decreases considerably in the subsequent semesters, suggesting a partial catch-up.

Bleemer (2022) studies the effects of Proposition 209, which prohibited affirmative action policies based on ethnic-racial criteria—that is, for those of African American, Native American, or of Latino American descent — in the admissions processes for public universities in California beginning in 1996. To this end, the author uses a longitudinal database for all those enrolled in selection processes for these institutions, with information between 1994 and 2002 on the previous and future educational trajectory and on the trajectory in the labor market. The causal identification strategy is based on the comparison of the temporal evolution of the students who belonged to priority groups, before Proposition 209, with the temporal evolution of the non-priority groups. As in the widely discussed Brazilian case of Unicamp (Estevan et al., 2018, 2019), the authors gather information on the human capital accumulated by students during basic schooling. The inclusion of these variables and of school of origin fixed effects in the differences-in-differences model makes identification of causal effects more robust. In a first step, Bleemer (2022) considers the effects of Proposition 209 on the quality of higher education institutions in groups previously considered as priorities. The results indicate that, after the abolition of affirmative action, priority students started to enter institutions of lower quality according to measures such as the average SAT score of the freshmen or the graduation rate.

In the medium term, abolition has also had a negative effect on the graduation rate of priority students, either within 4 or 6 years of entry. Over the 4-year horizon, for example, there was a decrease of 0.85 percentage points (or 1.8% over an average of 48%) in the graduation rate of priority students when compared to non-priority individuals from the same schools and with comparable performance in pre-entry tests. This negative effect is particularly pronounced for those students who had a low academic performance at the end of high school (2.1 percentage points in the horizon of 4, and 4.3 percentage points in the horizon of 6 years, for individuals in the first quartile of the distribution of this variable).

These results are inconsistent with the empirical validity, in this context, of global mismatch: under mismatch, accepted students with the worst academic performance should be the ones who would benefit the most from attending less selective universities in the absence of affirmative action. Perhaps most surprisingly, this negative effect is also found when one considers degrees in science, technology, and mathematics which are precisely those that usually involve greater preparation in order to keep up. Finally, the

author documents that these effects also translated into lower rates of students belonging to the groups previously considered priority who completed graduate courses.

In Israel, Alon and Malamud (2014) study the effects of the introduction of a policy of preferential admission of public school students from 2001 onwards in 4 universities (Tel-Aviv University, The Hebrew University, Ben-Gurion University and The Technion). For implementation purposes, these universities hired a non-governmental organization that assigned a socio-economic index to each student, from 0 to 85. The empirical strategy used in the paper is a regression in discontinuity design, taking advantage of the fact that eligibility for preferential admission is determined by the cutoff of 30 in this index. Using data on overall grade during year 1 at universities, overall grade over course, course completion, and completion in a selective course, the authors find no evidence that affirmative action influenced any of these margins. Again, these results are inconsistent with the idea that access to these universities would lead to a systematic occurrence of mismatch.

4.2.2. What are the effects on the labor market for groups affected by affirmative action in higher education?

In an article discussed at length above, Otero et al. (2021) also investigate the effects of the 2012 Quota Law on the trajectory in the labor market of students enrolled in 2016 in federal universities. Note, however, that the authors do not yet have complete information about this cohort, given that these students would be in the process of integrating into the labor market between 2021 and 2023. To operationalize the analysis, then, the authors obtain the predicted income in those years using a regression model in cohorts who entered higher education between 2010 and 2012 and their income in 2017. Using these data, the results indicate that the student from a priority group who is marginally above the cutoff score for his group has an average predicted gain of 87 reais per month between 2021 and 2023 resulting from college admission while the non-priority student marginally above the cutoff score of the broad competition gains of 27 reais per month in the same period (not statistically significant) as a result of being admitted to college. The significant differences of returns to higher education between priority and non-priority students is explained by the fact that non-priority students have, on average, better outside options than students targeted by affirmative action. For instance, private institutions are more likely to be feasible to them than to students in priority groups. As discussed above, exercises based on the method of regression in discontinuity characterize the impact on the individual at the margin of entry, considering the cutoff score of the last course he chose at Sisu. However, to evaluate the average causal effects of the policy, in particular on the trajectory in the labor market, it is important to use methods that allow us to go beyond what is learned in the vicinity of these cutoff scores. To achieve this goal, the authors propose and estimate a structural model for the choice of university courses. With the aid of this model, we reconstruct what would be the result variables for different

degrees of reserve (from 0 to 50%), using two sources of exogenous variation to identify the parameters of interest, which serve as instrumental variables: (i) strictness of the graders randomly assigned to correct students' essays in ENEM;[20] (ii) and color of the test notebook, which is also randomly assigned and determines the variation of the test that the student receives, which could vary in difficulty depending on the order of the questions.[21] The model is used to estimate the consequences of the Quota Law using data from Minas Gerais, comparing the (observed) reservation of 50% of vacancies to what would have been observed in the absence of any reservation.[22] The authors find that the Law increases the income of priority students by 1.2% and decreases the income of non-priority students by 0.9%, which is interpreted as a distributive result of increased equity without commitment to allocative efficiency. In addition, the effects on the income of priority students were particularly pronounced (approximately 30%) among those who scored relatively high (above 750 out of 1000) in the ENEM, who could have access, after choosing in Sisu, to more selective courses.

Brotherhood et al. (2022) presents an interesting alternative to the absence of data on long-run effects of affirmative action policies. Moreover, the study illustrates the multiple normative points of view from which affirmative actions can be evaluated. The authors are motivated by an empirical fact that emerges from the joint analysis of ENEM and the National Examination of Student Performance (ENADE), a test that evaluates the performance of Brazilian undergraduate students in contents related to their majors and included in the national curriculum guidelines.

More specifically, they use Enade data for the years 2014 to 2019 and restrict the sample to incoming students before the implementation of the Quota Law in 2012. They find that, although (as expected) students from high-income families have higher performance than students from low-income families, the pattern is reversed when they control for the students' admission grade in the ENEM. Thus, for example, students with similar performance in the ENEM coming from families with total income of 1.5 to 3 minimum wages had performance in the Enade around 3% of a standard deviation higher than students from families that earned more than 10 minimum wages. The exercise strongly suggests that students who grew up in lower-income families, while tending to come from an underprivileged background, have unobservable characteristics that allow them to have a higher return in higher education. In this sense, as the authors argue,

[20] The examiners hired by the Ministry of Education have bachelor's degrees in language-related areas and personally correct the digitized version of handwritten essays on an online platform. In the first step, each essay is evaluated by two different people. If the two grades have a discrepancy greater than 100 points in total or by more than 80 points in at least one skill, a third examiner with high agreement rates is automatically assigned and evaluates the essay.

[21] The relevance of this variable in the first stage is empirically confirmed in the article, and the hypothesis of exclusion restriction – that, for example, rigidity would not only have a direct effect on admission to higher education via an increase or decrease in the overall ENEM score – seems quite plausible.

[22] In the article, the authors justify the use of data restricted to the state of Minas Gerais for computational reasons and indicate that future versions of the article will incorporate data from the entire country.

efficiency gains could be achieved by affirmative action based on income criteria, which replaced students from wealthy families with students from poor families, with similar performance in the ENEM and who would tend to accumulate more human capital during their years at the university.

Motivated by these provocative empirical facts, the central question of the article is whether there can be gains in allocative efficiency with the implementation of income-based affirmative action. Also, whether these effects would carry enough weight to offset potential distortions in educational investments, such as those documented in Section 3. The first fundamental component of the model is that poor and rich families must invest before the college application period in factors that affect both the grade in the admission test (the ENEM) and the human capital accumulated by the time the students graduate. This distinction is fundamental in the authors' model because the ENEM score determines the probability of admission to higher education, but it is the human capital accumulated until graduation that determines the income earned in the labor market. The second key component is that investments before college applications affect the likelihood of admission more than the accumulated human capital. The third component is that high-income families are able to invest more in their children's education before entering university. In a scenario where, as assumed by the authors, the innate ability of children from poor and wealthy families come from the same random distribution, these components act as forces capable of generating inefficiencies such as those empirically documented above.

The quantitative exercises presented in Brotherhood et al. (2022) then consider the effects of affirmative action policies that would reserve a portion of vacancies for each quintile of the population. They consider two types of objective function to characterize these policies at their optimal level—one that maximizes aggregate efficiency (output, generated by human capital accumulated by society) and another that maximizes aggregate well-being (in terms of utility earned by households). The latter, in particular, consists of a seat reserve of approximately 11% of the vacancies to students of the two lower quintiles of income, which would leave 80% of Brazilian households in a better state (in terms of utility) than in a scenario without any kind of affirmative action. In addition, they can provide what we believe to be the only result in the literature about the potential impacts of affirmative action on intergenerational income mobility. More specifically, the authors show that the policy that maximizes aggregate well-being also has the effect of decreasing intergenerational income persistence by 5.7 percent. It should be noted that the income criterion of affirmative action that maximizes well-being is far removed from the income criterion currently used by the Quota Law. The Law reserves 50% of the vacancies for students with less than 1.5 per capita minimum wage, which sets a cutoff well above that of two lower quintiles of income and a much larger reserve for that fraction of the population.

It is still too early to document the long-term causal effects of the Quota Law on the labor market without resorting to structural models (such as Brotherhood et al., 2022) or extrapolation exercises to measure labor market outcomes of the impacted students (such as Otero et al., 2021). However, the evaluation of previous institutional experiences of implementing affirmative action provides some insight on the issue. For instance, Machado et al. (2022) study labor market outcomes using a broad administrative database of UERJ, linked to the Annual List of Social Information (RAIS), a matched employer-employee dataset that includes all formal workers. This approach allows them to observe the trajectory of the groups affected by affirmative action for a long period after enrollment in the entrance exam (from 6 to 13 years). Machado et al. (2022) use two different empirical strategies to identify relevant causal parameters in the case of UERJ. The first of these, used for cases in which the reserved places are, in fact, occupied by students in the priority group, is the regression in discontinuity, also used by Francis-Tan and Tannuri-Pianto (2018), for UnB, and Otero et al. (2021), for the Quota Law. As discussed above, this methodology allows one to characterize the impact on the enrollees around the entrance exam grade cutoff for acceptance. The parameters identified in this study refer to the courses in which the reserved places were almost all occupied, which were also the most selective ones. The authors document a 14% increase in the hourly wage of students who enrolled in UERJ because of the affirmative action policy instituted in the early 2000s, 6 to 9 years after they took the entrance exam. However, these positive effects on labor income seem to have dissipated when the time horizon is 13 years after enrollment in the entrance exam.

In a second step, Machado et al. (2022) evaluated the impacts of affirmative action on UERJ students who obtained high marks in the entrance exam, and could have entered higher education courses even in the absence of affirmative action. This group corresponds, approximately, to the top 55% of students in their courses each year. To identify causal parameters, the authors use, as in several cases discussed above, an empirical strategy of differences-in-differences, which compares the evolution of future salaries of students in courses in which there was high demand for the vacancies reserved through the policy with those in which the competition for those slots was less fierce. use of those same vacancies was lower. The authors identify a persistent negative effect of 14% on labor income from 6 to 13 years after admission on students who studied in courses in which there was high demand for the slots reserved because of affirmative action. The article also presents evidence on mechanisms that could explain this result. First, using data from ENADE and an empirical strategy of the same type, Machado et al. (2022) document that there has been a reduction in learning. Second, the authors find that the exposure of students who obtained high marks in the entrance exam to a larger share of peers from priority groups decreases their percentage of classmates working high-paying jobs in companies that hired other UERJ students. Thus, the intensity of the adoption of the policy seems to be associated with a reduction in the value of the networks that were

formed in college.

Moving on to international literature, Black et al. (2020) study the effects on wages of the already discussed preferential admission policy called the Texas Top Percent Plan, implemented in 1998. This affirmative action policy included reservation of seats in selective universities for students who placed, at the end of high school, among the top 10% highest GPAs of their school. Just like Otero et al. (2021), the authors estimate the effects of the policy for two groups in an effort to characterize gains and losses for students who gain more access and those who tend to lose access to higher education. The first group is made up of students with high GPAin high school, in schools that tended to have a low percentage of students entering public universities in Texas. The second group is made up of students with relatively low GPA from schools that typically had a high rate of students entering higher public education in the state. Similarly to Otero et al. (2021), the authors document gains for the first group in terms of tuition and graduation rates in higher education, and in the labor market 7 to 9 years after leaving university, but do not find negative effects for the second group. The results are rationalized, in the article, by the existence of alternative options available to the second group (such as private universities), which are not accessible to the first group. The main conclusion of the article is that "the Top Percent Rule, introduced for equity reasons, thus also seems to have improved efficiency".

Bleemer (2022), considers the relative effects of Proposition 209 on the labor market trajectory of priority and non-priority groups from 12 to 16 years after applying to college in California. The results indicate that the discontinuation of the affirmative action policy decreased labor earnings of students in priority groups by 4%, with a particularly pronounced effect for Hispanics. Thus, banning affirmative action ended up deepening social inequalities in this context.

Bertrand et al. (2010) study the long-term effects of Indian caste quota programs in public engineering schools in the country. The methodology used, of regression in discontinuity, brings this exercise closer to others carried out by Francis-Tan and Tannuri-Pianto (2018), for UnB, and Otero et al. (2021), for the Quota Law. The results presented in the article are, once again, consistent with gains in the labor market for students admitted, at the margin, by affirmative action. However, and unlike the Brazilian case described above, the estimated points suggest that the gains of priority groups admitted are accompanied by greater losses among students of non-priority groups. In general, this exercise emphasizes the importance of considering the gains and losses of seat reservations for the priority and non-priority groups at the same time. The comparison of these gains and losses allows one to evaluate the redistributive potential of a specific policy, and its potential losses of allocative efficiency.

5. Final Comments

This document systematically presents the results of a broad quantitative literature on the causal effects of implementation and discontinuation of affirmative action in Brazil and around the world. We give special attention to the branch of literature that measures the effects of the Quota Law implemented in federal universities since 2012 and other affirmative action policies in Brazilian public universities. One of the central objectives of the analysis is to discuss different criteria used to analyze affirmative action in higher education and to subsidize future research on the matter.

In Section 2, we describe a relatively unambiguous body of evidence on increases in the representativeness of target groups generated by affirmative action, which occurs in a particularly pronounced manner in the most selective courses. It seems indisputable that affirmative action in Brazil and in the world was responsible for non-trivial changes in the student profile of higher education students. Next, we address the criticism that affirmative action would benefit only the most privileged members of the target groups (see Sowell, 2017, for example). Although there is no systematic evidence on the subject for the 2012 Quota Law, the literature indicates that, on average, individuals who won a seat because of affirmative action are not more privileged than those who lost their slot because of it. For example, Estevan et al. (2018) analyze the pioneering experience of Unicamp which, in 2003, introduced a bonus system to increase the representation of public school and self-declared PPI students. ,They document that, in subsequent years, only 25% of the mothers of candidates who were admitted as a consequence of the bonuses in grades had a university degree. Among the students who would have been admitted in the absence of the policy, this number rises to 53%. We consider that exercises of this kind for the Quota Law would provide a more complete picture for civil society of the effects of the policy. Finally, given the centrality of prioritization criteria based on ethnic-racial characteristics in Brazil and the rest of the world, we also consider the evidence on the importance of this criterion for the constitution of the effects of affirmative action policies on groups defined by these characteristics. The attention, in this case, falls on the potential substitutability between ethnic-racial and socioeconomic criteria. It is closely linked to the argument that, given the great overlap between such criteria, these could be two alternative ways of focusing on similar sets of individuals. The literature indicates that policy designs based on alternative criteria—for example, exclusively on income criteria —would have significantly lower effects on the representation of ethnic-racial minorities than those that address ethnicity and race directly.

Because affirmative action policies alter the odds of admission to higher education for priority and non-priority groups, Section 3 focuses on evidence on students' margins of adjustment to these changes during basic schooling. The empirical evidence reviewed in this section points to a decrease in the effort of priority groups in preparing for university

entrance exams in cases where affirmative action induced great changes in the probabilities of admission to higher education for representatives of these groups. There is, for the time being, no systematic evaluation of these effects for the 2012 Quota Law, despite the opportunity to study its effects given the diversity of experiences lived by priority groups in different locations in Brazil. Regarding possible effects on efforts to fit the priority profile, the literature indicates that the Quota Law encouraged the transfer of students from private schools to public schools, with a higher incidence in private schools of lower quality and with a composition of students with a lower socioeconomic profile.

In Section 4, we focus our attention on the effects documented in the empirical literature on the educational and labor market trajectories of priority and non-priority groups after the implementation of affirmative action. Central to the academic literature on the subject is the mismatch (or incompatibility) hypothesis, according to which affirmative action would place students in priority groups in majors and universities for which they would be ill-prepared. In a borderline case, these individuals would benefit more from less selective majors or institutions, or even by progressing directly to the labor market. As we have seen, the existing evidence on the subject provides little support for the existence of a systematic mismatch in Brazilian federal universities after the full implementation of the Quota Law, although there is more consistent evidence with the phenomenon in the cases of UFBA (Oliveira et al., 2022) and, for women, UnB (Francis-Tan and Tannuri-Pianto, 2018). Students brought into the university because of the reservation of places do not graduate from higher education with lower probability. Perhaps more surprisingly, students who fail to enter federal universities because of reservation do not tend to have lower graduation rates in higher education or even lower salaries — facts that can only be rationalized by the existence of alternative options available to this group, such as private universities, that are not accessible to the target groups of the Quota Law. It should be noted, however, that the literature on the subject does not distinguish between public school students, public school students who declare themselves PPI, or even public-school students from families with a per capita income below 1.5 minimum wages. This literature also does not systematically incorporate into the analysis the potential heterogeneity of effects in selective courses. In addition, specific state experiences have not yet been given attention, which, as described above, will tend to present different results according to the ethnic-racial composition in the 2010 Demographic Census. We consider that it would be interesting to understand the heterogeneities of the effects according to these margins to offer a more complete picture of the impacts of the Quota Law.

As we have seen, most of the studies presented above present impact assessments of historical experiences of implementation or discontinuation of affirmative action policies with specific design. One of the difficulties faced, however, is precisely the structuring of the design. For example, in the case of the Quota Law, we saw that half of the 50% of places reserved for public school students is reserved for students who come from

households in which the gross *per capita* income is higher than 1.5 minimum wages – a condition met by more than 90% of students enrolled in ENEM between 2012 and 2016 (Senkevics and Mello, 2022). What would be the consequences of reducing the income criterion or of using, as in the case of the ethnic-racial criterion of the Law, the share of households in the state of the institution to determine the size of the seat reserve for the poorest students? We consider counterfactual exercises in structural models (such as Brotherhood et al., 2022, for example) to be particularly important to answer these questions.

References

Akerlof, G. A. and Kranton, R. E. (2000). Economics and identity. *The quarterly journal of economics*, 115(3):715–753.

Akhtari, M., Bau, N., and Laliberté, J.-W. P. (2020). Affirmative action and pre-college human capital. Technical report, National Bureau of Economic Research.

Alon, S. and Malamud, O. (2014). The impact of israel's class-based affirmative action policy on admission and academic outcomes. *Economics of Education Review*, 40:123–139.

Altmejd, A., Barrios-Fernández, A., Drlje, M., Goodman, J., Hurwitz, M., Kovac, D., Mulhern, C., Neilson, C., and Smith, J. (2021). O brother, where start thou? sibling spillovers on college and major choice in four countries. *The Quarterly Journal of Economics*, 136(3):1831–1886.

Arcidiacono, P. and Lovenheim, M. (2016). Affirmative action and the quality-fit trade-off. *Journal of Economic Literature*, 54(1):3–51.

Ayres, I. and Brooks, R. (2004). Does affirmative action reduce the number of black lawyers. *Stan. L. Rev.*, 57:1807.

Backes, B. (2012). Do affirmative action bans lower minority college enrollment and attainment? evidence from statewide bans. *Journal of Human Resources*, 47(2):435–455.

Bagde, S., Epple, D., and Taylor, L. (2016). Does affirmative action work? caste, gender, college quality, and academic success in india. *American Economic Review*, 106(6):1495–1521.

Bedard, K. (2001). Human capital versus signaling models: university access and high school dropouts. *Journal of political economy*, 109(4):749–775.

Bertrand, M., Hanna, R., and Mullainathan, S. (2010). Affirmative action in education: Evidence from engineering college admissions in india. *Journal of Public Economics*, 94(1-2):16–29.

Black, S. E., Denning, J. T., and Rothstein, J. (2020). Winners and losers? the effect of gaining and losing access to selective colleges on education and labor market outcomes. Technical report, National Bureau of Economic Research.

Bleemer, Z. (2022). Affirmative action, mismatch, and economic mobility after californias proposition 209. *The Quarterly Journal of Economics*, 137(1):115–160.

Brotherhood, L., Herskovic, B., and Ramos, J. (2022). Income-based affirmative action in college admissions. *UB Economics–Working Papers, 2022, E22/425*.

Cattaneo, M. D., Idrobo, N., and Titiunik, R. (2019). *A practical introduction to regression discontinuity designs: Foundations*. Cambridge University Press.

Chung, K.-S. (2000). Role models and arguments for affirmative action. *American Economic Review*, 90(3):640–648.

Coate, S. and Loury, G. C. (1993). Will affirmative-action policies eliminate negative stereotypes? *The American Economic Review*, pages 1220–1240.

Cullen, J. B., Long, M. C., and Reback, R. (2013). Jockeying for position: Strategic high school choice under texas' top ten percent plan. *Journal of Public Economics*, 97:32–48.

Darity, Jr, W., Deshpande, A., and Weisskopf, T. (2011). Who is eligible? should affirmative action be group-or class-based? *American Journal of Economics and Sociology*, 70(1):238–268.

Durlauf, S. N. (2008). Affirmative action, meritocracy, and efficiency. *Politics, Philosophy & Economics*, 7(2):131–158.

Estevan, F., Gall, T., and Morin, L.-P. (2018). Redistribution without distortion: Evidence from an affirmative action programme at a large brazilian university. *The Economic Journal*, 129(619):1182–1220.

Estevan, F., Gall, T., and Morin, L.-P. (2019). On the road to social mobility? affirmative action and major choice.

Ferman, B. and Assunção, J. (2015). Does affirmative action enhance or undercut investment incentives? evidence from quotas in brazilian public universities.

Firpo, S. and Possebom, V. (2018). Synthetic control method: Inference, sensitivity analysis and confidence sets. *Journal of Causal Inference*, 6(2).

Francis, A. M. and Tannuri-Pianto, M. (2012a). The redistributive equity of affirmative action: Exploring the role of race, socioeconomic status, and gender in college admissions. *Economics of Education Review*, 31(1):45–55.

Francis, A. M. and Tannuri-Pianto, M. (2012b). Using brazils racial continuum to examine the short-term effects of affirmative action in higher education. *Journal of Human Resources*, 47(3):754–784.

Francis, A. M. and Tannuri-Pianto, M. (2013). Endogenous race in brazil: affirmative action and the construction of racial identity among young adults. *Economic Development and cultural change*, 61(4):731–753.

Francis-Tan, A. and Tannuri-Pianto, M. (2018). Black movement: Using discontinuities in admissions to study the effects of college quality and affirmative action. *Journal of Development Economics*, 135:97–116.

Fryer Jr, R. G. and Loury, G. C. (2005). Affirmative action and its mythology. *Journal of Economic Perspectives*, 19(3):147–162.

Hoxby, C., Turner, S., et al. (2013). Expanding college opportunities for high-achieving, low income students. *Stanford Institute for Economic Policy Research Discussion Paper*, 12(014):7.

Jenkins, L. D. and Moses, M. S. (2014). Affirmative action initiatives around the world. *International Higher Education*, (77):5–6.

Khanna, G. (2020). Does affirmative action incentivize schooling? evidence from india. *Review of Economics and Statistics*, 102(2):219–233.

Kirkeboen, L. J., Leuven, E., and Mogstad, M. (2016). Field of study, earnings, and self-selection. *The Quarterly Journal of Economics*, 131(3):1057–1111.

Kosse, F., Miglino, E., and Tincani, M. M. (2022). Subjective beliefs and inclusion policies: Evidence from college admissions.

Long, M. C. (2004). Race and college admissions: An alternative to affirmative action? *review of Economics and Statistics*, 86(4):1020–1033.

Loury, G. C. (1992). Incentive effects of affirmative action. *The ANNALS of the American Academy of Political and Social Science*, 523(1):19–29.

Machado, C., Reyes, G., and Riehl, E. (2022). Alumni job networks at elite universities and the efficacy of affirmative action.

Mello, U. (2021). Affirmative action and the choice of schools.

Mello, U. (2022a). Centralized admissions, affirmative action, and access of low-income students to higher education. *American Economic Journal: Economic Policy*, 14(3):166–97.

Mello, U. (2022b). Online appendix: Centralized admissions, affirmative action, and access of low-income students to higher education. *American Economic Journal: Economic Policy*.

Melo, A. P. (2021). Affirmative action, college access and major choice.

Oliveira, R. C., Santos, A., and Severnini, E. (2022). Affirmative action with no major switching.

Otero, S., Barahona, N., and Dobbin, C. (2021). Affirmative action in centralized college admission systems: Evidence from brazil. Technical report, Working paper.

Pedrosa, R. H., Dachs, J. N. W., Maia, R. P., Andrade, C. Y., and Carvalho, B. S. (2007). Academic performance, students' background and affirmative action at a brazilian university. *Higher education management and policy*, 19(3):1–20.

Roth, J., Sant'Anna, P. H., Bilinski, A., and Poe, J. (2022). What's trending in difference-in-differences? a synthesis of the recent econometrics literature. *arXiv preprint arXiv:2201.01194*.

Rothstein, J. and Yoon, A. H. (2008). Affirmative action in law school admissions: What do racial preferences do? Technical report, National Bureau of Economic Research.

Sander, R. H. (2004). A systemic analysis of affirmative action in american law schools. *Stan. L. Rev.*, 57:367.

Senkevics, A. S. and Mello, U. M. (2019). O perfil discente das universidades federais mudou pós-lei de cotas? *Cadernos de Pesquisa*, 49:184–208.

Senkevics, A. S. and Mello, U. M. (2022). Um balanço dos dez anos da política federal de cotas na educação superior (lei nº 12.711/2012). *Cadernos de Estudos e Pesquisas em Políticas Educacionais*, 6.

Sowell, T. (2017). *Ação afirmativa ao redor do mundo: um estudo empírico sobre cotas e grupos preferenciais*. É Realizações Editora Livraria e Distribuidora LTDA.

Tannen, M. B. (1978). The investment motive for attending college. *ILR Review*, 31(4):489–497.

Vieira, R. S. and Arends-Kuenning, M. (2019). Affirmative action in brazilian universities: Effects on the enrollment of targeted groups. *Economics of Education Review*, 73:101931. X

A. Detailed Description of Historical Experiences of Implementation or Discontinuation of Affirmative Action in Higher Education

A.1. Affirmative Action Policy in Public Higher Education in Brazil (Quota Law)

What is the goal?

The goal is to increase the admission of candidates who have graduated from public high school, especially poor students, and students from racial and ethnic minorities, considered underrepresented groups in the student body of Brazilian federal universities.

Where and when was it implemented?

The "Law of Quotas" (Law N 12,711) was approved by the National Congress on August 29, 2012. It determined that the vacancy reservation policy should be fully implemented in Brazil by 2016.

How is it designed?

The policy established that all federal institutions of higher education in Brazil linked to the Ministry of Education should, mandatorily, reserve part of their vacancies for public high school graduates and ensure the representation of low-income, black, mixed race, or indigenous students within this group. More specifically, the quota policy stipulated the following categories of competition and reservation of vacancies for the selection process of universities and federal technical institutes:

1. students in broad competition;
2. candidates who have fully attended high school in public schools, to which 50% of the vacancies are reserved;
3. candidates with a gross *per capita* family income equal to or less than 1.5 minimum wages who have fully attended high school in public schools. This group would have half of the vacancies reserved for public high school graduates; ;
4. self-declared black, mixed race, or indigenous candidates with a gross *per capita* family income equal to or less than 1.5 minimum wages and who have fully attended high school in public schools. The law establishes that each of these groups should have a share of the seats reserved to low-income high-school graduates (described in 3.) proportional to their prevalence in the population of the state where the institution is located according to the last demographic census.
5. self-declared black, mixed race, or indigenous candidates who, regardless of income, have fully attended high school in public schools. These groups should have a share of the seats reserved for public school graduates (described in 2.) determined by the proportion of these groups in the state where the educational establishment is located, according to the latest demographic census.

The choice of major and institution is made by the Unified Selection System (Sisu), which uses a digital platform where public universities post vacancies and students apply for them using their grades in National High School Examination (ENEM) without financial cost. After selecting their majors , students compete only with the other candidates who have registered within that same category for the same course. Normative Ordinance N. 1,777,

from 2018, eliminated the possibility that candidates eligible for quotas with performance greater than or equal to that of the broad competition occupied vacancies destined to priority groups.

What have we learned from monitoring and evaluation?

The following evidence regarding the monitoring and causal impact of the increase in the reservation of vacancies induced by the Quota Law from 2012 onwards has been documented in the published article and in the articles for discussion listed in the section below:

- Between 2012 and 2015 the rate of reserved places in courses offered by federal public institutions went from 23% to 48%, with a relatively higher increase in the rate of vacancies reserved by racial and ethnic criteria, which went from 7.7% to 28% in the period, than by other criteria, which grew from 15% to 19% in the same period [1];
- A 31% increase (4.7 percentage points) in the transfer rate of students in the 9th year of junior high school from private schools to public schools, in regions where there were institutions of higher education that completely adhered to the reservation of 50% of the vacancies [3];
- The increase described above was particularly pronounced for non-white students, who would benefit the most from the transfer, and also for students from low-performing private schools [3];
- An 18% increase (9.9 percentage points) in the enrollment of students who attended all of high school in public schools, in institutions of higher education that fully complied with the reservation of 50% of the vacancies and adhered to Sisu in the period [1];
- The effects on enrollment rates described above were greatest in institutions where public school admission rates were lowest in 2012, but even universities that had more than 50% of students from public schools increased this contingent with the implementation of the policy [1];
- A 29% increase (7 percentage points) in the enrollment rate of students who attended all of high school in public schools and were black, mixed race, or indigenous in higher education institutions that fully complied with the reservation of 50% of the vacancies and adhered to Sisu in the period [1];
- A 34% increase (2.4 percentage points) in the enrollment rate of students who attended all of high school in public schools and who came from low-income families (defined as those in which total household income was lower than 1 minimum wage, which is not the same income criterion used by the Quota Law), in higher education institutions that have completely adhered to the reservation of 50% of the vacancies and that had a representative level of adherence to Sisu in the period [1];
- The effects described above occurred in all courses, but were particularly pronounced in courses of high selectivity: in 2012, the 10% most selective courses had 35% of students from priority groups, while in 2016, this share increased to 52% [4];
- There is no evidence that the increase in reserved places has had negative effects on the quality of the courses attended or drop-out rate for students close to the acceptance cutoff for their major and category.

  This is inconsistent with the hypothesis that students admitted by quotas have insufficient preparation, which would lead them to have worse performance, to seek easier courses or, as a last resort, to drop the course in which they had entered [4];

- By affecting enrollment rates and student progression in public higher education, the

reservation system had had distributional effects when fully implemented in 2016. It increased the income of the average priority student by 1.2% while reducing the income of the average non-priority student by 0.9% [4];

- In addition, the effects on the income of priority students were particularly pronounced (approximately 30%) among those who scored relatively high (above 750 out of 1000) on the ENEM, who could have access to more selective majors [4].

Where does this information come from?

1. Mello, U. (2022a). Centralized Admissions, Affirmative Action and Access of Low-income Students to Higher Education. American Economic Journal: Economic Policy, 14(3), 166-197.
2. Mello, U. (2022b). Online Appendix: Centralized Admissions, Affirmative Action and Access of Low-income Students to Higher Education.
3. Mello, U. (2021). Affirmative Action and the Choice of Schools. Unpublished Manuscript.
4. Otero, S., Barahona, N., Dobbin, C. (2021). Affirmative Action in Centralized College Admission Systems: Evidence from Brazil. Unpublished Manuscript.

A.2. Affirmative Action Policy of the State University of Campinas

What is the goal?

The goal is to increase the admission of candidates who have graduated from public high school and are racial minorities, considered as underrepresented groups in the university's student body.

When and where was it implemented?

The policy was implemented in 2004, affecting those enrolled for the 2005 entrance exam, which served as the basis for admission, in the same year, for enrollment at the State University of Campinas (UNICAMP), in the municipality of Campinas, São Paulo, Brazil.

How is it designed?

The policy, which was implemented by the university's own initiative, created the possibility that candidates who attended the three years of high school in public schools and/or were black, mixed race, or indigenous could request bonus points in the entrance exam when filling out the online registration form. The design of the policy was inspired by a descriptive study that showed that public high schools graduates performed better than private school graduates in the university's undergraduate courses. This was interpreted as a sign that public high school graduates could be subject to a lower admission threshold without significantly compromising academic performance [3]

More specifically, applicants who reported having studied the three years of high school in public schools received a bonus of 30 points on their entrance exam score, an amount that corresponded to 30% of a standard deviation of the grade distribution. If these candidates also declared themselves black, mixed race, or indigenous, they received 10 additional points, totaling 40 points. According to the study referenced in the paragraph above, the bonus values were chosen to equate the relative differences in entrance exam grades in previous years. The draft stipulated, finally, that black, mixed race, or native applicants from private high schools would not receive any bonuses.

What have we learned from monitoring and evaluation?

The following evidence regarding the monitoring and causal impact of the quota policy among those enrolled in the UNICAMP selection process in 2005 were documented in the published articles and in the article for discussion listed in the section below:

- a 26% increase (2.8 percentage points) in the acceptance rate among applicants who attended the last three years of high school in public schools, and a 14% increase (1.5 percentage points) in the acceptance rates of public school students who also declared themselves black, mixed race, or indigenous, though the latter result has been inaccurately estimated [1];
- a 15% reduction (1.6 percentage points) in the acceptance rate of who declared themselves black, mixed race, or indigenous, but who attended part or all of high school in private schools [1];
- students who entered UNICAMP due to affirmative action came from low socioeconomic status families: For example, 53% of the mothers of the candidates who would have been accepted in the absence of affirmative action policies (but were not due to policies) have a university degree. This number drops to 25% among the applicants who were admitted due to affirmative action[1];

also, students who entered due to affirmative action had grades on the National High School Exam (ENEM) similar to those of students who would have been admitted in the absence of the policy. This suggests that the affirmative action policy redistributed places without compromising the stock of skills accumulated by entrants and without negatively influencing the academic quality of the students who eventually enrolled at UNICAMP [1];

- there is no evidence that the policy would have influenced priority group students' effort in preparing for college applications when compared to the effort of students not contemplated by the affirmative action policy. Hence, the implementation of quotas does not seem to have a discernable effect of encouragement or discouragement on the performance of candidates from public schools in relation to candidates from private schools [1];
- the results reported above are qualitatively and quantitatively similar when the analysis period extends to the year 2008, and not only to the first year of implementation, 2005
- a 9.8% increase (2.0 percentage points) in the rate of students from public schools who registered for the entrance exam opting for one of the 5 majors with the highest cutoff score at UNICAMP (Medicine, Computer Engineering, Control Engineering and Automation, and Electrical Engineering, in the morning and afternoon shifts) [2];
- the above effects occur mainly for students with higher ENEM scores, more specifically those in the top quartile of the distribution of exam grades [2];
- An 63 to 93% increase (from 0.6 to 0.8 percentage points) in the acceptance rate of public school applicants who opting for one of the majors listed above [2].

Where does this information come from?

1. Estevan, F., Gall, T., Morin, L. P. (2018). Redistribution Without Distortion: Evidence from an Affirmative Action Programme at a Large Brazilian University. The Economic Journal, 129(619), 1182-1220.
2. Estevan, F., Gall, T., Morin, L. P. (2019). On the Road to Social Mobility? Affirmative Action and Major Choice. Unpublished Manuscript.
3. Pedrosa, R. H., Dachs, J. N. W., Maia, R. P., Andrade, C. Y., Carvalho, B. S. (2007). Academic Performance, Students' Background and Affirmative Action at a Brazilian University. Higher Education Management and Policy, 19(3), 1-20.

A.3. Affirmative Action Policy of the Federal University of Espírito Santo

What is the goal?

Increase the admission of candidates who graduated from public high school and from poorer families, considered as underrepresented groups in the university's student body.

Where and when was it implemented?

The policy was implemented in 2007, affecting those enrolled in the 2008 admissions exam at the Federal University of Espírito Santo (UFES). The exam served as the main criterion for admission.

What is the design like?

The policy, which was implemented by the university's own initiative, consisted of a reservation of 40% of the vacancies of each major for candidates who had completed high school in public schools and a total of at least 4 years in public schools. An additional income criterion, which was verified upon presentation of documentation, excluded students with a household income greater than 7 minimum wages from reserved seats.

What have we learned from monitoring and evaluation?

The following evidence regarding the monitoring and the causal impact of the quota policy among those enrolled in the selection process of UFES in 2008 were documented in the article for discussion listed in the section below:

- students who entered UFES due to affirmative action policies came from families from lower socioeconomic status: for example, while 58% of the candidates who would have been admitted in the absence of affirmative action (but were not due to affirmative action) had some relative who had gone through university, this number drops to 16% among the group of enrollees who were admitted due to the policy [1];
- the policy also altered the racial profile of entrants: while 39% of the candidates who would have been admitted in the absence of affirmative action (but were not due to affirmative action) were from racial minorities, this number rises to 51% among the group of registrants who were admitted due to policies [1];
- finally, students who entered due to the policy had a lower score, at 20% of a standard deviation, on the National High School Examination (ENEM) than students who would have been admitted in the absence of the policy [1];
- a 9.4% increase (2.8 percentage points) in the rate of students from public schools who registered for the entrance exam opting for one of the 5 majors with the highest cutoff scores at UFES (Medicine, Pharmacy, Computer Engineering, Environmental Engineering, and Law) [1];
- a 11.4% increase (2.2 percentage points) in the acceptance rate of applicants eligible to reserved seats in the majors listed above [1];

Where does this information come from?

1. Melo, A. P. (2021). Affirmative Action, College Access and Major Choice. Unpublished Manuscript.

A.4. Affirmative Action Policy at the University of Brasilia

What is the goal?

The goal is to reduce racial inequalities, increase diversity on campus and sensitize civil society about the existence of the black population.

Where and when was it implemented?

The policy was implemented in 2004, affecting those enrolled in the entrance exam for enrollment in the second semester at the University of Brasília (UnB), in the municipality of Brasília, Federal District, Brazil.

How is it designed?

The policy, which was implemented by the university's own initiative, consisted of a reservation of 20% of the vacancies of each course for candidates who self-identified as black at the time of registration. To prevent fraud, quota candidates were interviewed by a hetero-identification commission for the verification of racial identity. In addition, in the years they attended university, quota students had access to programs designed to support their academic and social development, including tutoring services, public seminars on the value of blacks in society, and a meeting spaces on campus in which to study and interact.

What have we learned from monitoring and evaluation?

The following evidence regarding the monitoring and causal impact of the affirmative action policy on the applicant cohorts of 2004 and 2005 was documented in the published articles listed in the section below:

- the policy altered the racial profile of the entrants: while 1.8% of the candidates who would have been admitted in the absence of the policy (but were not due to the policy) were black, this number rises to 27% among the applicants who were admitted due to the policy [1];
- more, as one more example like the one described above, while 31% of the candidates who would have been admitted in the absence of the policy (but were not due to the policy) were mixed race, this number rises to 71% among the group of enrollees who were admitted due to the policy [1];
- the students who entered UnB due to the quota policy come, on average, from families from lower socioeconomic status: for example, while 19% of the candidates who would have been admitted in the absence of the policy (but were not due to the policy) lived in families that earned less than 1,500 reais per month, this number rises to 40% among the group of applicants who were admitted due to the policy [1];
- also, while 58% of the mothers of candidates who would have been admitted in the absence of the policy (but were not due to the policy) have a college degree, that number drops to 35% among the group of applicants who were admitted due to the policy [1];
- the introduction of the policy appears to have affected students' racial identification behavior, leading some darker-skinned students to identify as black (mixed race or black) [1, 3];
- there is no evidence that the policy has negatively influenced the effort of black students in the stage of preparation for admission to university, as measured by the number of times students took the UnB entrance exam and the rate of students who took a preparatory course [1];

- there was also no evidence that the policy decreased the grades of black students on tests applied at the university, suggesting little room for the hypothesis that students targeted by affirmative action are poorly qualified for their majors [1];
- a 5.2% increase (0.77 years) in the total number of years of study achieved by male UnB students who were eligible for the quotas and scored just above the admission cutoff grade. No statistically significant effects were found for female quota enrollees [4];
- a 26% increase (17 percentage points) in the college graduation rate of male UnB students who were eligible for the quota and scored just above the cutoff grade for admission. No statistically significant effects were found for female quota enrollees [4];
- an increase of approximately 42% in the income earned in the labor market in 2012, among male UnB students eligible for the quota who had a grade just above the cutoff required for admission. No effects were found for female quota enrollees [4].

Where does this information come from?

1. Francis, A. M., Tannuri-Pianto, M. (2012a). Using Brazil's racial Continuum to Examine the Short-Term Effects of Affirmative Action in Higher Education. Journal of Human Resources, 47(3), 754-784.
2. Francis, A. M., Tannuri-Pianto, M. (2012b). The Redistributive Equity of Affirmative Action: Exploring the Role of Race, Socioeconomic Status, and Gender in College Admissions. Economics of Education Review, 31(1), 45-55.
3. Francis, A. M., Tannuri-Pianto, M. (2013). Endogenous Race in Brazil: Affirmative Action and the Construction of Racial Identity Among Young Adults. Economic Development and Cultural Change, 61(4), 731-753.
4. Francis-Tan, A., Tannuri-Pianto, M. (2018). Black Movement: Using Discontinuities in Admissions to Study the Effects of College Quality and Affirmative Action. Journal of Development Economics, 135, 97-116.

A.5. Affirmative Action Policies in State Public Higher Education of Rio de Janeiro

What is the goal?

The goal is to decrease economic, social, and educational disparities between people of different social and racial groups.

Where and when was it implemented?

The policy was implemented between 2001 and 2002, affecting those enrolled for the 2003 entrance exam for the State University of Rio de Janeiro (UERJ) and the State University of Rio de Janeiro Norte Fluminense (UENF), both in the state of Rio de Janeiro, Brazil.

How is it designed?

The policy, which was implemented by the Rio de Janeiro state government without the participation of the university's governing body, consisted of reserving a portion of the vacancies at the two universities for students coming from public schools (50%) and for students who declared themselves black or of mixed race (40%). To implement the laws, two examinations were carried out in 2003. In the first process, any student could apply, while the second was restricted to public school students. In both examinations, the reservation of a portion of vacancies for black and mixed-race students was applied.

What have we learned from monitoring and evaluation?

The following evidence of the causal impact of the quota policy of the state of Rio de Janeiro on 3rd year high school students in the year 2003 were documented in the article for discussion listed in the section below:

- a reduction of 27% of one standard deviation in scores on standardized tests for Mathematics and Portuguese of self-declared black students of public schools. This suggests that the high intensity of the quota policy for this group reduced the effort in the year of preparation for the entrance exam [1];
- no similar effects were found for self-reported white public school students, suggesting that groups less intensely affected by the system were not affected in a manner similar to the one described above [1];
- there were no significant effects on white students or students from private schools, which could have occurred if, for example, the new rules generated disincentives to prepare for the entrance exam [1];
- the differences in the results described above are explained, in the article, by the differences in intensity of the policy with regard to the group of black and white students from public schools: in the case of the first group, it led to a potential student-vacancy ratio of 17, while for the second group this same ratio was at the level of 120 [1];
- also, the differences between these negative results and neutral results found for black students after the implementation of quota policies at the State University of Bahia is explained, in the article, by the differences in intensity of the policies: in the case of Bahia, it led to a potential student-vacancy ratio of 74 for the target group [1].

Where does this information come from?

1. Assunção, J. Ferman, B. (2015) Does Affirmative Action Enhance or Undercut Investment Incentives? Evidence from Quotas in Brazilian Public Universities. SSRN Working Paper.

A.6. Affirmative Action Policy of the University of the State of Bahia

What is the goal?

The goal is to reduce economic, social, and educational disparities between people of different social and racial groups.

Where and when was it implemented?

The policy was implemented in 2002, affecting those enrolled for the 2003 entrance exam for the National University of the State of Bahia (UNEB), in Brazil.

How is it designed?

The policy, which was implemented by the university's own initiative, consisted in reserving 40% of the university's places for students who had completed high school in a public school and who declared themselves to be of black or mixed race.

What have we learned from monitoring and evaluation?

The following evidence of the causal impact of the quota policy of the state of Bahia on 3rd year high school students in the year 2003 have been documented in the article for discussion listed in the section below:

- no statistically significant effects were found in standardized tests of Mathematics and Portuguese of students belonging to the target groups of the policy (i.e., black or mixed race from public schools), suggesting that it did not reduce the effort in the year of preparation for the entrance exam among potential beneficiaries [1];
- there were no statistically significant effects in standardized tests of Mathematics and Portuguese for students who did not belong to the target groups of the policy [1];
- the differences between these results and some negative results found for black students after the implementation of quota policies in state universities in Rio de Janeiro is explained, in the article, by the differences in intensity of the policies: in the case of Bahia, it led to a potential student-vacancy ratio of 74 for the target group, while in Rio de Janeiro this same ratio was 17 for black students, one of the target groups of the policy [1].

Where does this information come from?

1. Assunção, J. Ferman, B. (2015) Does Affirmative Action Enhance or Undercut Investment Incentives? Evidence from Quotas in Brazilian Public Universities. SSRN Working Paper.

A.7. Affirmative Action Policy of the Federal University of Bahia

What is the goal?

The goal is to increase the admission of public high school graduates and black candidates, considered as underrepresented groups in the university's student body.

Where and when was it implemented?

The policy was announced in 2004, affecting those enrolled for the 2005 entrance exam of the Federal University of Bahia (UFBA), in Salvador, Bahia, Brazil.

How is it designed?

The policy, which was implemented by the university's own initiative, consisted of a reservation of 45% of the vacancies in each major for candidates who attended the three years of high school in public schools and at least one year in a public elementary or junior high school. Within the set of vacancies reserved for public school students, 85% were reserved for black, mixed race or indigenous students.

Finally, if a student eligible for the quota obtained a sufficient score on the entrance exam to be admitted regardless of the policy, they would still be ranked among the quota students. Thus, after the implementation of the affirmative action policy, there was no more competition in the admission process between future public and private high school students.

What have we learned from monitoring and evaluation?

The following evidence regarding the monitoring and causal impact of the quota policy in 2005 and 2006 has been documented in the article for discussion listed in the section below:

- An 85% increase (23 percentage points) in the admission rate of candidates who attended the three years of high school in public schools and who, in addition, had studied for another year in public schools during elementary or junior high school [1];
- no statistically significant effects were found in the proportion of courses failed by the policy's target students admitted to UFBA [1];
- a 6% reduction (4.6 percentage points) in the graduation rate of the policy's target students admitted toUFBA, and these effects are particularly pronounced in the group of courses in Architecture and Urbanism, Engineering, Computer Science, Physics, Geophysics, Geography, Mathematics, Oceanography, Chemistry, and Information Systems [1];
- 2% increase in GPA at the end of college among students who eventually graduated in the majors they chose at the entrance exam[1];
- still among the group of students who eventually graduated in the majors they chose at the entrance exam, there is descriptive evidence of quite different experiences in terms of course enrollment between students targeted by the quota and their non-eligible peers. For example, quota students have more difficulty at the beginning of the course, failing more subjects and completing fewer required credits between the second and fourth semesters, but this difficulty seems to diminish considerably in subsequent semesters, suggesting a partial recovery from this delay [1].

Where does this information come from?

1. Oliveira, R. C., Santos, A., Severnini, E. (2022). Affirmative Action With No Major Switching. Unpublished Manuscript.

A.8. Preferential Admission to Universities by the Program of Assistance and Effective Access to Higher Education in Chile

What is the goal?

The goal is to increase the admission rate of candidates in situations of social vulnerability in the student body of universities.

Where and when was it implemented?

The Program for Compliance and Effective Access to Higher Education (PACE) was implemented in 2014 in Chile. The results below refer to a group of students affected by the program from the year 2016, within the context of an experimental impact study involving 221 schools.

How is it designed?

The program focused on students enrolled in schools with a high index of social vulnerability in the student body, chosen based on an index built by the Chilean government. The program included guaranteeing a university slot for students in these schools who met 2 criteria:

1. maintain a cumulative GPA from 9th grade to 3rd grade among the top 15% highest in their cohort within their school from 9th grade to 3rd year high school;
2. have taken the national university entrance examination, even in cases where the mark on the exam would not be used for admission purposes.

The vacancies in higher education occupied by students who are admitted by the preferential route were created especially for this purpose. The Ministry of Education offered classes on the college application process and on study techniques in the schools contemplated. Furthermore, students admitted via PACE also had access to tutoring sessions during college.

What have we learned from monitoring and evaluation?

The following evidence regarding the monitoring and causal impact of the program has been documented in the discussion article listed in the section below:

- at the beginning of the 3rd year of high school, more than 40% of students in the contemplated schools believed that they would finish the year in the top 15% GPAs of their cohort in school and would secure a place in higher education by PACE. This showing a high prevalence of optimistic and incorrect subjective perceptions about performance among potentially affected students [1];
- a reduction of 9.9% of one standard deviation in the grade on a standardized test at the end of high school, collected independently by the researchers, and a reduction of 8.8% of one standard deviation in an indicator of effort during high school, suggesting there is little incentive effect attached to the program [1];
- results shown above are consistent with a behavior model in which the program exacerbates the negative effects of incorrect subjective perceptions, inducing high-ability students to take admission for granted and reducing their efforts, and low-ability students with high confidence to consider it within their grasp and increasing their efforts [1];

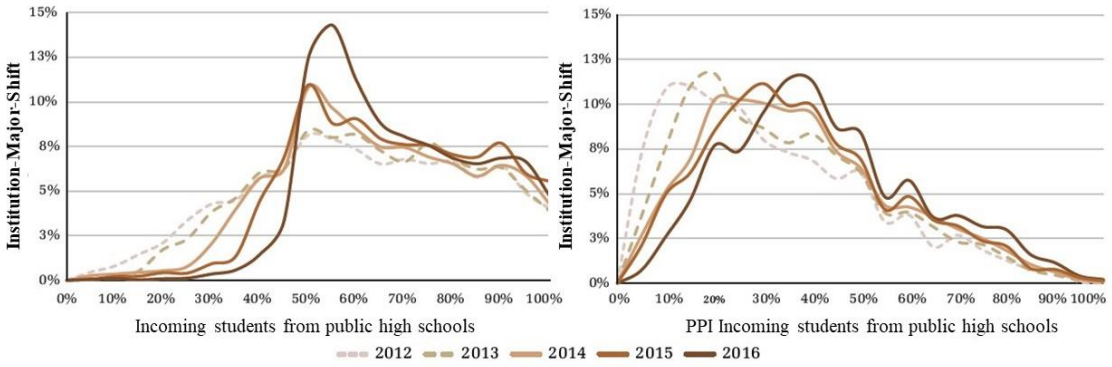
- 32% (or 2.7 percentage point) increase in higher education enrolment [1].

Where does this information come from?

1. Tincani, M. M., Kosse, F., Miglino, E.(2021). Subjective Beliefs and Inclusion Policies: Evidence from College Admissions. UCL Working Paper.

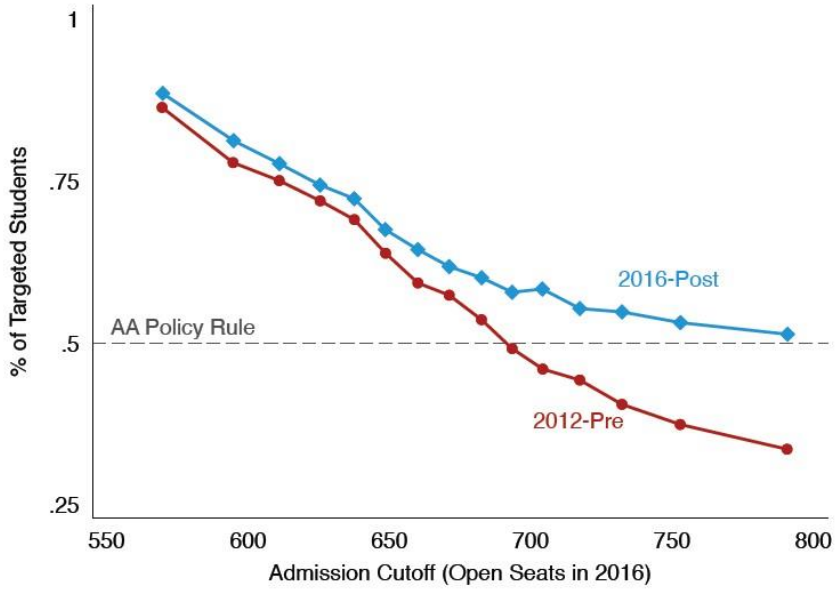
1. Supplementary Material

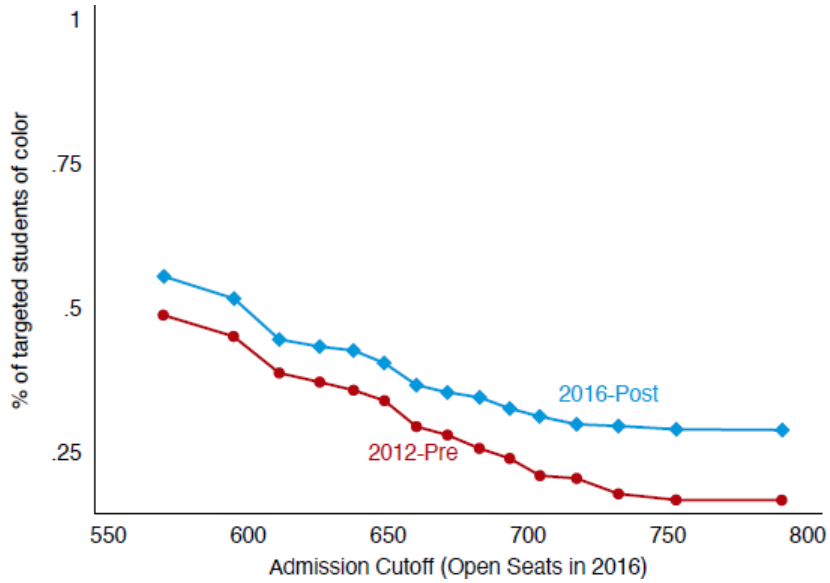
Figure B.1: **Composition in Terms of Priority Status, EP and EP/PPI (2012-2016)**



Note: This figure is a reproduction of Graph 1, in Senkevics and Mello (2019). One observation is a course from an institution that used SISU for candidate selection in the year 2016. These observations were ranked by a course selectivity indicator, the cutoff score for vacancies in "broad competition," and grouped into deciles.

Figure B.2: **Composition in Terms of Priority Status, All (2012-2016)**





Note: These figures are a reproduction of Figure 3, in Otero et al. (2021). One observation is a course from an institution that used SISU for candidate selection in the year 2016. These observations were ranked by a course selectivity indicator, the cutoff score for vacancies in "broad competition," and grouped into deciles.