Affirmative action and demand for schooling
evidence from a nationwide policy

Ursula Mello (PUC-Rio, IAE and BSE)
Ana Paula Melo (Howard University)

AA in higher education has been adopted worldwide to mitigate inequality in access, performance and graduation.

- Evidence on ↓ inequality in access to college and high-return majors.

  E.g., Arcidiacono et al. (2015); Estevan et al. (2018); Bleemer (2022); Melo (2021); Otero et al. (2021); Mello (2022).

- Impact on pre-college human capital depends on how AA changes the admission probabilities (↑targeted ↓non-targeted)

  → perceived return to pre-college human capital investments.

  Bodoh-Creed and Hickman (2018); Cotton et al. (2020).

- Mixed evidence on the impact of AA on pre-college HC decisions.

  Caldwell (2010); Antonovics and Backer (2014); Khanna (2020); Mello (2021); Akhtari et al. (2021); Tincani et al. (2021).

Does affirmative action affect high school persistence and demand for college?

- **Context:** expansion of affirmative action targeted at public-school students in Brazil due to national quota reform.

- **Outcomes of Interest:** high-school dropout, graduation, and college entrance exam take-up (as proxy of demand for college).

- **Empirical strategy:** explore geographic and time variation in treatment intensity (proportion of college seats allocated to affirmative action).

  Heterogeneity by type of school (public or private) and school socioeconomic status

Context: AA in public higher education

- Affirmative action policies in Brazil started in 2003.
- Exclusively in public (federal and state) colleges in Brazil.
    - highly selective: free-tuition, and perceived as high quality.
- Often targeting public high school students, and URM (black, mixed and indigenous).
    - historically underrepresented in public colleges and selective majors.
- Until 2012, AA policies were institution-based or mandated by state laws.

The policy: The 2012 federal affirmative action law

- In 2012, the federal government enacted an AA law that **required all federal higher education institutions to reserve 50 percent of vacancies per major** for public high school students.

  $\rightarrow$ with sub-quotas for URM and low-income students. (Allocation rule)

- Starting in 2013, institutions had a maximum of 4 years to reach full adoption of the law, with **yearly minimum quota requirements**.

The variation in AA adoption between 2010-2015 is **primarily due to the 2012 federal law**
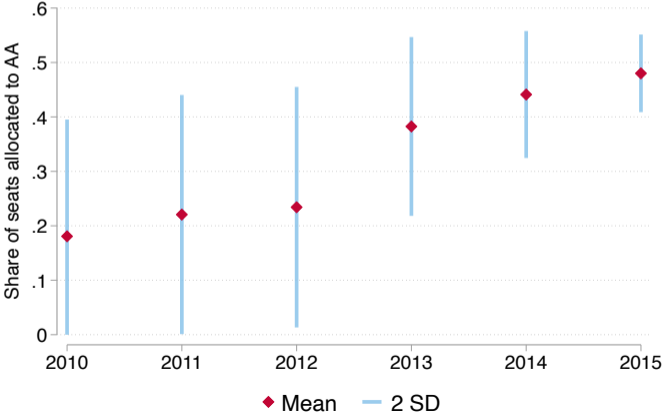
Figure: Number of institutions adopting affirmative action (out of 94)
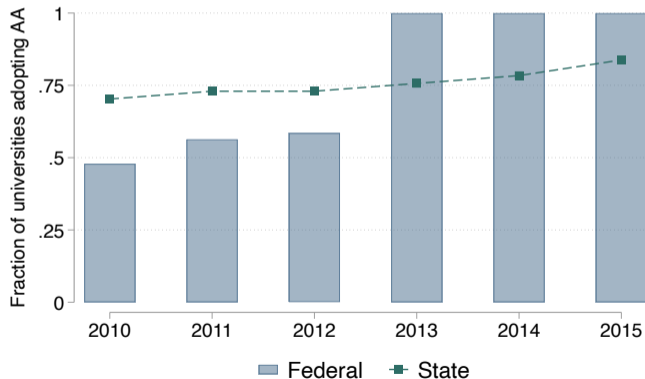
Note: There are 94 federal universities and institutes and 37 state universities
included in the analysis

The variation in AA adoption between 2010-2015 is **primarily due to the 2012 federal law**

Figure: Percentage of seats allocated to affirmative action in federal institutions

Local-level Treatment Exposure

- AA_{mt} is % of total seats allocated to AA at municipality m in year t.
- Measure normalized to vary from zero to one.
- θ_{mm} is % of students that lived in m before and during college, pre-policy.
- θ_{md} is % of students that moved from m to d for college, pre-policy.

$$AA_{mt}^{N} = \theta_{mm}AA_{mt} + \sum_{d \neq m} \theta_{md}AA_{dt} \qquad (1)$$

- Restrict sample to municipalities with positive pre-reform flows.
- Results robust to using only AA_{mt}.

Estimation

Outcomes: high school dropout and college exam take-up

$$Y_{smt} = \alpha + \beta AA^N_{mt} + \gamma Z_{mt} + \phi_s + \theta_t + \epsilon_{smt}$$

Estimated by targeted and non-targeted.

Y_{smt}: outcome at school s municipality m in year t.

AA^N_{mt}: local-exposure to national affirmative action policy at m in year t.

Z_{mt} is a vector of municipality time-varying controls, including adoption of a centralized admissions system.

ϕ_s, θ_t: school and year fixed effects.

Errors are clustered at the municipality (location) level. Estimation is weighted by school size.

Our identification strategy relies on the **geographical and time variation** in the share of college seats allocated to AA.

- **Pre-tends test for policy adoption by universities:** Pattern of adoption of AA (and SISU) is not correlated with pre-trends in the enrollments of low socioeconomic status students in the public universities. (Mello, AEJ Policy 2022) (Pre-trends)

  $\rightarrow$ The within-institution variation in AA adoption between 2010-2015 primarily due to the 2012 federal law, which externally mandates that all federal institutions either adopt AA or adapt their ongoing AA policy.

AA increased high school persistence among the targeted group, narrowing the baseline socioeconomic gap by 11.45%

	High School Dropout	
	Targeted	Non-targeted
% AA	-0.019***	0.004
	(0.01)	(0.00)
Observations	35,535	17,335
Time varying ctrl	x	x
School FE	x	x
Year FE	x	x
Mean Dependent Var. (2010)	0.181	0.050

Note: Number of schools = 10,574; Public = The estimation is weighted by the total number of students enrolled in the high school to account for different school sizes. Errors are clustered at the municipality level.

AA also had positive effects on the demand for college among the targeted group, but negative for the non-targeted

| | **High School Dropout** | | **College exam take-up** | |
	Targeted	Non-targeted	Targeted	Non-targeted
% AA	-0.019***	0.004	0.042**	-0.069***
	(0.01)	(0.00)	(0.02)	(0.02)
Observations	35,535	17,335	35,535	17,335
Time varying ctrl	x	x	x	x
School FE	x	x	x	x
Year FE	x	x	x	x
Mean Dependent Var. (2010)	0.181	0.050	0.406	0.707

Note: The estimation is weighted by the total number of students enrolled in the high school to account for different school sizes. Errors are clustered at the municipality level.

Targeted group: effects on the demand for college is concentrated among low-SES schools

Dropout by SES

| | College Exam Take-up | |
| | Targeted | |
	Low SES	High SES
% AA	0.060 ***	-0.007
	(0.02)	(0.01)
Observations	17,525	17,525
Mean Dependent Var. (2010)	0.353	0.466
Avg. socioeconomic index [0-10]	4.71	5.64

Note: The estimation includes time-varying controls, school and year FE. Weighted by the total number of students enrolled in the high school to account for different school sizes. Errors are clustered at the municipality level. N. of observations missing SES index = 2,580. Main results robust to excluding these schools from analysis.

Non-targeted group: negative effects are concentrated among the high-SES → relatively more outside options

| | **College Exam Take-up** | | | |
| | **Targeted** | | **Non-targeted** | |
	Low SES	High SES	Low SES	High SES
% AA	0.060 ***	-0.007	-0.034 *	-0.113 ***
	(0.02)	(0.01)	(0.02)	(0.02)
Observations	17,525	17,525	7,625	7,625
Mean Dependent Var. (2010)	0.353	0.466	0.722	0.737
Avg. socioeconomic index [0-10]	4.71	5.64	6.48	7.66

Note: The estimation includes time-varying controls, school and year FE. Weighted by the total number of students enrolled in the high school to account for different school sizes. Errors are clustered at the municipality level. N. of observations missing SES index = 2,580. Main results robust to excluding these schools from analysis.

Discussion

- AA can affect pre-college human capital investment decisions.
- AA in Brazil contributed to narrowing the socioeconomic gap in high-school persistence and demand for *public* college.
  - *In progress*: negative effects on college demand among non-targeted.
    - Delaying college entrance (preparatory courses)?
    - Displacement to private colleges?
- Economically significant effects induced by marginal short-term changes in the policy's intensity.
- Policy debates ignoring these effects may understate the benefits (and costs) of these policies.
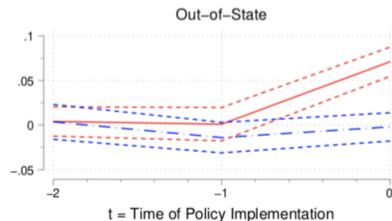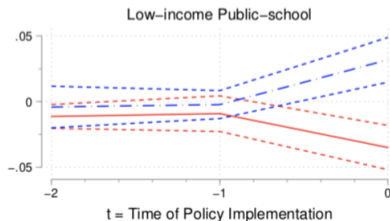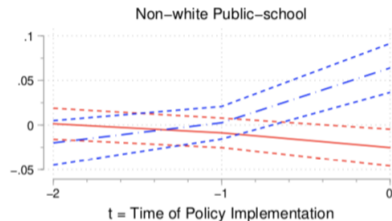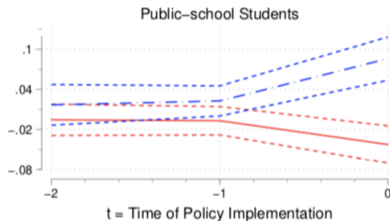
Appendix

Allocation of seats according to the 2012 AA Back

Federal Policy 2013-Current
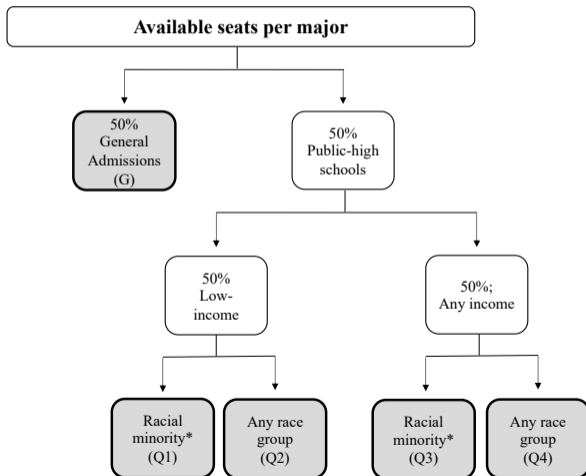
Pattern of adoption of AA is not correlated with pre-trends in college enrollment. (Mello, 2022)

| | **HS Dropout** | | | |
| | **Targeted** | | **Non-targeted** | |
	Low SES	High SES	Low SES	High SES
% AA	-0.015 **	-0.022 **	0.002	0.004
	(0.01)	(0.01)	(0.00)	(0.01)
Observations	17,525	17,525	7,625	7,625
Mean DV (2010)	0.217	0.144	0.055	0.038

Note: The estimation includes time-varying controls, school and year FE. Weighted by the total number of students enrolled in the high school to account for different school sizes. Errors are clustered at the municipality level. N. of observations missing SES index = 2,580. Main results robust to excluding these schools from analysis.