Affirmative action and student academic performance at UFMG, Brazil

André B. Golgher

Universidade Federal de Minas Gerais

Ernesto F. L. Amaral

RAND Corporation

Alan V. C. Neves

Universidade Federal de Minas Gerais

Studies available in www.ernestoamaral.com

Significance

- Brazil has been experiencing changes in relation to student admissions at universities.

- UFMG implemented a socio-racial bonus on their entrance exam between 2009 and 2012.

- We performed some analyses about the association between this affirmative action and student academic performance in 2009 and 2010.

Changes at UFMG

– Affirmative actions:

  – **Socio-racial bonus** (2009–2012): 10% (7 years in public primary/secondary school) + 5% (black/brown).

  – **Quota law** (2013...): public school, income, race/color.

– Admission exams:

  – 2009–2010: Traditional entrance exam (**vestibular**).

  – 2011–2013: National exam of secondary education (**ENEM**) replaced the first phase of vestibular, along with short essay in the second phase.

  – 2014...: Exam done through the unified selection system (**SISU**) of the Ministry of Education.

Criticisms of the bonus program

– Race/color criterion would benefit black/brown applicants with a better **socioeconomic status**.

– Students receiving the bonus would **perform worse academically** in relation to other students:

   – Reduce quality of education.

   – Increase retention rates.

– Students benefiting from bonus would have difficulties completing the undergraduate program, which would increase **dropout rates**.

Our studies and main results

– Investigate **socioeconomic status** of students who received socio-racial bonus.

  – Bonus benefited students with worse SES.

– Correlation between bonus and **grade** on admission exam.

  – Positive association, controlling for covariates.

– Correlation between bonus and **academic performance**, considering different majors.

  – Grades are usually similar between beneficiary and non-beneficiary students, but there are exceptions...

Data source

- Permanent commission of admission exam (COPEVE):

  - 2008 (no bonus), 2009, 2010 (bonus).

  - Information about bonus category (0%, 10%, 15%).

  - Grade on admission exam.

  - Socioeconomic characteristics of students.

  - The socioeconomic data can be criticized as lacking reliability: online self administered questionnaires.

- Department of registry and academic control (DRCA):

  - Grade point average (GPA) in each semester of 2009 and 2010.

Registered and admitted students from UFMG admission exam, 2009 and 2010

Bonus socio-racial category	2009		2010	
	Registered (%)	Admitted (%)	Registered (%)	Admitted (%)
0% bonus	72.24	64.18	73.25	64.96
10% bonus	10.85	11.60	9.92	9.20
15% bonus	16.91	24.22	16.83	25.84
Overall total	60,914	5,372	62,032	6,045

Source: COPEVE (2009, 2010).

Before and after the bonus

– Socio-racial bonus changed characteristics of students, based on comparisons between 2008 (no bonus) and 2009, 2010 (bonus).

– After affirmative action, higher proportions of students:

   – Public secondary school.

   – Black/brown.

   – Mother with low education.

   – Low household income (<1, 1–2, 2–5 minimum wages).

   – Participating in the labor market.

Characteristics and grade on admission exam

- **<u>Multinomial logistic regression</u>**:
  - Analyze whether bonus categories (dependent variable) are associated with characteristics of students:
    - Gender
    - Age
    - Race/color
    - Household income per capita
    - Labor force participation
    - Mother's education
    - Type of secondary school
    - Shift of secondary school (morning/evening)
- **<u>Ordinary least squares regression</u>**:
  - Estimate if grades of admitted students (dependent variable) are associated with bonus categories.

Multinomial: bonus categories (dependent)

– Students with worse socioeconomic conditions are more likely to receive the bonus.

– Race/color self declaration did not only benefit black/brown applicants with better socioeconomic status.

– Race criterion was only implemented for students who studied for at least 7 years in public schools, which might have benefited students with low SES.

OLS: admission exam grade (dependent)

– Bonus had a significant association with grades of students on admission exam, controlling for covariates and prior to adding the bonus.

– Using students not receiving the bonus in 2009 as the reference:

   – Students with 10% bonus had 8.9 more points.

   – Students with 15% bonus had 13.6 more points.

– Using students not receiving the bonus in 2010 as the reference:

   – Students with 10% bonus had 5.3 more points.

   – Students with 15% bonus had 11.1 more points.

Type of secondary school

– Students from federal public secondary schools would have been admitted even without the bonus.

– There is a suggestion that these policies should only be directed to students from municipal and state public schools.

– Admitted students from federal public schools represented 11% in 2008 and 10% in 2010.

– Admitted students from state public schools represented 18% in 2008 and 30% in 2010.

Academic performance

– Do beneficiary students have worse grade point averages (GPA) compared to non-beneficiary students?

– We merged data on socioeconomic characteristics with academic performance for students who were in 1st, 2nd, 3rd, and 4th semesters in 2009 and 2010.

– Unit of analysis refers to each semester of each student.

– Database has 28,325 observations.

Statistical models

– Ordinary least squares regressions estimated associations of several variables with GPA.

– There are criticisms that GPA is not a good measure of academic performance, because it is not comparable among professors, classes, and majors.

– A way to deal with this issue is to include information about semester in university, semester of entrance, and major.

– Models also considered information on socioeconomic status, household characteristics, and secondary education.
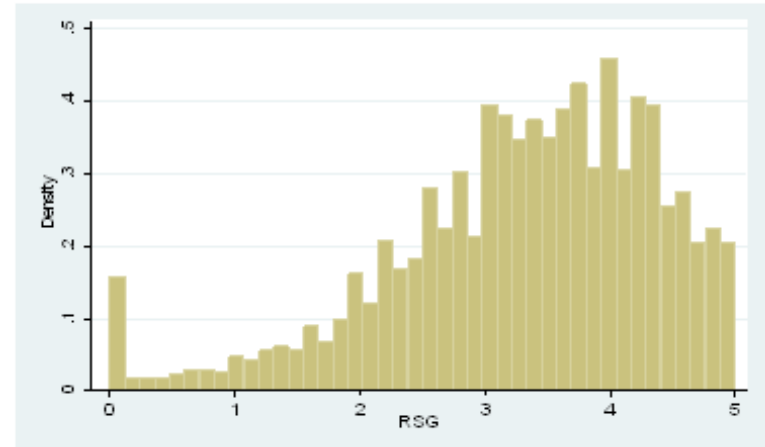
GPA distribution by bonus category

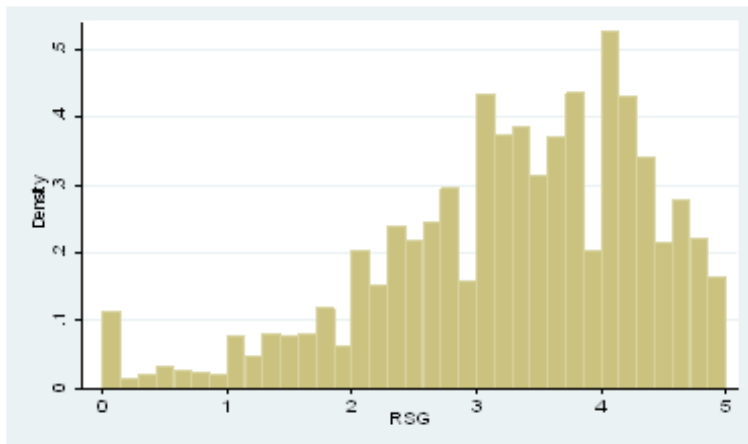– Apparently, GPA is similar across bonus categories:
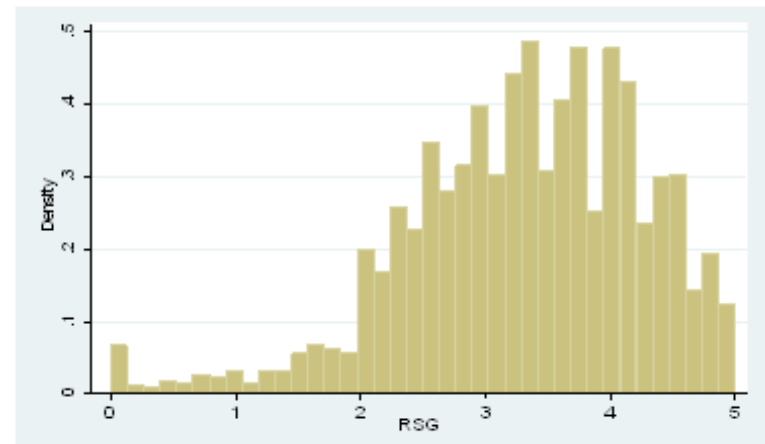
All students
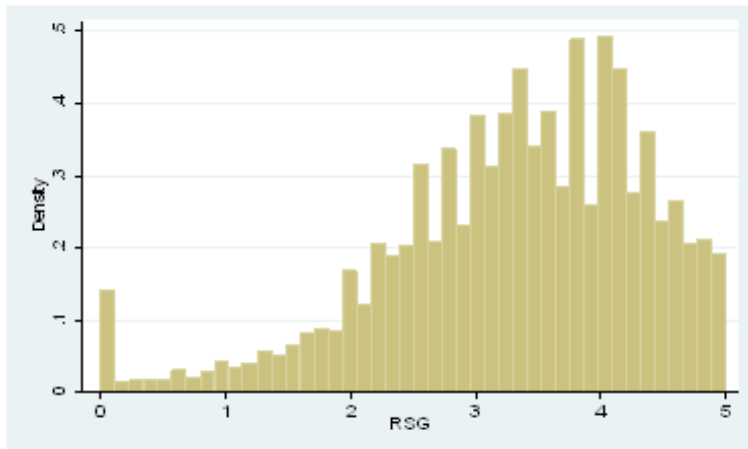
Students without bonus

Students with 10% bonus

Students with 15% bonus

Comparison of GPA across groups

Semester at university	GPA	GPA no bonus	GPA 10% bonus	GPA 15% bonus
1	3.35	3.37	3.29	3.34
2	3.29	3.27	3.32	3.32
3	3.22	3.21	3.18	3.25
4	3.30	3.29	3.30	3.31
Total	**3.30**	**3.30**	**3.28**	**3.32**

– In the first semester, GPA of non-beneficiary students is a little higher than other groups.

– In other semesters, students with 15% bonus perform better academically.

– Differences are small and not statistically significant.

– It is necessary to control for other student characteristics...

Associations of other characteristics with GPA

- **Gender:** men have lower GPAs than women.

- **Age:** older students have lower GPAs than younger students.

- **Marital status:** single students have higher GPAs than those who are married, when not controlling for their major.

- **Semester in university:** there is a general tendency of decline in GPA over time.

- **Semester of entrance:** those who started in 2009/1 and 2010/1 have higher GPAs than those who started in 2010/2.

- **Major:** students in STEM, biology, and health majors had lower GPAs than the reference (pedagogy).

- **Bonus:** GPA differences between students without bonus, 10% bonus, and 15% bonus were not statistically significant.

Models estimated for subgroups

– Several models were estimated for subgroups of students to estimate GPA differentials:

  – By bonus category.

  – By semester at university.

  – By semester at university and semester of entrance.

GPA differentials were small

and not statistically significant

between beneficiary and

non-beneficiary students.

Bonus and level of competition in each major

– Percentage of beneficiary students is higher in less competitive majors on admission exam.

$y = -0.2554x + 37.828$

$R^2 = 0.28$

Minimum grade on admission exam

Percentage of beneficiary students
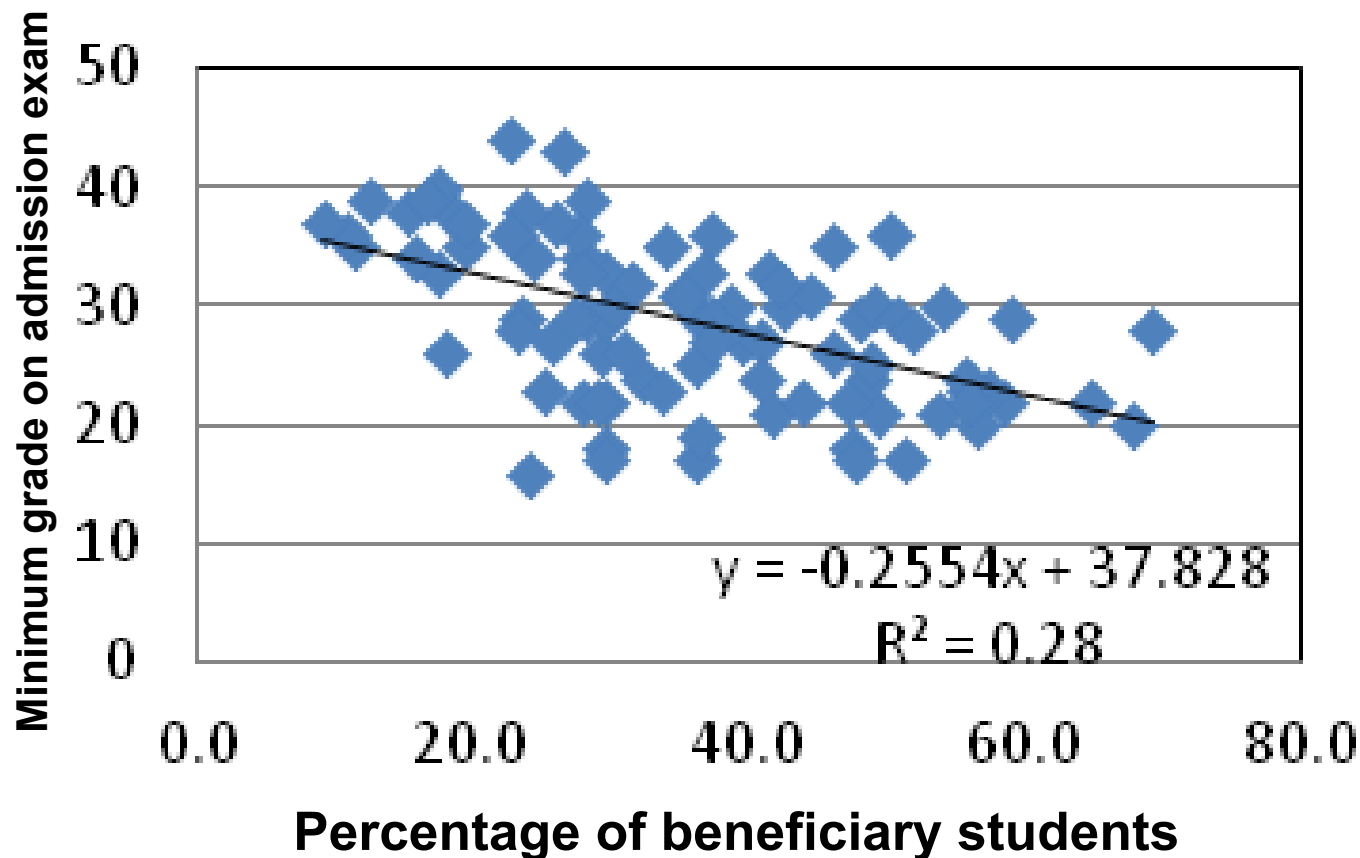
Field, competition, % of beneficiary students

– In general, **differences were not statistically significant**.

– **STEM:** beneficiary students had <u>higher</u> GPAs in more competitive majors and overall.

– **Humanities:** beneficiary students had <u>higher</u> GPAs in less competitive majors with many beneficiary students.

– **Biology/Health:** beneficiary students had <u>lower</u> GPAs in more competitive majors.

– **Arts:** beneficiary students had <u>higher</u> GPAs overall.

– **Agrarian:** beneficiary students had <u>higher</u> GPAs in less competitive majors and <u>lower</u> GPAs in more competitive majors with few beneficiary students.

Final considerations

– In general, GPAs are similar between students without bonus, 10% bonus, and 15% bonus.

– We controlled our models for several covariates.

– The main disadvantage of beneficiary students seems to be their underrepresentation in more competitive majors.

– There were considerable differences on proportions of beneficiary students by major.

– This issue might have been overcome by the quota law requirement of minimum percentages by major.

Future projects

– Further studies with **more recent data**, which will allow us to conduct a cohort analysis.

– We intend to **compare policies**: socio-racial bonus period and quota law period.

– **HLM models** can explore individual variables and those related to major.

– Conduct **qualitative research** to understand barriers experienced by beneficiary students in competitive majors:

  – Require more financial investment (materials, books...)?

  – Less friendly environment for students with low SES?