The impacts of studying abroad: Evidence from a government-sponsored scholarship program in Brazil

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The Science Without Borders program

- Created by the Brazilian Ministry of Education in July 2011
  - **Goal:** Send students for 6-12 months exchange period.
- Focus on undergraduates, which accounted for 79% (73,353) of the scholarships between 2011 and 2016.
  - Between 1987 and 2000, CAPES and CNPQ offered 13,819 scholarships (for undergrad, Ph.D. and post-doc).

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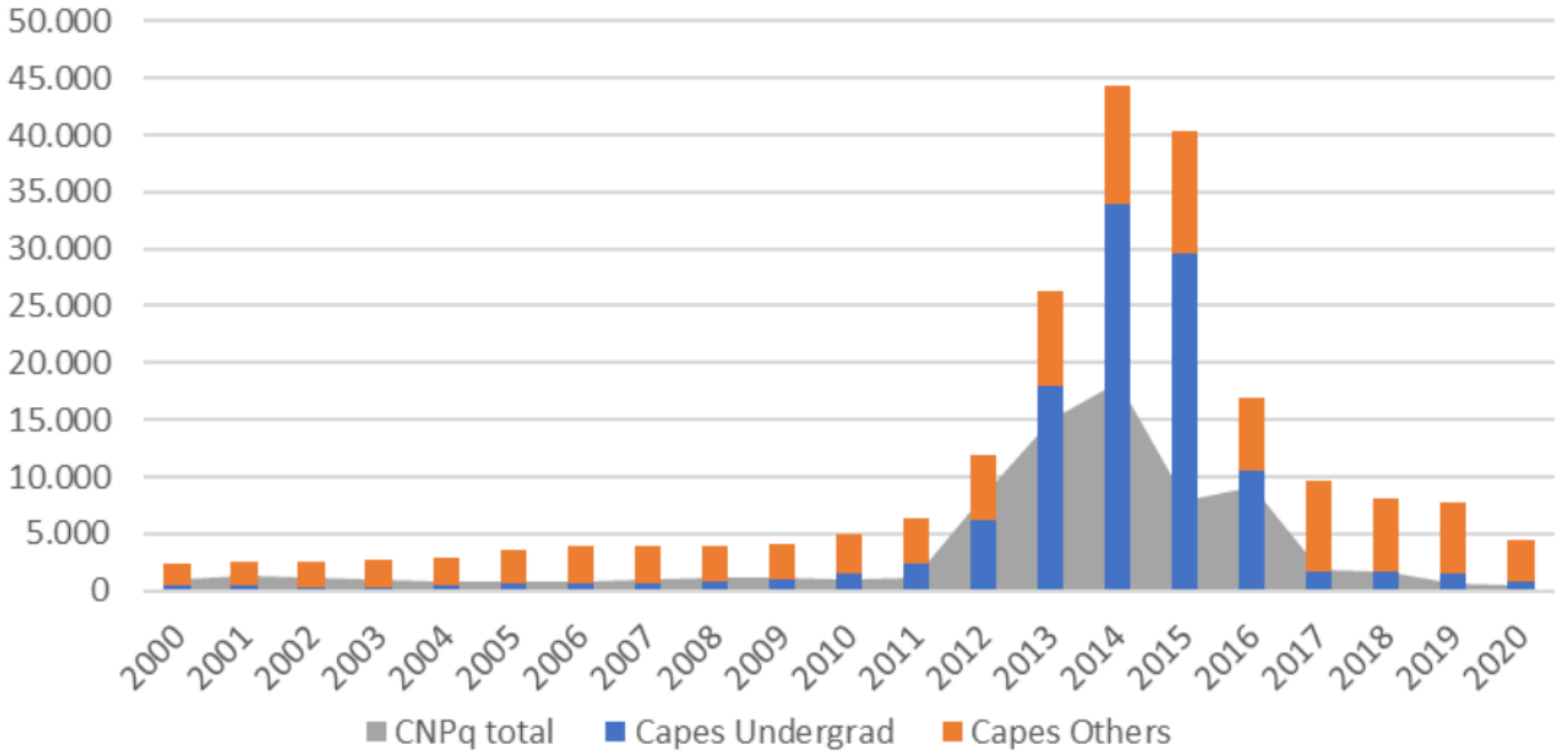
  - Between 1987 and 2000, CAPES and CNPQ offered 13,819 scholarships (for undergrad, Ph.D. and post-doc).
- Benefits: monthly stipend, airfare, housing allowance, health insurance, installation aid, and aid for educational materials.
- Very high costs: US$ 2.72 billion (BRL 15 billion in 2022) EU spent EU 14bi on ERASMUS between 14-20.
  - 5x the average expenditure necessary to maintain a student in a public university during one year in Brazil. Same cost of a school meal program that attends 39 million of children.

Figure: Number of government-sponsored undergraduate scholarships per year in Brazil



Source: De Negri, 2022.

Paper in a nutshell

- We are the first paper to estimate the impacts of a study abroad program on:
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- **Main results:** Negative impacts on post-graduation enrollment. No effects on the probability of having a formal job and entrepreneurship.

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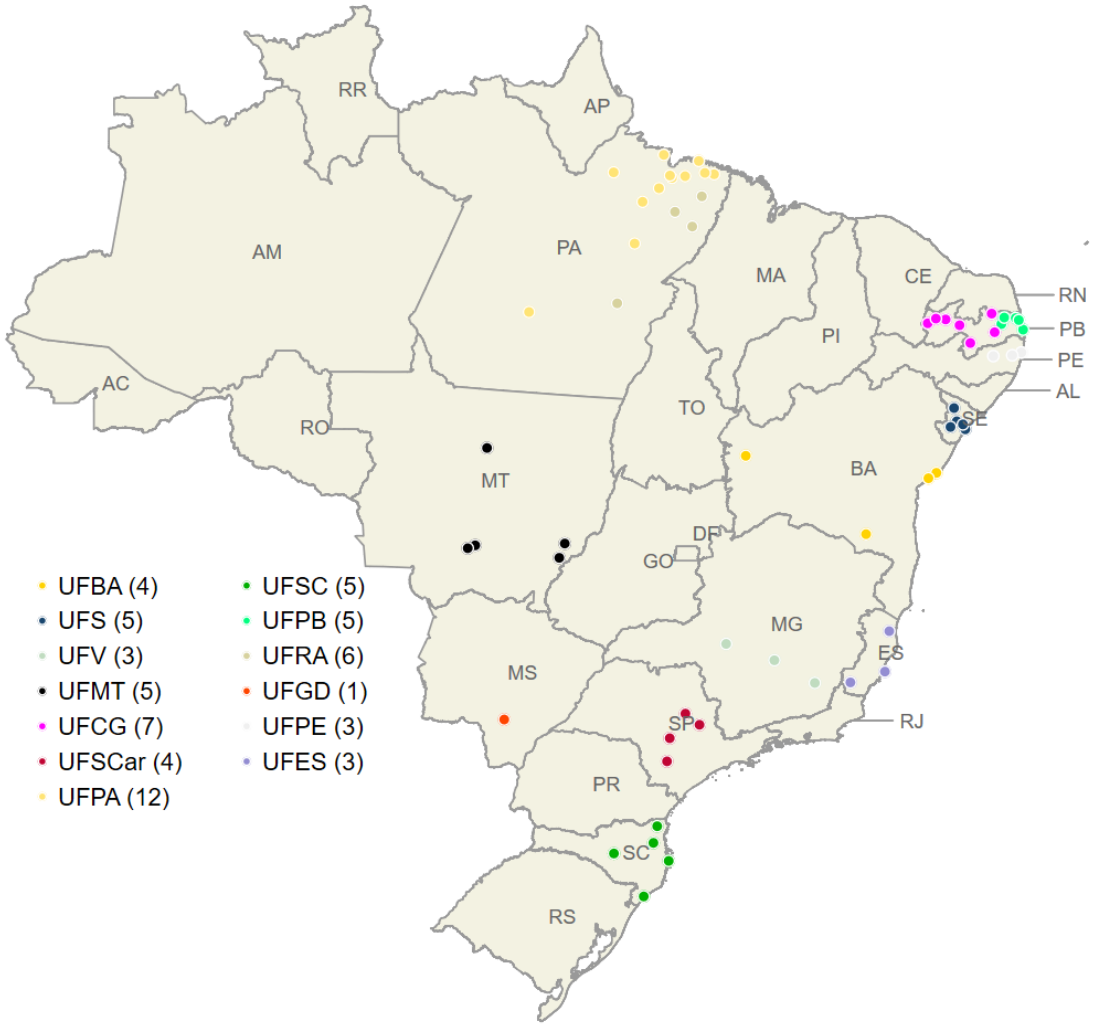
- **Main results:** Negative impacts on post-graduation enrollment. No effects on the probability of having a formal job and entrepreneurship.
- Mechanism: $\uparrow$ delayed graduation and (potential) brain drain

Empirical Strategy: Data

We build a novel data set comprising public and non public registries. We merged the data sets using probabilistic linkages using the Brazilian social security number (e.g., ***-123-456-**) and complete names.

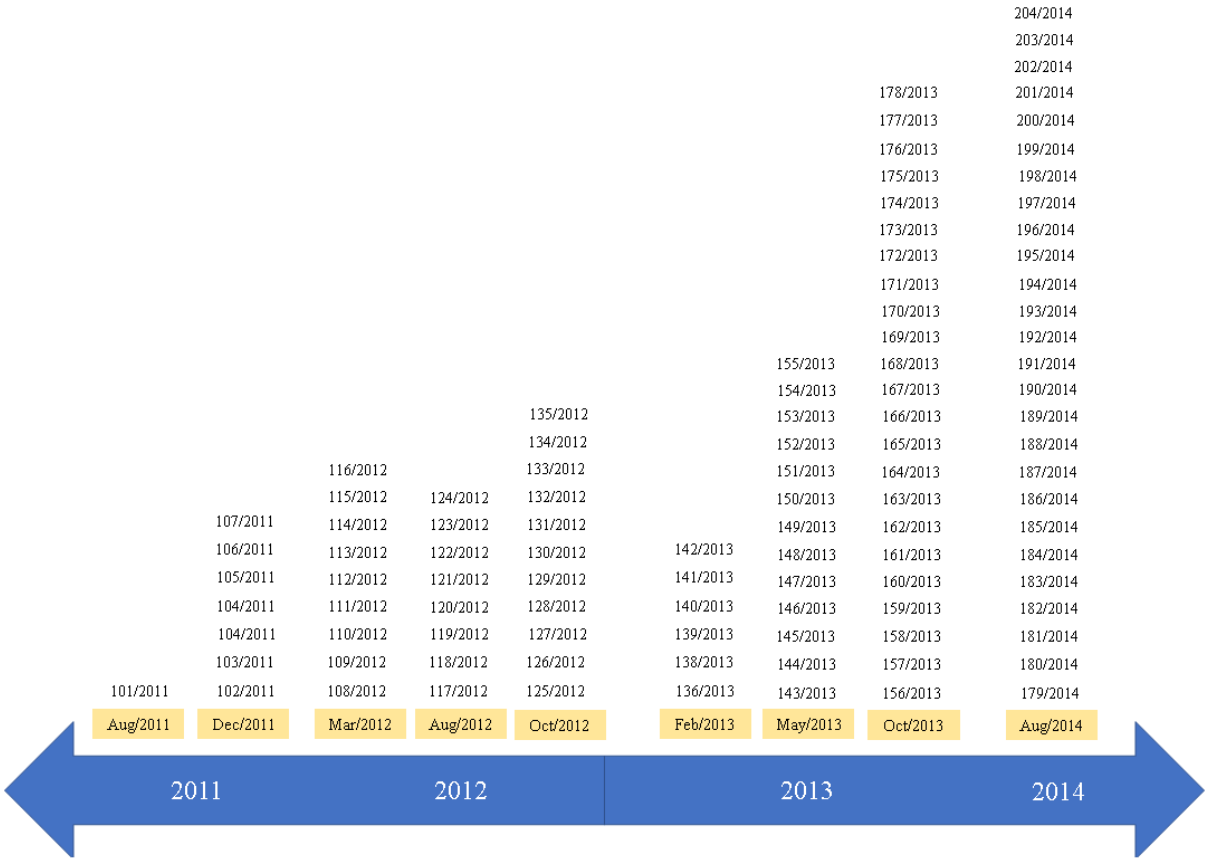
- Non public:
  - **CSF candidates registry:** applicants x approved. Provided by CNPQ and CAPES.
  - **University records:** entrance exam score, enrollment year, major provided by each university
  - **Formal Labor Market (RAIS):** painel data with employment status and wages.
- Public:
  - **Post graduation:** enrollment in a graduate program in Brazil.
  - **Formal entrepreneurship:** firm registry as a partner.
- Add non-public: detailed students history at UFBA.

Sample distribution



Program selection and IV

1) CSF launch the call (e.g. UK, March 2013)



- **Important for the IV validity:** No one knew the program call schedule.

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Problem: We have information on 13 out of 60 universities, and CNPQ and CAPES did not provide the ENEM score of the last approved candidate in some calls.

Empirical Strategy:

$$Y_{i,c} = \beta_0 + \beta_1 Approved_{i,c} + \beta_2 Entrance\_Exam_{i,c} + \quad (1)$$
$$\beta_3 Male_i + \beta_4 Dup\_Major_i + \alpha_s + \pi_u + \theta_m + \mu_y + \psi_d + \varepsilon_{i,c}$$

- $Y_{i,c}$ is one of the outcomes
- $Approved_{i,c}$ is a dummy if the student received the scholarship.
- $Entrance\_Exam_{i,c}$ is the vestibular score
- α_s, π_u, θ_m, μ_y and ψ_d are cohort, university, major, call's year , and destination country fixed effect
  - In the appendix, we show results using a (major-university-call's year) fixed effect. Results do not change
- Standard errors clustered at the call level

Program selection and IV

- We created a measure of each program call competitiveness:
  - Discounted call approval rate: share of approved per-call excluding the candidates from the 13 universities in the sample.
  - Intuition: more students from other university approved in a given call, less competitive is the call
  - More competitive a call is, the less likely it is for a given applicant from one of the thirteen universities in the sample to receive a schorlarship scholarship.

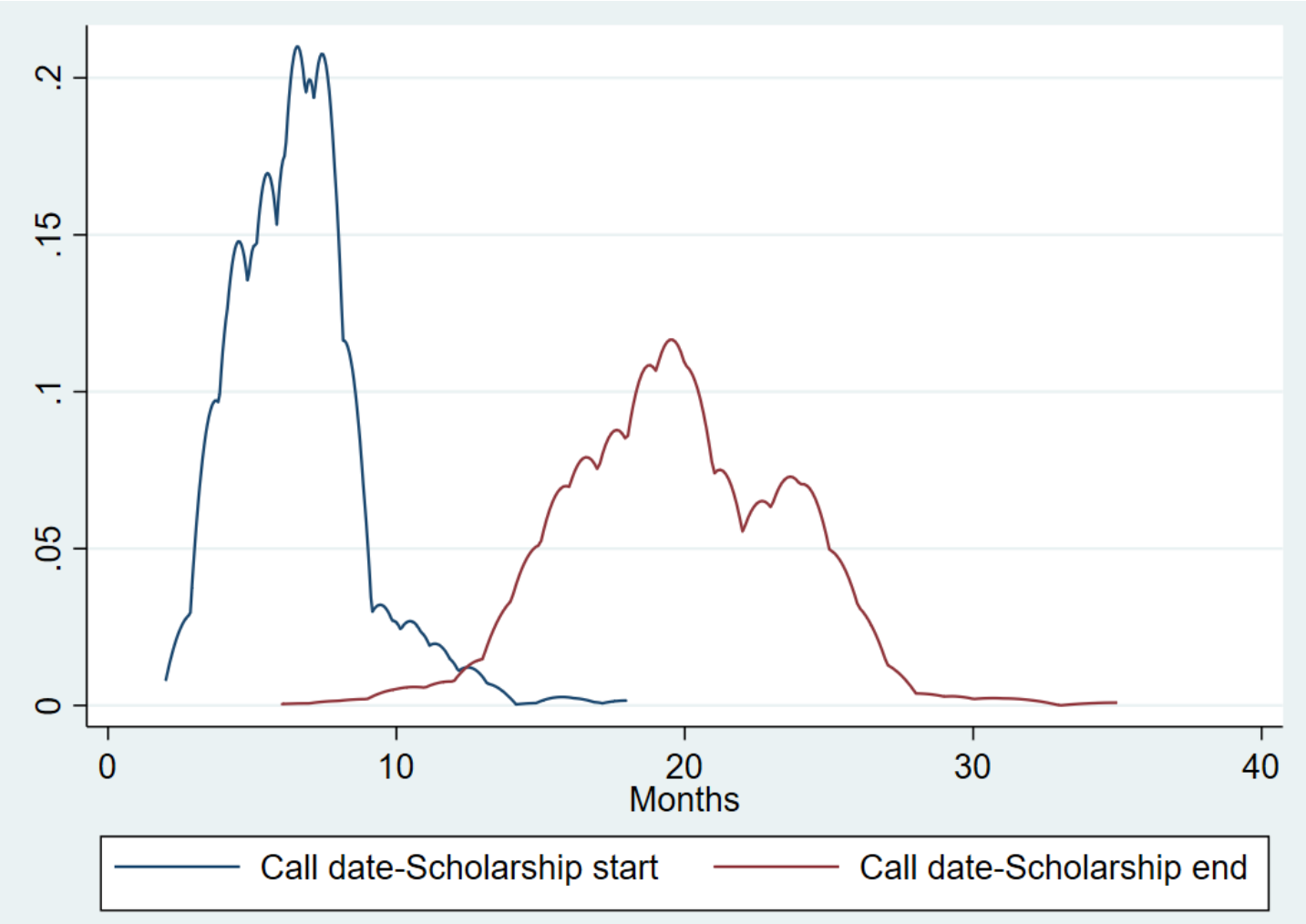
Important: candidates did not know the number of slots available and if there would be new calls for the same destination country

Exclusion Restriction

Table: The effect of CSF on pre-treatment covariates using UFBA data

	Age	Metropolitan Region of Salvador	Mother or father with a college degree	Single	Financially dependent Financially dependent	Attended vocational track in high school
	(1)	(2)	(3)	(4)	(5)	(6)
Approved	0.181	0.067	0.020	-0.085	0.019	0.007
	[0.532]	[0.114]	[0.092]	[0.083]	[0.072]	[0.0445]
Mean dep. var	18.92	0.626	0.198	0.847	0.545	0.072
Obs	1,566	1,566	1,566	1,566	1,566	1,566
No. clusters	80	80	80	80	80	80

Difference between call-date and scholarship start and end



Effects of Science Without Borders on post-graduation

Table: Effects on postgraduate education enrollment

	+1 year	+2 years	+3 years	+4 years	+5 years	+6 years	+7 years	Pooled +1 to +3 years	Pooled +4 to +7 years	Pooled +8 to +9 years
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Approved	-0.028**	-0.085***	-0.118***	-0.075*	-0.033	-0.006	-0.029	-0.125***	-0.065**	-0.026
	[0.013]	[0.024]	[0.036]	[0.038]	[0.031]	[0.024]	[0.028]	[0.036]	[0.030]	[0.027]
Mean dep. var	0.02	0.07	0.14	0.20	0.21	0.20	0.19	0.14	0.29	0.20
Obs	14,271	14,271	14,271	14,271	14,271	14,271	14,271	14,271	14,271	14,271
No. clusters	97	97	97	97	97	97	97	97	97	71

Effects of Science without Borders on having a formal job

Table: Effects on having a formal job

	+1 year	+2 years	+3 years	+4 years	+5 years	+6 years	+7 years	Pooled +1 to +3 years	Pooled +4 to +7 years	Pooled +8 to +9 years
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A. Only contracts started after the call's year										
Approved	-0.023**	-0.053***	-0.038*	-0.060***	0.009	-0.093***	-0.042	-0.058***	-0.072**	-0.031
	[0.009]	[0.017]	[0.021]	[0.019]	[0.022]	[0.025]	[0.027]	[0.020]	[0.032]	[0.024]
Mean dep. var	0.03	0.07	0.11	0.12	0.15	0.19	0.26	0.13	0.37	0.32
Obs	14,271	14,271	14,271	14,271	14,271	14,271	14,271	14,271	14,271	14,271
No. clusters	97	97	97	97	97	97	97	97	97	71
Panel B. All contracts independently of when they started										
Approved	-0.031**	-0.055***	-0.039*	-0.060***	0.004	-0.093***	-0.038	-0.065***	-0.076**	-0.032
	[0.013]	[0.017]	[0.022]	[0.022]	[0.023]	[0.026]	[0.026]	[0.022]	[0.033]	[0.023]
Mean dep. var	0.05	0.08	0.12	0.12	0.15	0.20	0.27	0.14	0.38	0.33
Obs	14,271	14,271	14,271	14,271	14,271	14,271	14,271	14,271	14,271	14,271
No. clusters	97	97	97	97	97	97	97	97	97	71

Effects of Science without Borders on entrepreneurship

Table: Effects on being a firm owner or partner

	+1 year	+2 years	+3 years	+4 years	+5 years	+6 years	+7 years	Pooled +1 to +3 years	Pooled +4 to +7 years	Pooled +8 to +9 years
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A. Only firms started up after the call's year										
Approved	-0.007	-0.020***	-0.013	-0.014	-0.021	0.014	-0.025*	-0.042***	-0.047*	-0.033**
	[0.007]	[0.006]	[0.011]	[0.014]	[0.015]	[0.015]	[0.014]	[0.016]	[0.027]	[0.016]
Mean dep. var	0.01	0.02	0.02	0.04	0.05	0.05	0.05	0.05	0.17	0.08
Obs	14,271	14,271	14,271	14,271	14,271	14,271	14,271	14,271	14,271	14,271
No. clusters	97	97	97	97	97	97	97	97	97	71
Panel B. All firms independently of when they started										
Approved	-0.007	-0.020***	-0.013	-0.014	-0.021	0.014	-0.025*	-0.042***	-0.047*	-0.033**
	[0.007]	[0.006]	[0.011]	[0.014]	[0.015]	[0.015]	[0.014]	[0.016]	[0.027]	[0.016]
Mean dep. var	0.01	0.02	0.02	0.04	0.05	0.05	0.05	0.05	0.17	0.08
Obs	14,271	14,271	14,271	14,271	14,271	14,271	14,271	14,271	14,271	14,271
No. clusters	97	97	97	97	97	97	97	97	97	71

Table: Effects on graduation, on-time graduation, and the main outcomes for candidates enrolled at UFBA

	Graduation	On-time graduation	Postgrad. +1 to +3	Postgrad. +4 to +7	Formal emp. +1 to +3	Formal emp. +4 to +7	Firm owner +1 to +3	Firm owner +4 to +7
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A. Second stage								
Approved	0.185*	-0.231***	-0.018	-0.017	-0.132***	-0.208**	-0.061	0.079
	[0.104]	[0.051]	[0.054]	[0.066]	[0.041]	[0.102]	[0.042]	[0.092]
Mean dep. var	0.79	0.18	0.08	0.22	0.11	0.34	0.07	0.21
Obs	2,044	2,040	2,044	2,044	2,044	2,044	2,044	2,044
No. clusters	85	85	85	85	85	85	85	85
Panel B. First stage								
Ratio	1.051***	1.055***	1.051***	1.051***	1.051***	1.072***	1.072***	1.072***
	[0.157]	[0.159]	[0.157]	[0.157]	[0.157]	[0.152]	[0.152]	[0.152]
F-stat of Instrument	44.54	43.98	44.54	44.54	44.54	49.85	49.85	50.85

Attrition: Effects of Science Without Borders on being found in any of the data sets

Table: Effects on the probability of finding the candidate in any outcome data set

	+1 year	+2 years	+3 years	+4 years	+5 years	+6 years	+7 years	+8 years
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Approved	-0.043**	-0.137***	-0.143***	-0.114***	-0.031	-0.062*	-0.057*	-0.03
	[0.017]	[0.024]	[0.034]	[0.041]	[0.035]	[0.033]	[0.031]	[0.057]
Mean control dep. var	0.05	0.14	0.24	0.31	0.36	0.39	0.44	0.42
Obs	14,271	14,271	14,271	14,271	14,271	14,271	10,881	4807
No. clusters	97	97	97	97	97	97	71	30

Mechanism: Brain drain

- We found 73% of the approved candidates in the (outcome) data. More specifically, we were not able to find 25% of the non-approved candidates and 29% of the approved candidates.

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    - NEET (18-25 years): 35.9%
  - Finishing undergrad
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  - Finishing undergrad
  - Moved to another country! However, there are mobility constraints:
    - Brazilians do not have work permit in Europe, U.S. or Australia
    - Brazilians need to pay higher fees for post-grad than European and U.S. citizens
    - No students loans programs

Discussion

- The program did not achieve the main results in the short and medium term
  - Program implementation and design are controversial
  - Long-term effects may differ
- Delayed graduation seems to be an important mechanism, at least for UFBA.
- We are not able to identify many impacts: cultural capital, perceptions about other cultures and the world, political views, etc.
  - Spillovers/peer effects may also be important

Thank you!