The Long-Term Impact of High School Financial Education: Evidence from Brazil

Miriam Bruhn (World Bank and IZA)

Gabriel Garber (Central Bank of Brazil)

Sergio Koyama (Central Bank of Brazil)

Bilal Zia (World Bank)

7th Cherry Blossom Financial Education Institute

What are the long-term effects of school financial education?

- Meta-analysis: School financial education programs have strong effects on financial knowledge and weaker but significant effects on financial behavior (Kaiser and Menkoff 2020)

- Most studies measure only short-term effects of financial education, less than a year following the intervention (Entorf and Hou 2018)

- Frisancho (2021) examines credit bureau data for two years after a financial literacy program ended in Peruvian high schools
  - The program led to less borrowing for students in some subgroups

This paper

- Builds on Bruhn et al (2016) who use a randomized control trial to measure the short-term effects of a financial education program
  - About 25,000 students in 892 public high schools in Brazil

- Examines administrative data on use of financial products and employment outcomes
  - Close to 16,000 students from the short-term impact evaluation
  - Up to 9 years after the program ended

The financial education program

- 72 case studies taught over 3 semesters during the regular curriculum of mathematics, science, geography, and history

BOOK 1
Short term situations related to individual context:
Daily Family Life, Social Life and Personal Property

BOOK 2
Medium term situations:
Work, Entrepreneurship and Big Projects

BOOK 3
Social Context:
Public Property, Country and World Economy

Experimental design

- 892 public high schools in six Brazilian states were grouped into matched pairs based on school and municipality characteristics and randomly allocated to
  - Treatment: One class received free textbooks and teacher training during 11^{th} and 12^{th} grade
  - Control: Did not receive the program but selected a class to participate in surveys

- Students graduated high school at the end of the study

Short-term effects on students

- Follow-up survey data, collected at the end of the program, shows the financial education program led to
  - Increased financial proficiency
  - Higher grade-passing rates
  - Improvements in self-reported savings and budgeting
  - Greater self-reported use of expensive forms of credit to make consumer purchases

Sample for long-term impact evaluation (IE)

- Find national ID numbers (CPF) to track students through administrative data housed at Central Bank of Brazil (BCB)
  - Search for student names in the registry of names from the Federal Government Revenue Service (SRF)
  - Drop any matches that are not age compatible
  - Get 15,940 students with CPFs
    - Use 3,657 CPFs collected during short-term evaluation to check accuracy of the matches
      - Only 2.7% are different
  - More CPFs for control (46%) than treatment (44%) students

Baseline balance in long-term IE sample

	Number of schools	Number of students	Control Mean	Treatment Mean	Difference in Means Test (p-value)
Panel A: School-level variables (administrative data)					
Number of students in school (2008)	886		642.59	680.92	0.245
Number of teachers in school (2008)	764		37.53	38.40	0.633
Grade-level dropout rate (2009)	876		11.08	11.71	0.420
Panel B: 2010 baseline survey data					
Student is female	886	15,925	0.54	0.56	0.034 **
Student has failed at least one school year	886	15,667	0.27	0.29	0.283
Family receives *Bolsa Familia* cash transfer	886	15,828	0.31	0.34	0.157
Financial proficiency score	886	15,939	50.73	51.25	0.277

Short-term effects by IE sample

	Financial Proficiency Score			
	Short-term IE sample		Long-term IE sample	
	Follow-up 1	Follow-up 2	Follow-up 1	Follow-up 2
Treatment school	3.793***	3.049***	4.173***	3.770***
	(0.299)	(0.352)	(0.320)	(0.432)
R^2	0.449	0.318	0.494	0.436
N	18,276	18,953	10,776	7,859
Number of schools	852	847	841	783
Dependent variable mean in control group	56.050	59.045	57.195	59.915
Dependent variable SD in control group	14.808	14.866	15.022	15.374

* p<0.10, ** p<0.05, *** p<0.01

Administrative data sources (housed at BCB)

- Registry of Clients of the Financial System (CCS)
  - Accounts holdings at financial institutions
- Credit Registry System (SCR)
  - Use of various credit products
- Annual Report of Social Information (RAIS)
  - Formal employment, reported by employers for employees with a written contract
  - Does not include business owners or self-employed
- Federal Government Revenue Service (SRF) registry of firms
  - Formal microenterprise ownership (MEI)
    - Simplified tax regime for firms with up to USD 17,000 per year in revenue and at most one employee, making up 42% of firms in SRF
  - No data on other firms since we can't easily link their ID numbers to the owner's CPF
- Proxy for informal employment based on COVID-19 relief transfer program

Timeline

	‘08	**‘09**	**‘10**	**‘11**	**‘12**	**‘13**	**‘14**	**‘15**	**‘16**	**‘17**	**‘18**	**‘19**	**‘20**
Intervention			X	X									
Baseline			X										
Follow-up 1			X										
Follow-up 2				X									
CCS financial accounts data	X	X	X	X	X	X	X	X	X	X	X	X	X
SCR credit data									X	X	X	X	X
RAIS employment data						X	X	X	X	X	X	X	X
MEI entrepreneurship data					X	X	X	X	X	X	X	X	X
Average student age	14	15	16	17	18	19	20	21	22	23	24	25	26

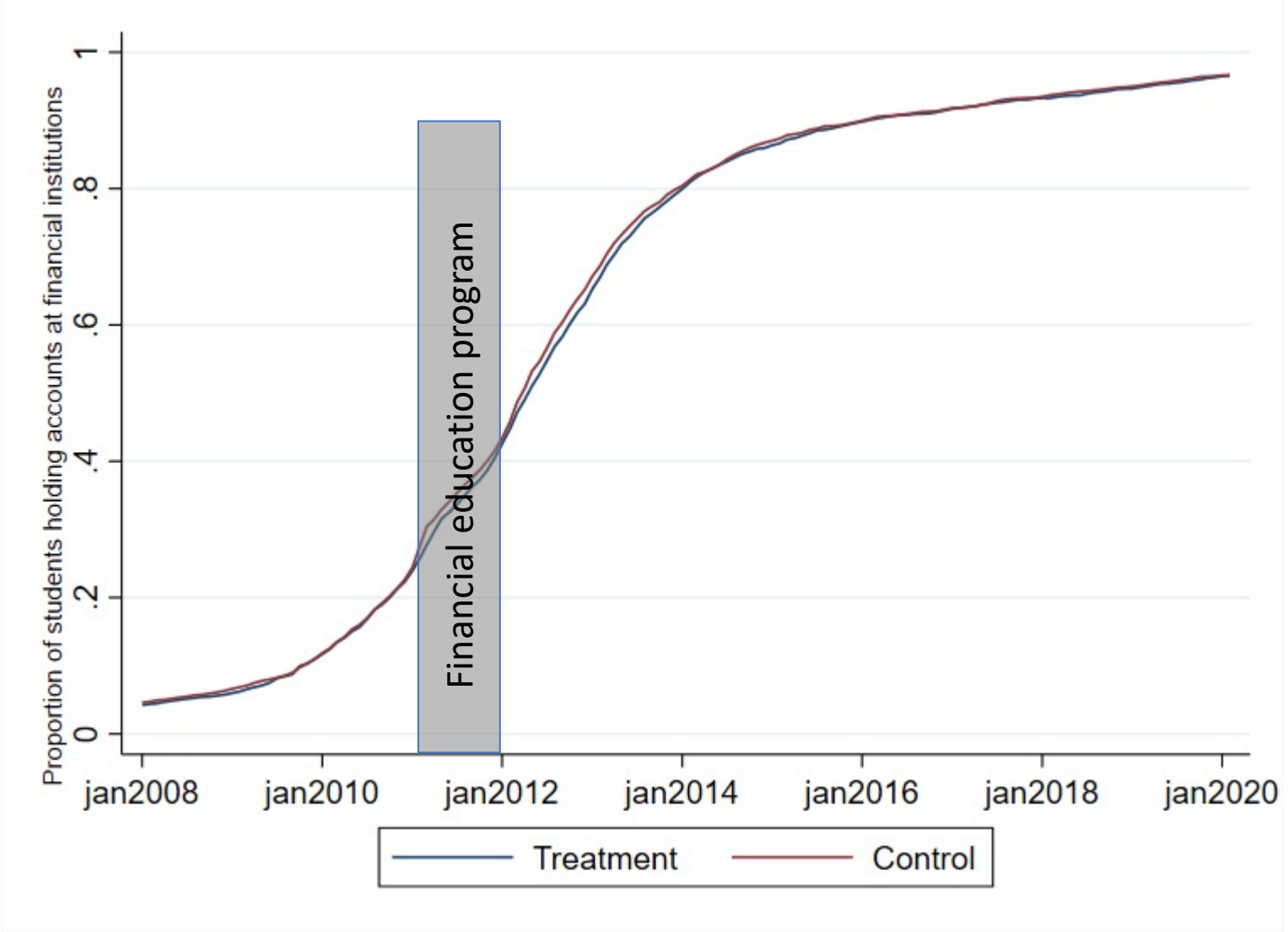
Estimating equation

$$y_{i,s,r,t} = \alpha + \beta \text{Treatment}_{i,s,r} + \sum \gamma_{s,r} d_{s,r} + \eta f_{i,s,r} + \sum \theta_{rt} m_{rt} + \varepsilon_{i,s,r,t}$$

- $y_{i,s,r,t}$: Outcome of student i in school pair s, in region r, in month t
- $\text{Treatment}_{i,s,r}$: Dummy equal to one if treatment school
- $d_{s,r}$: School pair dummies
- $f_{i,s,r}$: Dummy for student being female
- m_{rt}: Month region fixed effects
- Error term $\varepsilon_{i,s,r,t}$ clustered at school level

- Also split post-intervention years into two time periods
  - 2012 to 2018: Students may still be in university
  - 2019 to 2020: Most students have entered the labor market

No effect on holding accounts at financial institutions, but most students have accounts

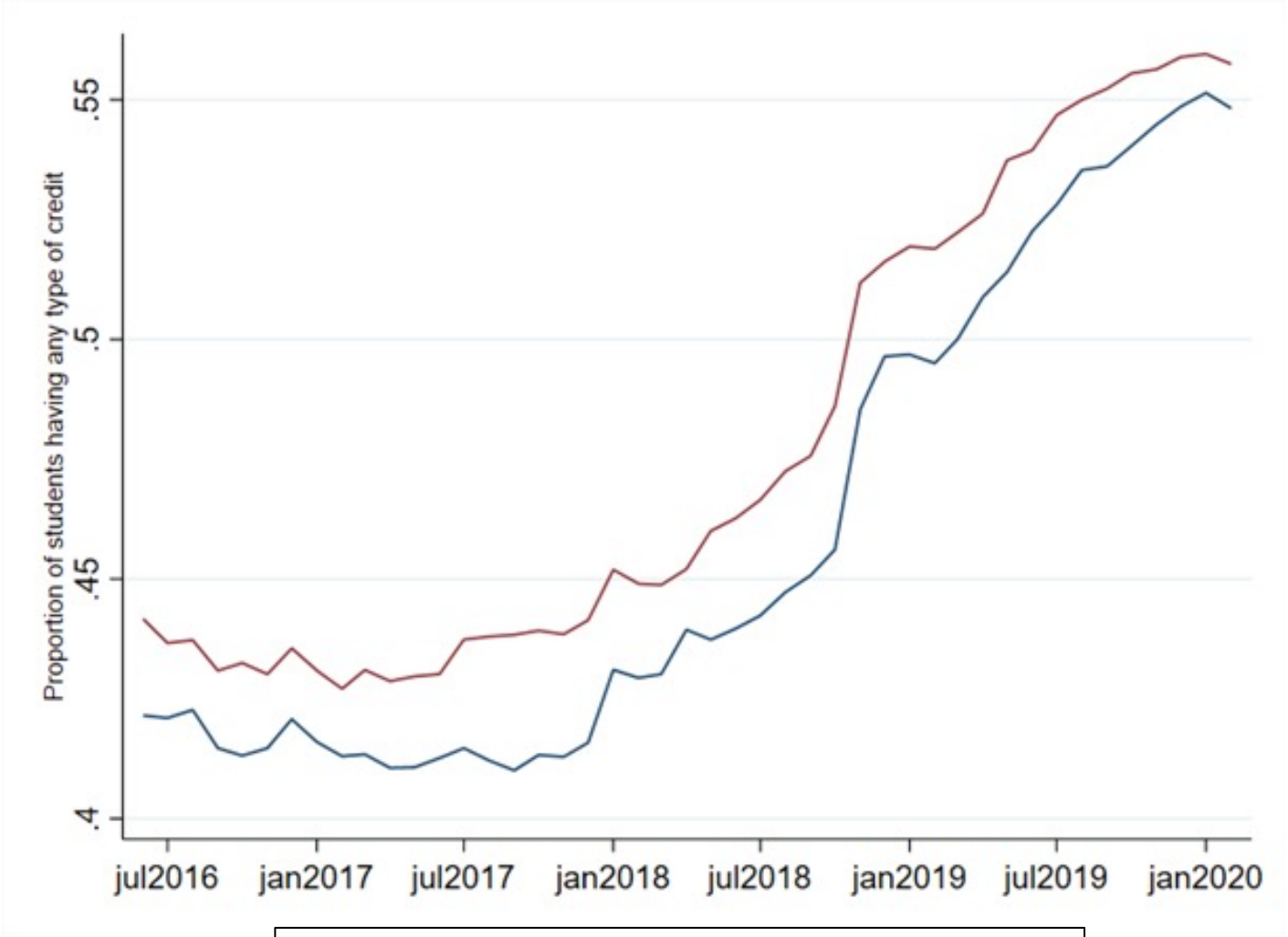


Financial education decreases probability of having expensive types of credit

	Any type of credit	Credit card purchases	Credit card debt	Overdrafts	Non-payroll
Treatment school	-0.0196***	-0.0175***	-0.0142***	-0.00900***	-0.00294
	(0.00494)	(0.00490)	(0.00351)	(0.00247)	(0.00203)
R^2	0.044	0.041	0.025	0.034	0.017
Observations (student x month)	717,300	717,300	717,300	717,300	717,300
Number of students	15,940	15,940	15,940	15,940	15,940
Number of months	45	45	45	45	45
Number of schools	886	886	886	886	886
Dependent variable mean in control group	0.478	0.344	0.230	0.111	0.0612

* p<0.10, ** p<0.05, *** p<0.01

Effect on credit use persists over time

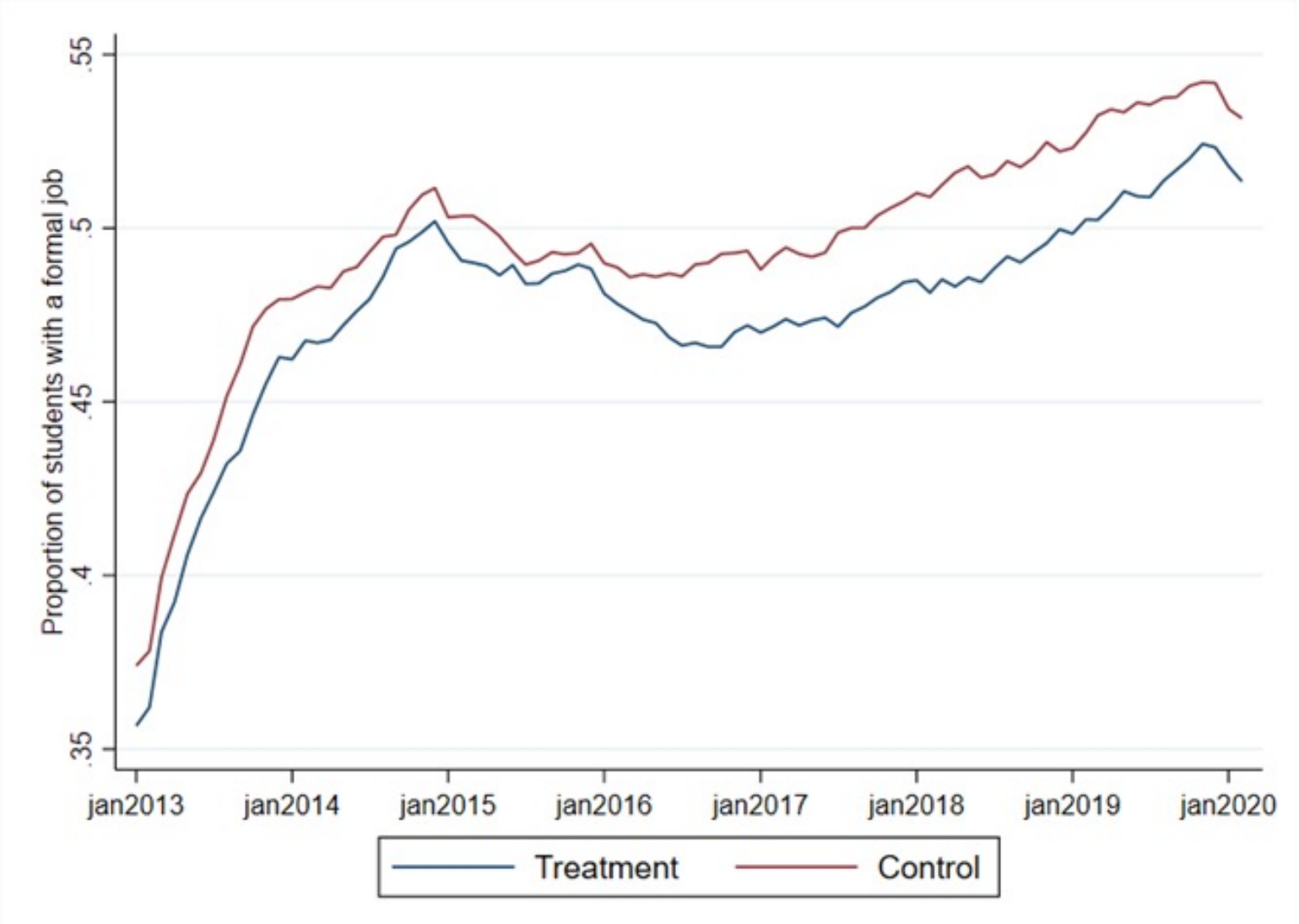


Financial education decreases formal job holding and increases formal microenterprise ownership

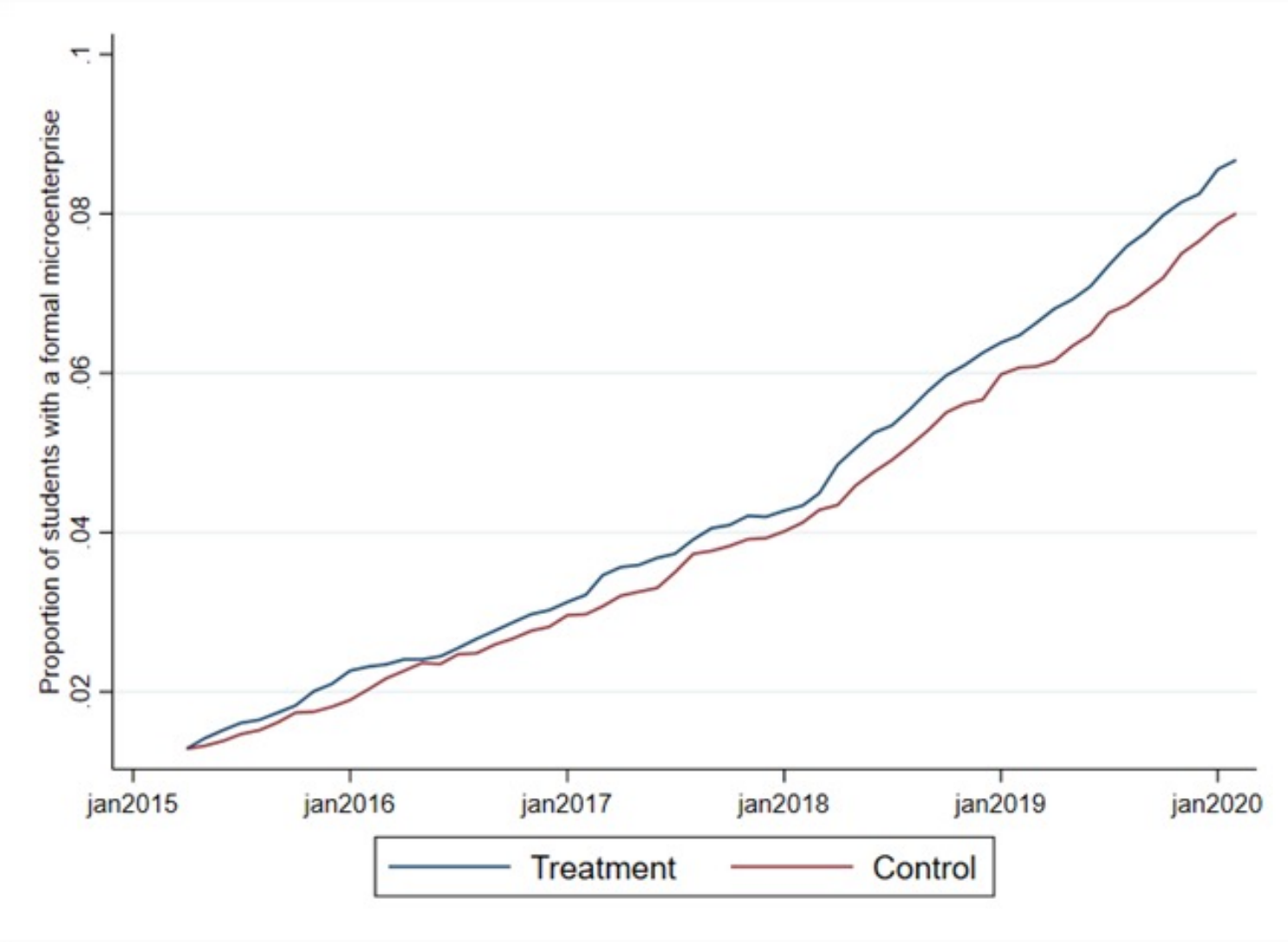
	Formally employed	Owns microenterprise (MEI)
Treatment school x (2012 to 2018)	-0.0112**	0.000970
	(0.00495)	(0.00126)
Treatment school x (2019 to 2020)	-0.0173***	0.00689**
	(0.00659)	(0.00349)
R^2	0.052	0.034
F-test p-value (effect equal in both periods)	0.3030	0.065
Observations (student x month)	1,370,840	1,562,120
Number of students	15,940	15,940
Number of months	86	98
Number of schools	886	886
Dependent variable mean in control group	0.495	0.027

* p<0.10, ** p<0.05, *** p<0.01

Effect on formal employment is biggest from 2016 onwards (5 years after high school)



Effect on microenterprise ownership emerges over time



Weak evidence that financial education also increases informal/self-employment

	2020 pandemic aid (for MEIs, informal, and underemployed)	2020 informal proxy (Pandemic aid if not MEI, RAIS or PBF)
Treatment school	0.0137**	0.0106*
	(0.00650)	(0.00588)
R^2	0.057	0.036
Observations (students)	15,940	15,940
Number of schools	886	886
Dependent variable mean in control group	0.383	0.255

PBF = Programa Bolsa Familia, a cash trasfer program for low-income households
p<0.10, ** p<0.05, *** p<0.01

Conclusions

- The high school financial education program in Brazil had lasting effects on students' financial behavior and employment outcomes
  - In the long-run, treated students were less likely to use expensive sources of credit than control students, although the opposite was true in the short-run
    - Higher stakes?
    - Self-reported vs. administrative data
  - Treatment students were less likely to hold formal jobs and more likely to own formal microenterprises than control students, probably because the program was comprehensive and included modules on work and entrepreneurship

- No evidence that the size of the effects declined over time