

Student Debt and Entrepreneurship in the US

Marta Morazzoni (UPF & BSE)

CEPR WE_ARE_IN Macroeconomics and Finance Conference in Basel

What the Paper is About

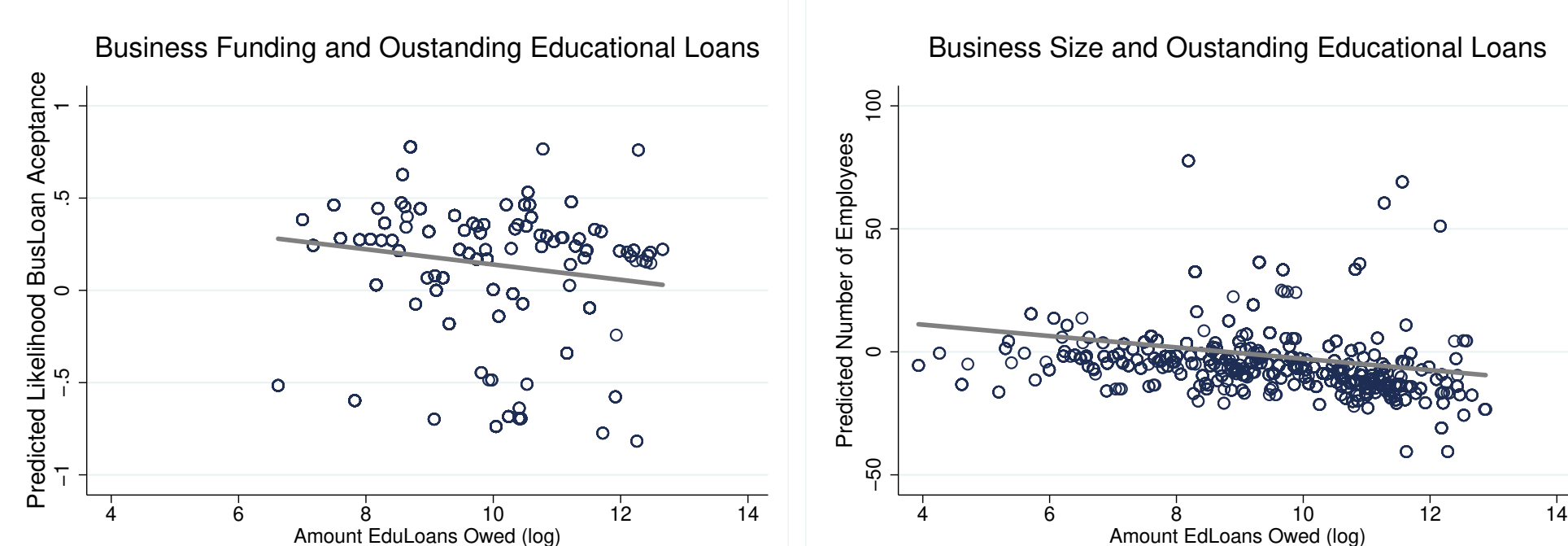
In the US, 1 in 4 labor force participants has borrowed to finance their degree. Student loans are the second largest debt market in the country – valued \$1.6 trillion and worth 6% of the GDP– and are currently at the center of its public debate. While college borrowing represents the main pathway to university for many US students, the cost of higher education has been rising faster than inflation and faster than the college premium over the past years. Such steady increase in university prices has been accompanied by an unprecedented upsurge in the level of student debt per person. Nowadays, the median borrower piles up more than 40K dollars of education loans, and there is increasing evidence of graduates' debt overhang. If student debt was to interact with the entrepreneurial decisions of college-educated individuals during adulthood, could then this have unintended repercussions for US firm dynamism, capital allocation and aggregate output? In this paper, I investigate the interplay of education and occupational choices over the life-cycle of households, and highlight the quantitative impact student debt can have on entrepreneurial margins and aggregate quantities.

Empirical Evidence

Using micro-level data from the FED Survey of Consumer Finances (1989-2019) I document few facts:

- Higher education → better business outcomes
- Larger student loans → lower entrepreneurial rates
- No instance on negative selection into student debt

Business Outcomes by Outstanding Student Debt



Focusing on entrepreneurs, I further show that:

- Larger student loans → lower firm credit
- Larger student loans → lower firm size
- Larger student loans → lower firm revenues/profits
- Larger student loans → higher productivity (suggests stricter selection into entrepreneurship)

Model: Overview

I build a GE life-cycle model where individuals differ by wealth, productivity, age and student debt. Households save out of their income and consume a final good produced by heterogeneous firms. During youth, they decide if to attend university and how much to take out in student loans to pay for the tuition, net of scholarships. College grants a future income premium. During adulthood, individuals decide whether to be workers or entrepreneurs. In retirement, they consume their pension and savings, and leave bequests. The government collects income taxes, holds student debt and distributes pensions.

Model: Key Ingredients

- The repayment of loans upon graduation reduces savings, and slows down wealth accumulation:

$$V^{coll}(a, z, d, age) = \max_{a', c} \left\{ u(c) + \beta \theta_{age} \int V^{coll}(a', z', d', age') d\Xi(z'|z) \right\}$$

$$\text{s.t. : } c + a' = (1+r)a + (1-\tau) \max(\pi^*, \bar{w}_{age}) - \mathcal{R}$$

$$\text{and : } a' \geq 0, \quad c \geq 0, \quad \mathcal{R} = \max \left\{ \frac{d_{edu}}{T_{repay}} + r^d d, 0 \right\}$$

- Outstanding student debt balances tighten entrepreneurs' borrowing constraint.

$$\pi^* = \max_{l, k} e^{c_{age}} (k^\alpha l^{1-\alpha})^{1-\nu} - wl - (r + \delta)k$$

$$\text{s.t. : } k \leq \lambda(a - \eta d)$$

Main Takeway

Ex-ante, student loans reduce firm creation, and ex-post limit business operations of indebted entrepreneurs.

Quantitative Exercise

I estimate the model on US data, and then quantify whether the presence and extent of student loans can explain part of the entrepreneurial differences across individuals with and without university education.

Untargeted Moments	Model	Data
<i>Entrepreneurship & Education</i>		
Share of Student Borrowers	0.68	0.70
Average Entrepreneurial Rate	0.12	0.10
Average Entrepreneurial Rate College	0.15	0.14
Average Entrepreneurial Rate Non-College	0.10	0.08
Share of Entrepreneurs with Student Debt	0.11	0.21
Share of Entrepreneurs without Student Debt	0.37	0.28
Share of Entrepreneurs without College	0.52	0.51

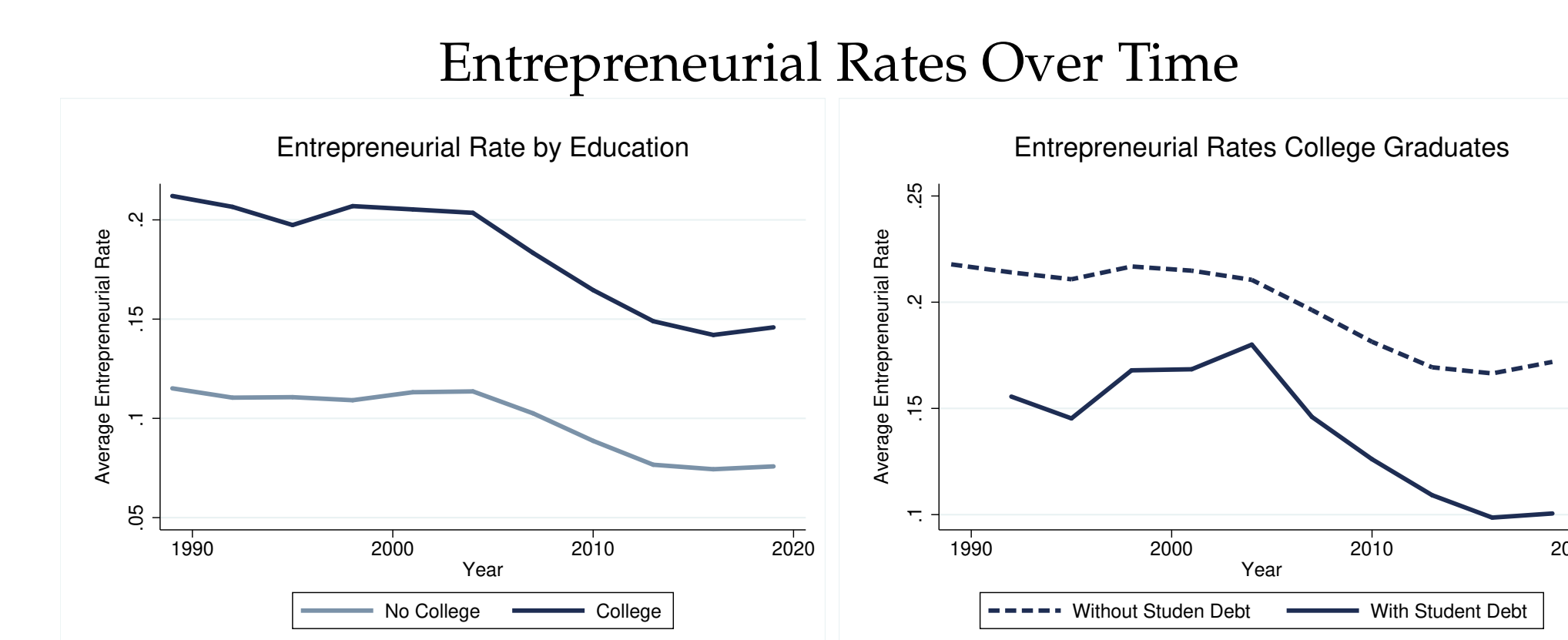
Model-Implied Elasticities

Business Size (employees) to Student Loans	-0.641	-0.859
Business Profits to Student Loans	-0.210	-0.082
Business Sales to Student Loans	-0.169	-0.098

Education and entrepreneurship correlate positively because college graduates have a higher deterministic income premium. Yet, debt repayment slows down wealth accumulation, and outstanding loans lower the collateral entrepreneurs can pledge to rent capital. Since entrepreneurial productivity is stochastic and not pre-determined in youth, college borrowing discourages firm entry, and lowers entrepreneurial profits and capital before the student debt is fully repaid.

Rise in Student Debt & Decline in Entrepreneurship: 1980's to Today

Taking a time perspective, I study how the rise in college tuition and premium has affected the increase in student debt and the decline in the entrepreneurial rate of college graduates over the last decades:



I perform a steady state comparison by calibrating my model to the 1980's US economy, keeping all parameters fixed and recomputing the equilibrium of today feeding 2 changes: college premium ↑ and tuition ↑

	Targeted	Data	Model
College Premium	+ 20.0%	+ 20.0%	
College Tuition	+ 179%	+ 178%	
<i>Untargeted</i>			
Total Student Debt	+ 788.9%	+ 689.5%	
Share of Student Borrowers	+ 30.0 p.p.	+ 35.9 p.p.	
Entrepr. Rate Overall	- 4.25 p.p.	- 0.50 p.p.	
Entrepr. Rate Graduates w/ Loans	- 5.47 p.p.	- 1.82 p.p.	

Further Validation: an RDD

As a further validation, I investigate the impact of student loans bankruptcy availability on entrepreneurial entry. In 1998, the US prevented student loans to be discharged. Before this policy reform, borrowers could file for bankruptcy after 7 years into repayment. What is the potential effect on entrepreneurship?

$$k_t \leq \lambda(a_t - \eta d_t) \rightarrow \text{shift in } d_t \text{ for } t > 7$$

I split my data sample in **two groups** and run an RDD:

- Treated: started repaying before 1991 (can default)
- Control: started repaying after 1991 (cannot default)

$$Entrep_{it} = \beta_0 + \beta_1 SubjectReform_i + \beta_2 \Delta_i^{cutoff} + \delta' \Gamma_{it} + \alpha_t + \epsilon_{it}$$

Mapping the Data to the Model

- Student loans discharge after 7 years repayment
- Bankrupt individuals pay $\max\{a - d; 0\}$
- I target the % of bankrupt borrowers in the 90's

Effect of Loans Discharge on Entrepreneurship

	Baseline RDD	Model Counterfactual
Subject to Reform	-0.0632**	-0.0769
Observations	4,782	30,000

Policy Counterfactuals

I run 4 policy experiments to study how the sources and characteristics of college aid interact with entrepreneurship. All reforms are financed by taxes.

- Increase merit-based grants by 50%:

Entrepreneurship (w/ Stud. Debt)	Output (w/ Stud. Debt)	Business Debt (w Stud. Debt)	Output Aggregate	College Attainment
+2.60%	+12.29%	+0.05%	+2.30%	+9.84%

- Increase need-based grants by 50%:

Entrepreneurship (w/ Stud. Debt)	Output (w/ Stud. Debt)	Business Debt (w Stud. Debt)	Output Aggregate	College Attainment
-2.31%	-0.8%	-9.07%	+0.4%	+2.78%

- Increase student loans borrowing limit by 25%:

Entrepreneurship (w/ Stud. Debt)	Output (w/ Stud. Debt)	Business Debt (w Stud. Debt)	Output Aggregate	College Attainment
-9.38%	-3.09%	-4.98%	+0.77%	+16.67%

- Switch to income-driven repayment plans:

Entrepreneurship (w/ Stud. Debt)	Output (w/ Stud. Debt)	Business Debt (w Stud. Debt)	Output Aggregate	College Attainment
-12.32%	+11.60%	+9.97%	+2.65%	+8.33%