Skin in the Game: Colleges' Financial Incentives and Student Loans

Nano Barahona (UC Berkeley & NBER)
Cauê Dobbin (Georgetown University)
Hanson Ho (Stanford GSB)
Sebastián Otero (Columbia University)
Constantine Yannelis (Chicago Booth & NBER)

NBER SI Education

July 24, 2024

A privately-run, but publicly-funded, higher education system

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⇒ High **default rates** threatening the sustainability of loan programs

→ Deliquency rate:
- **Brazil:** 53%
- **US:** 40%

The economics behind the storm

Misaligned incentives

1. Imperfect information on education **quality**
   - No past experience/one-time decision $\rightarrow$ Opaque product
   - New students and new programs
   - Advertising is an important driver of demand (Armona and Cao, 2022)

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Skin-in-the-game policies

- Create contracts based on **outcomes** → hold them accountable for student loan defaults
  - **Brazil:** Penalize schools for dropouts or defaults starting in 2018 (our experiment)
  - **US:** Proposed legislation makes institutions liable for 50% of student loans in default

#Views #Opinion INSIDE HIGHER ED

Colleges Should Cosign Student Loans

Risk sharing is coming, argues Carlo Salerno, and Congress can improve accountability by obligating colleges to help repay the debt they ask students to take on.

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WHITE HOUSE · Published March 21, 2019

Trump exec order to hold colleges accountable for student loan debt, free speech

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COMMENTARY

Student Loan Losses Would Decline if Schools Had Skin in the Game

The AMERICAN INTEREST

STUDENT LOAN BUBBLE

Colleges Need Skin in the Game

Republicans and Democrats have offered two distinct approaches to the student loan crisis. GOP lawmakers have proposed introducing

Forbes

Dec 7, 2020, 09:00am EST | 1,227 views

Student Loan Losses Would Decline If Schools Had Skin In The Game

Richard Vedder Contributor
Education
I am Distinguished Professor of Economics Emeritus at Ohio University.

Skin in the Game Act would require colleges pay 50% of student loans for students who default

GovTrack.us Follow
Sep 3, 2019 · 3 min read

#News #Student Aid And Loans

Risks of Risk Sharing

INSIDE HIGHER ED

As bipartisan consensus emerges in Congress that colleges should share the burden of students who can't repay loans or find jobs, higher ed leaders consider how such a plan would work and whether it would discourage them from educating the disadvantaged.

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U.S.

White House Might Put Colleges on the Hook for Student Loans

Executive order under consideration would require schools to take financial stake when students don't repay

Forbes

Apr 30, 2018, 09:00am EDT

What Universities Need: More Skin In The Game

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Education
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This paper

Research Question: How do for-profit institutions respond to a policy that makes them accountable for students' outcomes?

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What do we do?:

1. Reduced-form evidence of policy that increased college accountability in 2017 in Brazil
2. Build equilibrium model to compute optimal penalty & conduct counterfactuals

Related Literature

- **Student Loans:** Amromin and Eberly (2016), Avery and Turner (2012), Bleemer et al., (2017), Looney and Yannelis, (2015, 21), Lucca, Nadauld and Shen (2019), Kargar and Mann (2018), Mueller and Yannelis (2019, 2021), Eaton, Howell, and Yannelis (2021), Fos et al. (2022), DiMaggio, Kalda and Yao (2019), Catherine and Yannelis (2022), Cornaggia and Xia (2022), Manso et al. (2022), Solis (2017)

- **Design of Government Loan Programs:** Gale (1991), Brosshardt, Kakhbod and Kermani (2023), Bachas, Kim and Yannelis (2020), Granja et al. (2022), Kuchler et al. (2022)

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- **Incentives in Ownership:** Hart, Shleifer and Vishny (1997), Duggan (2000), Deming, Goldin and Katz (2012), Eaton, Howell and Yannelis (2020); Gupta et al. (2022)

- **Productivity and Incentives in Education:** Hoxby and Turner (2019), Mountjoy and Hickman (2020), Card (1999), Dale and Krueger (2002), Dinerstein and Smith (2020), Neilson (2020)

Data and Setting

Data

Data

University entrance exam

- Standardized national college entrance exam
- Period: 2009-2022

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University census

- Universe of students enrolled in higher education
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Federal student loan program (FIES)

- Loans: amount, interest rate, conditions
- Repayment: loan balances, days overdue, delinquency rates [New!]
- Period: 2009-2023

Higher education landscape in Brazil

Market structure

- In 2018: 6 million students in 2,200 institutions
- Students enroll in specific degree (major-college combination)

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Federal student loan program (FIES)

- Covers 100% of tuition costs
- Subsidized interest rates
- Broad coverage:
  - Largest year: 28% of incoming students (80% of degrees)

The allocation of FIES loans (Since 2015)

- Limited number of loans per degree
- Loans distributed to students through a centralized mechanism based on test scores
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  → Increasing their degrees' loan cutoff

Skin-in-the-game reform

- Passed in 2017, the program was reformed to increase school liability
- It targeted **dropout** and **default rates**
  - Default and dropout positively correlated Details
- Schools are liable for 10-25% of loans (based on dropout/default of students with loans)

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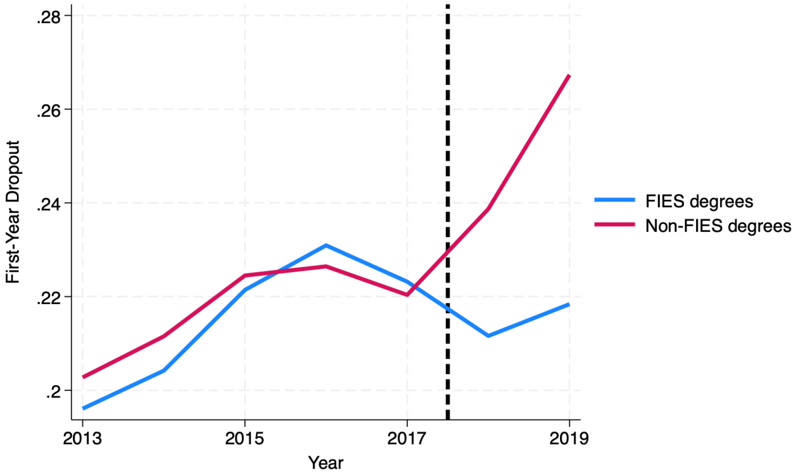
$$\text{Revenue per loan student} = (1 - \text{penalty}) \cdot \text{tuition}$$

$$\text{penalty(dropout,default)} \in [0.10, 0.25]$$

Details

Effects of the Skin in the Game Reform: Descriptive Evidence

How did the policy impact dropout rates?



FIES Students

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  - **FIES reliance:** $\mathbb{E}\left[\text{share students w/ loans}\middle|\text{major,college,region}\right]$
- Timing:
  - Regression sample: 2016, 2017 (pre-policy); 2018, 2019 (post-policy)
  - FIES reliance: Calculated in 2015

Event study

$$\text{LoanDropout}_{jt} = \alpha_j + \alpha_t + \beta_t \cdot \text{FiesReliance}_j + \epsilon_{jt}$$

FIES dropout decreased for schools with higher FIES reliance

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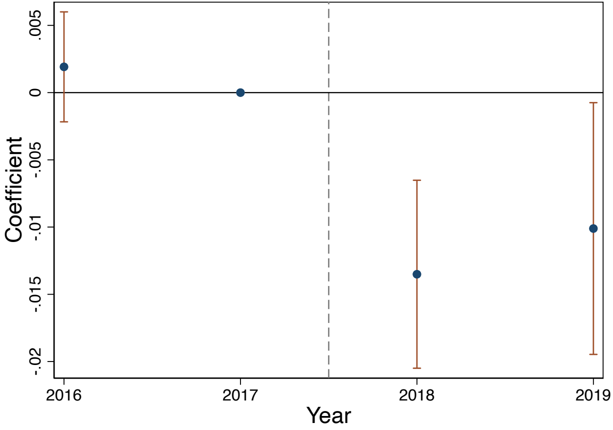

- FIES reliance ↑ 1 sd ⇒ Dropout rate ↓ 1.3 pp (14%)

Decomposing dropout into degree and composition effects

- Change in dropout driven by:
  - Changes in degree quality
  - Changes in student body composition

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$\rightarrow$ Same event study, with degree and composition effects as outcomes

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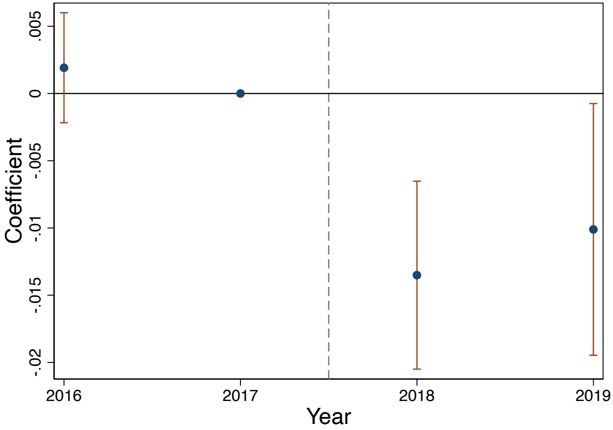
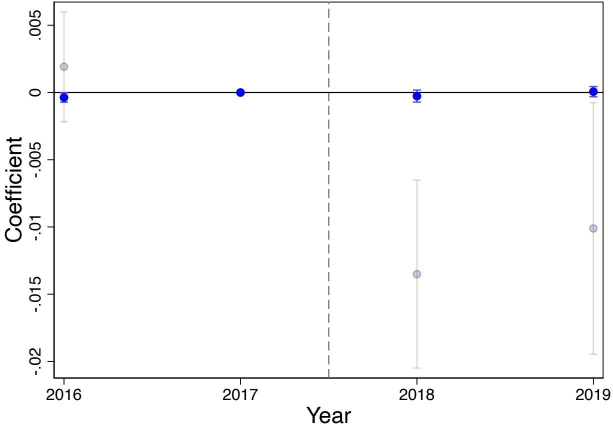


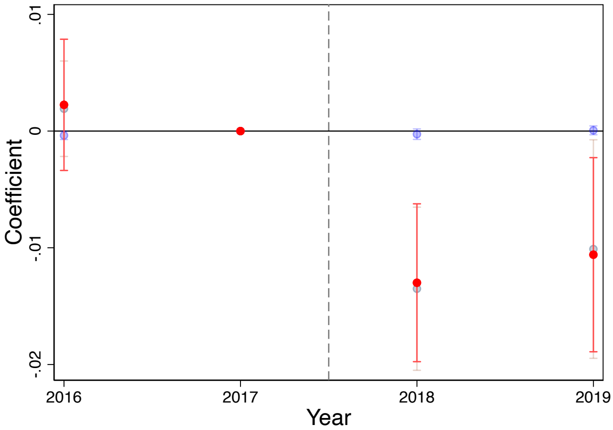
No effect on composition

$$\text{Composition}_{jt} = \alpha_j + \alpha_t + \beta_t \cdot \text{FiesReliance}_j + \epsilon_{jt}$$



Degree effect fully explains dropout changes

$$\text{DegreeEffect}_{jt} = \alpha_j + \alpha_t + \beta_t \cdot \text{FiesReliance}_j + \epsilon_{jt}$$



Mechanisms?

- Faculty-student ratios are a standard measure of quality (Eaton et al., 2020, Angrist & Lavy, 1999; Angrist, et al., 2019; Hoffmann & Oreopoulos, 2009)

Faculty-student ratio went up for degrees with higher FIES reliance

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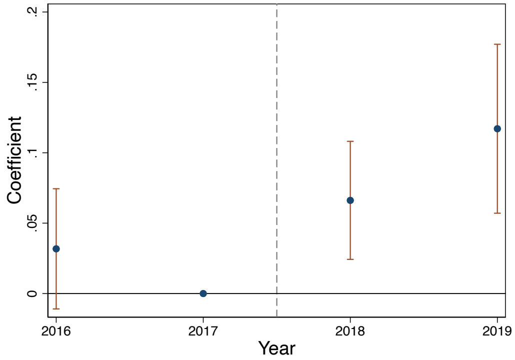
$$\log(\text{Faculty}/\text{Student}_{jt}) = \alpha_j + \alpha_t + \beta_t \cdot \text{FiesReliance}_j + \epsilon_{jt}$$



- ▶ FIES reliance ↑ 1 sd ⇒ Faculty-student ratio ↑ 8%

Which degrees have incentive to increase screening?

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- Expected profits from each loan student:

$$\pi_i = \text{tuition} - \text{marginal cost} - \text{expected penalty}$$

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Measuring exposure

- **Dropout risk:**

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- **Outcome:** FIES Cutoff

  → Negative correlation between scores and dropout/default

Event study

$$\text{FiesCutoff}_{jt} = \alpha_j + \alpha_t + \beta_t \cdot \text{DropoutRisk}_j + \epsilon_{jt}$$

FIES cutoff increased in high-dropout degrees

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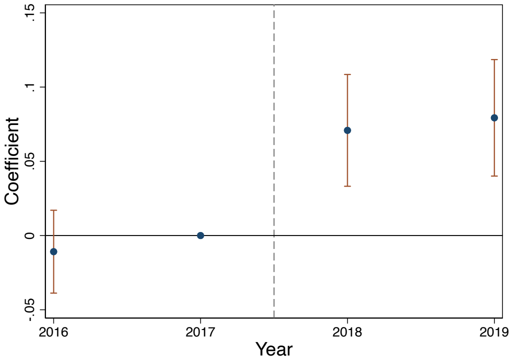
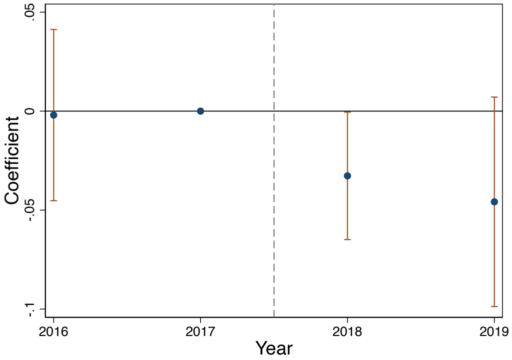


- Dropout risk ↑ 1 sd ⇒ FIES Cutoff ↑ 0.08 sd

High-dropout degrees less likely to stay in FIES

$$\text{HasAnyLoan}_{jt} = \alpha_j + \alpha_t + \beta_t \cdot \text{DropoutRisk}_j + \epsilon_{jt}$$



- Dropout risk ↑ 1 sd ⇒ Has any loan ↓ 4pp (7%)

Takeaways

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1. Degrees more reliant on FIES:
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2. Degrees with high dropout risk:
   - Increased sorting (FIES cutoff)
   - More likely to opt-out of the loan program

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(a) Incorporate trade-offs into unified welfare measure

(b) Predict equilibrium outcomes of counterfactual policies

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(a) Incorporate trade-offs into unified welfare measure [In Progress]

(b) Predict equilibrium outcomes of counterfactual policies ✓

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Structural Model

The model in a nutshell

1. Supply: Colleges choose price, loan cutoff, quality to maximize profits
2. Demand: Students choose a degree to maximize utility

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Demand: Degree choice

- Market: All students who took ENEM (centralized exam) in each year t
- Choice set: all private degrees in student's region Selectivity
- Students choose a degree (or the outside option $j = 0$) to maximize utility:

$$U_{ijt} = \beta_i^h \mathbf{h}_j + \alpha_{iL_{ij}} p_{jt} + \xi_{ijt}$$

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- $\mathbf{h}_j$ are fixed degree characteristics
- β_i^h represents preference heterogeneity

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- Prices (p_{jt})
- Price sensitivity (α) depends on whether the student has a loan (L_{ijt})
  - → Subsidized interest rates
  - → Alleviate credit constraints
  - → Some students expect to not pay back

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- ξ_{ijt}: demand shock
- Parameterization: $\xi_{ijt} = \gamma_j + \gamma_{rt} + \xi_{jt} + \epsilon_{ij}$
- $\epsilon_{ij} \overset{iid}{\sim}$ Extreme Value Type I
- γ: fixed effects

Student loan allocation

Supply: Colleges choose price, quality, cutoff to maximize net profits

$$\max_{p,q,\bar{r}} \overbrace{\left[p - c(q,\bar{r})\right] \cdot s(p,\bar{r})}^{\text{profits}} - \overbrace{\theta \cdot p \cdot d(p,q,\bar{r})}^{\text{expected penalty}}$$

- p : price
- $\bar{r}$: loan cutoff
- q : quality
- $s(p,\bar{r})$: market share
- $c(q,\bar{r})$: marginal cost
- $d(p,q,\bar{r})$: expected dropout
- θ : penalty rate

Marginal costs: Details

Dropout depends on cutoff, quality

- Student i drops out from degree j if:

$$d_{ijt} = \mathbb{1}\{f(q_{jt}, r_i) + \Delta\delta_{it} \geq 0\},$$

  - q_{jt}: quality
  - r_i: score
  - ν: parameter
  - ν: student-level iid dropout shock

Estimation: Method of moments

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Moment: Enrollment discontinuity across loan eligibility cutoffs

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- Dropout function

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- Marginal cost function

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Results

Welfare

$$\text{Welfare} = CS + \Pi + T$$

- CS: Consumer surplus
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- CS: Consumer surplus
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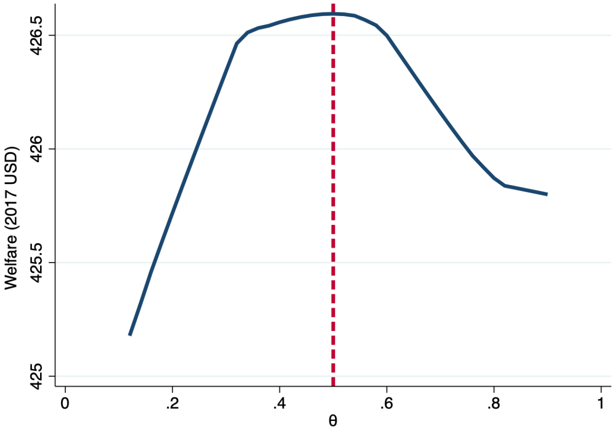
- Π: Profits
- T: Government losses due to default
  - Assumption: All students who dropout default the full amount of their loans

Optimal penalty is 50%



Conclusion

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Descriptive evidence: Following a skin-in-the-game policy implemented in Brazil in 2017, colleges:

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Next steps: Incorporate student-level default data into the analysis

Thank you!

Marginal costs depend on cutoff, quality

$$c_{jt}(q_{jt}, \bar{r}_{jt}) = \Gamma(q_{jt} - \gamma_{jt})^2 + R(\bar{r}_{jt} - \upsilon_{jt})^2 + \omega_{jt}$$

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  - Government imposes minimum cutoff, quality requirements
  - Demand might be affected in the long term (prestige etc.)

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  - Providing quality is costly
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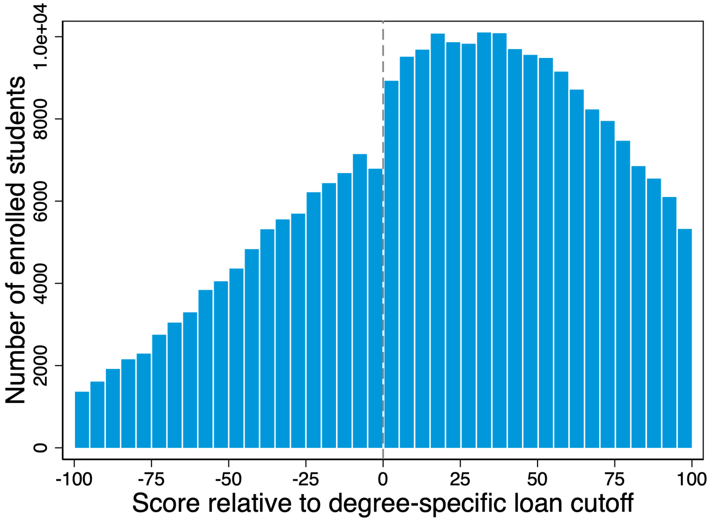
  → $\gamma_{jt}, \upsilon_{jt}$ estimated to match observed quality, cutoffs

Structural Estimation | Model: Supply

Students are more likely to enroll if a loan is available



Structural Estimation

Dropout score

Structural Estimation

Dropout quality

Structural Estimation

Skin-in-the-game reform

$$penalty_j = 0.16 + 0.025 \cdot \frac{x_j - mean(x)}{sd(x)}$$

$$x_j = \frac{1}{2}\frac{default_j - mean(default)}{sd(default)} + \frac{1}{2}\frac{dropout_j - mean(dropout)}{sd(dropout)}$$

- The penalty is capped between 10% and 25%.

Back

The Allocation of Student Loans

- The allocation of student loans is given by:

$$L_{ij} = \begin{cases} 1, & \textit{if } B_i = 1 \text{ and } r_i \geq \bar{r}_{jt} \\ 0, & \textit{if } B_i = 0 \text{ or } \quad r_i < \bar{r}_{jt} \end{cases}$$

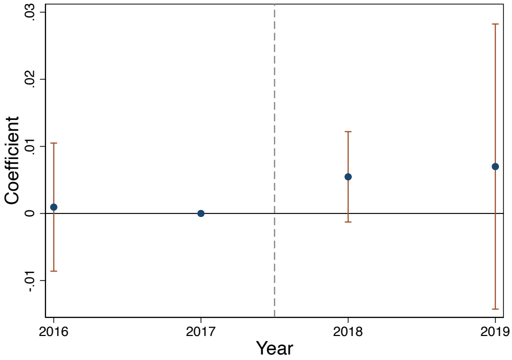
  - B_i : loan take-up indicator
  - $\bar{r}_{jt}$: cutoff to receive a loan in degree j in year t

- $\rho(\mathbf{x}_i) \equiv P(B_i = 1|\mathbf{x}_i)$ is a known function
  - Up to parameters to be estimated

Back

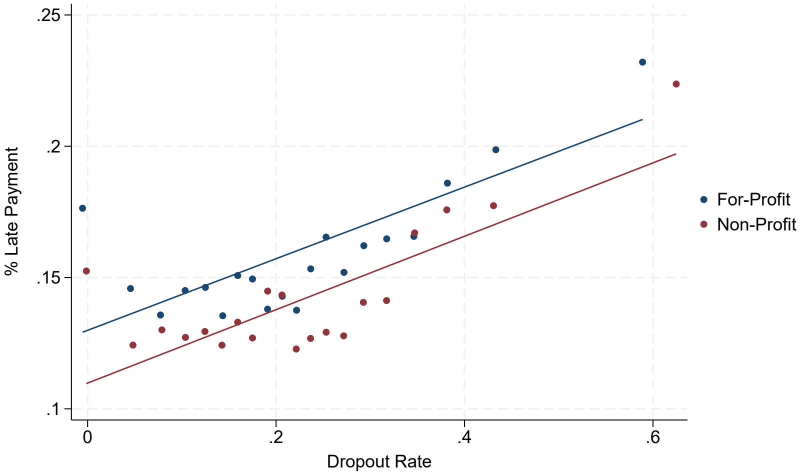
No significant effects on dropout rates

$$\text{DropoutRate}_{jt} = \alpha_j + \alpha_t + \beta_t \cdot \text{DropoutRisk}_j + \epsilon_{jt}$$



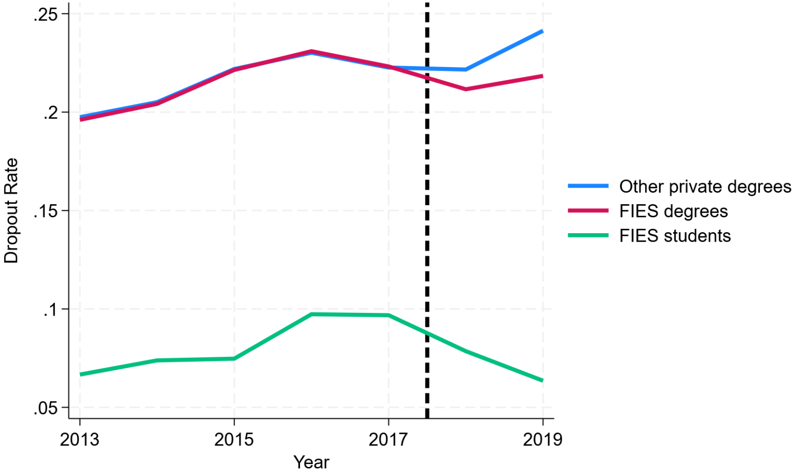
Cutoff

Dropout and default are positively correlated



Back

How did the policy impact dropout rates?



FIES Degrees