Intergenerational Transmission of Human Capital

Following Peru's 1996 Higher-Education Deregulation

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Motivation

- For-profit universities have expanded rapidly in developing countries, often with limited regulation.
- Quality varies widely, raising concerns about labour market returns and long-term impacts.
- Key question: Does liberalisation improve access at the cost of quality and opportunity—especially across generations?

This paper

- Studies Peru's 1996 reform that authorised for-profit universities.
- Uses nationally representative data to estimate causal effects of for-profit higher education.
- Focuses on both individual labour market outcomes and intergenerational impacts on children's education.
- Addresses whether observed disadvantages are causal or driven by selection.

What I do

- Exploit quasi-experimental variation from Peru's reform to compare exposed and non-exposed cohorts.
- Use machine learning (Random Forest) to estimate propensity scores for for-profit attendance.
- Construct synthetic control groups for robust causal inference.
- Analyse effects on parents' labour market outcomes and children's educational attainment.

What I find

- For-profit universities expanded access for marginal students.
- Graduates of for-profits earn less, face higher informality, and have weaker labour market attachment than peers from public or non-profit universities.
- Children of for-profit graduates complete about one year less schooling than those whose parents attended traditional universities.
- The trade-off: broader participation, but persistent disadvantages across generations.

Contributions

- Empirically,
  - First causal evidence on for-profit higher education's intragenerational and intergenerational effects in a developing country (Lovenheim & Smith, 2023; Salto & Levy, 2021; Villaizan, 2022).
  - Shows liberalisation expands access but reinforces inequality and quality gaps (Armona et al., 2022; Cellini Riegg & Turner, 2019).
- Theoretically,
  - Highlights the limits of market-driven expansion for social mobility and the need for quality assurance (González et al., 2015; UNESCO, 2004; Zhong, 2013).

Outline

Background: Peru's 1996 Neoliberal Reform

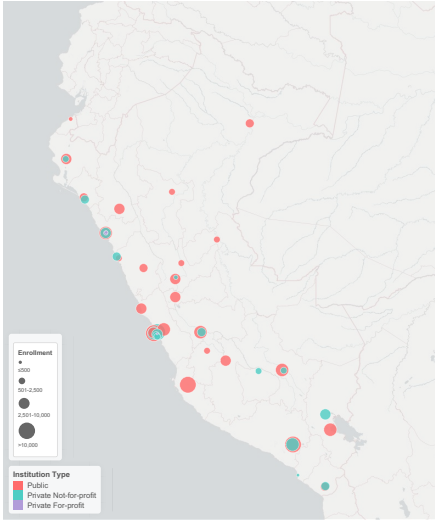
- In 1996, Peru enacted DL 882, liberalising education and authorising for-profit universities (Balarin, 2015).
- Reform aimed to modernise and expand supply amid fiscal constraints, granting tax incentives to private investors (Balarin, 2016; Balarin & Escudero, 2018).
- Regulation was minimal: market forces were expected to ensure quality, but no independent oversight was created (Balarin & Rodríguez G., 2025; Yamada & Nelson, 2016).
- Private universities shifted from elite focus to serving middle and lower-income households through low-fee institutions (Balarin & Escudero, 2018).
- Admission standards declined, especially in private institutions, while public universities remained more selective and low-cost (Chávez, 2015; Díaz, 2008; Lavado et al., 2014).

Background: Expansion and Consequences

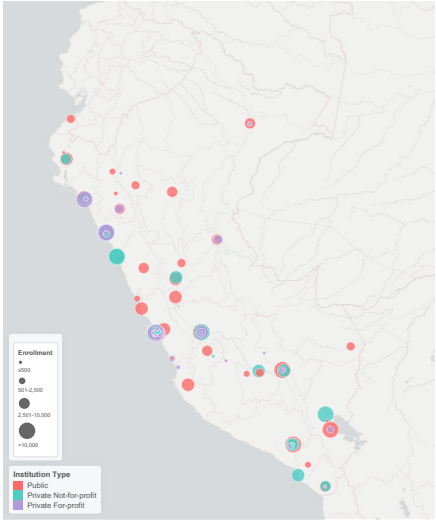
- Number of universities rose from 65 (1996) to 150 (2014); for-profit institutions drove most of the growth (Manky & Dolores, 2021).
- Undergraduate enrolment surged by 288%, with for-profits capturing nearly 40% of students by 2014 (Benavides & Watanabe, 2024).
- Expansion prioritised vocational training and labour market preparation over research and critical inquiry (Cuenca, 2015; Thapa et al., 2022).
- Unintended consequences: lower academic standards, professional underemployment, and persistent barriers for low-income students (Castro & Yamada, 2013; Villaizan, 2022; Yamada et al., 2012).
- Regulatory reforms (SUNEDU, 2014) revealed widespread deficiencies, especially among for-profit universities; recent counter-reforms have weakened oversight again (Benavides & Watanabe, 2024; Cuenca, 2024; Sunedu, 2024; Zavaleta M. & Alarcón, 2023).

University expansion in Peru (considering enrolment)

1995

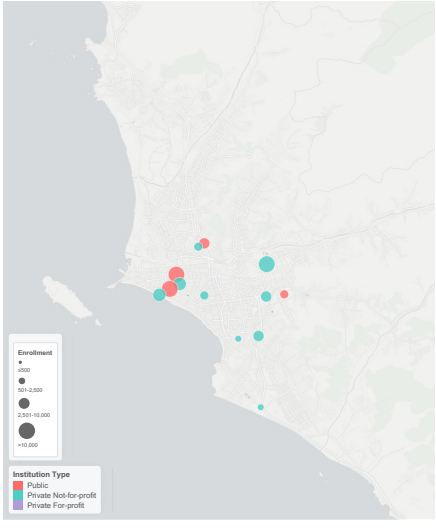


2014



In Lima Metropolitan...

1995



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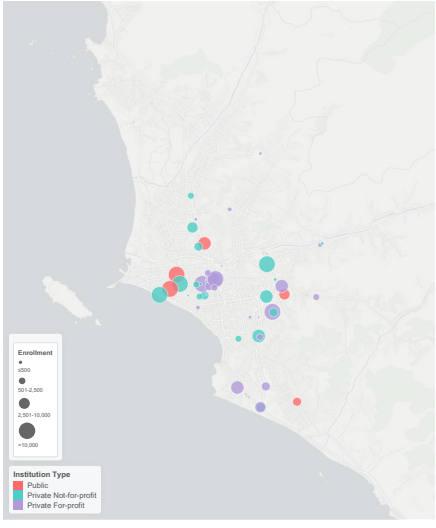
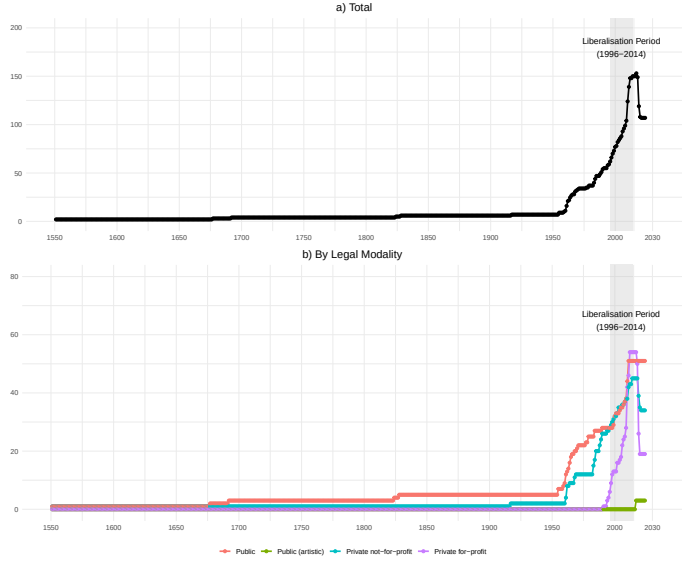
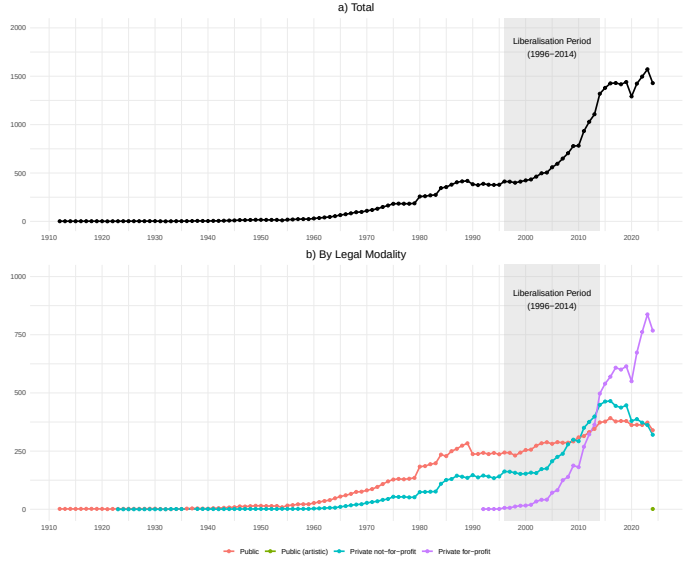


University expansion



And enrolment



Outline

Data: Sources and Sample

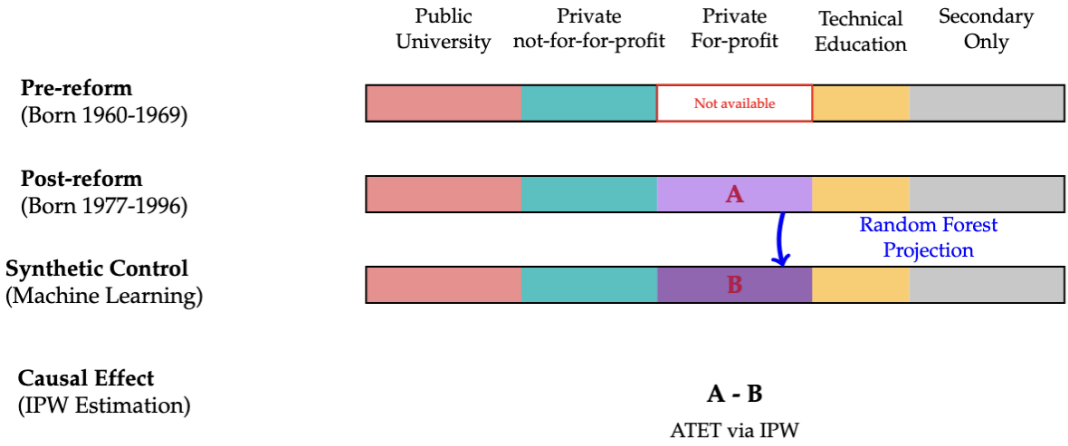
- Data: Peru's National Household Survey (ENAHO, INEI), nationally representative, 2014–2024.
- Coverage: educational attainment, labour market outcomes, demographics; analysis uses survey weights and stratification.
- University type: assigned by cross-referencing ENAHO with SUNEDU records—public, private non-profit, and private for-profit (authorised since 1996).
- Two generations: household heads (parents) and their co-resident children; all children included.
- Parental cohorts:
  - Pre-reform (born 1960–1969): completed education before for-profit universities.
  - Post-reform (born 1977–1996): eligible for for-profit universities.
- Parental sample: completed at least secondary education and currently employed.

Data: Outcomes and Measurement

- Parental outcomes:
  - Informal employment (ILO definition)
  - Underemployment (visible/invisible)
  - Log hourly wages (deflated to 2024 Lima prices)
- Children's outcome: highest educational attainment (harmonised to years of schooling)
- All children analysed individually; standard errors clustered at household level
- Rich background controls: gender, grandparents' education, indigenous language, disability, household composition, and geographic indicators

Outline

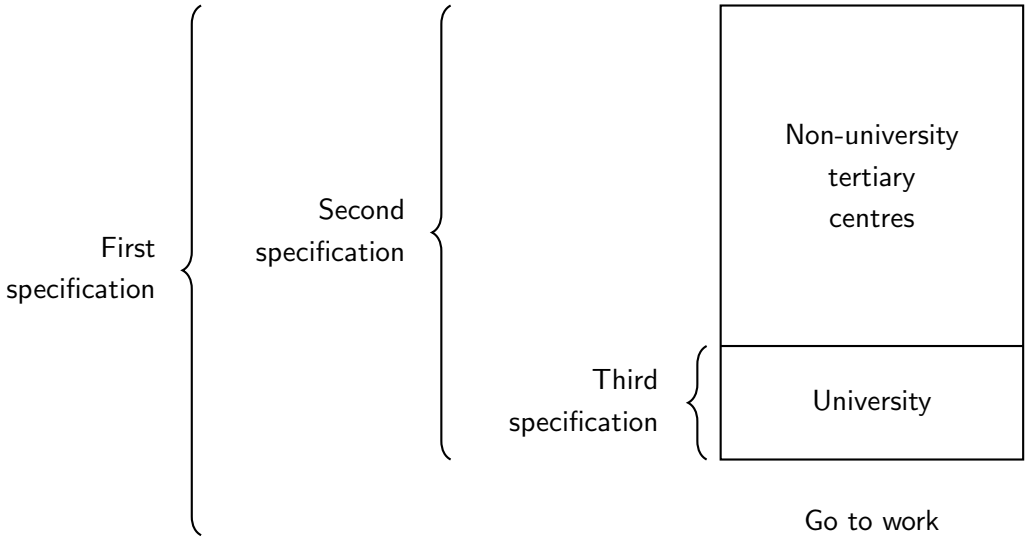
Econometric Strategy: Graphical Representation



Step 1: Predict For-Profit Attendance

- Estimate $\hat{p}_{i,s} = \Pr(T_i = 1 \mid X_i, S_i = s)$ using Random Forest for each specification $s \in \{1, 2, 3\}$.
- Sample: Post-reform cohorts (born 1977–1996) eligible for higher education.
- Covariates: sex, birth year, grandparents' education, indigenous language, district rurality at birth, department-of-birth fixed effects.
- **Three specifications** capture different margins:
  - **Spec 1 (Market Entry):** For-profit vs. all post-secondary alternatives
  - **Spec 2 (Substitution):** For-profit vs. technical + other universities
  - **Spec 3 (Quality Premium):** For-profit vs. other universities only
- Only pre-treatment variables to avoid post-HE bias.

Step 1: Predict For-Profit Attendance



Step 2: Construct Specification-Specific Counterfactuals

- Project RF models onto *pre-reform cohorts* (born 1960–1969, aged 27 in 1996).
- Generate counterfactual propensities $\hat{p}_{i,s}^{\text{pre}}$ for each specification.
- **Specification-consistent projection:**
  - Spec 1: All pre-reform individuals with secondary education
  - Spec 2: Pre-reform individuals with technical education
  - Spec 3: Pre-reform university graduates only
- Apply common support: retain only $\hat{p}_{i,s} \in [0.05, 0.95]$.
- Creates synthetic control groups of individuals who would likely have chosen for-profit HE under each comparison framework.

Step 3: Estimate ATET via Specification-Specific IPW

- Apply Inverse-Probability Weighting for each specification s:

$$w_{i,s} = \begin{cases} 1 & \text{if } T_i = 1 \text{ (post-reform treated)} \\ \frac{\hat{p}_{i,s}}{1-\hat{p}_{i,s}} & \text{if } T_i = 0 \text{ (pre-reform synthetic control)} \end{cases}$$

- Estimate specification-specific Average Treatment Effect on the Treated:

$$\text{ATET}_s = \mathbb{E}[Y_i(1) - Y_i(0) | T_i = 1, S_i = s]$$

- Focuses on realized effects for those who responded to 1996 reform.
- Robustness: IPWRA and alternative estimators across specifications.

Step 4 & 5: Parent and Intergenerational Effects

Parent Generation (Step 4):

- Outcomes: informal employment, underemployment, log hourly wages
- Controls: gender, grandparents' education, indigenous language, disability, household composition, partner presence

Children Generation (Step 5):

- Intergenerational model following maurin2008:

$$\text{ATET}_s = \mathbb{E}[Y_i^c(1) - Y_i^c(0) | T_i = 1, S_i = s]$$

- Outcome: children's educational attainment (years)
- Additional controls: child age, gender, disability, indigenous language
- Same IPW framework maintains causal identification across generations
- Specification-specific analysis reveals different transmission mechanisms

Outline

Parental labour–market outcomes

Sp. 1: Market Entry Effect			
	Informal employment	Underemployment	Log hourly wage
Treated vs. control	–0.0548***	–0.0947***	0.1913***
	(0.0028)	(0.0024)	(0.0052)
Control-group mean (POmean)	0.4084	0.2366	2.5718
Observations	3 400	3 400	3 368
Sp. 2: Substitution Effect			
Treated vs. control	0.0518***	–0.0468***	–0.0151***
	(0.0017)	(0.0016)	(0.0037)
Control-group mean (POmean)	0.3017	0.1887	2.7781
Observations	6 093	6 093	6 027
Sp. 3: University Quality Premium			
Treated vs. control	0.1218***	0.0099***	–0.2176***
	(0.0008)	(0.0006)	(0.0016)
Control-group mean (POmean)	0.2318	0.1320	2.9806
Observations	8 514	8 514	8 431

Children outcomes

Sp. 1: Market Entry Effect	
	Children's schooling (years)
Treated vs. control	–1.9212***
	(0.4831)
Control-group mean (POmean)	4.8331
Observations	747
Sp. 2: Substitution Effect	
Treated vs. control	–1.4026***
	(0.4533)
Control-group mean (POmean)	4.3146
Observations	1 396
Sp. 3: University Quality Premium	
Treated vs. control	–0.9881**
	(0.4279)
Control-group mean (POmean)	3.9001
Observations	1 982

Outline

Conclusions

- Access-Quality Trade-off: For-profit universities expanded participation but delivered lower-quality education with persistent intergenerational costs.

- Key Findings:
  - Market Entry: Parent gains vs. secondary education but children lose 1.9 years schooling
  - Substitution: Mixed effects vs. technical education with 1.4 years children's penalty
  - Quality Premium: Clear deficits vs. other universities across all outcomes

- Peru's liberalization created *stratified* rather than *democratized* higher education—expanding access while reinforcing inequality across generations.

- Educational expansion without quality assurance produces nominal democratization. Inclusive development requires regulatory frameworks prioritizing both access and quality.

Thank you!

Questions and feedback welcome.

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