# Closing Gaps in Higher Education Trajectories

Direct and Indirect Effects of Information and Personalized Counseling

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#### **Implementation Leaders**









### **Implementation Team**



#### Inequality in higher education trajectories

- Investment in higher education is very unequal across SES groups: both in developed and developing countries.
  - Funding:
     Dynarski, 2003; Van der Klaauw, 2002; Long,
     2004: Bellev and Lochner, 2007; Solis, 2017.
  - Behavioral barriers:
     Lavecchia et al., 2016; French and Oreopolous, 2017; Carrell and Sacerdote, 2017.

#### Other countries

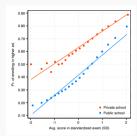
- Information:
   Dinarsky et al., 2019; Hastings et al., 2016;

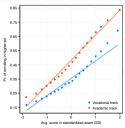
   Larrocau et al., 2024
- Social networks influence:
   Altjmed et al., 2021; Barrios-Fernandez, 2021;
   Barrios-Fernandez et al., 2023.
- How to efficiently tackle inequality in post-secondary education trajectories?
  - Low-touch: traditional information interventions find none to modest effects

Notable exceptions: Hoxby and Turner, 2013; Dynarski et al., 2019.

 High-touch: personalized support much more effective, but expensive.
 Bettinger et al., 2012: Carrell and Sacerdote, 2017: Mulhern, 2023

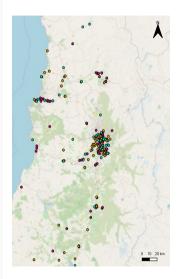
 Can social spillovers amplify the effects of college-going interventions?





#### This paper...

- 1. Survey senior students in vocational track high schools at the beginning/end of the school year ( $\sim$  40% of high school students).
- Combine survey and admin data with a RCT
   (AEARCTR-0007303) to evaluate two interventions designed to
   help students to make autonomous and informed decisions about
   their future.
  - 2.1 Information provision (74):
    - Funding availability, average differences in labor market outcomes, heterogeneity in HE, application procedures.
    - Maximize salience.
    - Customized information.
  - 2.2 Personalized counseling (74):
    - Personalized support: high school visits and phone calls to a random set of four students per class.
    - Can social spillovers among <u>classmates</u> improve cost-effectiveness of college going interventions?



#### This paper...

- 1. Survey senior students in vocational track high schools at the beginning/end of the school year ( $\sim 40\%$  of high school students).
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#### **Preview of Results**

#### We first descriptively show that:

- 1. Most students in vocational high schools plan to attend higher education ( $\sim$  91%).
- 2. They face large information frictions:
  - Little knowledge of funding opportunities: application procedures, requisites, and generosity of benefits
  - Little knowledge of labor market trajectories: underestimate earnings associated with higher education.

#### We then rely on a RCT to show that:

- 1. Information alone improves understanding of the higher ed system ( $\uparrow 0.08\sigma$ ) but does not increase funding applications or enrollment in higher education.
- 2. Information + personalized counseling improve perceived/actual understanding of the higher ed system (0.28σ), pr of registering/taking the college admission exam (13pp), applications for funding (11pp) and applications/enrollment in higher education (7pp).
- 3. Personalized counseling has large social spillovers: especially among "close friends" of treated students.

Barrios Fernández et al. (2024) Closing Gaps in HE June 20, 2024

#### **Outline**

Local Institutions

Survey: Understanding Barriers to Access HE

Our Interventions

**Empirical Strategy** 

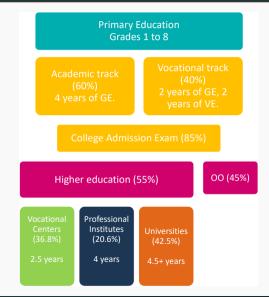
Results & Discussion

Final Remarks

## Local Institutions

#### **Chilean Education System**

- High school tracking does not depend on academic performance: centralized DA.
- College admission exam is free for students from subsidized schools
- Higher Ed. Admissions:
  - Decentralized: VC and IP.
  - Centralized (DA): Universities.
- High tuition fees, but generous funding:
  - Free higher education for students in the bottom 60% of the income distribution.
  - Scholarships and subsidized loans for the rest

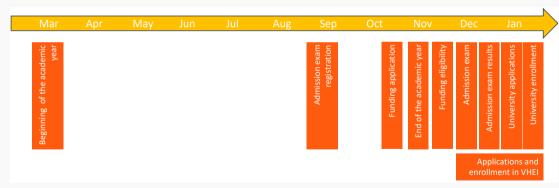


#### **Applications to Higher Education**

#### Steps to apply to higher education:

- Registration for the admission exam (Aug-Sep).
- Taking the admission exam (Dec).

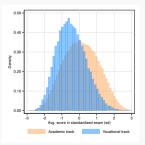
- Applying for funding (Oct-Nov).
- Applying/enrolling in higher ed (Dec-Feb).



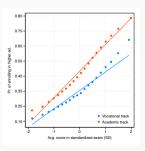
#### **Vocational Secondary Education**

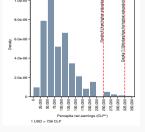
- Represent 40% of high school students and typically come from low-SES backgrounds.
- Less likely to attend higher education, even though many would likely benefit (Aguirre, 2021; Zimmerman, 2014):
  - Lack of interest (underestimating benefits).
  - Lower academic potential.

- Credit constraints (funding).
- Costly applications (complex system).



(a) Test scores distribution





(b) Pr. of attending HE (c) Income Distribution

Closing Gaps in HE

## **Survey: Understanding Barriers**

to Access HE

Local Institutions

Survey: Understanding Barriers to Access HE

Our Interventions

**Empirical Strategy** 

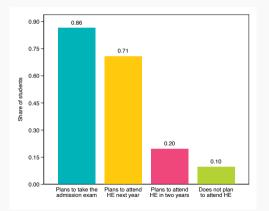
Results & Discussion

#### Schools in the Study are similar to other Vocational Schools in Chile

	Schools in the Study (1)	All Vocational Schools in the Country (2)	All Schools in the Country (3)
Public School	0.424	0.508	0.263
Voucher School	0.576	0.492	0.572
Rural	0.029	0.104	0.050
Share of Female Students	0.488	0.490	0.510
Average Age	17.639	17.695	17.447
School SES Level	1.604	1.488	2.726
SIMCE Math Score	233.619	231.741	266.957
SIMCE Reading Score	232.043	231.150	251.986
Observations	229	978	3467

#### 1. High Interest in Higher Education

- 91% of the students plan to enroll in higher education in the next two years.
- 63% of them would like to attend university.



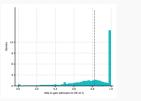
0.80 0.63 0.60 Share of students 0.37 0.20 University Vocational Higher Ed

(a) Interest in Higher Ed.

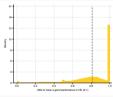
(b) Interest in HEI

## 1. High Confidence in Ability to Succeed in HE

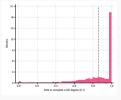
- Most students believe they would be able to gain admission, perform well, and complete HE (0.8).
- They, however, do not necessarily believe they are better prepared for HE than their classmates (0.6).



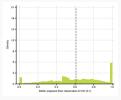
(a) Ability to be



(b) Ability to perform well



(c) Ability to complete HE



(d) Better prepared than classmates

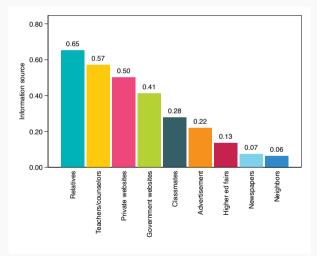
#### 2. Important information frictions

Independently on how well students think they know the system, they have little knowledge of funding opportunities, application procedures, and to higher education returns.

Area of Knowledge						
	Financial Aid			Labor Markets Returns		
	Share in each perceived knowledge category	Share of correct answers	Funding knowledge index	Share in each perceived knowledge category	Share of correct answers	Labor market knowledge index
	(1)	(2)	(3)	(4)	(5)	(6)
Very Little	0.199	0.378	-0.110	0.157	0.319	-0.081
A Little	0.507	0.394	-0.003	0.424	0.332	0.012
Well	0.258	0.403	0.062	0.340	0.332	0.006
Very Well	0.036	0.420	0.191	0.079	0.338	0.073
Observations	8328	8328	8328	8328	8328	8328

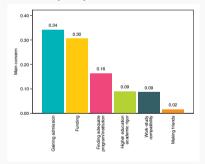
## 2. Important information frictions

Main sources of information:

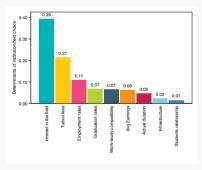


### 3. Do not fully understand their funding opportunities

- Most common concerns:
  - Gaining admission to a HEI (34%).
  - Funding (30%).
- Most important factors to choose college/field are:
  - Interest in area of study (39%).
  - Tuition fees (21%).



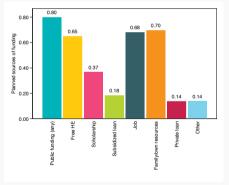




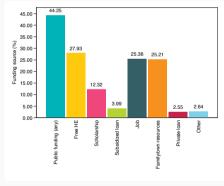
(b) College & Major Choice

## 3. Do not fully understand their funding opportunities

- Most students are aware of financial aid programs: 80% of them plan to use some type of public support.
- They are not fully aware of the generosity of these programs: plan to fund less than half of their costs with public support (44%)



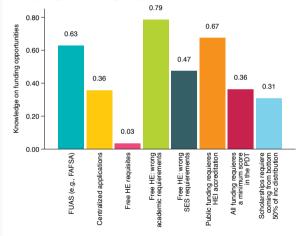




(b) Planned Funding by Source (%)

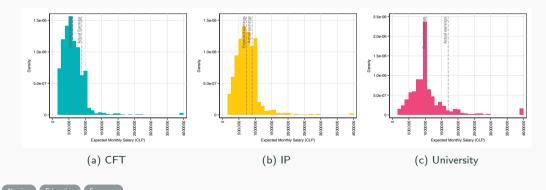
## 3. Students do not fully understand their funding opportunities

- Overestimate application costs: believe they need to apply independently to each program (64%).
- Overestimate academic (80%) and SES (50%) requirements of the most generous funding program.



## 4. Students underestimate avg. earnings

- Biased and imprecise beliefs on average earnings.
- $\bullet$  Expected vs actual earnings for business degrees in CFT, IP, and University are underestimated by 20% to 40% .



#### **Summary**

Large information frictions: less than half of students in our sample believe they have a good understanding of the HE system (uncertainty).

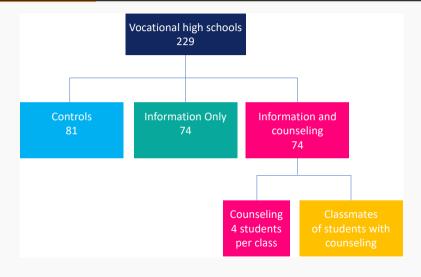
- 1. They are aware of the existence of funding programs and intend to use them.
- 2. However, they overestimate the academic and SES requirements of the most generous funding program: free HE.
- 3. They also have biased and imprecise beliefs on the earnings of higher education graduates (some differences across fields).

Nevertheless, huge interest in attending higher education (90%): differences in enrollment do not seem to come from lack of demand:

- 1. Behavioral barriers: e.g., inattention to relevant dates such us exam registration deadlines.
- 2. Complex/costly tasks: e.g., filling funding applications (FUAS).

# Our Interventions

#### **Experiment Design**





#### **Information packs**

Students received information packs in the middle of their high school senior year highlighting:

- Relevant dates
- Eligibility for funding.
- Average differences between individuals with/without higher education: earnings and employment.
- Examples of heterogeneity in potentially relevant fields: based on HS common trajectories.
- Sources of information to compare HEI and programs (graduation rates, duration, earnings, employment).







#### Information packs: Eligibility for funding



- Higher education could be free for you.
- Higher education, scholarships and subsidized loans.
- You can apply to all these benefits at once.
- Fill the FUAS form at www.fuas.cl

#### Information packs: Avg. differences



- Average earnings of individuals with complete primary, secondary and tertiary ed.
- Average employment of individuals with complete primary, secondary and tertiary ed.

### Information packs: Heterogeneity





- Statistics on common programs at the high school: retention, time to graduation, employment, earnings, earnings range.
- Link to the government website that publishes these statistics.
- Table to fill the same statistics for programs at different institutions.

### Information packs: Application process



- 1. Prepare your funding application.
- Register for the college admission exam: needed for uni.
- 3. Look for the right program and institution for you.
- 4. Apply to higher education: centralized system vs descentralised system.
- 5. Enroll in higher education.

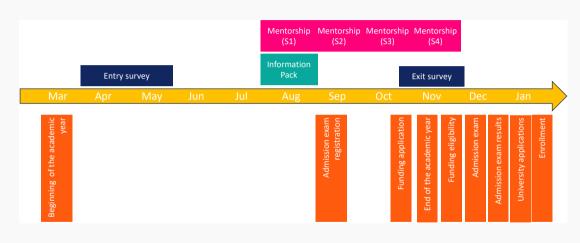
#### **Personalized Counseling**

The intervention is in charge of FL school counselors during the final semester of their high school senior year:

- Trained counselors in the implementation of a program co-designed with the FL.
- Four group sessions:
  - Session I: Aspirations and barriers for future education.
  - Session II: Choosing a college and major/program.
  - Session III: Applying for funding.
  - Session IV: Applying to higher education.
- Five phone calls: follow-up and reinforce key messages of the sessions.



#### **Implementation Timeline**



Return

#### Compliance

#### Panel A: Information Intervention

	N. of Students Allocated (1)	Sh. Answering the Survey (2)	Sh. Reporting to have received the letter (3)
Information	8,748	0.516	0.461
Information and Mentoring	8,796	0.484	0.485

#### Panel B: Mentorship Program

Total students assigned to	Share of Participants in at least	Share of Participants completing four
the program	1 session	sessions
(1)	(2)	(3)
756	0.636	0.222

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Information and Mentoring

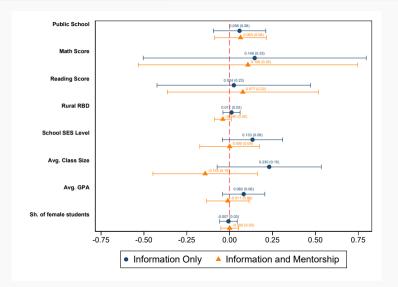
**Empirical Strategy** 

## **Empirical Strategy**

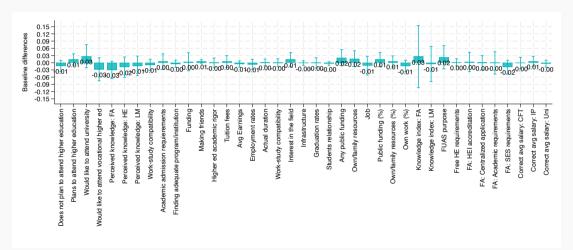
$$Y_{is} = \beta_0 + \beta_1 I_{is} + \frac{\beta_2}{\epsilon_2} CPC_{is} + \frac{\beta_3}{\epsilon_3} PC_{is} + \delta X_{is} + \varepsilon_{is}$$
 (1)

#### Where:

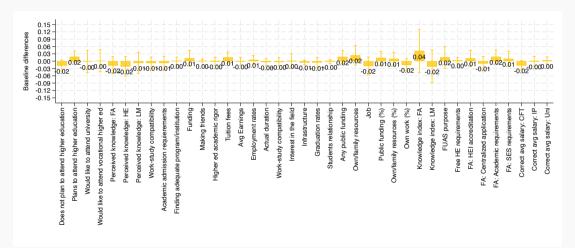
- $l_{is}$  is 1 if student i attends school s assigned to the information only treatment group.
- $CM_{is}$  is 1 if student i has classmates in the personalized counseling program, but does not receive the counseling herself.
- $M_{is}$  is 1 if the student i is assigned to the personalized counseling program.
- $X_{is}$  is a vector of individual and school controls (only to gain precision).
- \* Standard errors clustered at the randomization level (i.e., school network).
- \* Randomization worked.



Balance in entry survey answers: information only vs control schools.



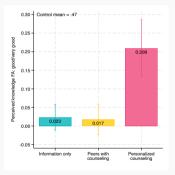
Balance in entry survey answers: personalized counseling vs control schools.



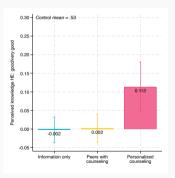
# Results & Discussion

#### 1. Information + counseling improves perceived knowledge

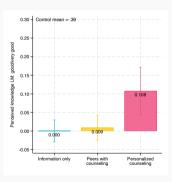
How well do you know the following aspects of the higher education system?



(a) Financial Aid



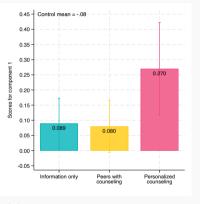
(b) Applications to Higher Ed.



(c) Labor Markets Returns

### 2. Information + personalized counseling also improves actual knowledge:

Knowledge index using principal component analysis (PCA) based on survey answers:



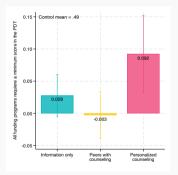
(a) Changes in Knowledge Index

Improvement in knowledge driven by financial aid and labor market. Details

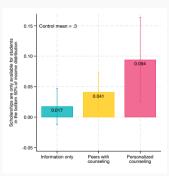
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### 2. Improvement in knowledge driven by a better understanding of financial aid

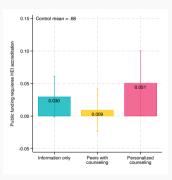
Students improve their understanding of funding requirements:



(a) Academic requirements



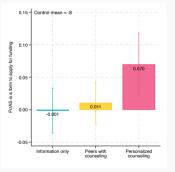
(b) Socioeconomic requirements



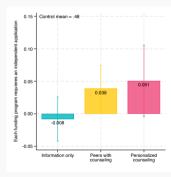
(c) Institutional requirements

### 2. Improvement in knowledge driven by a better understanding of financial aid

Students improve their understanding of how funding applications work:



(a) FUAS purpose (FAFSA)

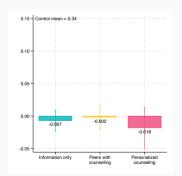


(b) Centralized applications for funding

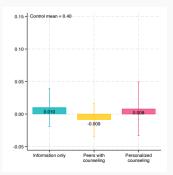
### 2. Improvement in knowledge NOT driven by better understanding of labor mkt

Students do not improve their perceptions of higher ed graduates earnings:

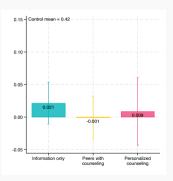
$$Deviation = \frac{|E(w) - \bar{w}|}{\bar{w}}$$



(a) CFT graduates



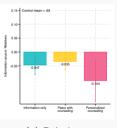
(b) IP graduates



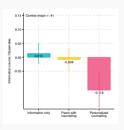
(c) Uni graduates

#### 3. Information + counseling changes the sources of information

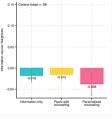
Most important sources of information:



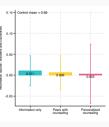
(a) Relatives



(b) Classmates



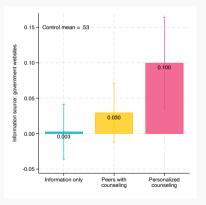
(c) Neighbors



(d) Teachers

#### 3. Information + counseling changes the sources of information

Most important sources of information:



0.15 Control mean = .45 0.10 0.05 0.036 0.00 -0.010 -0.05 Information only Peers with Personalized counseling counseling

(a) Official websites

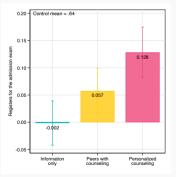
(b) Teachers

#### Effects on knowledge of the system

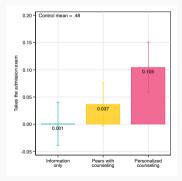
- 1. Information + personalized counseling improves perceived and <u>actual</u> knowledge.
- 2. Information alone improves <u>actual</u> knowledge but NOT perceived knowledge.
- 3. No evidence of social learning.

#### 4. Information + counseling increases pr of taking the admission exam

- Information + counseling: ↑ 13 pp (20%) in pr. of registering and ↑ 10 pp (22%) in pr. of taking the admission exam.
- Peers of students in the counseling program: ↑ 6 pp (9%) in pr. of registering and ↑ 4 pp (8%) in pr. of taking college admission exam.



(a) Pr. of Registering for PDT

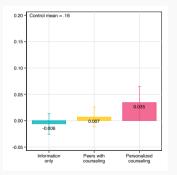


(b) Pr. of taking the PDT

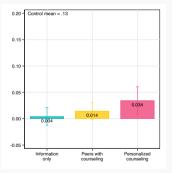
#### 4. Information + counseling increases pr of taking the admission exam

Increase in the pr of taking the admission exam driven by students scoring in the first three quintiles of the exam distribution:

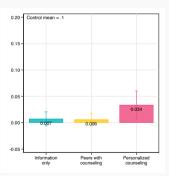
•  $y_i$ : 1 if student i takes the admission exam and scores in quintile q; 0 otherwise.



(a) Pr. of scoring in the Q1



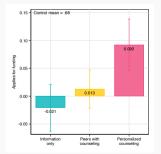
(b) Pr. of scoring in the Q2



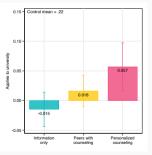
(c) Pr. of scoring in the Q3

# 5. Information + personalized counseling increases applications for funding and to university

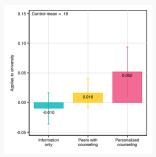
- Information + counseling:  $\uparrow$  9.2 pp (14%) in pr. of applying for funding.
- Information + counseling: ↑ 5.7 pp (25%) in pr. of applying to university, and 5.2 (27%) in pr of sending at least one valid application to university.
- No evidence of social spillovers.



(a) Pr. of Applying for Funding



(b) Pr. of Applying to University

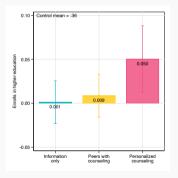


(c) Pr. of Valid Application to University

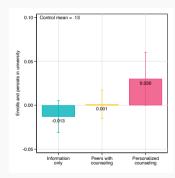
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os in HE June 20, 2024

### 6. Information + personalized counseling increases enrollment immediately after high school

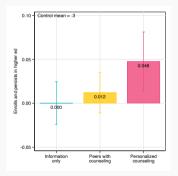


(a) Pr. of Enrolling in Higher Ed. (b) Pr. of Enrolling in University

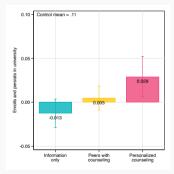


#### **6.** Information + personalized counseling effects persist over time

Students who enroll in higher education immediately after high school, re-enroll in their second year.

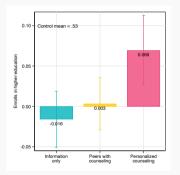


(a) Pr. of Enrolling and Persisting in Higher Ed.

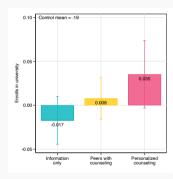


(b) Pr. of Enrolling and Persisting in University

### 6. Information + personalized counseling also increases enrollment two years after high school

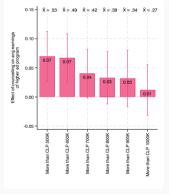


(a) Pr. of Enrolling in Higher Ed. (b) Pr. of Enrolling in University

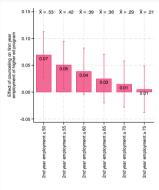


# 6. Information + personalized counseling also increases enrollment two years after high school

Increases in enrollment in higher education programs along wide parts of the "quality" distribution (earnings and employment).



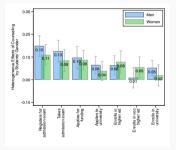
(a) Enrollment by Earning Levels



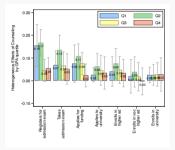
(b) Enrollment by Employment Levels

### 7. Information + personalized counseling heterogeneous effects

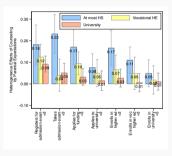
- No much difference by gender.
- Effects seem to be weaker at the very top of the academic performance distribution.
- Effects seem to be stronger for students from households with low parental expectations.



(a) Heterogeneity by gender



(b) Heterogeneity by GPA



(b) Heterogeneity by parental expectations

#### Cost effectiveness of personalized counseling

The personalized counseling program was offered to 756 students.

#### Benefits:

- Additional 52.95 students in higher education.
- Additional 26.43 students in university.

#### Costs

- Information intervention: USD 2.27 per student  $\rightarrow$  USD 1,716.12
- Personalized counseling: USD 95.57 per student  $\rightarrow$  USD 72,250.92

#### Cost per additional student in higher ed/university:

- USD 1.417.97 per additional student in higher education.
- USD 2.795.43 per additional student in university.

#### Is the program worth?

VPN: USD 3.259 per student.



#### Effects on applications and enrollment

- 1. Information + personalized counseling increase participation in college admission exams, applications to funding and to university, and enrollment in higher education.
- 2. Social spillovers in participation in admission exam, but not in university applications or higher education enrollment: relatively easy task.
- 3. Absence of social learning/support to deal with more complex parts of applications—i.e., funding applications—likely explain the lack of spillovers in enrollment.

#### Effects on friends of students receiving information + counseling

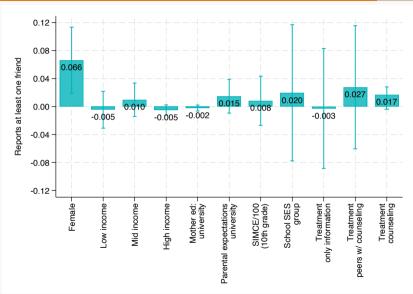
In the entry survey—pre-treatment—we asked students for their five closest classmates:

- We identified friends for  $\sim$  6,090 students (22% of our sample).
- On average, students answering this question reported 2.97 friends.
- The probability of reporting friends and the number of friends reported are balanced across treatment-control groups.

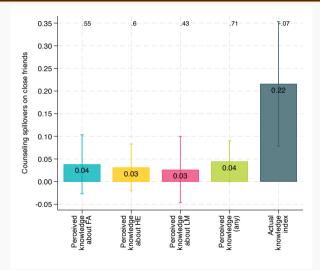
To study spillovers on friends, we focus exclusively on individuals identified as friend of someone in the survey and who do not receive the mentorship program themselves:

$$Y_{is} = \gamma_0 + \gamma_1 F M_{is} + \gamma_2 X_{is} + \varepsilon_{is}$$

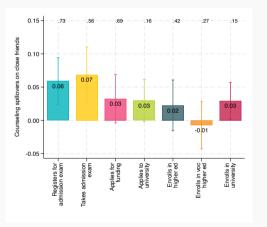
### Students reporting/not reporting friends are similar



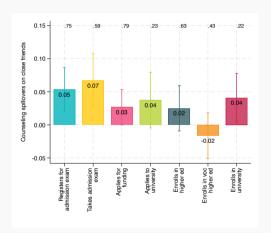
# Friends of students receiving information + counseling: $\uparrow$ perceived and actual knowledge



# Friends of students receiving information + counceling: $\uparrow$ applications and university enrollment







(b) Effects two years after HS

#### Cost effectiveness of personalized counseling

The personalized counseling program was offered to 756 students: 2.97 friends on average.

#### Benefits:

- Additional 52.95 + 44.91 students in higher education.
- Additional 26.43 + 89.81 students in university.

#### Costs:

- Information intervention: USD 2.27 per student → USD 1,716.12 + USD 18,253.07
- ullet Personalized counseling: USD 95.57 per student ightarrow USD 72,250.92

#### Cost per student in higher ed/university:

- USD 942.37 per additional student in higher education (66% of original cost).
- USD 800.24 per additional student in university (29% of the original cost).

**Final Remarks** 

#### **Final Remarks**

We evaluate two complementary interventions designed to help students from disadvantaged backgrounds to make informed decisions about their future education:

- 1. Provision of information alone improves students' understanding of the higher education system but does not change their behavior.
- 2. Provision of information and counseling improves students' understanding of the higher education system and makes them more likely to apply for funding and to attend higher education.
- 3. Strong evidence of social spillovers:
  - Social learning/support seem to be key to change trajectories in complex/uncertain environments: funding applications are complex (Bettinger et al., 2012; Dynarski et al., 2018, 2021).
  - Social spillovers are relevant for policy evaluation: made our intervention 2 to 3 times more effective!
     (Altjmed et al., 2022, Barrios-Fernandez, 2022)
  - Social spillovers might be relevant for the design of RCT.
  - Peer effect studies: definition of peer group is key: classmates vs friends.

#### **Outline**

Local Institutions

Survey: Understanding Barriers to Access HE

Our Interventions

**Empirical Strategy** 

Results & Discussion

Final Remarks

## Thanks!

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# Closing Gaps in Higher Education Trajectories

Direct and Indirect Effects of Information and Personalized Counseling

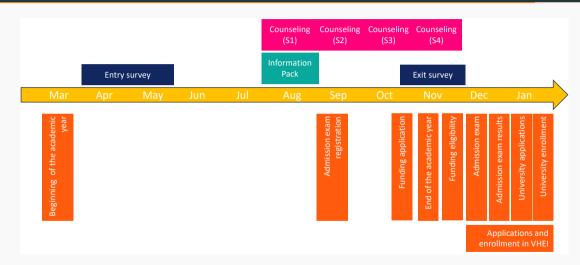
Andrés Barrios Fernández Josefina Eluchans Errázuriz Fernanda Ramírez Espinoza

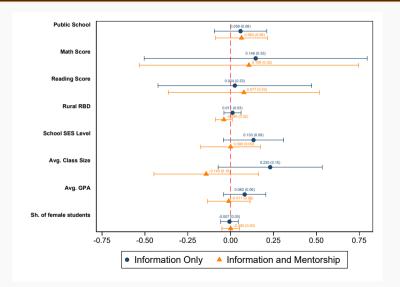
June 20, 2024

#### Schools in the Study are similar to other Vocational Schools in Chile

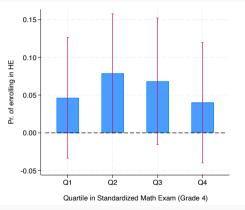
	Schools in the Study (1)	All Vocational Schools in the Country (2)	All Schools in the Country (3)
Public School	0.424	0.508	0.263
Voucher School	0.576	0.492	0.572
Rural	0.029	0.104	0.050
Share of Female Students	0.488	0.490	0.510
Average Age	17.639	17.695	17.447
School SES Level	1.604	1.488	2.726
SIMCE Math Score	233.619	231.741	266.957
SIMCE Reading Score	232.043	231.150	251.986
Observations	229	978	3467

#### **Implementation Timeline**

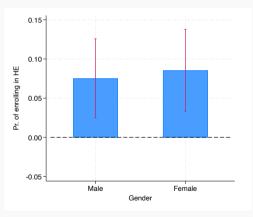




#### Heterogeneous Effects of Mentorship on HE Enrollment



(a) By Academic Performance



(b) By Gender



#### Cost effectiveness of personalized counseling

Benefits: proxy of benefits based on average earnings of different trajectories.

- High school graduates: USD 412 & employment level of 68% (CASEN, 2022).
- Higher education students: employment levels and average earnings of each degree four years after graduation from "Mi Futuro."
- VPN of differences in earnings: USD 3941 (social discount rate in Chile: 6%).

Costs: additional cost incurred in higher ed on top of costs of the program.

- Costs of the program: USD 97.85 per student.
- VPN of additional expending in higher education: USD 584.2
- VPN of average costs: USD 682.04

Benefits - Costs = USD 3.259 (ignoring fiscal externalities, general equilibrium effects, etc).



#### **Costs of information** + **counseling**

Considering the number of treated students and the size of the effects, inducing a student to enroll in higher education costs USD 2.083:

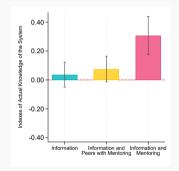
- Information (USD 2.27 per student).
- Counseling (USD 95.57 per student).
- USD 1309 each additional student in higher education

Using the discount rate that the Chilean government uses to evaluate its projects (6%):

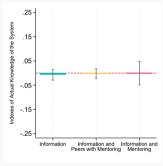
- ullet Short vocational higher ed. programs need to increase monthly salaries by  $\sim$  USD 110.
- ullet Long vocational higher ed. programs need to increase monthly salaries by  $\sim$  USD 185.
- $\bullet$  University programs need to increase monthly salaries by  $\sim$  USD 250.

These figures are in the lower bound of labor market gains estimated for marginal students in Chile....

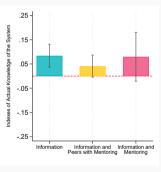
#### Improvement in knowledge driven by FA and LM



(a) Financial Aid



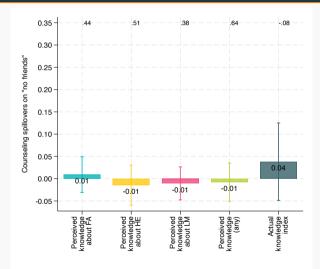
(b) Application to Higher Ed.



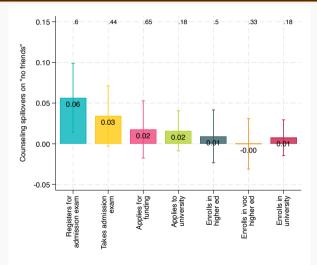
(c) Labor Market Returns



# "No friends" of students receiving information + counseling: no change in perceived or actual knowledge



# "No friends" of students receiving information + counseling: no change in HE trajectories



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