To inspire and to inform : The role of role models

by
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Summary

- **Research Question : Does a brief and face-to-face exposure to external female role models influence career choices and perceptions in developing countries with predominant gender stereotypes ?**
- **Peruvian context and students in high school choosing majors of study at college** $\rightarrow$ This paper examines the impact of light touch intervention where female engineering students act as role-models for high school students in Peru.
- **Results :** 20-minute interaction with the role-models led to sharp increases in preferences towards engineering, with the effects being concentrated on female students with high math aptitude.
- **Mechanisms :** $\uparrow$ self-confidence in own math abilities

Literature Review

- Existing studies in the topic, we need to think carefully about the contribution of the paper...(I will cover it in the next slide)
- Papers that evaluate the determinants of women under-representation in STEM-fields :
  - Biological differences, UNESCO 2017
  - Gender stereotypes, culture, and perceptions, Kahn and Ginther (2017)
  - Competition, Buser at al. (2014), Reuben et al. (2017)
  - Interventions with teachers : Lim and Meer (2020), Eble and Hu (2017), Bettinger and Long (2005), Bottia et al. (2015), Carrell at al. (2010)
  - Discrimination : Bertrand and Mullainathan (2004)
  - External Role Models : **Porter and Serra (2020)**, **Breda et al. (2023)**
  - Signaling : Agurto et al. (2021)

Contribution

1. Our study adds to the extensive body of research on the causes of the STEM gender gap, particularly in engineering.
   - No studies looking at engineering specifically. Most of them cover STEM-fields broadly.
2. Focus in developing countries with predominant gender stereotypes : i) No science track in Peruvian high schools.
   - Porter and Serra(2020) : Economics, Higher Education, and United States
   - Breda et al. (2023) : STEM fields, high school, and France
3. Rich dataset on mechanism : i) Information (i.e. salary expectations, knowledge about engineering types), Gender stereotypes (i.e. recommending engineering to a high-performance female friend/male friend, success in engineering attributed to men rather than women), self-concept (i.e. self-confidence in own math ability)
   - To understand mechanisms : inspiration versus information

The Field Experiment

- Field experiment to increase young women's preferences for Engineering
- Location in Northern Peru
- Stratification (city) and Randomization (school)
- 51 Treatment and 58 Control schools.
- Target population : Senior High school students (11th graders)
- The intervention took place in 18 cities in Peru
- Context : Absence of a Science Track for high school students before entering college. the presentation Compliance RCT

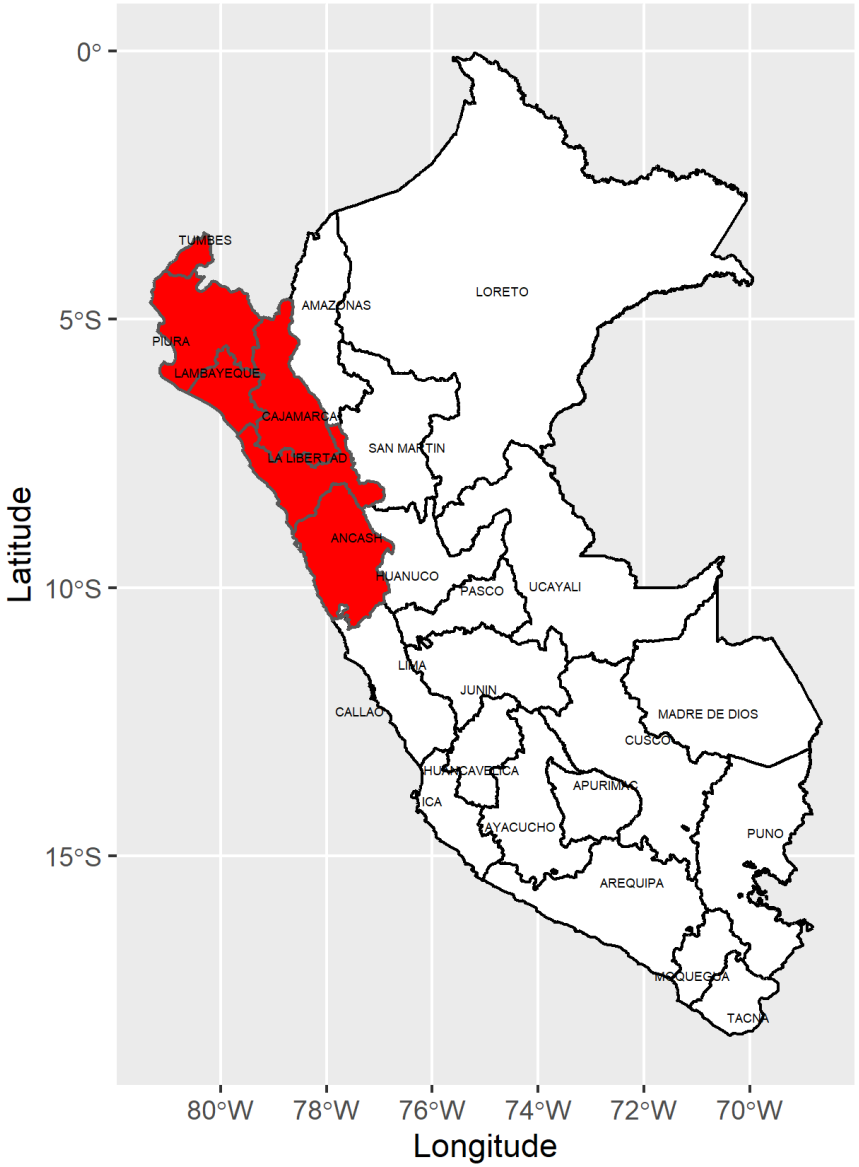

Figure – Experimental Sample in Peru

Data

- Follow-up survey (6 months after the intervention administered in both treatment and control schools) :
  - Students' career choices at higher education, preference for engineering, and other disciplines.
  - Baseline scores of math, language, and science at Grade 10
  - Demographic characteristics : Gender, age, parental education, sibling education, number of siblings, socio-economic status, parental working status
  - Perceptions : gender stereotypes, recommending engineering to male and female friends, self-confidence about ability to succeed in engineering, knowledge of engineering types and salary in the engineering sector.
- Survey sample : 5000 students. Of them 56% (2998) were women. 50% (2704) of the students were in a school which was treated.

  balance test
- No baseline survey

Table – Difference in preferences for engineering and perceptions : by gender

Sample :	(1) Boys	(2) Girls	(3) Diff
Prefer engineering	0.405	0.139	0.266***
	(0.015)	(0.009)	(0.017)
Male_success	0.883	0.609	0.274***
Successful engineer is male	(0.010)	(0.013)	(0.016)
Self_confidence	0.585	0.367	0.219***
Consider to have needed skills to succeed in engineering	(0.015)	(0.012)	(0.019)
University_study	0.670	0.711	-0.041**
Plan to study at university	(0.014)	(0.012)	(0.018)
lorena_eng	0.520	0.492	0.028
Recommended engineering to Lorena	(0.015)	(0.013)	(0.020)
count_eng	4.323	4.403	-0.081**
Number of engineering majors listed	(0.031)	(0.023)	(0.037)

Model : LPM

$$Outcome_{isc} = \beta_0 + \beta_1 T_{sc} + \beta_2 female + \beta_3 female * T_{sc} + \beta_4 X_{isc} + \theta_c + \varepsilon_{isc}$$

Where $Outcome_{isc}$ denotes the outcome of student i in school s and city c ; T_{isc} is a dummy variable indicating whether the student's school located in city c has been selected to receive a role model visit, *female* is a dummy variable that equals one for girls and zero for boys. We control for student characteristics X_{isc} (including household background) and city fixed effects (θ_c). Standard errors are clustered at the school level.

Results

- For the overall sample of women and men, the intervention does not have a statistically significant impact on boys' and girls' preferences for engineering. Full Sample
- Heterogeneous effects for different ranges of students math ability distribution, as measured by grade 10th math GPA.
- Local effects.

top Q top Piura top 3R

Table – The effect of exposure to role models on students' preference for engineering (by quartile of math ability)

Dep. Variable :	**Prefer Engineering**			
Sample :	Q1 math	Q2 math	Q3 math	Q4 math
	(1)	(2)	(3)	(4)
Treatment	0.019	0.066	-0.069	-0.002
	(0.035)	(0.042)	(0.066)	(0.049)
Female	-0.195***	-0.254***	-0.338***	-0.307***
	(0.025)	(0.036)	(0.053)	(0.038)
Interaction	-0.039	-0.065	0.067	0.093
(Treatment*female)	(0.040)	(0.048)	(0.071)	(0.059)
ITT female :	-0.019	0.001	-0.002	0.091**
Treatment + Interaction				
City FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Number of observations (N)	1437	1558	646	939
Adjusted R^2	0.118	0.146	0.147	0.136
Mean Dv	0.08	0.14	0.19	0.20
(Treatment==0)				

Notes : This table reports the intent to treat (ITT) estimates on students' career preferences for engineering for students who answered the survey, separately by quartile of performance in math. Control variables include : has an engineering parent, owns house, parental education FE, baseline scores in 10th grade, age and having an engineer sibling. The regression controls for city fixed effects since the randomization was stratified by city. Standard errors clustered at the unit of randomization (school) are shown in parentheses. $^{***}p < 0.01, ^{**}p < 0.05, ^{*}p < 0.1$.

Mechanisms

- Treated girls in the top quartile of the math score distribution in Piura, Tumbes, and Lambayeque schools are 12.5 percentage points (significant at 5%) more likely to indicate that they do have the necessary skills and aptitude to major in engineering.
- We evaluate whether or not the role models affected gender beliefs, biases and stereotypes $\longrightarrow$ No statistically significant effects on boys and girls.

mechanism

Figure – Senior-Year High School Students- Perceptions

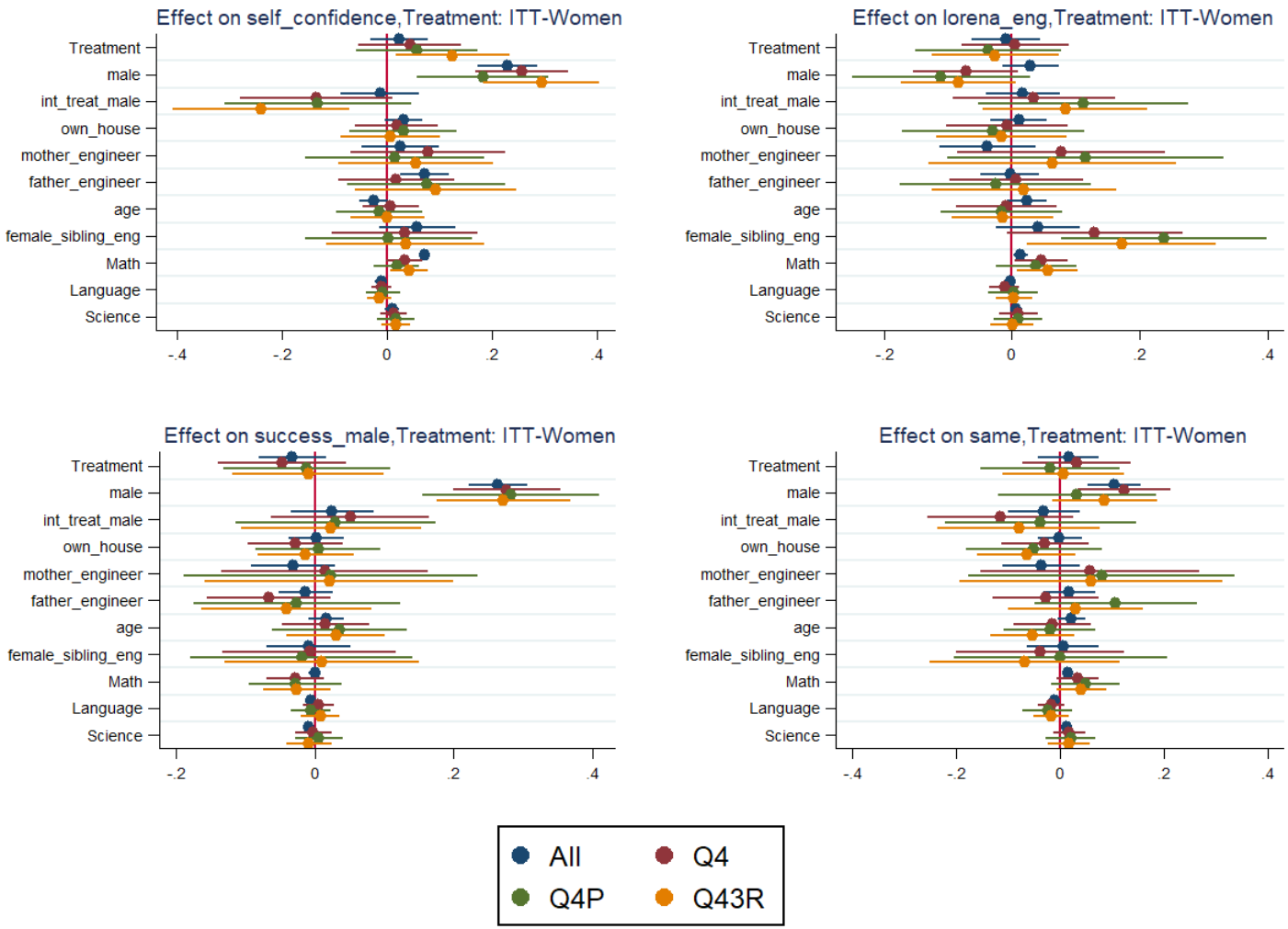

Table – The effect of exposure to role models on students' self-confidence in Piura/Lambayeque/Tumbes schools

Dep. Variable :	**Self-Confidence**			
Sample :	Q1 math	Q2 math	Q3 math	Q4 math
	(1)	(2)	(3)	(4)
Treatment	0.034	0.055	0.019	-0.116**
	(0.050)	(0.046)	(0.084)	(0.053)
Female	-0.199***	-0.232***	-0.208***	-0.294***
	(0.043)	(0.044)	(0.077)	(0.055)
Interaction	-0.030	-0.021	0.027	0.240***
(Treatment*female)	(0.056)	(0.056)	(0.101)	(0.084)
ITT female :	0.003	0.034	0.046	0.125**
Treatment + Interaction				
City FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Number of observations (N)	1190	1290	522	708
Adjusted R^2	0.068	0.087	0.063	0.113
Mean Dv	0.19	0.34	0.51	0.55
(Treatment==0)				

Notes : This table reports the intent to treat (ITT) estimates on students' self-confidence in their aptitude and skills to pursue an engineering major, separately by quartile of performance in math. The sample is restricted to students in schools located in Piura/Lambayeque/Tumbes. Control variables include : has an engineering parent, owns house, parental education FE, baseline scores in 10th grade, age and having an engineer sibling. The regression controls for city fixed effects since the randomization was stratified by city. Standard errors clustered at the unit of randomization (school) are shown in parentheses.
$^{***}p < 0.01, ^{**}\ p < 0.05, ^{*}\ p < 0.1$.

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Robustness Checks

- Baseline z-scores (math, science, language)
- Probit Estimation
- LATE Estimation
- Alternative measures of ability : Science and Math, Science and no Math, Math and no Science.
- ECE math scores (standardized national examination) to control for school quality. control ECE
- Timing of visits
- Multiple hypothesis test $\rightarrow$ Anderson p-value

Heterogeneous Effects

- Identity of the Role Models
- School distance to UDEP :
  - Girls in the top GPA math quartile are 17.2 percentage points (significant at 1%) more likely to prefer engineering after a role model exposure if they come from a school located below the median distance (less than 43 km) from UDEP.
- Role Model's Major : Girls in the top math ability quartile and within UDEP's catchment area are 13.4 percentage points (significant at 1%) more likely to list one of the role models' engineering majors.

Conclusion

- We show that role models are important and influence preferences for some students.
- Girls in the highest math ability quartile are more likely to prefer engineering majors as a result of the treatment.
- Role models inspired girls by changing self-confidence regarding own skills and aptitudes to successfully pursue engineering majors.
- While role models matter, the context in which they intervene critically determines their effectiveness.
- This study shows that role model interventions can reduce gender gaps in male dominated careers but are not enough to change stereotypes.
- Important implication to inform effectiveness of interventions to address gender disparities in developing countries.

Thank You !
Q&A
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Appendix

Table – Treatment-control balance

	Control Group (1)	Treatment Group (2)	Difference T-C (3)	p-value (4)
Panel A : Student level (full sample)				
Female, gender (female=1)	0.575	0.540	-0.058	0.330
Age (in years)	16.232	16.266	0.018	0.393
Math, 10th grade math GPA	14.641	14.510	-0.083	0.621
Language, 10th grade spanish GPA	15.589	15.072	-0.333	0.100
Science, 10th grade science GPA	15.201	15.042	-0.170	0.278
Years education father	13.955	13.718	-0.185	0.279
Years education mother	13.641	13.419	-0.142	0.425
Father engineer	0.151	0.146	-0.014	0.411
Mother engineer	0.032	0.038	0.003	0.682
Number of siblings	1.959	1.962	-0.006	0.908
Own a house	0.845	0.854	0.009	0.508
Mother work	0.675	0.679	0.020	0.280
Father work	0.950	0.951	0.005	0.483
Has female sibling engineer	0.044	0.041	-0.003	0.599
(*)Girls in Q4 math	0.114	0.094	-0.013	0.529
(*)Girls in Q3 math	0.077	0.081	-0.002	0.921
(*)Girls in Q2 math	0.192	0.171	-0.030	0.351
(*)Girls in Q1 math	0.171	0.175	-0.009	0.719
(*)Boys in Q4 math	0.092	0.084	-0.001	0.914
(*)Boys in Q3 math	0.048	0.064	0.021	0.028
Number of Observations	2694	2704		
Test of joint significance excluding (*)		F-stat : 1.11 (p-value : 0.358)		

Table – Treatment-control balance

	Control Group (1)	Treatment Group (2)	Difference T-C (3)	p-value (4)
Panel B : School level (full sample)				
Average math ECE 2015	599.981	600.739	0.532	0.937
Number of teachers	14.944	16.660	1.518	0.457
Number of male teachers	7.882	9.136	1.251	0.367
Number of female teachers	7.500	8.106	0.451	0.743
Teachers-concluded pedagogy studies	23.755	27.326	3.320	0.383
Teachers-not concluded pedagogy studies	8.068	8.583	0.168	0.938
Private school	0.741	0.723	-0.051	0.555
Registration-total students	58.444	64.979	5.965	0.576
Registration-total male students	24.907	29.340	4.554	0.447
Registration-total female students	33.537	35.638	1.411	0.855
Single-sex school (only women)	0.130	0.128	-0.012	0.869
Test of joint significance	F-stat : 0.32 (p-value : 0.956)			

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Figure – Senior-Year High School Students- Preference for Engineering by Student Gender and Quartile of Baseline Math Score : Only Piura

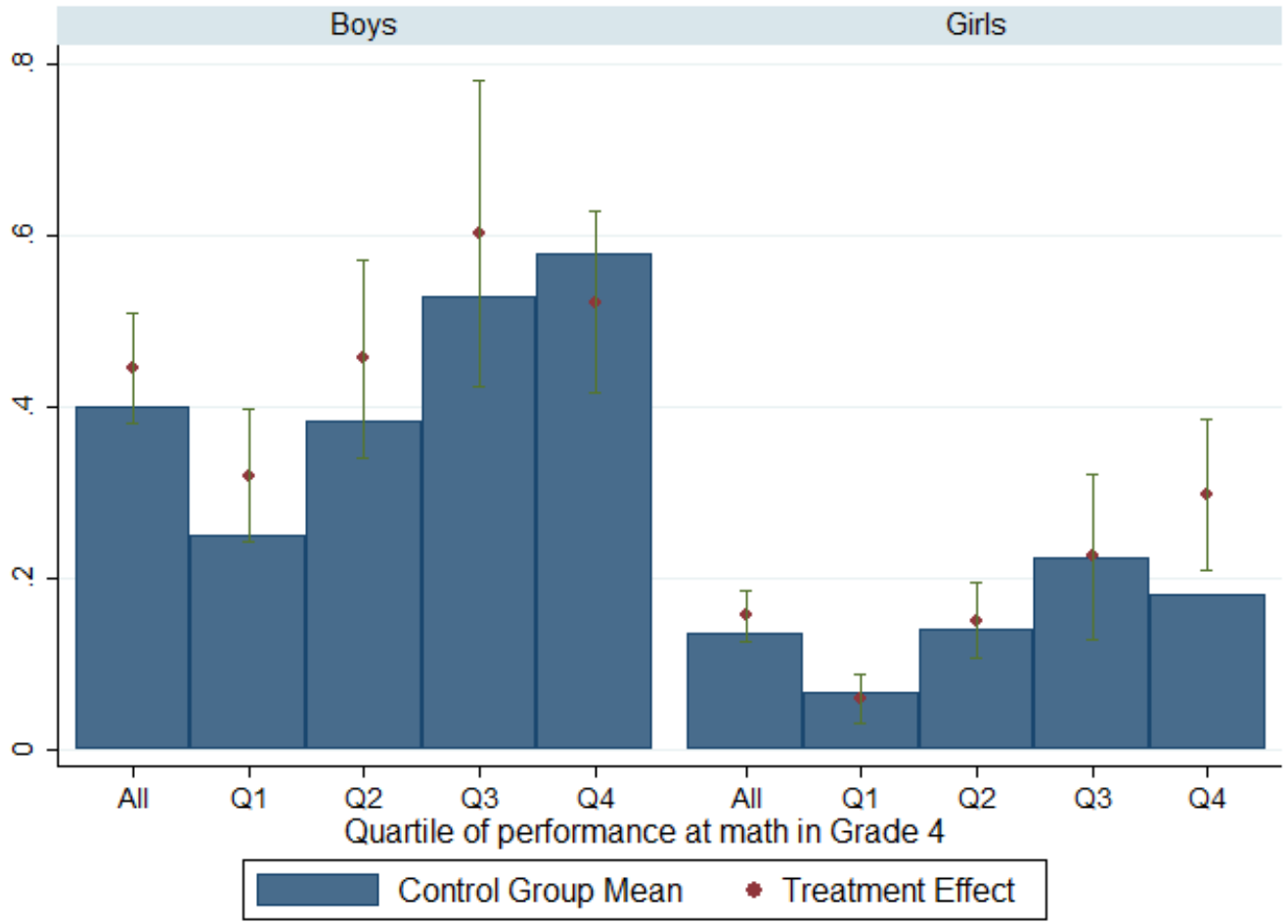

Table – The effect of exposure to role models on students' preference for engineering in Piura/Lambayeque/Tumbes schools

Dep. Variable :	**Prefer Engineering**			
Sample :	Q1 math	Q2 math	Q3 math	Q4 math
	(1)	(2)	(3)	(4)
Treatment	0.058	0.064	-0.008	-0.043
	(0.036)	(0.048)	(0.072)	(0.050)
Female	-0.187***	-0.239***	-0.364***	-0.354***
	(0.025)	(0.041)	(0.062)	(0.042)
Interaction	-0.070*	-0.053	0.019	0.174***
(Treatment*female)	(0.041)	(0.054)	(0.084)	(0.065)
ITT female :	-0.011	0.011	0.011	0.131***
Treatment + Interaction				
City FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Number of observations (N)	1132	1246	515	691
Adjusted R^2	0.131	0.135	0.150	0.141
Mean Dv	0.07	0.14	0.19	0.17
(Treatment==0)				

Notes : This table reports the intent to treat (ITT) estimates on students' career preferences for engineering, separately by quartile of performance in math. The sample is restricted to students in schools located in Piura/Lambayeque/Tumbes. Control variables include : has an engineering parent, owns house, parental education FE, baseline scores in 10th grade, age and having an engineer sibling. The regression controls for city fixed effects since the randomization was stratified by city. Standard errors clustered at the unit of randomization (school) are shown in parentheses. $^{***}p < 0.01, ^{**}p < 0.05, ^{*}p < 0.1$.

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Sample :	Q1 math	Q2 math	Q3 math	Q4 math
	(1)	(2)	(3)	(4)
Treatment	0.034	0.055	0.019	-0.116**
	(0.050)	(0.046)	(0.084)	(0.053)
Female	-0.199***	-0.232***	-0.208***	-0.294***
	(0.043)	(0.044)	(0.077)	(0.055)
Interaction	-0.030	-0.021	0.027	0.240***
(Treatment*female)	(0.056)	(0.056)	(0.101)	(0.084)
ITT female :	0.003	0.034	0.046	0.125**
Treatment + Interaction				
City FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Number of observations (N)	1190	1290	522	708
Adjusted R^2	0.068	0.087	0.063	0.113
Mean Dv	0.19	0.34	0.51	0.55
(Treatment==0)				

Notes : This table reports the intent to treat (ITT) estimates on students' self-confidence in their aptitude and skills to pursue an engineering major, separately by quartile of performance in math. The sample is restricted to students in schools located in Piura/Lambayeque/Tumbes. Control variables include : has an engineering parent, owns house, parental education FE, baseline scores in 10th grade, age and having an engineer sibling. The regression controls for city fixed effects since the randomization was stratified by city. Standard errors clustered at the unit of randomization (school) are shown in parentheses.
$^{***}p < 0.01, ^{**}\ p < 0.05, ^{*}\ p < 0.1$.

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Table – The effect of exposure to role models on students' perceptions of males successfulness in engineering in Piura/Lambayeque/Tumbes schools

Dep. Variable :	**Males successfulness**			
Sample :	Q1 math	Q2 math	Q3 math	Q4 math
	(1)	(2)	(3)	(4)
Treatment	-0.026	-0.011	-0.007	0.014
	(0.036)	(0.032)	(0.063)	(0.048)
Female	-0.227***	-0.266***	-0.211***	-0.271***
	(0.043)	(0.041)	(0.065)	(0.048)
Interaction	-0.035	-0.034	-0.000	-0.023
(Treatment*female)	(0.060)	(0.047)	(0.077)	(0.065)
ITT female :	-0.061	-0.045	-0.007	-0.009
Treatment + Interaction				
City FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Number of observations (N)	1126	1233	499	674
Adjusted R^2	0.083	0.107	0.057	0.093
Mean Dv	0.65	0.61	0.65	0.57
(Treatment==0)				

Notes : This table reports the intent to treat (ITT) estimates on students' perceptions of males successfulness in engineering, separately by quartile of performance in math. The sample is restricted to students in schools located in Piura/Lambayeque/Tumbes. Control variables include : has an engineering parent, owns house, parental education FE, baseline scores in 10th grade, age and having an engineer sibling. The regression controls for city fixed effects since the randomization was stratified by city. Standard errors clustered at the unit of randomization (school) are shown in parentheses.
$^{***}p < 0.01, ^{**}\ p < 0.05, ^{*}\ p < 0.1$.

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Table – The effect of exposure to role models on students' recommending engineering to Lorena (hypothetical female friend) in Piura/Lambayeque/Tumbes schools

Dep. Variable :	**Engineering to Lorena**			
Sample :	Q1 math	Q2 math	Q3 math	Q4 math
	(1)	(2)	(3)	(4)
Treatment	-0.039	0.086*	-0.006	0.057
	(0.050)	(0.044)	(0.091)	(0.049)
Female	-0.035	-0.045	-0.048	0.084*
	(0.037)	(0.043)	(0.070)	(0.045)
Interaction	0.004	-0.082	0.046	-0.083
(Treatment*female)	(0.053)	(0.069)	(0.098)	(0.065)
ITT female :	-0.035	0.003	0.039	-0.026
Treatment + Interaction				
City FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Number of observations (N)	1172	1270	520	697
Adjusted R^2	-0.005	0.021	0.004	0.025
Mean Dv	0.46	0.45	0.51	0.59
(Treatment==0)				

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Table – The effect of exposure to role models on students' number of engineering fields listed in Piura/Lambayeque/Tumbes schools

Dep. Variable :	**Types of engineering listed**			
Sample :	Q1 math	Q2 math	Q3 math	Q4 math
	(1)	(2)	(3)	(4)
Treatment	-0.142	0.030	0.157	0.005
	(0.094)	(0.077)	(0.146)	(0.083)
Female	0.013	-0.057	0.004	0.139*
	(0.069)	(0.073)	(0.123)	(0.079)
Interaction	0.106	-0.034	-0.139	-0.208*
(Treatment*female)	(0.120)	(0.111)	(0.156)	(0.110)
ITT female :	-0.035	-0.004	0.018	-0.203**
Treatment + Interaction				
City FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Number of observations (N)	1198	1296	525	710
Adjusted R^2	0.074	0.112	0.031	0.045
Mean Dv	4.32	4.33	4.51	4.65
(Treatment==0)				

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Table – The effect of exposure to role models on students' earnings expectations in Piura/Lambayeque/Tumbes schools

Dep. Variable :	**Salary (in logarithm)**			
Sample :	Q1 math	Q2 math	Q3 math	Q4 math
	(1)	(2)	(3)	(4)
Treatment	0.022	0.095**	-0.090	-0.078
	(0.050)	(0.040)	(0.068)	(0.052)
Female	0.033	0.012	-0.103**	-0.043
	(0.050)	(0.038)	(0.048)	(0.049)
Interaction	-0.085	-0.094*	0.082	0.085
(Treatment*female)	(0.066)	(0.049)	(0.073)	(0.073)
ITT female :	-0.063	0.002	-0.008	0.007
Treatment + Interaction				
City FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Number of observations (N)	1187	1291	523	707
Adjusted R^2	0.005	0.011	-0.002	0.001
Mean Dv	8.20	8.19	8.17	8.23
(Treatment==0)				

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Table – The Effect of Exposure to Role Models on students' career choices

Dep. Variable :	**Prefer Engineering**					
Sample :	Full	Full	Full	Full	Full	Full
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	0.036	0.036	0.035	0.034	0.016	0.018
	(0.025)	(0.026)	(0.026)	(0.024)	(0.024)	(0.024)
Female	-0.263***	-0.265***	-0.266***	-0.265***	-0.258***	-0.261***
	(0.018)	(0.018)	(0.018)	(0.017)	(0.019)	(0.018)
Interaction	-0.023	-0.024	-0.024	-0.024	-0.008	-0.008
(Treatment*female)	(0.027)	(0.028)	(0.028)	(0.027)	(0.027)	(0.027)
ITT female :	0.013	0.011	0.011	0.010	0.008	0.010
Treatment + Interaction						
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes	Yes	Yes
Parent Engineer	No	Yes	Yes	Yes	Yes	Yes
Own house	No	No	Yes	Yes	Yes	Yes
Parent Education	No	No	No	Yes	Yes	Yes
Baseline Scores	No	No	No	No	Yes	Yes
Student's age	No	No	No	No	No	Yes
Female sibling engineer	No	No	No	No	No	Yes
Number of observations (N)	5156	4872	4856	4783	4639	4580
Adjusted R^2	0.105	0.107	0.109	0.114	0.158	0.161
Mean Dv	0.14	0.14	0.14	0.14	0.14	0.14
(Treatment==0)						

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Role Models

Table – Female Role Models : Summary Statistics

	All	RG	5G Students	4G Students
Age	21.7	23.5	21.6	20.7
	(1.4)	(0.7)	(1.3)	(0.6)
Field : ISE	0.42	0.00	0.43	0.67
Field : CE	0.42	1.00	0.29	0.33
Field : MEE	0.17	0.00	0.29	0.00
Number of high schools visited	4.7	3.5	4.4	6.0
	(1.4)	(0.7)	(1.1)	(1.7)
N	12	2	7	3

Standard deviations are shown in parentheses.

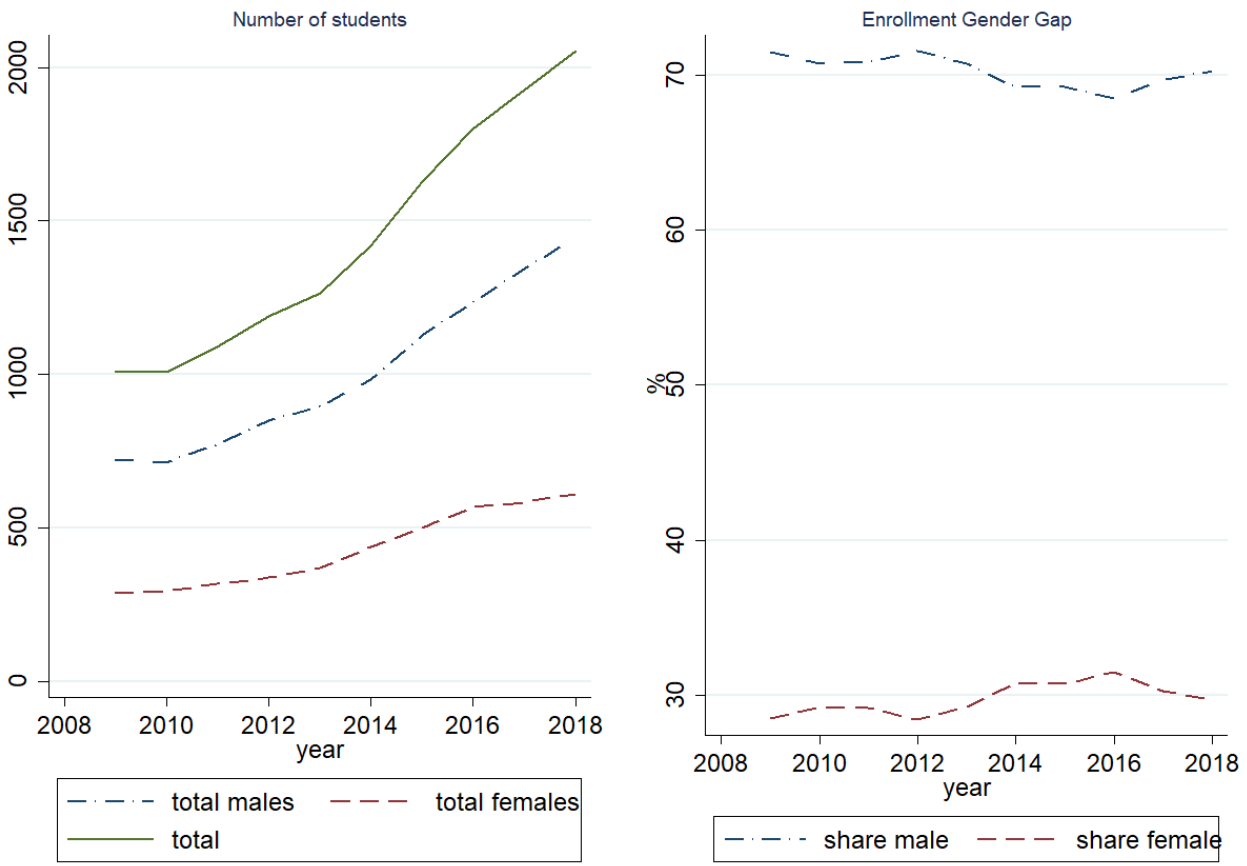

Figure – Enrollment Gender Gap- UDEP Engineering

Table – The Effect of Exposure to Role Models on students' career choices (high ability students)

Dep. Variable :	**Prefer Engineering**					
Sample :	4th Q math (1)	4th Q math (2)	4th Q math (3)	4th Q math (4)	4th Q math (5)	4th Q math (6)
Treatment	-0.003	0.005	0.001	-0.004	-0.006	-0.002
	(0.043)	(0.047)	(0.047)	(0.046)	(0.049)	(0.049)
Female	-0.335***	-0.338***	-0.338***	-0.331***	-0.309***	-0.307***
	(0.031)	(0.031)	(0.031)	(0.030)	(0.037)	(0.038)
Interaction	0.083	0.082	0.083	0.091*	0.096	0.093
(Treatment*female)	(0.055)	(0.054)	(0.054)	(0.054)	(0.059)	(0.059)
ITT female : Treatment + Interaction	0.080**	0.087**	0.084**	0.088**	0.090**	0.091**
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes	Yes	Yes
Parent Engineer	No	Yes	Yes	Yes	Yes	Yes
Own house	No	No	Yes	Yes	Yes	Yes
Parent Education	No	No	No	Yes	Yes	Yes
Baseline Scores	No	No	No	No	Yes	Yes
Student's age	No	No	No	No	No	Yes
Female sibling engineer	No	No	No	No	No	Yes
Number of observations (N)	1014	960	957	945	942	939
Adjusted R^2	0.117	0.126	0.128	0.126	0.133	0.136
Mean Dv (Treatment==0)	0.20	0.20	0.20	0.20	0.20	0.20

back

Table – The Effect of Exposure to Role Models on students' career choices for high ability students in Piura schools

Dep. Variable :	**Prefer Engineering**					
Sample :	4th Q math	4th Q math	4th Q math	4th Q math	4th Q math	4th Q math
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	-0.036	-0.030	-0.037	-0.031	-0.026	-0.012
	(0.056)	(0.058)	(0.056)	(0.057)	(0.059)	(0.057)
Female	-0.360***	-0.362***	-0.361***	-0.352***	-0.316***	-0.296***
	(0.045)	(0.045)	(0.043)	(0.042)	(0.048)	(0.048)
Interaction	0.177**	0.179**	0.177***	0.176**	0.171**	0.153**
(Treatment*female)	(0.069)	(0.068)	(0.064)	(0.067)	(0.070)	(0.071)
ITT female :	0.141***	0.148***	0.140***	0.145***	0.144***	0.141***
Treatment + Interaction						
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes	Yes	Yes
Parent Engineer	No	Yes	Yes	Yes	Yes	Yes
Own house	No	No	Yes	Yes	Yes	Yes
Parent Education	No	No	No	Yes	Yes	Yes
Baseline Scores	No	No	No	No	Yes	Yes
Student's age	No	No	No	No	No	Yes
Female sibling engineer	No	No	No	No	No	Yes
Number of observations (N)	549	516	514	511	510	507
Adjusted R^2	0.123	0.136	0.144	0.132	0.133	0.143
Mean Dv	0.18	0.18	0.18	0.18	0.18	0.18
(Treatment==0)						

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Table – The Effect of Exposure to Role Models on students' career choices for high ability students in Piura/Lambayeque/Tumbes schools

Dep. Variable :	**Prefer Engineering**					
Sample :	4th Q math	4th Q math	4th Q math	4th Q math	4th Q math	4th Q math
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	-0.041	-0.039	-0.042	-0.039	-0.049	-0.043
	(0.049)	(0.049)	(0.049)	(0.049)	(0.051)	(0.050)
Female	-0.374***	-0.373***	-0.371***	-0.370***	-0.358***	-0.354***
	(0.032)	(0.033)	(0.032)	(0.033)	(0.039)	(0.042)
Interaction	0.163***	0.162***	0.162***	0.169***	0.179***	0.174***
(Treatment*female)	(0.058)	(0.057)	(0.056)	(0.058)	(0.064)	(0.065)
ITT female : Treatment + Interaction	0.122***	0.124***	0.120***	0.129***	0.130***	0.131***
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes	Yes	Yes
Parent Engineer	No	Yes	Yes	Yes	Yes	Yes
Own house	No	No	Yes	Yes	Yes	Yes
Parent Education	No	No	No	Yes	Yes	Yes
Baseline Scores	No	No	No	No	Yes	Yes
Student's age	No	No	No	No	No	Yes
Female sibling engineer	No	No	No	No	No	Yes
Number of observations (N)	744	706	704	697	694	691
Adjusted R^2	0.135	0.140	0.141	0.133	0.134	0.141
Mean Dv (Treatment==0)	0.17	0.17	0.17	0.17	0.17	0.17

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Table – The Effect of Exposure to Role Models on students' career choices (low ability students)

Dep. Variable :	**Prefer Engineering**					
Sample :	1st Q math	1st Q math	1st Q math	1st Q math	1st Q math	1st Q math
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	0.0323	0.0309	0.0330	0.0390	0.0224	0.0196
	(0.0333)	(0.0369)	(0.0368)	(0.0354)	(0.0350)	(0.0355)
Female	-0.190***	-0.194***	-0.193***	-0.201***	-0.192***	-0.195***
	(0.0243)	(0.0269)	(0.0268)	(0.0254)	(0.0247)	(0.0251)
Interaction	-0.0478	-0.0504	-0.0545	-0.0543	-0.0389	-0.0387
	(0.0379)	(0.0413)	(0.0410)	(0.0398)	(0.0397)	(0.0398)
ITT female : Treatment + Interaction	-0.016	-0.020	-0.021	-0.015	-0.017	-0.019
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes	Yes	Yes
Parent Engineer	No	Yes	Yes	Yes	Yes	Yes
Own house	No	No	Yes	Yes	Yes	Yes
Parent Education	No	No	No	Yes	Yes	Yes
Baseline Scores	No	No	No	No	Yes	Yes
Student's age	No	No	No	No	No	Yes
Female sibling engineer	No	No	No	No	No	Yes
Number of observations (N)	1,606	1,504	1,498	1,472	1,462	1,437
Adjusted R^2	0.086	0.086	0.088	0.104	0.117	0.118
Mean Dv (Treatment==0)	0.08	0.08	0.08	0.08	0.08	0.08

Table – The Effect of Exposure to Role Models on students' career choices (low ability students) in Piura schools

Dep. Variable :	**Prefer Engineering**					
Sample :	1st Q math	1st Q math	1st Q math	1st Q math	1st Q math	1st Q math
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	0.070	0.068	0.066	0.073*	0.058	0.051
	(0.042)	(0.047)	(0.046)	(0.043)	(0.044)	(0.044)
Female	-0.181***	-0.184***	-0.186***	-0.199***	-0.194***	-0.198***
	(0.033)	(0.038)	(0.037)	(0.034)	(0.035)	(0.034)
Interaction	-0.076	-0.080	-0.082	-0.078	-0.058	-0.053
(Treatment*female)	(0.048)	(0.053)	(0.052)	(0.050)	(0.051)	(0.050)
ITT female : Treatment + Interaction	-0.006	-0.012	-0.016	-0.005	0.000	-0.002
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes	Yes	Yes
Parent Engineer	No	Yes	Yes	Yes	Yes	Yes
Own house	No	No	Yes	Yes	Yes	Yes
Parent Education	No	No	No	Yes	Yes	Yes
Baseline Scores	No	No	No	No	Yes	Yes
Student's age	No	No	No	No	No	Yes
Female sibling engineer	No	No	No	No	No	Yes
Number of observations (N)	1033	964	960	943	937	919
Adjusted R^2	0.099	0.104	0.108	0.129	0.138	0.136
Mean Dv (Treatment==0)	0.06	0.06	0.06	0.06	0.06	0.06

Table – The Effect of Exposure to Role Models on students' career choices (low ability students) in Piura/Lambayeque/Tumbes schools

Dep. Variable :	**Prefer Engineering**					
Sample :	1st Q math	1st Q math	1st Q math	1st Q math	1st Q math	1st Q math
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	0.066*	0.062	0.064*	0.077**	0.064*	0.059
	(0.035)	(0.038)	(0.038)	(0.036)	(0.036)	(0.036)
Female	-0.178***	-0.186***	-0.186***	-0.194***	-0.184***	-0.187***
	(0.025)	(0.028)	(0.028)	(0.026)	(0.025)	(0.025)
Interaction	-0.078*	-0.079*	-0.083*	-0.085**	-0.073*	-0.070*
(Treatment*female)	(0.041)	(0.043)	(0.043)	(0.042)	(0.042)	(0.041)
ITT female : Treatment + Interaction	-0.012	-0.017	-0.019	-0.008	-0.009	-0.012
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes	Yes	Yes
Parent Engineer	No	Yes	Yes	Yes	Yes	Yes
Own house	No	No	Yes	Yes	Yes	Yes
Parent Education	No	No	No	Yes	Yes	Yes
Baseline Scores	No	No	No	No	Yes	Yes
Student's age	No	No	No	No	No	Yes
Female sibling engineer	No	No	No	No	No	Yes
Number of observations (N)	1265	1183	1178	1158	1151	1132
Adjusted R^2	0.097	0.103	0.106	0.124	0.131	0.131
Mean Dv (Treatment==0)	0.07	0.07	0.07	0.07	0.07	0.07

Table – Effect on students' preference for Engineering : Including covariates

Sample :	(1) Full	(2) 4Q	(3) AM	(4) BM	(5) 1Q	(6) 4Q3R
Treatment	0.0179	-0.00162	-0.0170	0.0416	0.0196	-0.0430
	(0.0237)	(0.0489)	(0.0367)	(0.0285)	(0.0355)	(0.0501)
Interaction	-0.00797	0.0928	0.0628	-0.0504	-0.0387	0.174***
(Treatment*female)	(0.0269)	(0.0593)	(0.0384)	(0.0328)	(0.0398)	(0.0651)
Female	-0.261***	-0.307***	-0.321***	-0.226***	-0.195***	-0.354***
	(0.0184)	(0.0385)	(0.0310)	(0.0224)	(0.0251)	(0.0422)
own_house	0.0311*	0.0734	0.0571*	0.0168	-0.00729	0.0709
	(0.0164)	(0.0482)	(0.0328)	(0.0169)	(0.0260)	(0.0581)
mother_engineer	0.0364	0.0407	0.0384	0.0277	0.0227	0.0372
	(0.0290)	(0.0987)	(0.0555)	(0.0334)	(0.0456)	(0.126)
father_engineer	0.0412**	0.0876*	0.0609*	0.0239	0.00108	0.0941
	(0.0202)	(0.0442)	(0.0336)	(0.0238)	(0.0284)	(0.0623)
age	-0.0357***	-0.000528	-0.0200	-0.0422**	-0.0139	-0.00987
	(0.0124)	(0.0398)	(0.0235)	(0.0175)	(0.0196)	(0.0465)
female sibling in ENG	0.0635**	0.167***	0.0728	0.0538	0.0370	0.218***
	(0.0246)	(0.0601)	(0.0460)	(0.0329)	(0.0423)	(0.0586)
Math	0.0510***	0.0290	0.0372**	0.0490***	0.0277***	0.0287
	(0.00383)	(0.0207)	(0.0147)	(0.00536)	(0.00922)	(0.0229)
Language	-0.0235***	-0.0328***	-0.0294***	-0.0206***	-0.0215***	-0.0200
	(0.00638)	(0.0120)	(0.0110)	(0.00504)	(0.00593)	(0.0143)
Science	-0.00507	-0.00310	-0.0105	-0.00350	-0.00640	-0.00208
	(0.00554)	(0.0114)	(0.00999)	(0.00567)	(0.00569)	(0.0122)
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Parent education FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,580	939	1,585	2,995	1,437	691
Adjusted R^2	0.161	0.136	0.144	0.143	0.118	0.141

Table – Robustness check : average school ECE math scores

Outcome : Prefer Engineering	Control mean female (1)	Treatment effect (ITT) female (2)	Control group mean male (3)	Treatment effect male (4)	N (5)	Diff (ITT) p-value (ITT) (6)
All	0.139	0.021	0.405	0.025	4504	0.865
Q1	0.076	-0.018	0.271	0.019	1434	0.356
Q2	0.138	0.018	0.403	0.078*	1539	0.219
Q3	0.194	0.013	0.546	-0.060	624	0.303
Q4	0.205	0.097**	0.554	0.018	907	0.174
Main Regions						
3 Regions (3R)	0.129	0.032*	0.396	0.035	3508	0.938
Q1	0.068	-0.014	0.251	0.057	1129	0.093
Q2	0.138	0.036	0.389	0.078	1227	0.451
Q3	0.195	0.022	0.527	-0.009	493	0.711
Q4	0.175	0.132***	0.573	-0.029	659	0.016

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LATE

Table – The Effect of Exposure to Role Models on students' preference for engineering by quartile of math performance : LATE

Outcome : Prefer Engineering	Control group mean female (1)	Treatment effect (LATE) female (2)	Standard error (3)	Control group mean male (4)	Treatment effect (LATE) male (5)	Standard error (6)	N (7)
Panel A : Full Sample							
Quartile 1	0.076	-0.020	0.017	0.271	0.021	0.038	1437
Quartile 2	0.138	0.001	0.027	0.403	0.071	0.044	1558
Quartile 3	0.194	-0.002	0.042	0.546	-0.073	0.070	646
Quartile 4	0.205	0.097**	0.045	0.554	-0.002	0.052	939
Above median	0.200	0.049*	0.029	0.551	-0.018	0.039	1585
Below median	0.083	-0.004	0.018	0.302	0.049	0.036	2199
Panel B : Main Regions							
Quartile 1	0.068	-0.012	0.017	0.251	0.062	0.038	1132
Quartile 2	0.138	0.012	0.029	0.389	0.068	0.051	1246
Quartile 3	0.195	0.012	0.045	0.527	-0.008	0.076	515
Quartile 4	0.175	0.139***	0.046	0.573	-0.046	0.053	691
Above median	0.184	0.074**	0.028	0.558	-0.019	0.044	1206
Below median	0.077	0.003	0.018	0.276	0.075*	0.041	1737

Math and Science

Table – Robustness Check : High-ability Math and Science

Outcome : Prefer Engineering	Control group mean female (1)	Treatment effect (ITT) female (2)	Standard error (3)	Control group mean male (4)	Treatment effect (ITT) male (5)	Standard error (6)	N (7)
Panel A : Full Sample							
top 25 M & S	0.184	0.090	0.069	0.506	0.005	0.092	395
top 25 M not S	0.225	0.083	0.053	0.581	-0.034	0.061	544
top 25 S not M	0.173	-0.161**	0.070	0.15	0.051	0.111	189
Above median M & S	0.206	0.032	0.030	0.537	0.029	0.043	1242
Panel B : Main Regions							
top 25 M & S	0.129	0.214***	0.074	0.582	-0.052	0.099	286
top 25 M not S	0.220	0.071	0.057	0.574	-0.085	0.070	405
top 25 S not M	0.211	-0.171*	0.089	0.192	0.033	0.143	135
Above median M & S	0.194	0.064**	0.031	0.544	0.024	0.049	932

Role Models Major

Table – Students' preference for the role models' majors by quartile of math performance

Outcome : Any three types of engineering	Control group mean female (1)	Treatment effect (ITT) female (2)	Standard error (3)	Control group mean male (4)	Treatment effect (ITT) male (5)	Standard error (6)	N (7)
Panel A : Full Sample							
Quartile 1	0.042	-0.006	0.015	0.220	0.013	0.036	1437
Quartile 2	0.101	0.012	0.023	0.321	0.046	0.038	1558
Quartile 3	0.146	0.015	0.032	0.496	-0.064	0.061	646
Quartile 4	0.142	0.104**	0.040	0.512	-0.030	0.048	939
Above median	0.143	0.061**	0.026	0.507	-0.037	0.036	1585
Below median	0.052	0.002	0.015	0.246	0.018	0.030	2199
Panel B : Main Regions							
Quartile 1	0.034	0.000	0.016	0.202	0.051	0.038	1132
Quartile 2	0.104	0.023	0.025	0.306	0.052	0.042	1246
Quartile 3	0.152	0.018	0.034	0.484	-0.011	0.073	515
Quartile 4	0.132	0.134***	0.041	0.534	-0.074	0.048	691
Above median	0.141	0.074***	0.027	0.517	-0.041	0.042	1206
Below median	0.048	0.007	0.016	0.227	0.036	0.035	1737

Figure – Program Evaluation Timeline

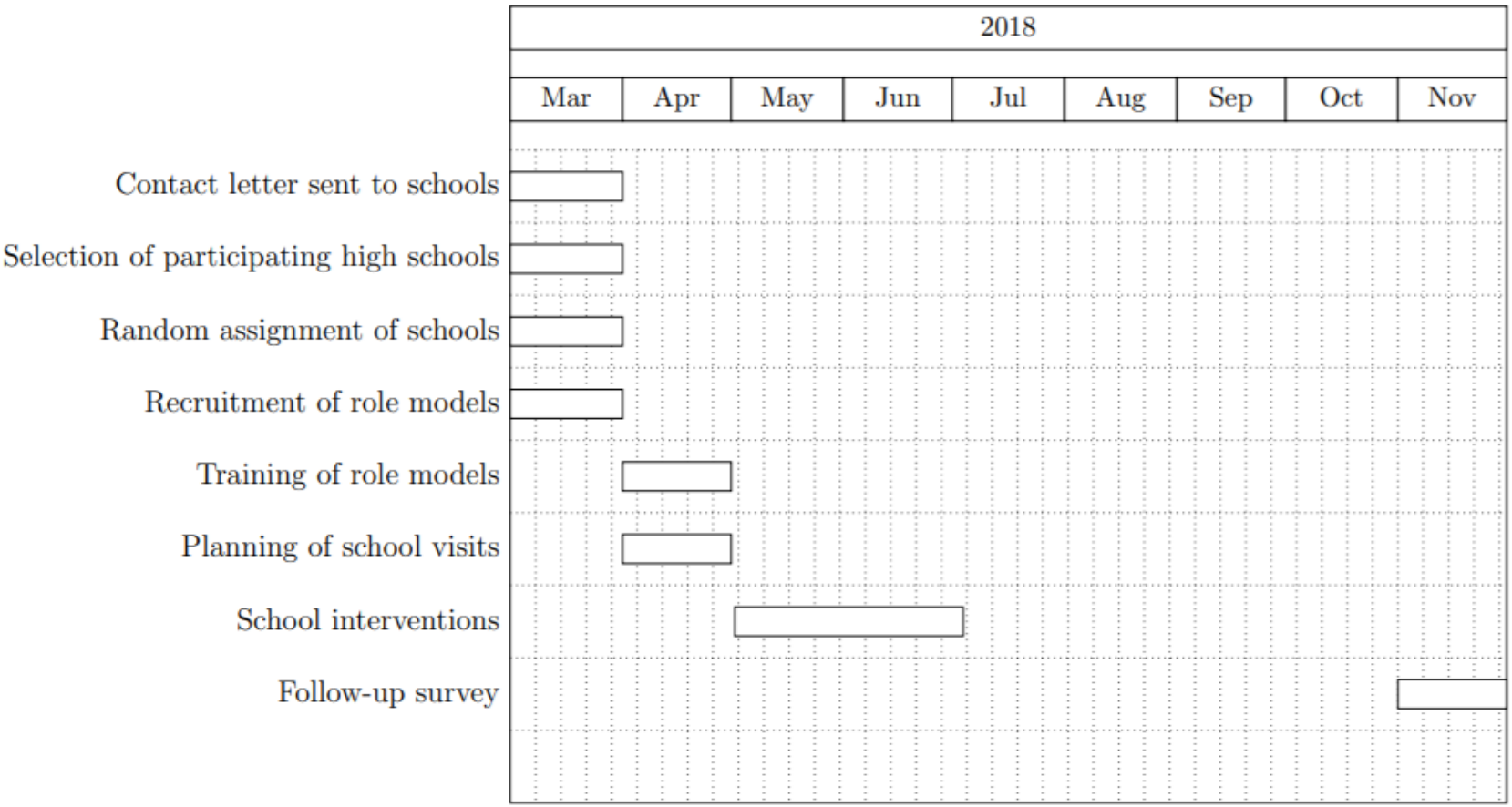


Figure – Senior-Year High School Students- Preference for fields of study

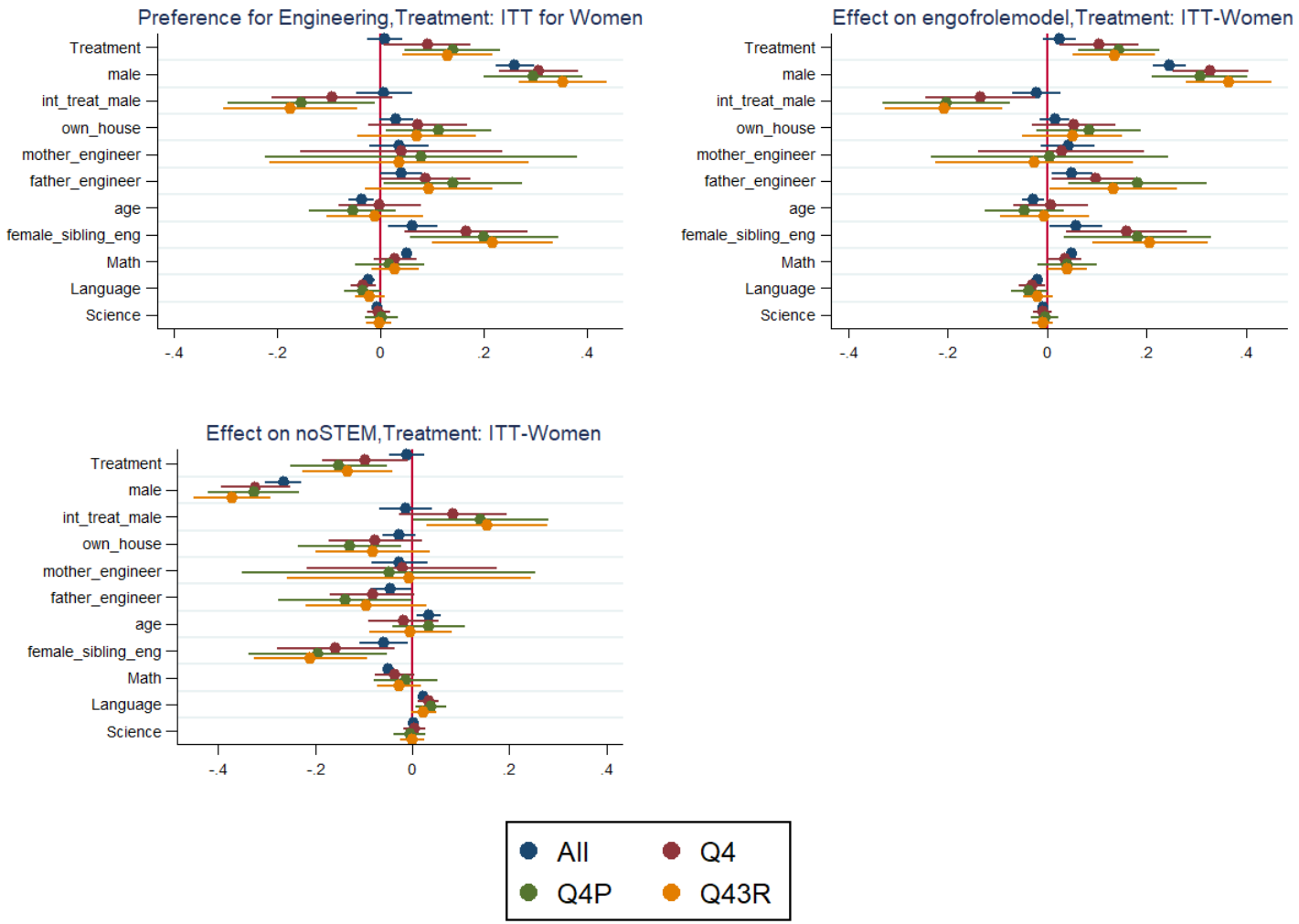
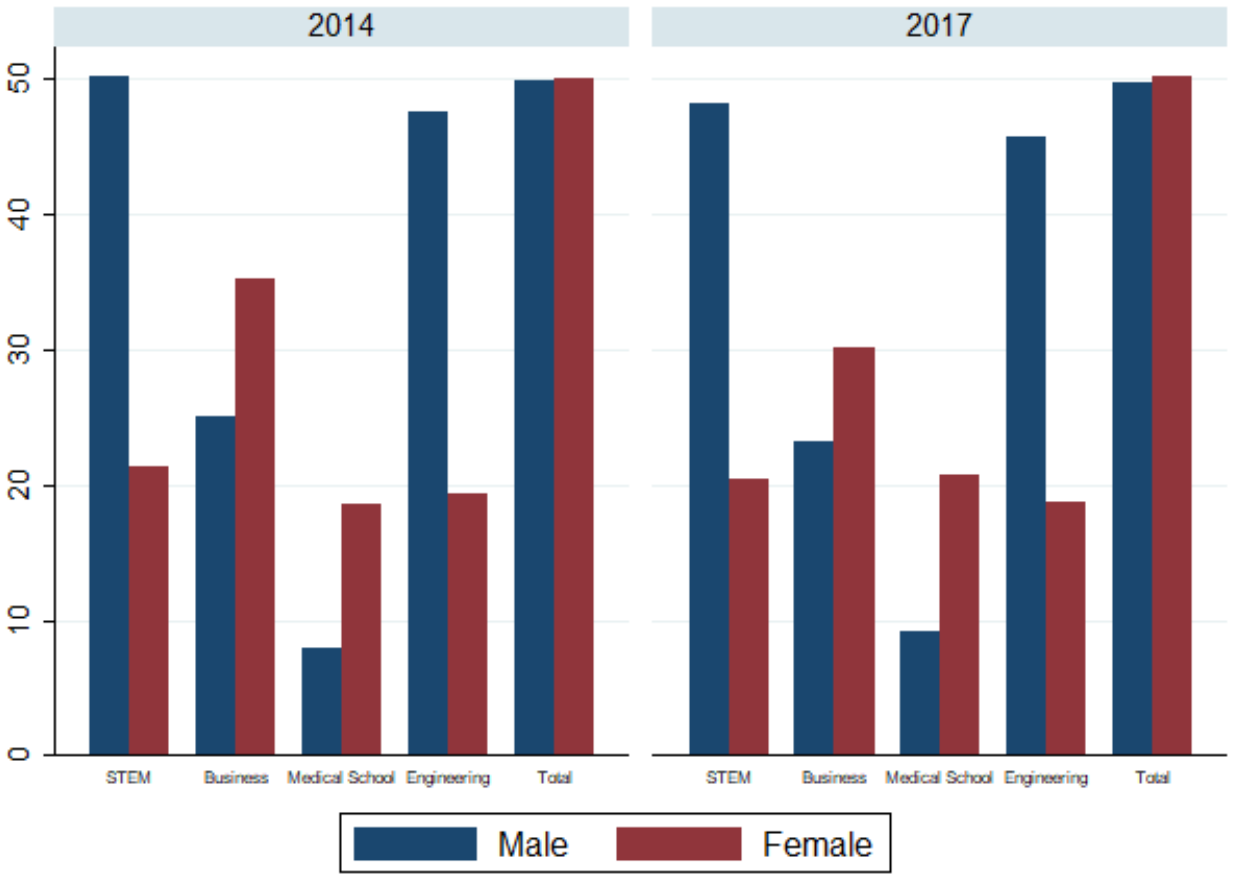


Figure – Share of male and female applicants to selective undergraduate academic programs for the whole population of applicants in 2014 and 2017, Peru



LATE

$$Outcome_{isc} = \beta_0 + \beta_1 D_{isc} + \beta_2 female + \beta_3 female * D_{isc} + \theta_c + \varepsilon_{isc} \quad (1)$$

$$D_{isc} = \alpha_0 + \alpha_1 T_{isc} + \alpha_2 X_{isc} + \gamma_c + \epsilon_{isc} \quad (2)$$

Compliance

Table – Compliance with Randomization

	All schools (1)	Schools assigned to: Control group (2)	Schools assigned to: Treatment group (3)
Schools visited by female role models	45	0	45
Schools not visited by female role models	64	58	6
Number of students (in survey)	5398	2694	2704
Student-level compliance with RA	0.94	1.00	0.88

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The presentation

Figure – Thumbnails of Slides Shown During School Visits

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The presentation

Figure – Thumbnails of Slides Shown During School Visits

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