Early exposure to entrepreneurship and the creation of female entrepreneurs

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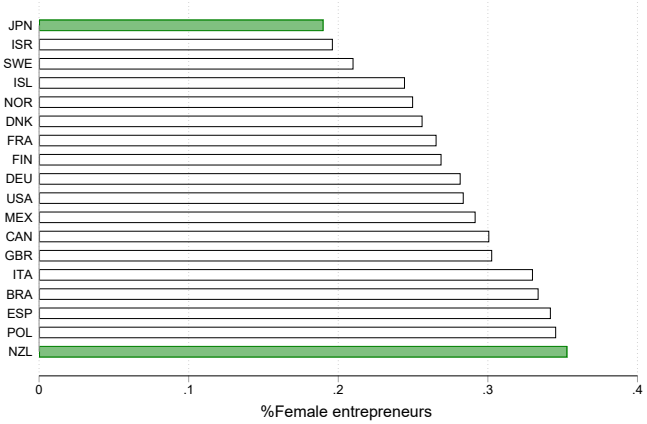
- Women are only between 1/5 & 1/3 of entrepreneurs in OECD countries



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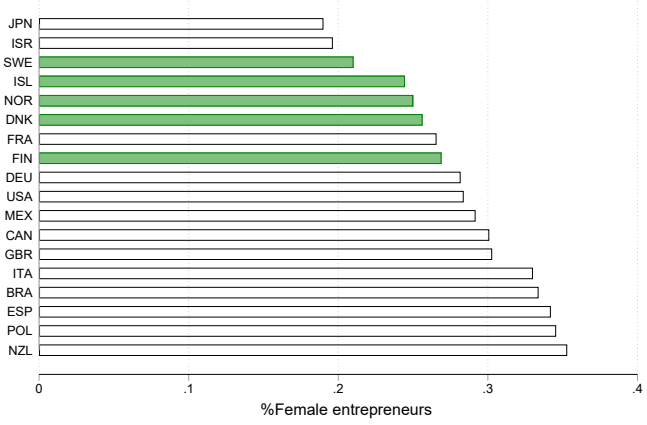
- Underrepresented even in countries otherwise characterized by gender equality Over-time



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  1. ↑ Women's representation in traditionally **male-dominated occupations** increases aggregate performance via better allocation of talent in the economy (Hsieh et al 2019)
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- Yet, surprisingly **little is known** about:
  - What are the factors shaping the gender gap in entrepreneurship
  - The extent to which this gap reflects talent misallocation

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2. Establishes whether gender gaps reflect **talent misallocation**

- We estimate **private and social returns** of narrowing gender gaps through early exposure

This paper: challenges and solutions

1. Find **exogenous variation in exposure** to entrepreneurship during adolescence
   - Quasi-random variation in the share of **peers whose parents are entrepreneurs within schools** across cohorts during the last years of compulsory schooling (age 13-15)

2. **Track individuals** from adolescence to adulthood to estimate long-run effects
   - Leverage **large-scale and longitudinal nature of Danish data** - follow the entire education and career history of almost one million individuals until they are 40 years old

3. **Estimate private and social returns** from reducing gender gaps in entrepreneurship
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Preview of results

1. **Early exposure helps narrowing gender gaps in entrepreneurship**
   - **Girls**: increase in entry & tenure in entrepreneurship
   - **Boys**: transitory effects, would have entered anyway
   - *Moving girls from 25 → 75 pct ≈ 7.5% of parent entrepreneur effect (↑ entry by 88%)*

2. **Gender gaps in entrepreneurship reflect talent misallocation and are costly**
   - **Private returns**: ↓ girls' prob to discontinue studies and of being employed in low-pay jobs
   - **Social returns**: newly created firms are larger and survive for longer than average firm
   - *Moving girls from 25 → 75 pct ↑ total number of jobs created by 4.8%*

3. **Women may face harder informational or cultural entry barriers to entrepreneurship**
   - **Cultural**: change in education path consistent with change in goals/aspirations
   - **Information**: sector-specific effects; ↑ awareness about entrepreneurship as career path
   - Less evidence in support of the effects coming from mentoring / access to capital

Literature and contribution

1. **Emerging literature on misallocation of talent across occupations** (Hsieh et al 2019)
   - First to **directly show** that gender gap in entrepreneurship reflect talent misallocation → particularly relevant for its high **social returns**

2. **Role of social context and exposure for the creation of entrepreneurs**
   - Nanda & Sørensen 2010; Lerner & Malmendier 2013; Lindquist et al 2015; Guiso et al. 2021
   - Fewer studies on gender gaps: Selective settings (**MBA** Hacamo & Kleiner, 2020; **Startups** Rocha & Van Praag 2020); No link to productivity (Markussen & Røed 2017)
   - Minimize issue of gender differences in **sorting** & obtain estimates for **full population**

3. **Role of nurture (vs nature) in shaping women's occupational choices**
   - Nurture: information/social norms/beliefs/role models (Bell et al. 2019; Bertrand 2011, 2020; Bursztyn et al. 2020; Del Carpio & Guadalupe 2021; Olivetti et al 2020; Porter & Serra 2020)
   - Focus on both **equity & efficiency** considerations

Roadmap

Data

Empirical strategy

Results: Effects on gender gaps

Results: Private and social returns

Results: Plausible mechanisms

Conclusions

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Data and Sample

- **Danish registry data** on population of individuals and firms between 1980-2017 ▸ Setting
  - Link data from (i) School register; (ii) Family register; (iii) Employment/Firm register
- **Exposure period**: the last three years of compulsory school (grades 7 to 9) ▸ Educational setting
  - Students are between 13 and 16 years old → *impressionable years*
  - Compulsory education and same curriculum → *trajectories of boys and girls not yet diverged*
- **Sample**: children attending grade 7 in 1980-92 (observed at least until age 35) ▸ Sample by age
  - Complete view of education and occupation history for ≈ 1 million individuals from age 13-40 (1,702 different schools and 275 distinct municipalities)
- **Entrepreneurs**: founders or top management of newly created firms ▸ Descriptive stats
  - Conditional on having employees → *exclude the self-employed* (Levine and Rubinstein 2017)
  - Relatively infrequent profession ≈ 5% of sample entrepreneurs at some point (3% vs 7%)

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Identification strategy

- We measure *exposure* as the share of *school peers* with *parents* who are entrepreneurs
  → Selection into school is not random

- Exploit within-school variation in share of peers with entrepreneur parents across different cohorts of students
  → Students from consequential cohorts in same school share the same environment
  → But can be exposed to ≠ share of peers with entrepreneur parents

- **Treat composition of parental occupation by cohort within-school as quasi-random**
  → Parents unlikely to be aware of cohort-to-cohort variation in the percentage of students with entrepreneurs parents within a particular school
  → Balancing tests support this assumption by showing that cohort-to-cohort changes in exposure are uncorrelated with changes in student characteristics ▸ Tests

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Empirical strategy

For each individual i (separately for boys and girls) attending school s in cohort c:

$$Y_{isc} = \beta_1 Entrepr_{-i,sc} + \beta_2 Parent_{isc} + \gamma_s + \gamma_m \times \gamma_c + \theta X_{isc} + \eta Z_{sc} + \epsilon_{isc}$$

- Y_{isc}: (i) indicator for ever being an entrepreneur; (ii) number of years spent in entrepreneurship
- $Entrepr_{-i,sc}$: share of peers with at least one entrepreneur parent (*leave-one-out*)

$$Entrepr_{-i,sc} = \frac{\sum_{k \neq i} Entrepr_{ksc}}{n_{sc} - 1}$$

- $Parent_{isc}$ is equal to 1 if individual i has an entrepreneur parent
- γ_s, γ_c and γ_m are school, cohort and municipality FE
- X_{isc} and Z_{isc} are a set of individual and peers characteristics
- Standard errors are clustered at the school level

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   - Due to their *different* educational and career *choices*, women are less likely than men to have *direct or indirect experience* in entrepreneurship during adulthood

   ↪ Early "forced" exposure may act as an *equalizer* for girls who would not become familiar with entrepreneurship otherwise

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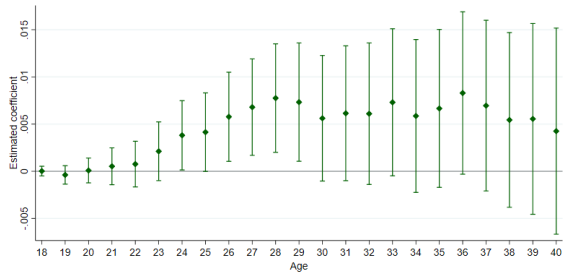
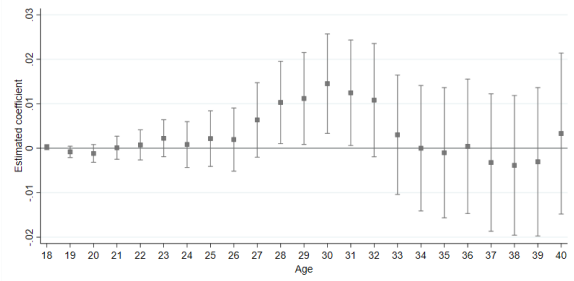
a Probability of ever being an entrepreneur by gender

▸ *Table*



(a) Women

25th → 75th pct in exposure ⇒ 4.5% ↑ in prob of entry in entrepr by age 30



(b) Men

Effects fade away quickly ⇒ they *anticipate* entry but would have entered anyway

b Number of years as entrepreneur by gender

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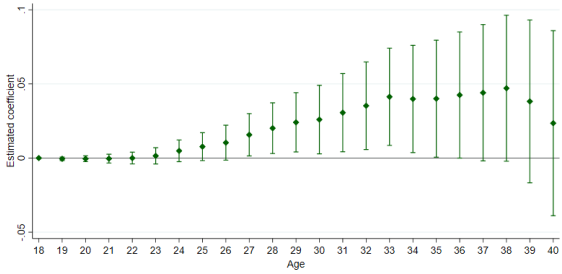
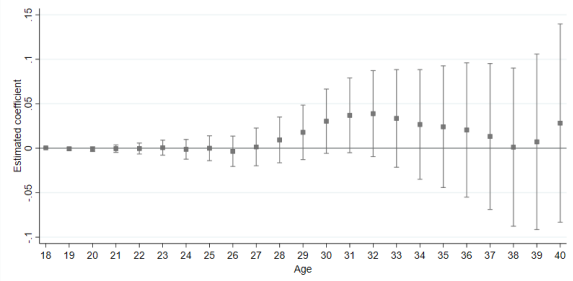


(a) Women

25th → 75th pct in exposure ⇒ 7.1% ↑ in N of years spent in entrepr by age 30

- ↑ both entry & time spent in entrepr



(b) Men

No effect on overall time spent in entrepr

Results

1. Does being exposed to larger share of peers with entrepreneur parents ↑ the **probability** of becoming an entrepreneur? And is the effect stronger for **girls**?
   - Exposure ↑ girls' early **entry** into entrepreneurship and **time** spent in entrepreneurship
   - Exposure is **key only for girls**, who would not have entered in entrepreneurship otherwise

2. To **validate** if these results are in line with exposure channel, we investigate if effects depend on **gender of peers** exposure is coming from: are they stronger for female peers?
   - Boys & girl interact with same-sex peers more **frequently** (Rubin et al. 2015)
   - Boys & girls differ in **type** of relation they have with friends (Underwood 2004; Cools et al. 2019)

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a Probability of ever being an entrepreneur by gender of peers

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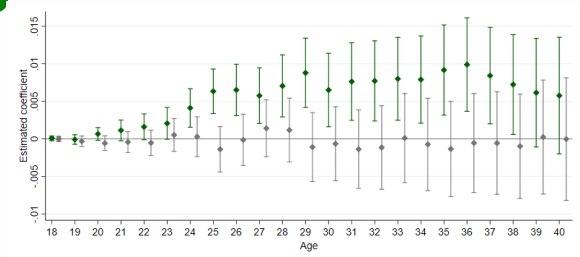
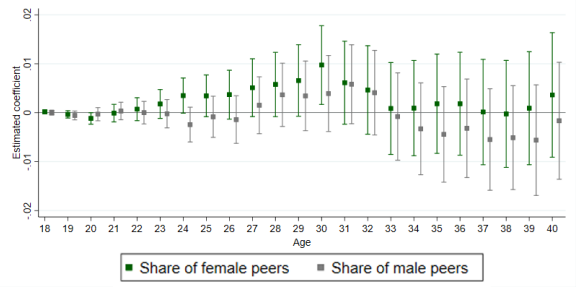


(a) Women

25th → 75th pct in % of *female* peers

- 6.4% ↑ in prob of entry by age 30
- Own parent entrepr ↑ prob by 88% → exposure is 7.3% of own parent effect
- ▸ Number of years graphs



(b) Men

Effects fade away quickly independently on gender of peers

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Implications for talent (mis)allocation

- Showing that early exposure is key for girls is relevant from a **gender equality** perspective
  - **Policy implications**: early exposure to entrepreneurship as a way to reduce gender gaps
  - Not sufficient to understand **efficiency implications** associated with ↓ inequality

- Study whether gender gaps in entrepreneurship reflect **talent misallocation** by looking at:
  1. Counterfactual educational and career paths of women (**private returns**)
  2. Performance of firms created by marginal women relative to incumbents (**social impact**)

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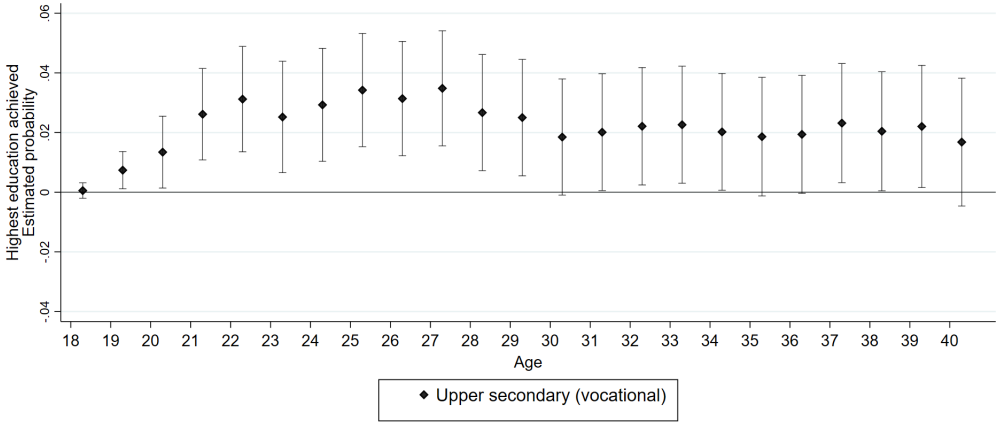
- Girls more likely to enrol & complete vocational education → path conducive to entrepreneurship



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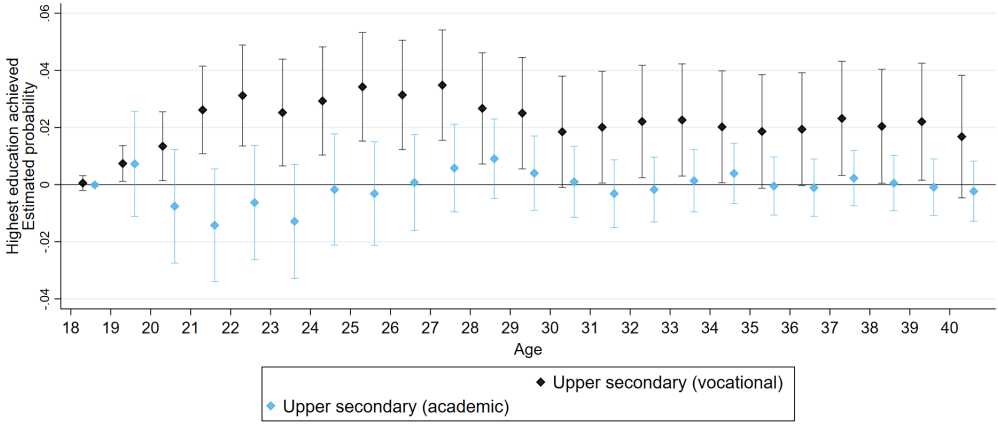

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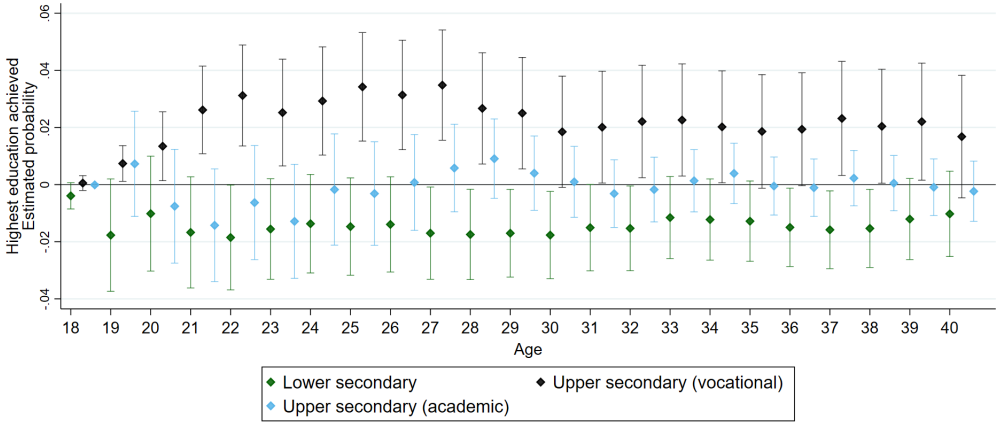

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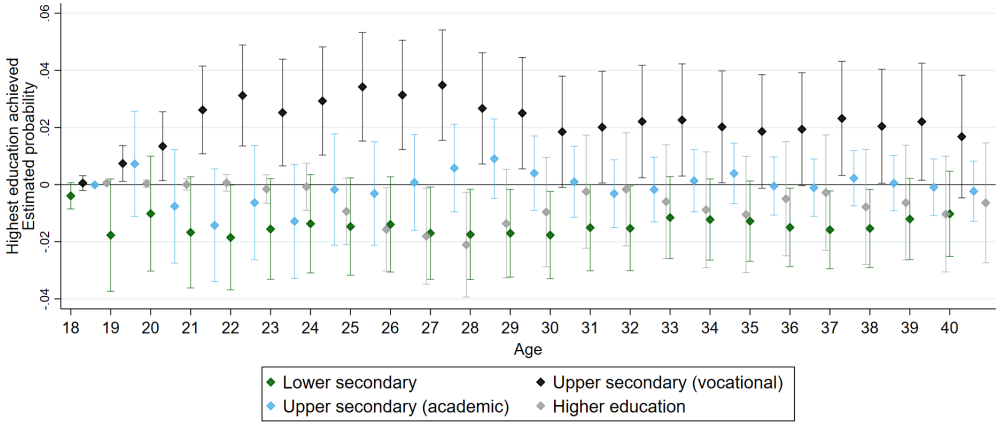

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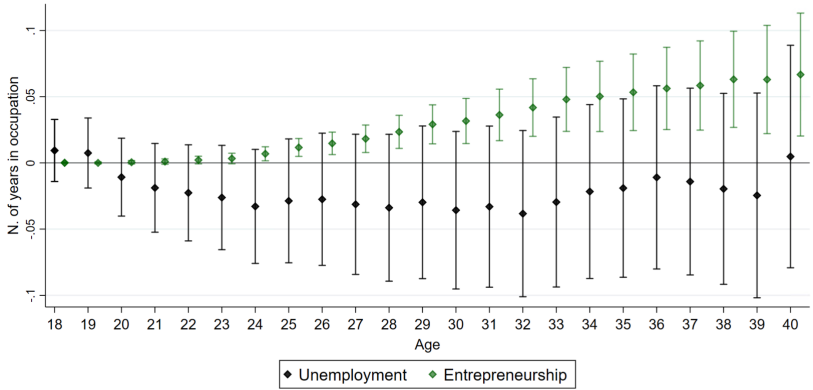

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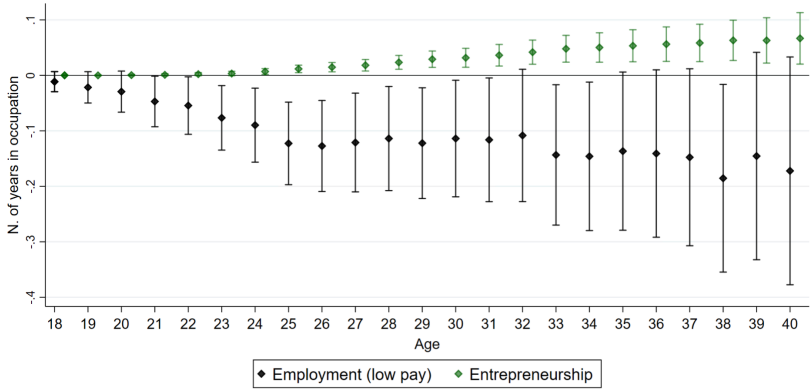
  → ▸ Total Income



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- **Premise of talent misallocation literature**

- **Premise of cost reduction channel**

3 Is the marginal woman entering entrepreneurship "good"?

- **Premise of talent misallocation literature**
  - If talented entrepreneurs do not pursue this profession due to **gender-specific barriers**
    $\rightarrow$ Lowering barriers by $\uparrow$ girls exposure should lead to creation of **successful** business
- **Premise of cost reduction channel**

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  - Exposure could lower women's **entry cost** of setting up a business
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- **Premise of cost reduction channel**
  - Exposure could lower women's **entry cost** of setting up a business
    → Pushes **less productive** girls to start business

⇒ **Compare performance of newly created firms - size, survival - to average business**

- Are the firms created by women exposed to a larger share of female peers with entrepreneur parents more likely to be (at any point) larger and to survive for longer than average firm?

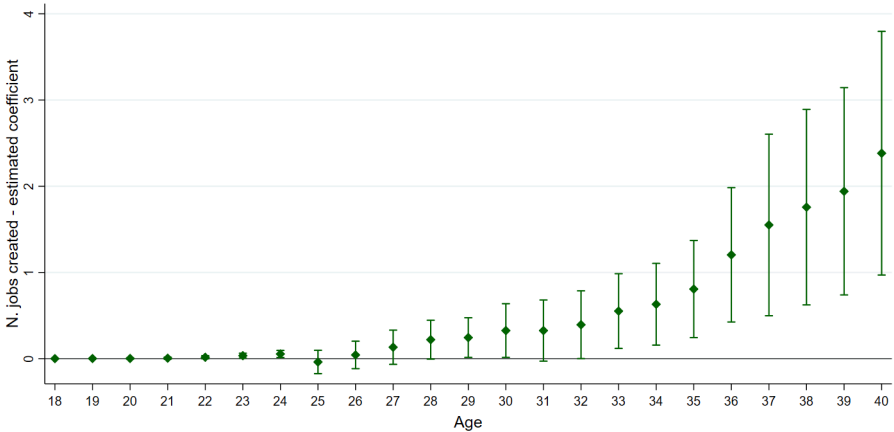
3 Is the marginal woman entering entrepreneurship "good"?

- ↑ in female entrepreneurship associated with creation of larger and longer surviving businesses
  ⇒ Consistent with presence of talent misallocation in entrepreneurship

	Size (n. of employees)		Survival (years)	
	(1) Below average	(2) Above average	(3) Below average	(4) Above average
Share of female peers with parent entrepr.	-0.001	0.005**	0.003	0.004*
	(0.006)	(0.002)	(0.004)	(0.002)
Share of male peers with parent entrepr.	-0.003	-0.001	0.002	-0.003
	(0.006)	(0.002)	(0.004)	(0.002)
Parents is entrepreneur	0.022***	0.004***	0.013***	0.006***
	(0.001)	(0.000)	(0.001)	(0.001)
Observations	395080	395080	395080	395080
School, cohort and municipality x cohort FE	X	X	X	X
Individual controls	X	X	X	X
Cohort controls	X	X	X	X
Mean dep. var	0.0576	0.00510	0.0207	0.00616
St.dev. share of female peers	0.0883	0.0883	0.0883	0.0883
St.dev. share of male peers	0.0870	0.0870	0.0870	0.0870

Cost of talent misallocation: "missing" jobs

- 25th → 75th: 4.8% ↑ tot number of jobs created by entrepreneurs over our sample period



Notes. The figure shows coefficients and 90% confidence intervals for the effects of share of female peers with entrepreneur parents on the cumulative number of jobs created by women.

Roadmap

Data

Empirical strategy

Results: Effects on gender gaps

Results: Private and social returns

Results: Plausible mechanisms

Conclusions

What drives the increase in female entrepreneurship?

In principle, our exposure effects may be consistent with:

1. Transmission of specific human capital
2. Changes in aspirations / goals
3. Increased awareness about entrepreneurship as career path
4. Mentoring or networks
5. Access to capital

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What drives the increase in female entrepreneurship?

In principle, our exposure effects may be consistent with:

1. Transmission of specific human capital
   - Sector-specific effects, especially in male-dominated sectors ▸ Sector effects
2. Changes in aspirations / goals
   - Exposure affects girls educational path
3. Increased awareness about entrepreneurship as career path
   - Results do not apply to other "more standard" male-dominated occupations ▸ Engineers
4. Mentoring or networks
   - No mothers-to-girls role model effect ▸ Gender of parents
5. Access to capital
   - Variations in exposure not associated with changes in peers' parents income ▸ Balancing Tests

Roadmap

Data

Empirical strategy

Results: Effects on gender gaps

Results: Private and social returns

Results: Plausible mechanisms

Conclusions

Early exposure to entrepreneurship lowers barriers for talented women

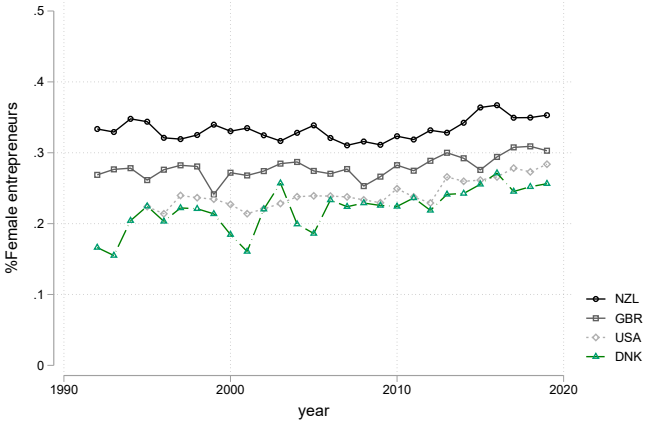
- Early exposure helps narrowing **gender gaps** in entrepreneurship
  - ↑ **Entry & tenure** for girls who would not have become entrepreneurs otherwise
  - ↑ Girls' exposure from 25th to 75th pct ↑ **probability** to start a firm by **6.4%**
- Effects of exposure mostly consistent with following **plausible mechanisms**:
  - Change in girls' goals / aspirations → **cultural barriers**
  - Transmission of specific information / ↑ awareness of career path → **informational barriers**
- Gender gaps in entrepreneurship reflect **talent misallocation**
  - Narrowing of gender gaps is associated with the creation of **productive businesses**
  - ↑ Girls' exposure from 25th to 75th pct ↑ **number of jobs** created by **4.8%**

Thank you!

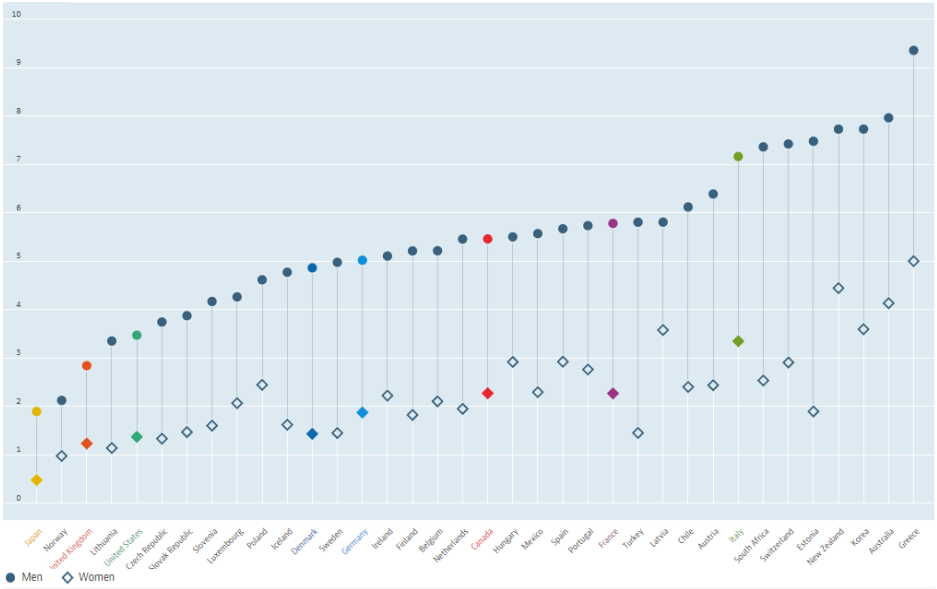
Gender gaps in entrepreneurship

Despite convergence in the occupational distribution of men and women, women continue to be highly underrepresented in entrepreneurship in OECD countries

- Differently from other professions, not much progress over time Back



Men/women entrepreneurs as % of employment 2021 (OECD)

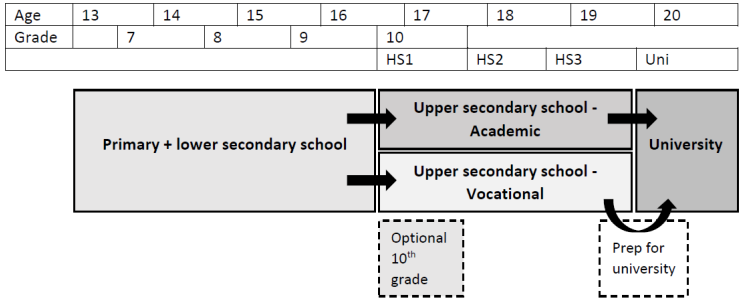


The Danish entrepreneurial scene

- Despite high wages and high taxes, Denmark is one of the major start-up hubs in Europe
- It is ranked 2nd in Europe and 4th country in the world for quality and health of the entrepreneurial ecosystem (Acs et al. 2019)
- Strong collaboration across Danish government, investors, startup communities and enterprise companies

Back

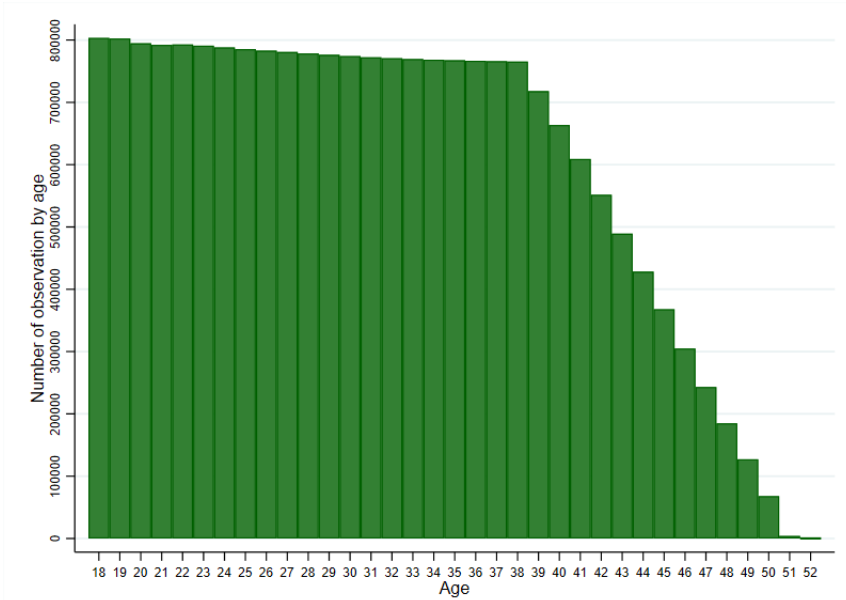
Educational setting in Denmark



- Children in Denmark attend 10 years of primary and lower secondary school (grade 0 to 9) in the same institution
- Hereafter they can either discontinue education or attend academic or vocational upper secondary school, and then university

Back

Sample size by age



Back

Descriptive stats

	All sample		Women		Men	
	Mean	St.Dev	Mean	St.Dev	Mean	St.Dev
A: Outcome variables						
Ever entrepreneur	0.048	0.214	0.027	0.162	0.069	0.253
Ever entrepreneur by 25	0.008	0.088	0.005	0.069	0.011	0.103
Ever entrepreneur by 30	0.024	0.153	0.013	0.111	0.035	0.183
Ever entrepreneur by 35	0.039	0.194	0.021	0.142	0.057	0.232
Ever entrepreneur by 40	0.058	0.234	0.032	0.177	0.082	0.275
N. of years as entrepreneur	0.222	1.302	0.115	0.918	0.325	1.578
N. of years as entrepreneur (cond. on entrepr.)	4.600	3.870	4.222	3.704	4.743	3.921
B: Cohort variables						
Share of peers with parent entrepr.	0.117	0.072	0.117	0.071	0.116	0.072
Number of students	55.061	24.251	55.329	24.259	54.803	24.240
Share of second-generation immigrants	0.007	0.027	0.007	0.027	0.007	0.026
C: Individual characteristics						
Female	0.489	0.500	1.000	0.000	0.000	0.000
Parents is entrepreneur	0.117	0.321	0.116	0.320	0.117	0.321
Observations	807300		395087		412213	
Schools	1702		1702		1702	
Cohorts	13		13		13	
Municipalities	275		275		275	

Back

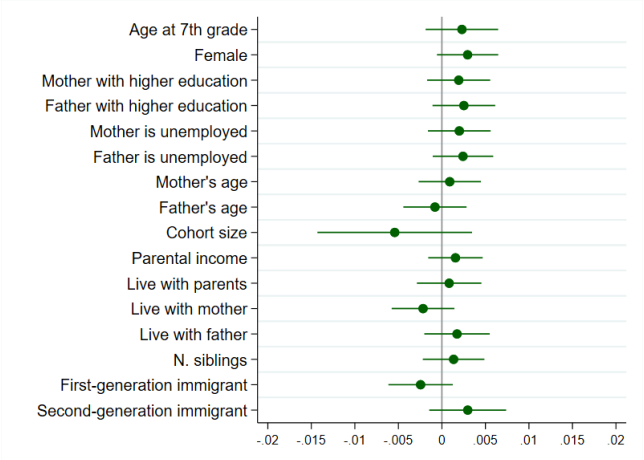
Raw and residual variation

	Mean	St.Dev
Share of peers with at least one entrepreneur parent		
Raw cohort variable	0.117	0.072
Residuals after removing school, cohort and municipality x cohort FE	0.000	0.042

Notes. This table reports the raw and residual (net of school, cohort and municipality times cohort fixed effects) variation in the share of peers whose parents are entrepreneurs.

Back

Balancing tests



Notes. Coefficients of separate regressions of each variable on the share of peers with parent entrepreneurs, including full set of FEs. All variables are standardized.

Back

Ever entrepreneur by gender

	Ever entrepreneur			
	(1) by age 25	(2) by age 30	(3) by age 35	(4) by age 40
A. Women				
Share of peers with parent entrepreneur	0.004*	0.006	0.007	0.003
	(0.002)	(0.004)	(0.005)	(0.007)
Parents is entrepreneur	0.005***	0.011***	0.016***	0.021***
	(0.000)	(0.001)	(0.001)	(0.001)
Observations	390770	386507	382862	330081
Mean dep. var	0.00474	0.0125	0.0206	0.0322
St.dev. share of peers	0.0716	0.0716	0.0716	0.0716
B. Men				
Share of peers with parent entrepreneur	0.001	0.014**	-0.001	-0.004
	(0.004)	(0.007)	(0.009)	(0.011)
Parents is entrepreneur	0.013***	0.043***	0.062***	0.075***
	(0.001)	(0.001)	(0.002)	(0.002)
Observations	407746	402146	396183	342964
Mean dep. var	0.0107	0.0347	0.0570	0.0822
St.dev. share of peers	0.0716	0.0716	0.0716	0.0716

Notes. The dependent variable in each columns is an indicator for whether the individual ever entered entrepreneurship by the age considered. All regressions include set of FEs and controls. Standard errors clustered at the school level in parentheses.

* $p< 0.1$, ** $p< 0.05$, *** $p< 0.01$.

Back

Number of years as entrepreneur by gender

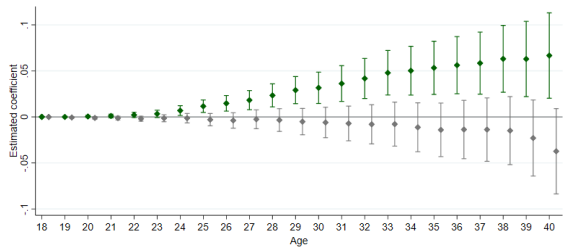
	N. years as entrepreneur			
	(1) by age 25	(2) by age 30	(3) by age 35	(4) by age 40
A. Women				
Share of peers with parent entrepreneur	0.008	0.026*	0.040*	0.026
	(0.006)	(0.014)	(0.024)	(0.039)
Parents is entrepreneur	0.008***	0.032***	0.065***	0.111***
	(0.001)	(0.003)	(0.004)	(0.007)
Observations	390770	386507	382862	330081
Mean dep. var	0.00911	0.0346	0.0733	0.136
St.dev. share of peers	0.0716	0.0716	0.0716	0.0716
B. Men				
Share of peers with parent entrepreneur	-0.002	0.029	0.023	0.009
	(0.008)	(0.022)	(0.041)	(0.068)
Parents is entrepreneur	0.030***	0.146***	0.333***	0.551***
	(0.002)	(0.005)	(0.010)	(0.016)
Observations	407746	402146	396183	342964
Mean dep. var	0.0202	0.0940	0.214	0.390
St.dev. share of peers	0.0716	0.0716	0.0716	0.0716

Notes. The dependent variable in each columns is the number of years spent in entrepreneurship by the age considered. All regressions include set of FEs and controls. Standard errors clustered at the school level in parentheses.
* p< 0.1, ** p< 0.05, *** p< 0.01.

Back

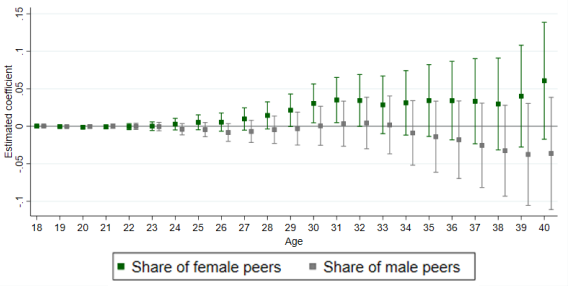
b Number of years as entrepreneur by gender of peers

Back



(a) Women

25th → 75th pct in % of *female* peers ⇒ 10.2% ↑ time spent in entrepr at age 30

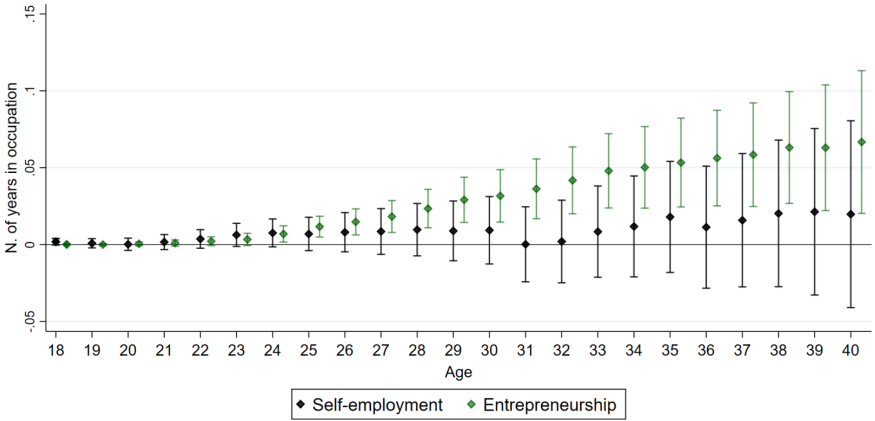


(b) Men

Insignificant effects, independently of gender of peers

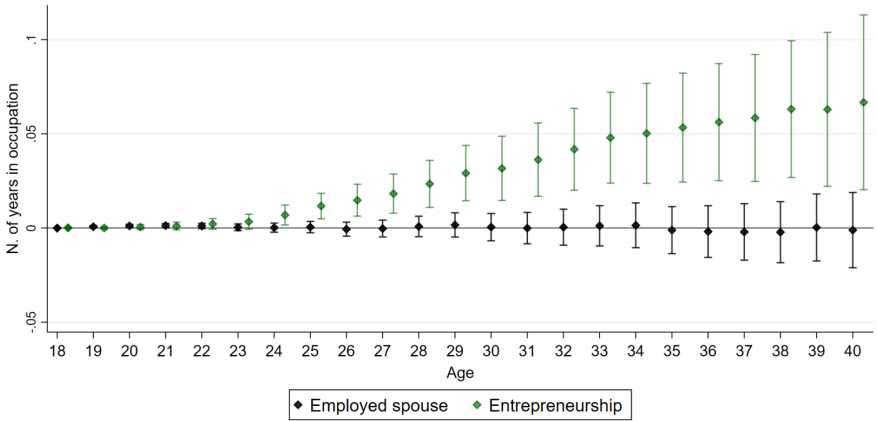
2 How does exposure affect women's career choices?

- No effect on years spent (i) as self-employed



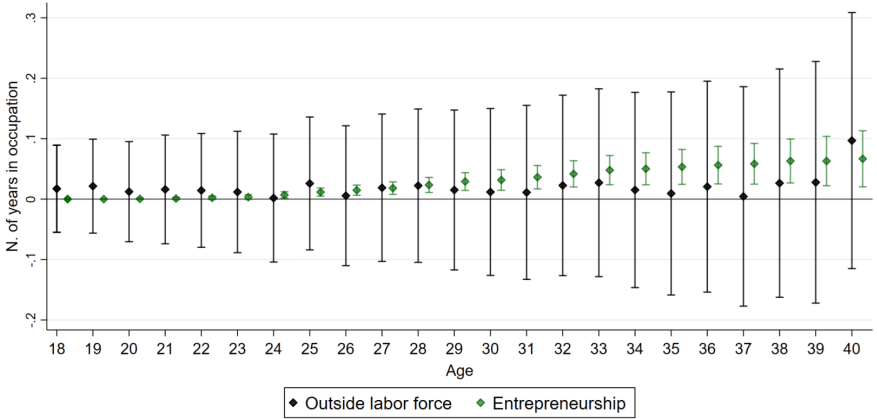
2 How does exposure affect women's career choices?

- No effect on years spent (i) as self-employed, (ii) employed spouse



2 How does exposure affect women's career choices?

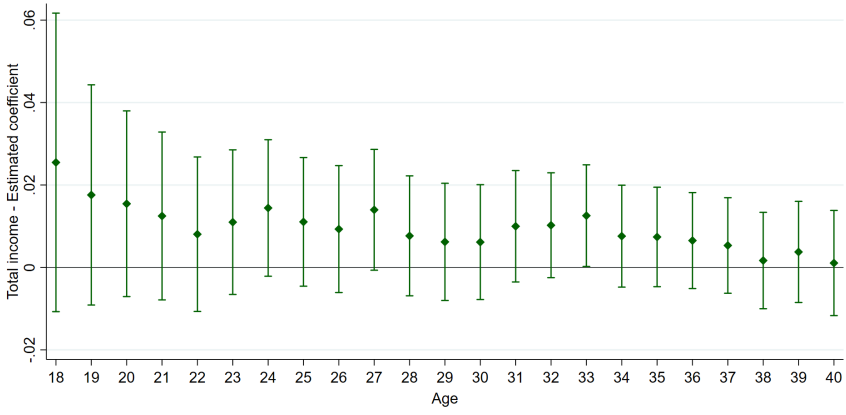
- No effect on years spent (i) as self-employed, (ii) employed spouse (iii) outside labor force



Back

2 How does exposure affect women's career choices?

- In line with previous results, women are not worst-off in terms of total income



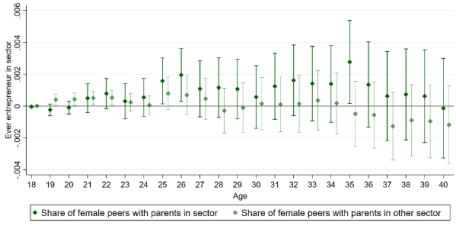
Back

Do women respond more to their peers' mothers?

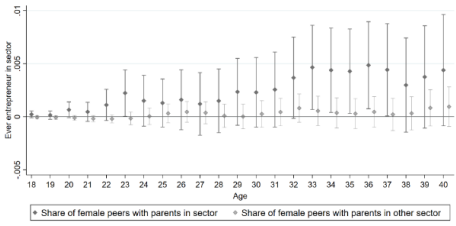
	Ever entrepreneur			
	(1) by age 25	(2) by age 30	(3) by age 35	(4) by age 40
A. Women				
Share of female peers with father entrepreneur	0.007***	0.005*	0.008**	0.002
	(0.002)	(0.003)	(0.004)	(0.005)
Share of female peers with mother entrepreneur	-0.000	0.010	0.010	0.010
	(0.004)	(0.007)	(0.009)	(0.011)
Share of male peers with father entrepreneur	-0.003	-0.001	-0.001	-0.002
	(0.002)	(0.003)	(0.004)	(0.005)
Share of male peers with mother entrepreneur	0.009*	0.003	-0.001	0.006
	(0.005)	(0.007)	(0.009)	(0.012)
Father is entrepreneur	0.003***	0.008***	0.013***	0.017***
	(0.000)	(0.001)	(0.001)	(0.001)
Mother is entrepreneur	0.009***	0.022***	0.029***	0.041***
	(0.001)	(0.002)	(0.003)	(0.004)
Observations	390770	386507	382862	330081
Mean dep. var	0.00474	0.0125	0.0206	0.0322
St.dev. share of female peers (fathers)	0.0830	0.0830	0.0830	0.0830
St.dev. share of female peers (mothers)	0.0305	0.0305	0.0305	0.0305
St.dev. share of male peers (fathers)	0.0816	0.0816	0.0816	0.0816
St.dev. share of male peers (mothers)	0.0295	0.0295	0.0295	0.0295

Effects of mothers and fathers are not statistically different (concern: lack of precision in mothers estimates) ▸ N. years entrepr. ◂ Back

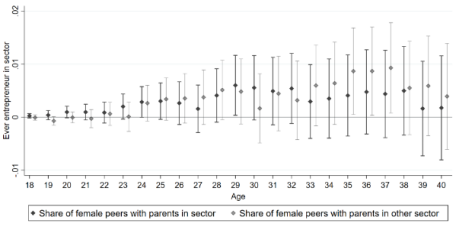
Is there a sector-specific effect for women?



(a) Primary sector and construction



(b) Manufacturing

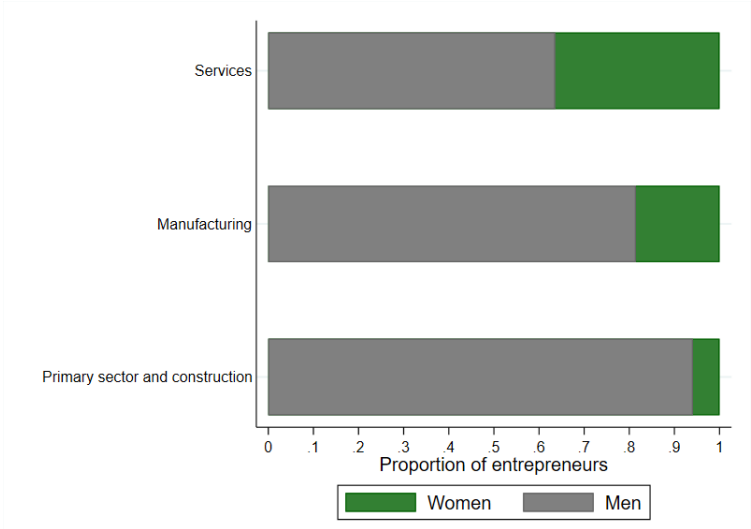


(c) Services

▸ Gender distribution ◂ Back

Women respond to exposure to manufacturing, a sector where they usually do not specialize into

Gender distribution within sectors



Back

Entrepreneurs vs Engineers

Effects are not "simply" due to lowering barriers to male-dominated occupation → exposure to some other feature specific to entrepreneurship matters

	Ever architect/engineer
Share of female peers with parent architect/engineer	-0.001
	(0.003)
Share of male peers with parent architect/engineer	0.001
	(0.004)
Parent is architect/engineer	0.014***
	(0.001)
Observations	395080
School, cohort and municipality x cohort FE	X
Individual controls	X
Cohort controls	X
Mean dep. var	0.0394
St.dev. share of female peers	0.114
St.dev. share of male peers	0.111

Back

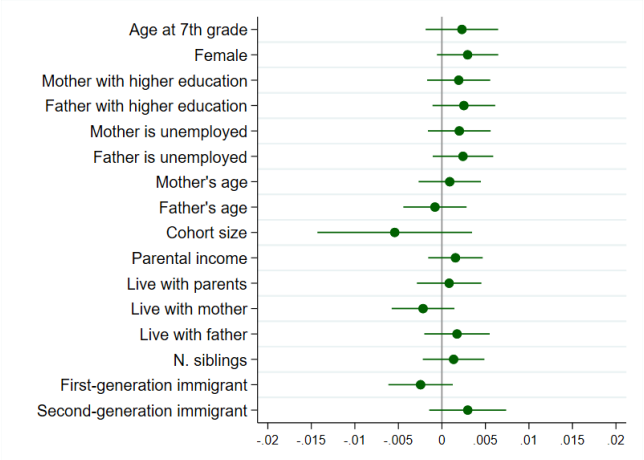
Entrepreneurs vs Engineers

Effects are not "simply" due to lowering barriers to male-dominated occupation → exposure to some other feature specific to entrepreneurship matters

	Ever architect/engineer
Share of female peers with parent architect/engineer	-0.001
	(0.003)
Share of male peers with parent architect/engineer	0.001
	(0.004)
Parent is architect/engineer	0.014***
	(0.001)
Observations	395080
School, cohort and municipality x cohort FE	X
Individual controls	X
Cohort controls	X
Mean dep. var	0.0394
St.dev. share of female peers	0.114
St.dev. share of male peers	0.111

Back

Balancing tests



Notes. Coefficients of separate regressions of each variable on the share of peers with parent entrepreneurs, including full set of FEs. All variables are standardized.

Back