Gender Stereotypes and Entrepreneur Financing

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CEPR-EBRD
Financing Women-led SMEs Conference
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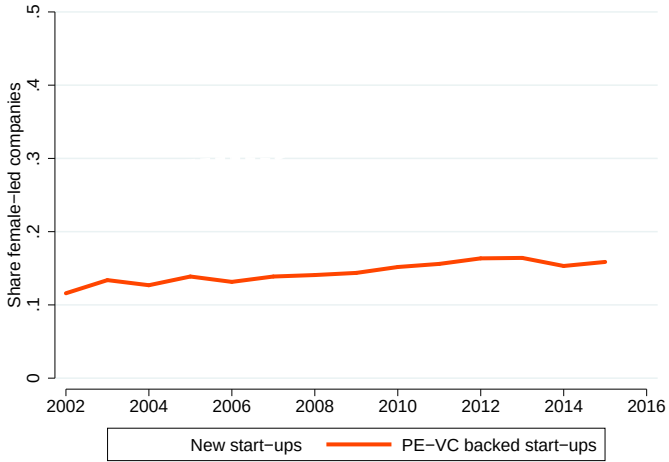
Motivation

- There is a long-lasting **gender funding gap**



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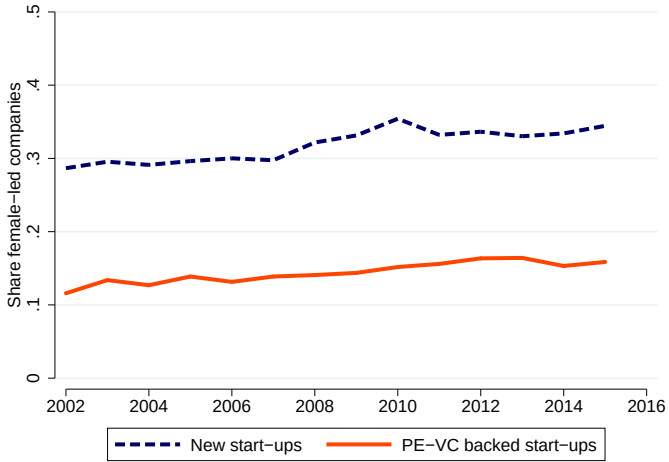

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Women in technology

Silicon Valley's sexism problem

Venture capitalists are bright, clannish and almost exclusively male

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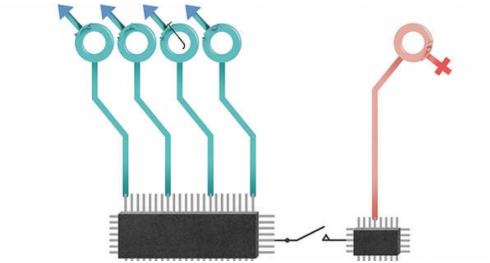
Valley of the dudes

Tech firms can banish sexism without sacrificing the culture that made them successful



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- Question: Are female entrepreneurs **systematically** at a disadvantage when raising capital?
  - Little systematic empirical evidence
  - Major challenge: data and identifying the causes of the gender gap in entrepreneur financing $\Rightarrow$ demand-side versus supply-side factors

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- Main results:
  1. Female entrepreneurs are on average less likely to use external equity and VC
  2. In female-dominated industries, female entrepreneurs are **more likely** to use VC
  3. The minority group **out-performs** conditional on receiving external equity ("the bar is set higher")

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   - But, highly-motivated female entrepreneurs who report difficulties getting funding are still less likely to be VC-backed

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6. Female entrepreneurs do not seek VC because they **anticipate discrimination**
   - But, anticipating discrimination, still suggests that there is discrimination

- Main contributions:
  - Different way of thinking about discrimination ⇒ **Context matters** in how investors perceive entrepreneurs' ability to succeed

- Three strands of the literature
  - Gender gap in entrepreneurship: Ewens and Townsend (2020), Calder-Wang and Gompers (2021), Gornall and Strebulaev (2022), Howell and Nanda (2022)
  - Stereotypes in other contexts: Lab: Reuben et al. (2014), Coffman (2014), Bordalo et al. (2016, 2018); Field: Arnold, Dobbie and Yang (2018), Bohren, Imas and Rosenberg (2019)
  - Performance of VCs: among others, Hellmann and Puri (2000,2002), Gompers and Lerner (1999), Kaplan and Schoar (2005)

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- Belief-based discrimination (Arrow, 1972)
  - Rational beliefs = statistical discrimination
  - Miscalibrated beliefs (Borhen, Imas and Rosenberg, 2019)

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– **Context-dependent stereotypes** (Bordalo, Coffman, Genaioli, Shleifer, 2016)
  - Exaggeration of the **average abilities** of the dominant group
  - "male" in computer programming, "female" in health care

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- Empirical predictions:

– Female entrepreneurs are more likely to raise capital in female-dominated sectors

– Male entrepreneurs are more likely to raise capital in male-dominated sectors

Empirical challenges

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  1. I do not observe **applications** to VCs
  2. Entrepreneurs' abilities are not observable
  3. Traditional datasets capture information about firms that have successfully raised capital $\rightarrow$ **sample selection**

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- The approach:
  1. Dataset with the **population** of new entrepreneurs → Benchmark the % funded entrepreneurs by gender to their representation in different sectors and at different stages of the pipeline
  2. **Survey** eliciting entrepreneurs' preferences
  3. Start ups' performance unconditional of their funding status

- French administrative data available at the the French Bureau of Statistics

- **Tax files**
  - Available for every firms in France from 2002-2017
  - Balance-sheet + income statements + Employers' payrolls

- **SINE surveys** (*Système d'Information des Nouvelles Entreprises*)
  - Large scale survey of entrepreneurs, **representative** of the population
    - Conducted on cohorts: 2002, 2006, 2010, 2014, 2018
    - 25% of the start-ups created within a year = $[15,000; 40,000]$ per cohort
    - 90% Response rate (run by the fiscal Administration)
  - **Detailed information** about entrepreneurs and their project
    - education, work experience, family structure, income sources
    - funding sources, activity, incorporation, startup capital
  - **Survey questions** about founding motivations, growth preferences, difficulties

What makes a female entrepreneur?

	1{**Female entrepreneur**} (1)	(*Continued*)	
Age $\geq$ 40	-0.0025	Innovative business	0.0037
	(0.01)		(0.00)
French national	0.0270***	High-growth oriented	-0.0242***
	(0.01)		(0.01)
Undergraduate	0.0610***	Incorporated	-0.0179***
	(0.01)		(0.01)
Graduate	0.0632***	Independent	-0.0141***
	(0.01)		(0.00)
Elite school	-0.1349***	Taste	-0.0157***
	(0.01)		(0.00)
Industry expert	-0.0640***	New Idea	0.0021
	(0.01)		(0.00)
Serial entrepreneur	-0.0826***	Opportunity	0.0187***
	(0.01)		(0.00)
Co-founder(s)	0.0242***	Successful peers	0.0108***
	(0.01)		(0.01)
Other controls	Yes		
Sector $\times$ Cohort + County FE	Yes		
R^2	0.218		
N	131,291		
Mean Dep. Var.	0.289		

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Funding sources

	All	Male		Female			
Variables	Mean	N	Mean	N	Mean	p-value	t-stat
External financing	0.493	93325	0.492	38018	0.495	-0.00	(-0.76)
VC	0.003	55932	0.004	23228	0.001	0.00***	(6.10)
External equity	0.020	93325	0.023	38018	0.013	0.01***	(13.03)
Bank loan	0.271	93325	0.276	38018	0.259	0.02***	(6.15)
Personal loan	0.121	93325	0.117	38018	0.129	-0.01***	(-5.50)
Microcredit	0.016	55932	0.015	23228	0.020	-0.01***	(-5.33)
Other loans	0.082	93325	0.079	38018	0.089	-0.01***	(-6.01)
Public grant	0.204	93325	0.201	38018	0.214	-0.01***	(-5.35)

- 50% of new firms use external financing at the end of their first year of operation
- 27% of new firms use bank loans vs less than 1% of them use VC
- Large unconditional gender funding gap for VC and external equity financing

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Gender Gap *within* Sector

	External equity (1)	VC (2)
Female	-0.0052***	-0.0013***
	(0.001)	(0.000)
Graduate	0.0063***	0.0015**
	(0.001)	(0.001)
Grande ecole	0.0093***	0.0083***
	(0.003)	(0.002)
Industry expert	-0.0000	-0.0012**
	(0.001)	(0.000)
Serial entrepreneur	0.0101***	0.0015***
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Co-founder(s)	0.0136***	0.0032***
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Sector × Cohort-year FE + County FE	Yes	Yes
R^2	0.039	0.027
N	131,291	79,160
Mean dep. var.	0.0205	0.0029

$$VC_i = \lambda_z + \lambda_{st} + \delta Female_i + \beta' X_i + \epsilon_i$$

- SIC-4 Sectors: 324 sectors
  - "Manufacture of electronic components" (26.11), "Manufacture of computers and peripheral equipment" (26.12)

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- SIC-4 Sectors: 324 sectors
  - "Manufacture of electronic components" (26.11), "Manufacture of computers and peripheral equipment" (26.12)
- Female-founded start-ups are **40%** $(= \frac{-0.0013}{0.0029})$ **less likely to use VC** relative to their male peers
- 25% $(= \frac{-0.0052}{0.0205})$ less likely to use sources of external equity
  - Includes VC, seed, angel, CVC

Gender Stereotypes

$$ExternalEquity_i = \lambda_{st} + \lambda_z + \delta_1 Female_i + \delta_2 Female_i \times F.Sector_t + \beta' X_i + \varepsilon_i$$

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- Female-dominated sector: 1 if more than 50% of new start-ups within a 4-digit French SIC sector are female-founded

Rank	Sector (4-digit French SIC)	% Female	# Start-ups	# deals
1	Hairdressing and other beauty treatment	0.77	5,627	110
3	Other human health activities	0.71	5,368	41
6	Physical well-being activities	0.68	541	11
9	Retail sale of flowers, plants, seeds, fertilizers, pets	0.64	736	19
18	Retail sale of clothing in specialized stores	0.59	1,942	49
...				
86	Restaurants and mobile food service activities	0.35	12,812	368
151	Manufacture of bread, pastry and cakes	0.24	2,494	81
217	Computer programming activities	0.16	1,366	54
237	Engineering activities and related technical consultancy	0.13	1,963	71
239	Maintenance and repair of motor vehicles	0.13	2,122	64

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  - $\delta_1 = 0$, and $\delta_2 = 0$

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- Rational case
  - $\delta_1 = 0$, and $\delta_2 = 0$
- Bias case
  - $\delta_1 < 0$ and $\delta_2 = 0$

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- Rational case
  - $\delta_1 = 0$, and $\delta_2 = 0$
- Bias case
  - $\delta_1 < 0$ and $\delta_2 = 0$
- Stereotypes
  - $\delta_1 < 0$ and $\delta_2 > 0$

Gender Stereotypes

$$ExternalEquity_i = \lambda_{st} + \lambda_z + \delta_1 Female_i + \delta_2 Female_i \times F.Sector_t + \beta' X_i + \gamma' Z_{st} + \epsilon_i$$

	External Equity (1)	VC (2)	External Financing (3)
Female	-0.0067***	-0.0017***	-0.0020
	(0.001)	(0.000)	(0.007)
Female × F-dominated sector	0.0059***	0.0016**	0.0343**
	(0.002)	(0.001)	(0.016)
Sector × Cohort-year FE	Yes	Yes	Yes
County FE	Yes	Yes	Yes
R^2	0.039	0.027	0.147
N	131,291	79,160	131,291
Mean dep. var.	0.0205	0.0029	0.4931

- Women are **33%** ($= \frac{-0.0067}{0.0029}$) less likely to use VC in M-dominated sectors

Gender Stereotypes

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	External Equity (1)	VC (2)	External Financing (3)
Female	-0.0067***	-0.0017***	-0.0020
	(0.001)	(0.000)	(0.007)
Female × F-dominated sector	0.0059***	0.0016**	0.0343**
	(0.002)	(0.001)	(0.016)
Sector × Cohort-year FE	Yes	Yes	Yes
County FE	Yes	Yes	Yes
R^2	0.039	0.027	0.147
N	131,291	79,160	131,291
Mean dep. var.	0.0205	0.0029	0.4931

- Women are **33%** ($= \frac{-0.0067}{0.0029}$) less likely to use VC in M-dominated sectors
- Women are **equally** ($= \frac{0.0059-0.0067}{0.0029}$) likely to use VC in F-dominated sectors
- Asymmetric funding outcomes across sectors

Gender Stereotypes

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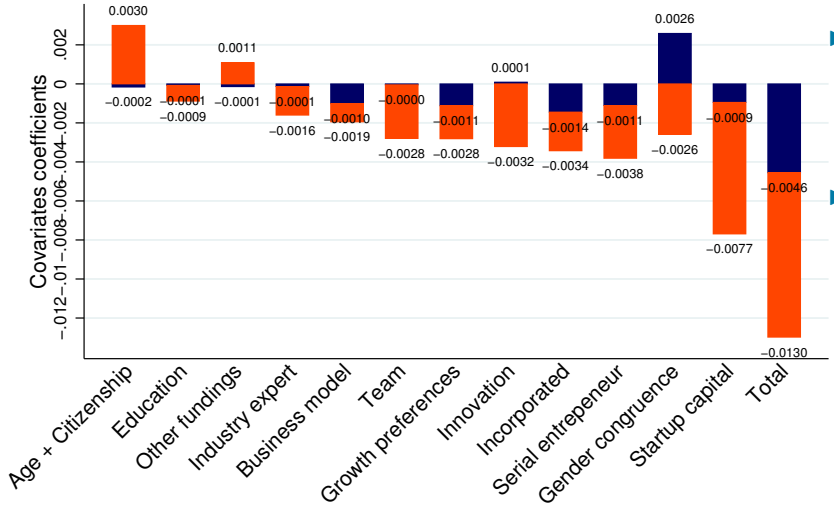
Dependent variable:	Bank loans		Other loans		Public
	Corporate debt	Personal debt	Microcredit	Other	Grants
Female	-0.0062	0.0003	0.0041*	0.0114***	0.0031
	(0.005)	(0.003)	(0.002)	(0.003)	(0.004)
Female × F-dominated sector	0.0211	0.0085*	0.0006	0.0040	0.0220***
	(0.014)	(0.005)	(0.003)	(0.007)	(0.008)
Sector × Cohort-year FE + County FE	Yes	Yes	Yes	Yes	Yes
R^2	0.109	0.047	0.032	0.038	0.253
N	131,291	131,291	79,160	131,291	131,291
Mean dep. var.	0.2709	0.1207	0.0165	0.0818	0.2043

- **No gender gap** in the use of **bank debt**
- Female entrepreneurs are more likely to use other sources of debt (micro credit and subsidized loans) in male-dominated sectors
- Female entrepreneurs in F-dominated sectors are more likely to use cash grants



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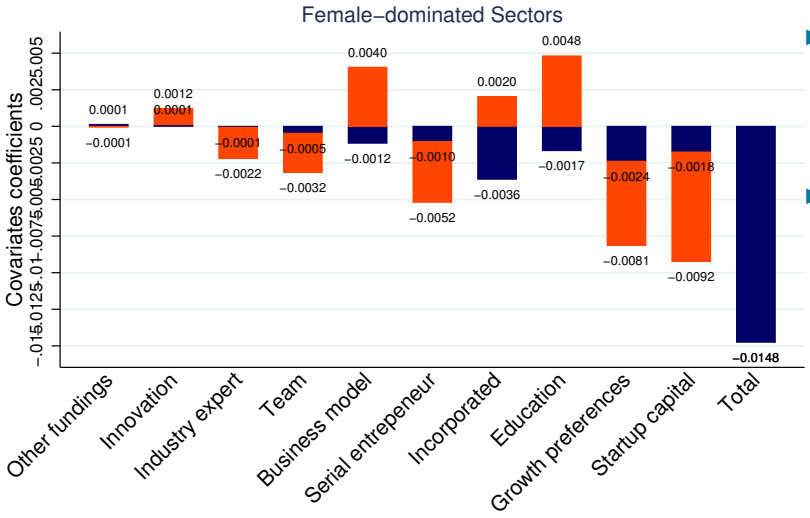

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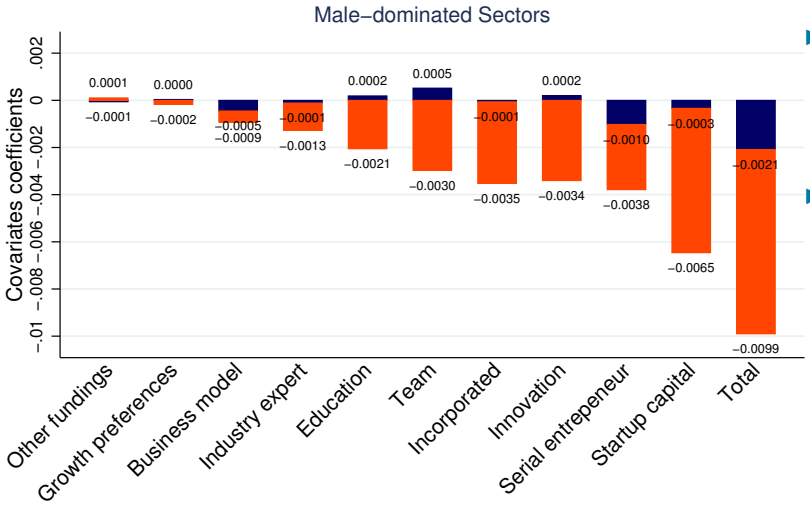

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   - Becker (1993)'s Outcome test

What profiles of female entrepreneurs?

Dependent variable	1(VC)					
Characteristics:	Serial entrepreneur (1)	Co-founders (2)	Incorporated (3)	High growth (4)	Innovative (5)	Difficulty funding (6)
Female	-0.0007	-0.0005	-0.0004	-0.0006	0.0001	-0.0003
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female × Characteristics	-0.0019**	-0.0025**	-0.0014**	-0.0018*	-0.0028***	-0.0041***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Serial entrepreneur	0.0020***	0.0015***	0.0015***	0.0015***	0.0015***	0.0015***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Co-founder(s)	0.0032***	0.0039***	0.0032***	0.0032***	0.0032***	0.0031***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Incorporated	0.0006	0.0007	0.0011**	0.0007	0.0006	0.0006
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
High-growth oriented	0.0026***	0.0026***	0.0027***	0.0031***	0.0026***	0.0024***
	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)
Innovative business	0.0022***	0.0022***	0.0022***	0.0022***	0.0030***	0.0020***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Difficulties getting funding						0.0046***
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Sector × Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.030	0.031	0.030	0.030	0.031	0.031
N	79,276	79,276	79,276	79,276	79,276	79,276

- Serial female entrepreneurs use VC at the **same rate** as first-time male entrepreneurs
- Female entrepreneurs who want to grow use VC at the same rate as male entrepreneurs whose main motivation is to create their own job

$$1(\text{F-dominated sector})_i = \lambda_z + \lambda_t + \delta_1 Female_i + \delta_2 Characteristics_i + \delta_3 Female_i \times \text{Characteristics}_i + \beta' X_i + \epsilon_i$$

Dependent variable:	1(Female-dominated sector)				
	(1)	(2)	(3)	(4)	(5)
Female × Grande Ecole	-0.0987**				
	(0.032)				
Female × Serial entrepreneur		-0.0337*			
		(0.013)			
Female × Incorporated			-0.2257***		
			(0.021)		
Female × Co-founder(s)				-0.1395***	
				(0.014)	
Female × High-growth					-0.1159***
					(0.019)
Female	0.2523***	0.2573***	0.3576***	0.2954***	0.2846***
	(0.016)	(0.017)	(0.021)	(0.019)	(0.019)
Grande ecole	-0.0536**	-0.0712***	-0.0742***	-0.0616***	-0.0723***
	(0.012)	(0.014)	(0.014)	(0.011)	(0.014)
Serial entrepreneur	0.0036	0.0117	0.0003	0.0011	0.0027
	(0.006)	(0.006)	(0.005)	(0.006)	(0.006)
Incorporated	-0.1007**	-0.1009**	-0.0344	-0.1159***	-0.0991**
	(0.023)	(0.023)	(0.017)	(0.013)	(0.022)
Co-founder(s)	-0.0003	-0.0003	0.0016	0.0348***	0.0001
	(0.005)	(0.005)	(0.005)	(0.003)	(0.005)
High-growth oriented	-0.0247***	-0.0246***	-0.0238***	-0.0235***	0.0052
	(0.004)	(0.004)	(0.005)	(0.003)	(0.006)

- Highly skilled and motivated women start in **Male-dominated sectors**
- Positive selection of women suggests barriers of entry in M-dominated sectors

$$1(\text{F-dominated sector})_i = \lambda_z + \lambda_t + \delta_1 Female_i + \delta_2 Characteristics_i + \delta_3 Female_i \times \text{Characteristics}_i + \beta' X_i + \epsilon_i$$

Dependent variable:	1(Female-dominated sector)		
	[18–34]	[35–44]	≥45 y/o
	(1)	(2)	(3)
Female × Children	0.0188	0.0514**	0.0141
	(0.011)	(0.006)	(0.013)
Children	-0.0260**	-0.0182**	-0.0052**
	(0.005)	(0.004)	(0.001)
Female	0.3055***	0.2130***	0.2083***
	(0.023)	(0.007)	(0.009)
Other controls	Yes	Yes	Yes
Cohort-year FE	Yes	Yes	Yes
County FE	Yes	Yes	Yes
R^2	0.206	0.133	0.091
N	27,193	24,357	24,516
Mean dep. var.	0.2551	0.2099	0.2049

- F-dominated sectors accommodate women with children's needs for **flexibility**

Dependent variable:	Incorporated Startup (1)	At least 1 employee (2)	Has co-founder(s) (3)	High growth oriented (4)	Successful peers (5)	Independent (6)
Female	0.0070	0.0261**	0.0455***	-0.0328***	0.0067***	-0.0338***
	(0.009)	(0.011)	(0.010)	(0.008)	(0.002)	(0.007)
Female × F-dominated sector	-0.1243***	-0.0849***	-0.0895***	-0.0761***	-0.0086	0.0505***
	(0.022)	(0.019)	(0.020)	(0.014)	(0.006)	(0.012)
Sector × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
County FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.318	0.161	0.075	0.079	0.047	0.080
N	131,291	130,897	131,291	131,291	131,291	131,291
Mean dep. var.	0.5304	0.1927	0.2458	0.3487	0.1019	0.6255

- Female entrepreneurs in M-sectors are found firms this the **same growth potential** as their male peers

$$\text{Performance}_{i,t} = \delta_1 \textit{Female}_i + \delta_2 \textit{VC}_i + \delta_3 \textit{Female}_i \times \text{VC}_i + \beta' X_i + \lambda_z + \lambda_{st} + \epsilon_{i,t}$$

Dependent variable	1(Survival $\geq$ 3) (1)	Δ sales (0,3) (2)	Δ employment (0,3) (3)
Female	-0.0115**	-0.0191*	-0.0458***
	(0.01)	(0.01)	(0.02)
VC	-0.0030	0.0372	0.0470
	(0.03)	(0.11)	(0.09)
Female $\times$ VC	0.2486***	0.5433**	0.1690
	(0.05)	(0.46)	(0.24)
Sector $\times$ Year + County FE	Yes	Yes	Yes
R^2	0.073	0.060	0.109
N	64,137	42,003	9,735
Mean dep. var.	0.7341	0.4999	0.2297

- VC-backed Female-founded startups backed with VC tend to **outperform**
  - Female entrepreneurs who are VC-backed are held at higher standards

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  - **Substitution** between VC and other funding sources?

Dependent variable	1(External equity)			
Bank loan	-0.0021			
	(0.005)			
Female × Bank loans	-0.0204**			
	(0.009)			
Subsidized loans		-0.0091		
		(0.009)		
Subsidized loans × Female		-0.0023		
		(0.017)		
Personal loan			0.0059	
			(0.008)	
Female × Personal loans			-0.0255**	
			(0.010)	
Public grant				0.0022
				(0.009)
Female × Public grants				0.0009
				(0.012)
Female	-0.0094	-0.0164***	-0.0139**	-0.0172***
	(0.006)	(0.005)	(0.006)	(0.005)
Other controls	Yes	Yes	Yes	Yes
Sector × Year + County FE	Yes	Yes	Yes	Yes
R^2	0.110	0.109	0.109	0.109
N	14,561	14,561	14,561	14,561
Mean dep. var.	0.0611	0.0611	0.0611	0.0611

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Conclusion

- Novel empirical finding: Minority-led start-ups are less likely to raise external equity in gender-incongruent sectors
  - Female entrepreneurs in male-dominated sectors
  - Male entrepreneurs in female-dominated sectors
- The pipeline of female entrepreneurship explains 1/3 of the gender gap in VC, 2/3 remains unexplained
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- The bar is set higher for female entrepreneurs
  - Evidence consistent with biased beliefs about gender and **stereotypes**
  - Also consistent with anticipated discrimination (self-stereotyping)

Implications

1. Investment implications
   - Invest in **female-founded** start-ups!
2. Political economy implications
   - Different **policy interventions** depending on the sources of discrimination
     - Statistical discrimination $\rightarrow$ Train female entrepreneurs
     - Taste based discrimination $\rightarrow$ Educate VCs or hire more female VCs
     - Biased beliefs $\rightarrow$ Increase the **representation** of female entrepreneurs **earlier in the pipeline** (VC-intensive sectors and high-growth oriented startups)

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Thank you!