Multinational Enterprise Experience Fosters Innovative Entrepreneurship: Evidence from China

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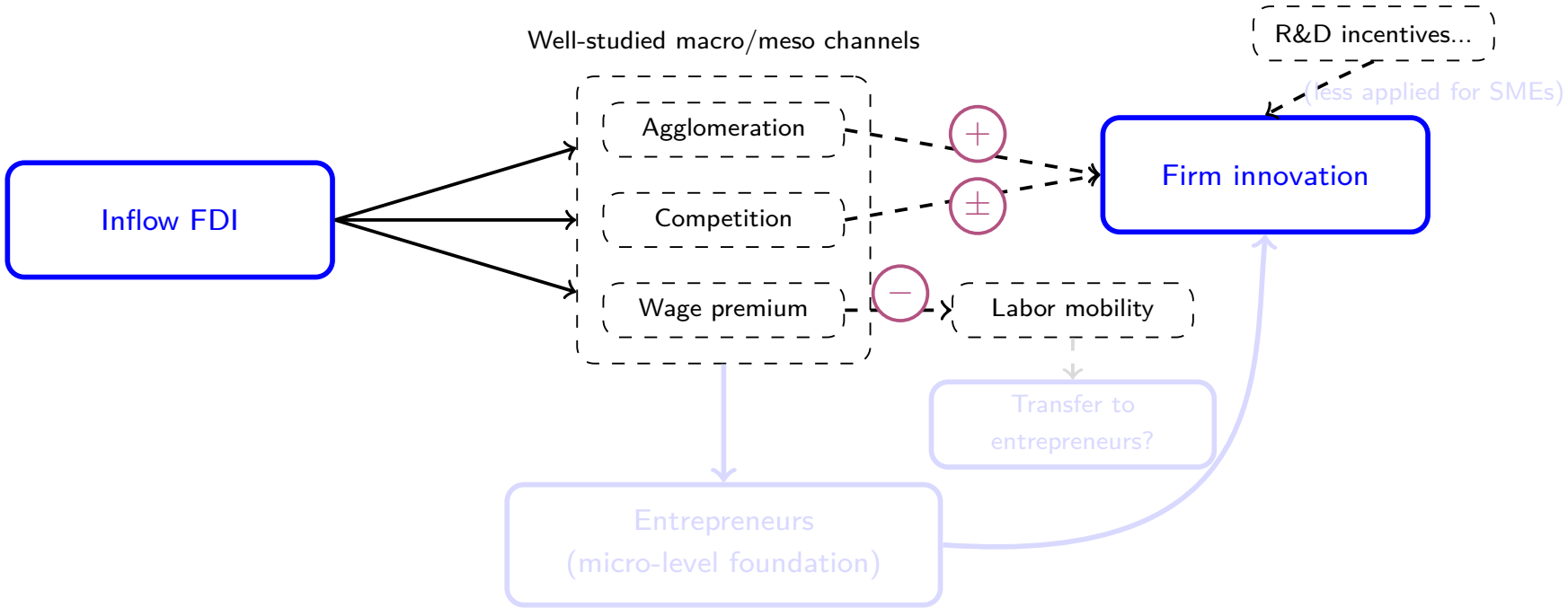
Motivation

- **FDI** and **entrepreneurship** are both central to economic development.
  - Multinational enterprises (MNEs) as a primary vehicle of FDI
- **Experience matters**: MNEs may train future entrepreneurs
  - Entrepreneurs can carry knowledge, practices, and networks into their own firms.
  - This channel may be especially important for small businesses.
- Existing FDI literature has focused on spillovers to domestic firms...
  - Yet the entrepreneurial mobility channel remains underexplored.

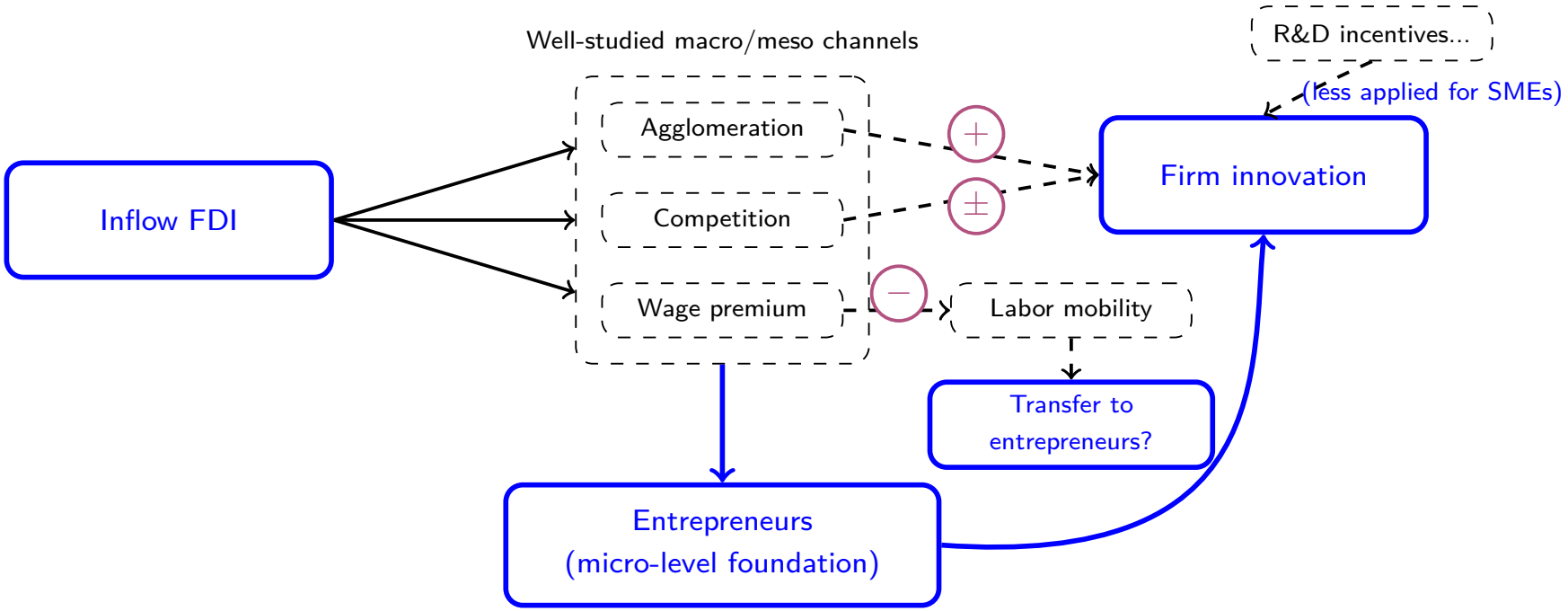
Motivation

Extensive literature on FDI



Motivation

Extensive literature on FDI



Critical but underexplored micro foundation

Preview

- This paper empirically studies the entrepreneurial mobility channel of FDI: Among entrepreneurs, does prior MNE work experience increase innovation?
  - Representative enterprise survey data
  - Construct a shift-share instrument via FDI deregulation in China
  - Main finding: MNE-experienced entrepreneurs exhibit an "innovation premium"
    - More novelty than mere imitation
    - Spillovers to subsequent performance: productivity, export, digitization, etc.
  - Mechanisms: production networks, human capital, and formalization

Contribution

- FDI spillovers to domestic firms: spinoffs, demonstration, local linkage, labor mobility, competition
  - Competing forces: agglomeration *vs.* competition
  - Mixed effects in existing studies via demonstration, production linkages, and competition (Cheung and Lin, 2004; Javorcik, 2004; Lu *et al.*, 2017; Choi *et al.*, 2025)
- Knowledge diffusion through MNE workers
  - MNE experience may shape workers' skills, organizational practices, and networks (Balsvik, 2011; Poole, 2013; Liu *et al.*, 2014).
  - Limited evidence: Yuan and Lu (2005) find little performance advantage among large private firms, while Liu *et al.* (2014) document a modest productivity advantage.

$\Rightarrow$ **We highlight a person-centered entrepreneurial mobility channel**

Contribution

- Prior experience can have persistent effects on economic decisions.
  - Evidence across politician (Guo *et al.*, 2024), investor (Koudijs and Voth, 2016), scientist (Wang *et al.*, 2019), student (Huang and Dong, 2025), ...
- Large literature examines long-lasting imprint effects among CEOs
  - Early-life disasters, family background, military service, and banking crises (Bernile *et al.*, 2017; Malmendier, 2021; Ru *et al.*, 2025; Yu, 2025)
- Less is known about work experience among ordinary founder-entrepreneurs.
  - Data rarely connect founders' histories to their innovation activities.
  - Endogeneity: "imprint" *vs.* selection (Fang *et al.*, 2023)

$\Rightarrow$ **We make progress using representative survey data, "enriched asking," and policy-induced variation in MNE job exposure.**

Background

- China provides a good laboratory
  - 1949-1978: Massive shutdown; Mainly from the Socialist Camp and overseas Chinese; Highly restricted or suspended $\rightarrow$ No "formal" FDI
  - 1979-1991: Trial policies and institutions in select zones; Loan-based
  - 1992-*Present*: Rapid economic growth, becoming the top FDI destination

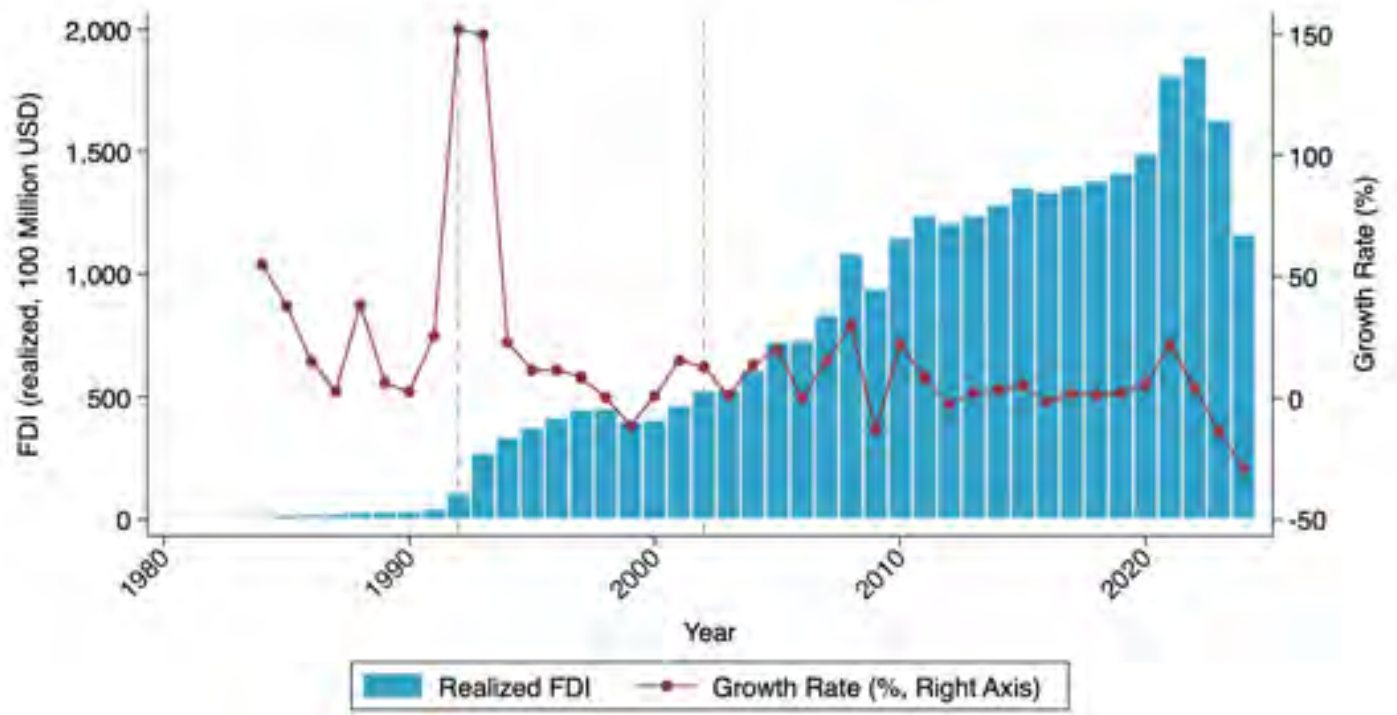


Figure 1: Foreign Direct Investment (realized) in China

Data source: CEIC, Ministry of Commerce PRC.

Background

- China experienced a rapid expansion of inward FDI after market reforms.
  - Especially around WTO accession, when FDI policy changed substantially

  → the basis for our shift-share IV.

- MNEs as an important source of urban employment and a training ground

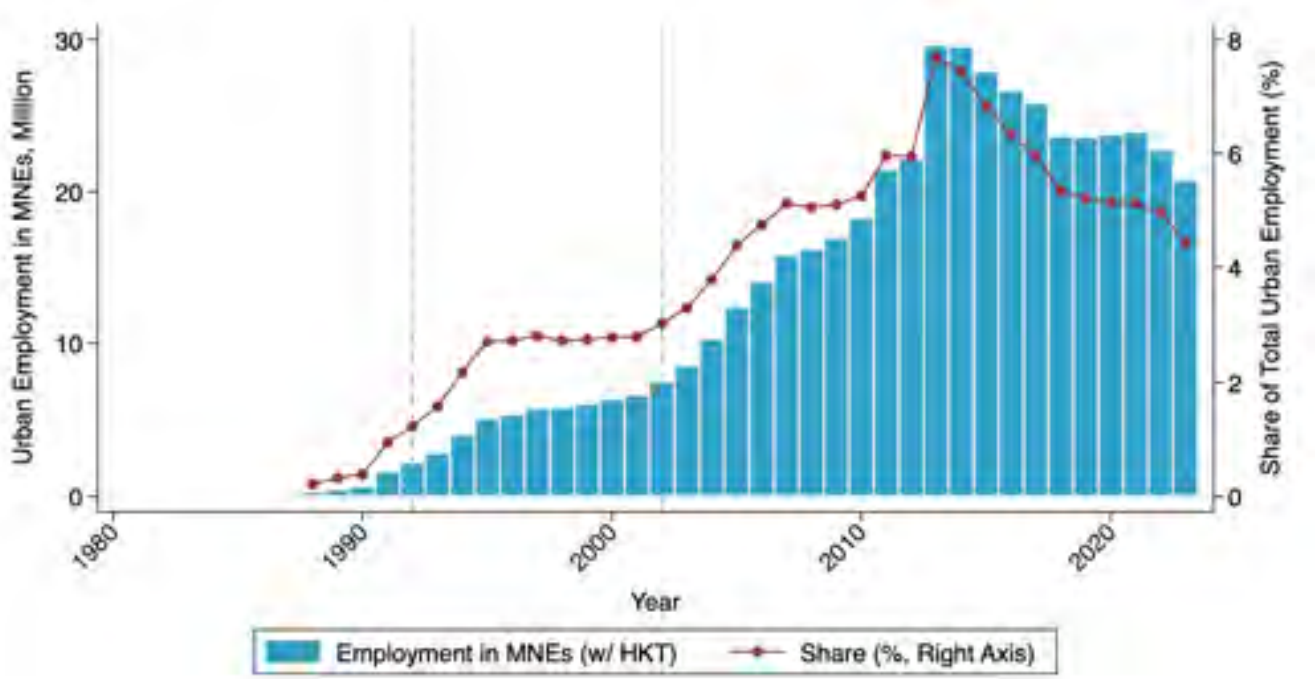


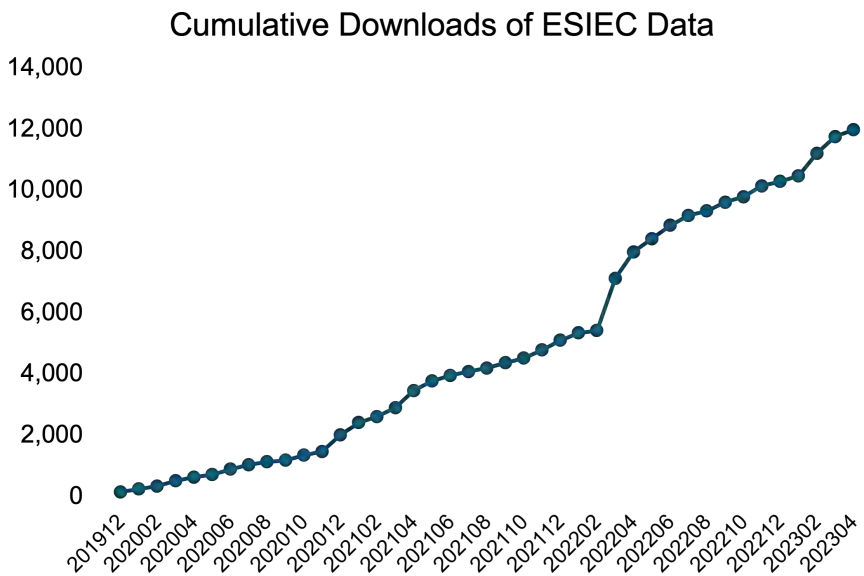
Figure 2: Urban Employment of MNEs in China

Data source: CEIC, Ministry of Human Resources and Social Security PRC.

Data

- Enterprise Survey on Innovation and Entrepreneurship in China (ESIEC)
  - Representative field survey of private enterprises and self-employed
  - Covers 107 counties/districts across 6 provinces
  - Sampling from universal firm registration
- Sample: Entrepreneur respondents in 2018 and 2023 waves Summary
  - Pooled cross-sectional of entrepreneur- and firm-level information
- Linked administrative and external data
  - Household survey: CFPS
  - Business registration, Population Census
  - Patents, trademarks, copyrights; Customs records on imports and exports

Data

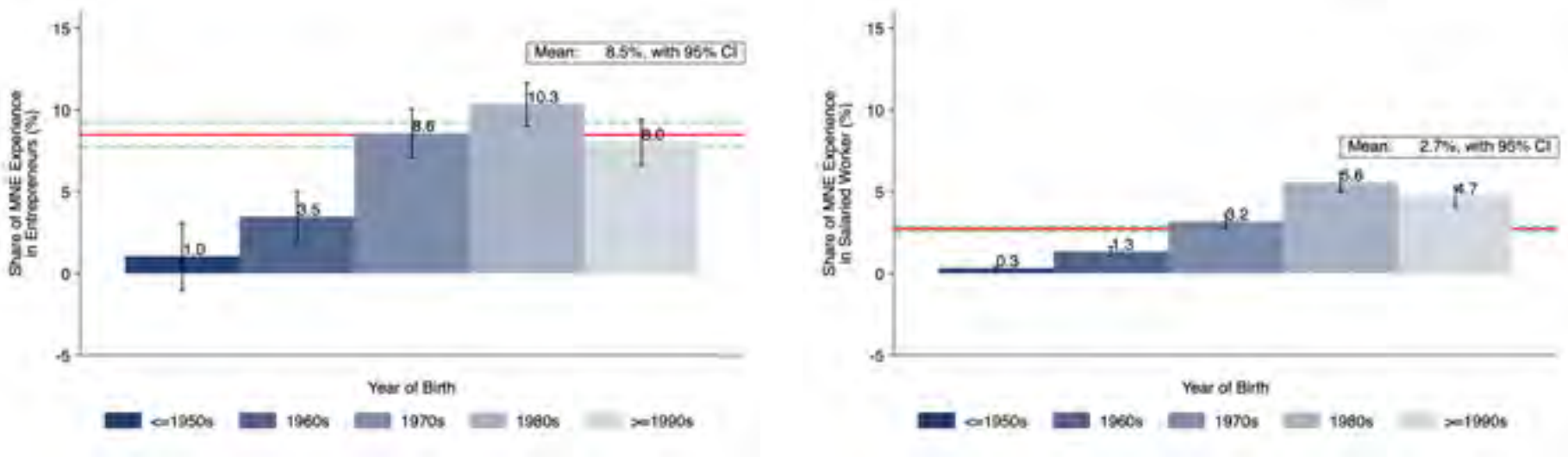


(a) Download

(b) Coverage

Extensive Margin

- No evidence of MNEs crowding out entrepreneurship.
  - If any, a *Bayesian* perspective $\Rightarrow P_r(\text{Entrepreneur} \mid \text{MNE-exp.}) > P_r(\text{Entrepreneur})$



(a) Entrepreneurs (b) Salaried Workers

Figure 3: MNE Experience Is More Prevalent among Entrepreneurs

Data source: ESIEC 2018 & 2023, CFPS 2010-2022. 95% confidence interval is indicated.

SOE experience as a counter-benchmark ▶; Analytical suggestive evidence ▶

OLS Specification

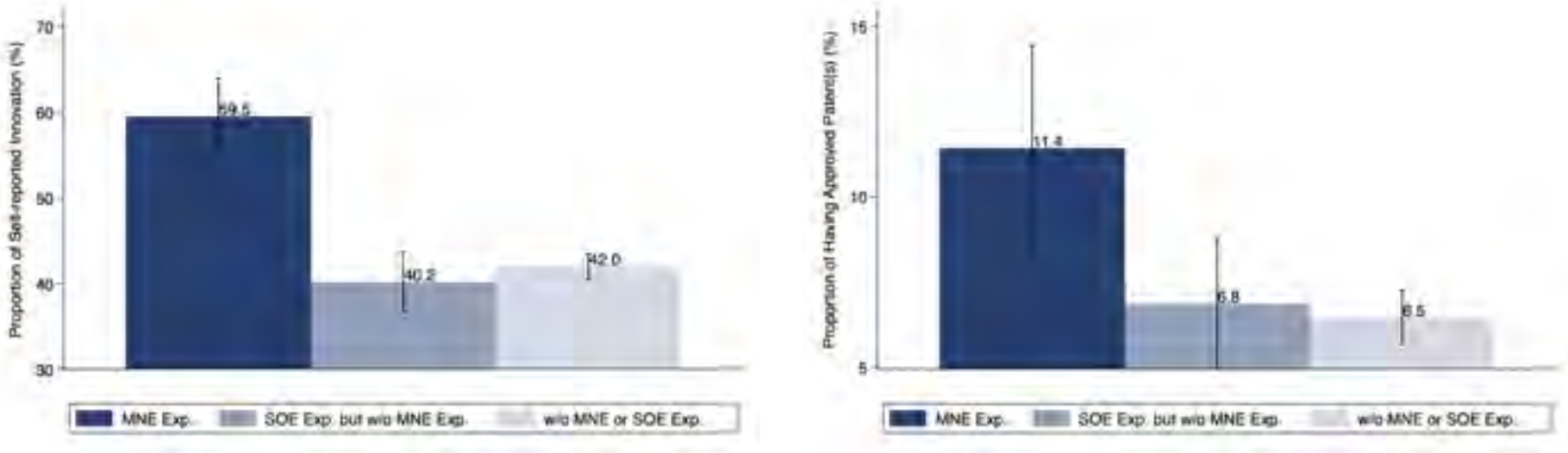
- Baseline linear probability model:

$$Y_{i,cjw} = \beta\,\text{MNEJob}_i + \beta_S\,\text{SOEJob}_i + X_i'\gamma + \underbrace{\theta_c + \eta_j + \phi_w + \lambda_{cj}}_{\text{FEs}} + \varepsilon_i.$$

- $Y_{i,cjw}$: self-reported product or process innovation (dummy)
  - Alternative innovation and outcomes
- MNEJob_i: MNE work experience prior to the entrepreneur's first venture
  - SOEJob_i as a comaprison group
  - X_i: entrepreneur characteristics and observed firm controls
- County-industry FEs λ_{cj} to control for other spillover channels
- Analogous Probit (and IVProbit) models are applied.

Unconditional Result

- Entrepreneurs with prior MNE experience are more likely to report innovation.
- The pattern is weaker for patent-based innovation.
  - Patents may understate innovation among SMEs.



(a) Self-reported Innovation (b) Patent

Figure 4: Comparing Innovation Variables among Groups with Different Experience

Data source: ESIEC 2018 & 2023. 95% confidence interval is indicated.

OLS Correlation

- Entrepreneurs' MNEs experience has a positive impact on innovation: Main
  - County × industry FE for agglomeration and competition effects partially.
  - Robust when adding other characteristics of work experience.
  - Robust when using Probit and PSM, adding 2,3,4-digit industry, and interaction terms

Table 1: OLS Regressions on Innovation

	(1)	(2)	(3)	(4)	(5)	(6)
			OLS: Innovation			
MNE Job	0.166***	0.167***	0.172***	0.175***	0.199***	0.190***
	(0.041)	(0.041)	(0.042)	(0.040)	(0.047)	(0.049)
SOE Job				-0.027	-0.026	-0.030
				(0.023)	(0.028)	(0.028)
Number of Job(s)						0.007
						(0.004)
Control	No	Yes	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes	Yes	Yes
County × Ind FE	No	No	Yes	No	Yes	Yes
Adj. R-sq	0.090	0.136	0.163	0.144	0.211	0.212
Observations	5,538					

Data source: ESIEC 2018 & 2023. Standard errors are clustered at the (birth-)county-year level. Significance level: *p <0.1 **p <0.05 ***p <0.01.

Bartik IV

- Identification challenge: Prior MNE experience is endogenous.
  - Career choices may reflect unobservable ability, ambition, or risk preferences.
- **Intuitions**: Policy-induced predicted exposure to MNE job opportunities
  - Exposure varies by entrepreneurs' birthplace and labor-market entry cohort.
- Bartik IV: Combine FDI deregulation shocks with pre-existing local structure.
  - Shock: Catalog for the Guidance of Foreign Investment Industries (*Catalogue*)
    - Deregulation from the planned economy
    - Major changes in 1997 *vs* 2002: WTO-focused institutional deregulation
  - Share: Pre-existing **regional industrial compositions** and **migration patterns**

Bartik IV: Construction

- For entrepreneurs born in location b in birth year y, we construct:

$$\text{Shock}_{by} = \sum_j \left(\underbrace{\frac{\text{Firm}_{jb,t=1995}}{\text{Firm}_{b,t=1995}}}_{\text{share}} \times \underbrace{\text{Dereg}_{j,y+25}}_{\text{shift}} \right).$$

  - Shift: Industry-level (j) deregulation in the *Catalogue*
    - Restricted or prohibited in 1997 $\rightarrow$ Supported or permitted in 2002
    - $(y+25)$: The year when they were likely to join the labor market
  - Share: Weighted by industrial distribution in 1995.

- A *nested* share construction further considering *population mobility* (Bell *et al.*, 2019)

Bartik IV: Construction

A *nested* construction further considering *population mobility*:

- For entrepreneurs born in location b in (birth-)year y, we further construct:

$$\text{Exposure}_{by} = \sum_d \Big[\underbrace{z_{b\to d, Y(y), t=2000}}_{\text{share}'} \times \underbrace{\text{Shock}_{dy}}_{\text{shift}'} \Big]$$

$$= \sum_d \Big[\underbrace{\frac{\text{Flow}_{b\to d, Y(y), t=2000}}{\text{Pop}_{b, Y(y), t=2000}}}_{\text{share}'} \times \underbrace{\sum_j \left(\frac{\text{Firm}_{jd, t=1995}}{\text{Firm}_{d, t=1995}} \times \text{Dereg}_{j, y+25} \right)}_{\text{shift}'} \Big].$$

- $Y(y)$ indices the cohort (± 3 or ± 5 yrs) of the birth year y.
- $z_{b\to d, Y(y), t=2000}$ is the share of immigrants who originated from birthplace b to destination city d, including those stayed at the birthplace ($b \to b$).
- We calculate it primarily from the 2000 Population Census.
  - Supplemented by the 2010 Population Census for several young entrepreneurs.

Bartik IV: Share

- FDI deregulation varied across industries
- Its local impact depended on a city's pre-existing specialization in the industry:
  - Upstream and downstream suppliers;
  - Infrastructure, information, and business networks;
  - Local market.

$\rightarrow$ These local advantages reduce MNEs' entry and operating costs.

- Migration shares further allow individuals born in city b to be exposed to MNE opportunities in likely destination cities d.

$\Rightarrow$ The share captures **where industry-specific deregulation was more likely to generate MNE job opportunities**.

First Stage

- Relevance: The cohort-place-based Bartik IV predicts the MNEs experience well
  - Standard errors are clustered at the birthplace-year level.
- Placebo: No correlation with other job experience before venture

Table 2: First-stage Regression

	(1)	(2) MNE Job	(3)
Bartik IV	0.347***	0.372***	0.382***
	(0.058)	(0.059)	(0.062)
Weak IV F Statistic	23.279	24.211	21.371
Control	No	Yes	Yes
FEs	Yes	Yes	Yes
County × Ind FE	No	No	Yes
Adj. R-sq	0.048	0.055	0.064
Observations		5,538	

Data source: ESIEC 2018 & 2023, Population Census, Business Registration Dataset, the *Catalogue*. OLS regressions are reported. Standard errors are clustered at the (birth-)county-year level. Significance level: *$p<0.1$ **$p<0.05$ ***$p<0.01$.

First Stage: Cohort DID

$$\text{MNEJob}_i = \beta \cdot \underbrace{(\text{Treat}_b \times \text{Post}_{y+25})}_{\text{Exposure}_{b(i)y(i)}} + \beta_S \cdot \text{SOEJob}_i + \text{Control}_i'\gamma + \text{FEs} + \text{TWFEs} + \epsilon_i.$$

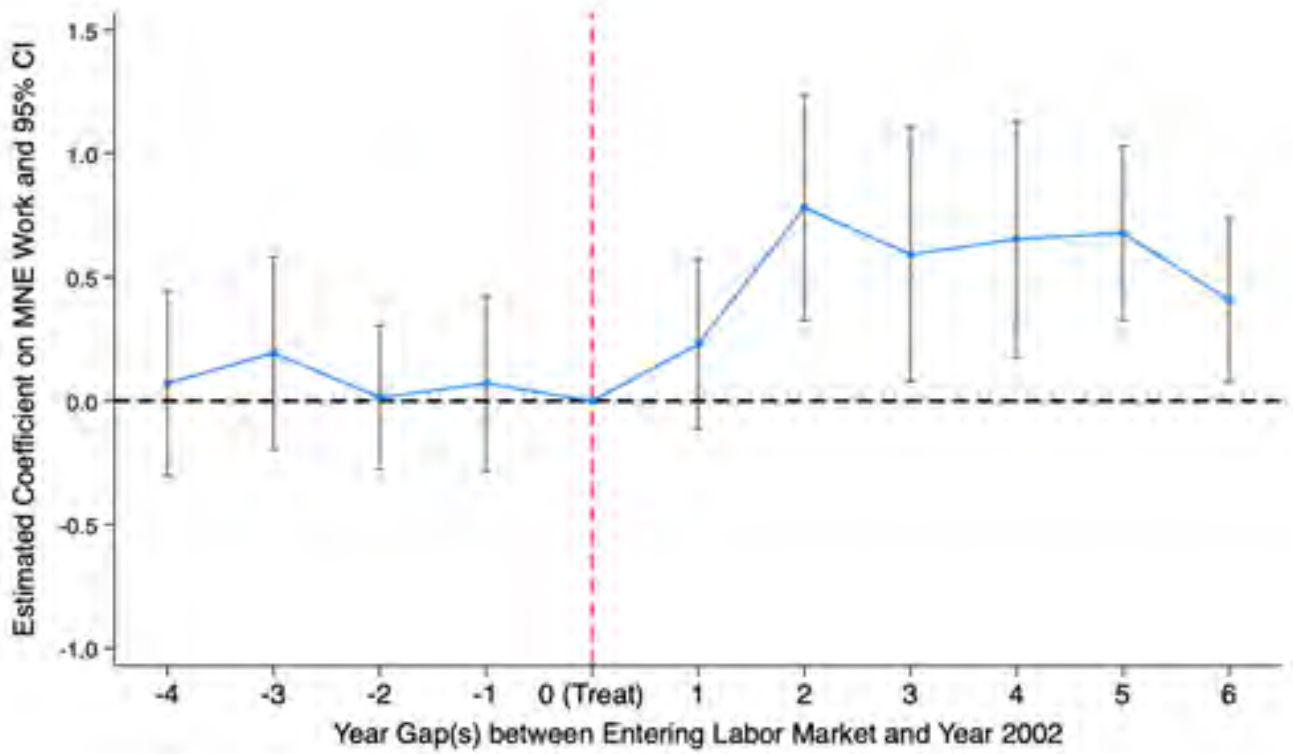
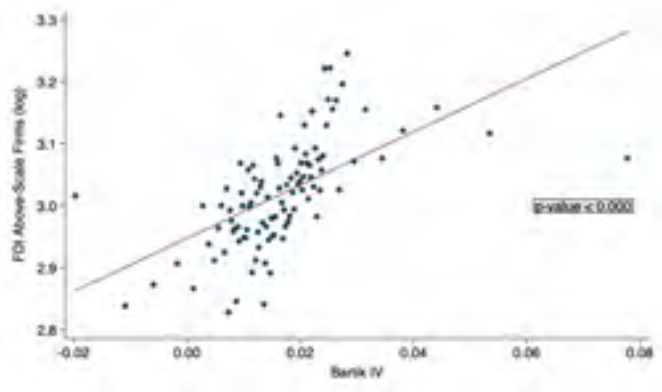


Figure 5: Event Study of Bartik IV (MNEs Exposure) on Entrepreneurs' MNEs Working Experiences

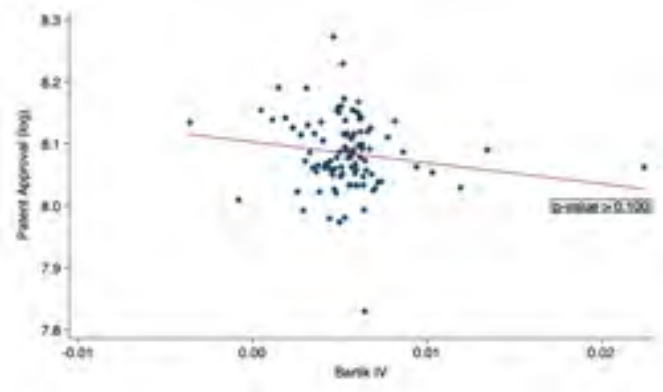
Data source: ESIEC 2018 & 2023, Population Census, Business Registration, the *Catalogue*. 95% confidence interval is indicated.

First Stage

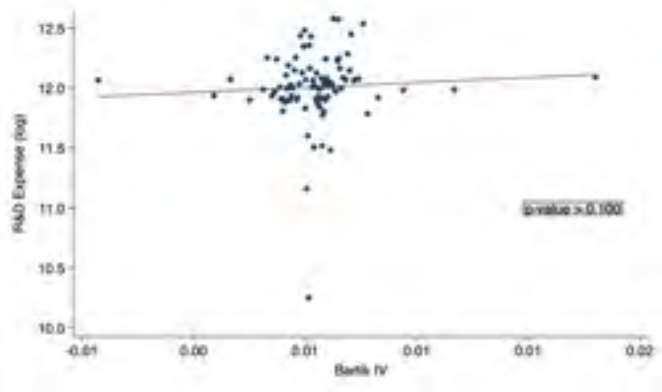
- The instrument is associated with # of FDI firms, but not the measures of local innovative capacity or performance ▸ external



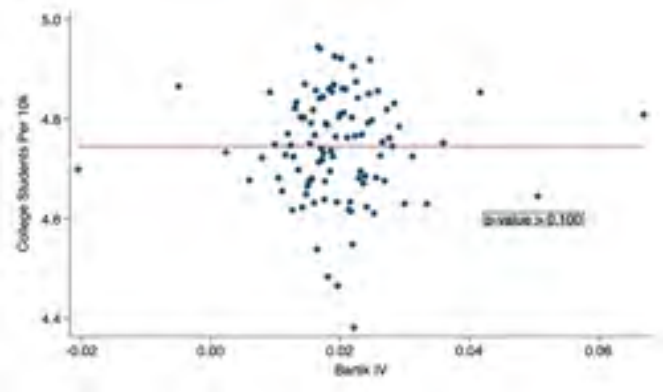
(a) FDI Above-Scale Firms



(b) Patent Application



(c) R&D Expense



(d) College Student Intensity

Figure 6: City-level Correlation between Bartik IV and Innovation Characteristics

Baseline: Innovation

- 2SLS estimates suggest a large positive effect for policy-induced compliers

Table 3: 2SLS Regressions of Prior MNE Work Experience on Innovation

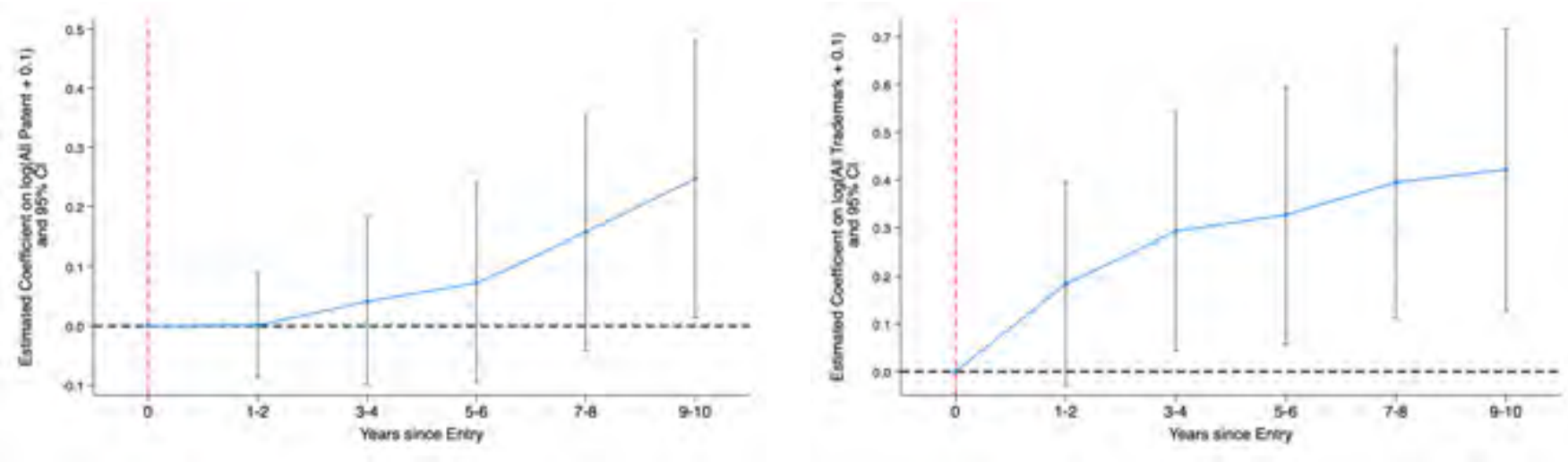
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	2SLS Estimation							
	Self-reported Innovation:					Approved IP Number:		
	Innovation	Product	Process	Sales	Environ.	Patent	Trademark	Copyright
MNE Job	0.757**	0.545	0.546*	0.728*	0.388	0.756	2.242*	1.248**
	(0.359)	(0.331)	(0.319)	(0.382)	(0.274)	(2.412)	(1.214)	(0.489)
SOE Job	-0.038	-0.009	-0.015	0.020	-0.006	-0.021	-0.112	-0.034
	(0.028)	(0.029)	(0.028)	(0.035)	(0.022)	(0.189)	(0.089)	(0.042)
Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-sq	-0.350	-0.308	-0.320	-0.432	-0.360	0.016	-0.145	-0.184
Observations	5,538					4,742 (firms)		

Data source: ESIEC 2018 & 2023, Tianyancha, Population Census, Business Registration Dataset, the *Catalogue*. 2SLS regressions are reported. Standard errors are clustered at the (birth-)county-year level. Significance level: $*p<0.1$ $**p<0.05$ $***p<0.01$.

Robust to IV-Probit, refined industries, and placebo tests . Dynamics .

Baseline: Innovation Dynamics

- Linking 2018 firms to post-entry patent and trademark panels:
  - An accumulative learning effect for patents, but many cannot survive
  - Trademark premium emerges earlier and persists.



(a) Patent (2018 wave)

(b) Trademark (2018 wave)

Figure 7: Dynamic Effects of MNE Experience on Patent and Trademark Registration Since Entry, 2018 Wave

Data source: ESIEC 2018, *Tianyancha*. Incorporated firm samples in the ESIEC 2018 wave are included and matched. 95% confidence interval is indicated. The *y*-axis presents the coefficient estimation of the interaction term between *MNEJob* and each year group dummy variable.

Baseline: Innovation

- The innovation may lead to more novel products/services.
  - "*In what market context would you consider your product or service to be new?*" — "national" or "global" as novelty
- High-quality, practical applicability rather than mere imitation
  - Patent-level evidence: similar to overseas patents, active status, citations

Table 4: 2SLS Regressions on Innovation Performance

	(1)	(2)	(3)	(4)
	Prod. Innovation:		Proc. Innovation:	
	Novelty	% Sale	Quality ↑	Cost ↓
MNE Job	0.989*	5.297*	0.767*	-0.245
	(0.516)	(3.014)	(0.451)	(0.669)
SOE Job	-0.097	-0.622**	-0.054	-0.000
	(0.064)	(0.315)	(0.050)	(0.079)
Control	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes
Adj. R-sq	-0.525	-0.160	-0.287	-0.102
Observations	1,755 (w/ Prod. Innovation)		1,743 (w/ Proc. Innovation)	

Data source: ESIEC 2018 & 2023, Population Census, Business Registration Dataset, the *Catalogue*. 2SLS regressions are reported. Standard errors are clustered at the (birth-)county-year level. Significance level: *$p<0.1$ **$p<0.05$ ***$p<0.01$.

Alternative Explanations and Robustness

- Self-selection: ability, education, risk attitudes, and pre-venture innovation motives
  - Estimates remain similar after adding these variables.
- General professional experience
  - Robust to the number and recency of previous jobs; no similar effect for other employment backgrounds.
- MNEs' concentration in innovative industries
  - Robust to detailed current-industry and pre-venture job-industry fixed effects.
- Local FDI spillovers, industrial policy, and secular trends
  - County $\times$ industry FEs, birth-cohort interactions, clustering index, and HHI .
  - The IV does not predict local patents, R&D expenditure, or college-student density.
- Export-oriented business model and signaling
  - No stronger effect among exporters or firms in Economic Development Zones.
  - No evidence of better bank-credit access or higher social status at entry.
- Financial advantage: no evidence on credit or initial investment

Return

Channel: Summary

- **Production Network**
- **Internal innovation capacity**
  - More R&D investment
  - More skilled and R&D employees
  - Limited evidence on government subsidies
- **Business formalization**
  - Incorporated registration
  - Workforce professionalization
  - Contract-based business relationships

Channel: Production Network

- MNE experience provides access to production networks.
- Strategic startups along the production network (Cardoza et al., 2025) and firm-to-firm learning (Alfaro-Urena et al., 2022; Amiti et al., 2024)

Table 5: 2SLS Regressions on Potential Channels: Production Network

	(1)	(2)	(3)	(4)	(5)
	First Order Helped by Previous *Colleagues*	Order Outsourcing:		Previous *Colleagues* as:	
		Receive	Send	Upstream	Downstream
MNE Job	0.392**	0.872***	0.792***	0.429**	0.180
	(0.159)	(0.296)	(0.289)	(0.109)	(0.264)
SOE Job	0.038**	-0.053**	-0.032	-0.011	-0.019
	(0.017)	(0.025)	(0.026)	(0.010)	(0.020)
Control	Yes	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes	Yes
Adj. R-sq	0.369	-0.230	-0.152	0.343	-0.022
Observations	3,003 (ESIEC 2018)	5,538			

Data source: ESIEC 2018 & 2023, Population Census, Business Registration Dataset, the *Catalogue*. 2SLS regressions are reported. Standard errors are clustered at the (birth-)county-year level. Significance level: *p <0.1 **p <0.05 ***p <0.01.

Business Performance

- MNE experience generates broader business-performance gains:
  - Higher revenue and stronger e-commerce adoption more aspects
  - Participation in import ↑ and export ↑
  - Pre-COVID survival ↑

Table 6: 2SLS Regressions on Spillover to Performance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Revenue (log)	Profit Rate	E-commerce	Ever Import	Ever Export	Exit: before 2019	Exit: before 2025
MNE Job	3.327***	1.214	0.765***	0.317**	0.302*	-0.542*	-0.299
	(1.017)	(1.999)	(0.238)	(0.147)	(0.155)	(0.278)	(0.435)
SOE Job	-0.039	0.018	-0.016	-0.051**	-0.043*	0.033	0.016
	(0.079)	(0.182)	(0.020)	(0.026)	(0.026)	(0.024)	(0.034)
Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-sq	-0.170	-0.033	-0.156	-0.455	-0.307	-0.435	-0.100
Observations	5,538			2,207 (firms in ESIEC 2018)			

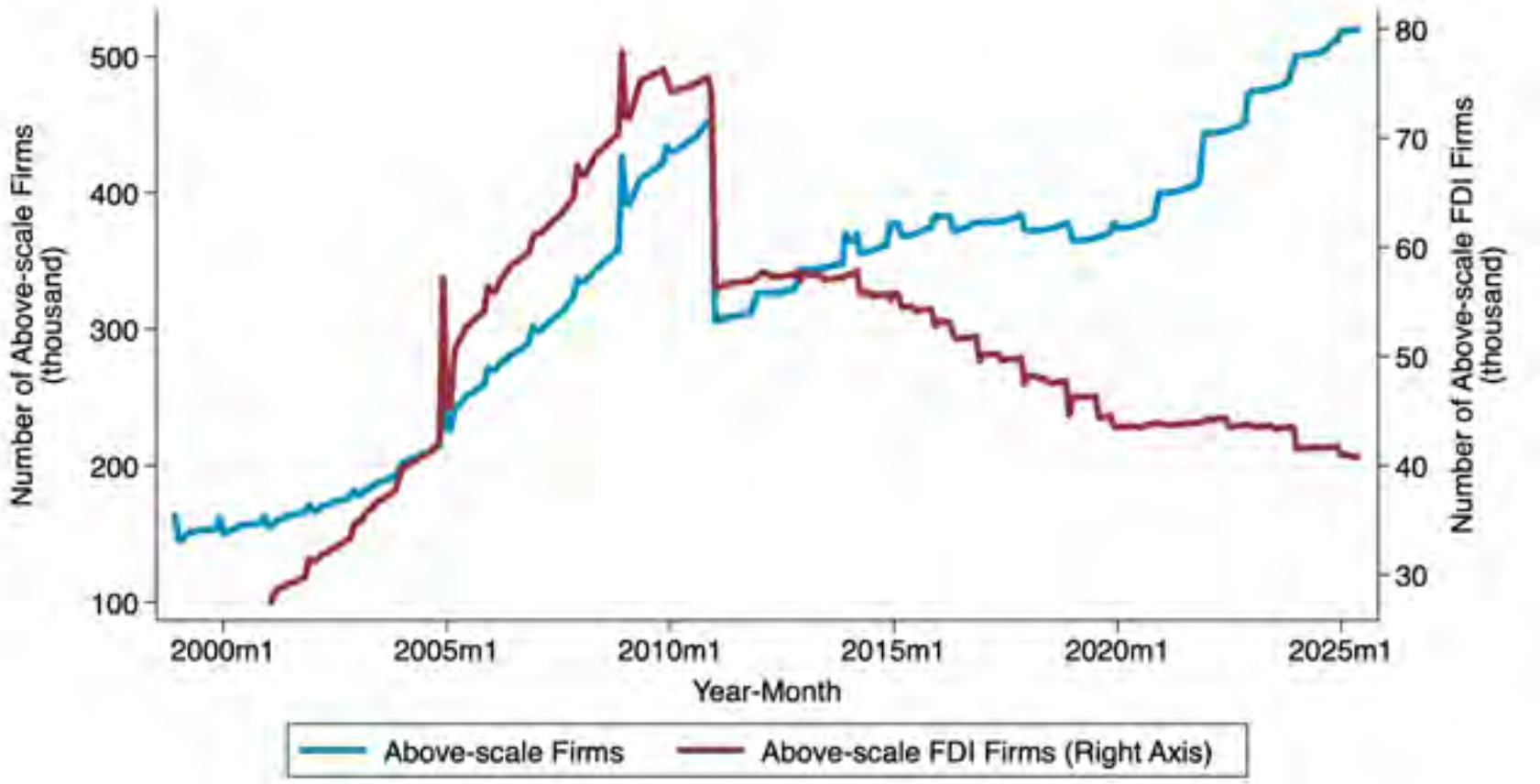
Data source: ESIEC 2018 & 2023, Population Census, Business Registration Dataset, Custom Records, the *Catalogue*. 2SLS regressions are reported. Standard errors are clustered at the (birth-)county-year level. Significance level: *p <0.1 **p <0.05 ***p <0.01.

Takeaway

- MNE experience fosters innovative and high-performing entrepreneurship.
- Unveiling the "*black box*" of the FDI knowledge spillovers via **entrepreneurial mobility channel**, with specific mechanisms
- Policy implications:
  - FDI policy can shape local entrepreneurial capacity in the long run.
  - FDI "escaping" China may impede long-run innovative capacity, especially under the decoupling risk.
  - What would China bring as a new FDI origin?

Implication

- Is FDI "escaping" China?



Data source: CEIC, National Bureau of Statistics, PRC.

Contribution

- Literature on prior experience: Disaster (Bernile *et al.*, 2017; Ru *et al.*, 2025), family (Cronqvist and Yu, 2017), military (Benmelech and Frydman, 2015), banking crises (Yu, 2025), ...
  - Data limitation: ordinary entrepreneurs and their work experience
  - Endogeneity: "imprint" *vs.* selection (Fang *et al.*, 2023)

  → We address these challenges by: data, identification, "enriched asking."

- Literature on border FDI spillover: spinoffs, demonstration, local linkage, labor mobility, competition
  - Only modest evidence on productivity in China before 2005 (Liu *et al.*, 2014)
  - Mixed findings on innovation: Cheung and Lin (2004) documented a positive demonstration, while Chen *et al.* (2022) found a competition effect. MNEs' innovation improves local productivity via technology diffusion (Gong, 2023). Yet, Lu *et al.* (2017) found a negative overall effect & little on innovation.

  → We zoom in on the specific experience-to-entrepreneurship pathway.

- Literature on MNEs specifically: an active propagation mechanism of shocks across economies (Cravino and Levchenko, 2017)

  → Internal and external network mechanisms

- Policy implication for innovation and (de-)globalization

Introduction

Contribution

- We make efforts to address several challenges of studying this phenomenon:
  - Data: A more representative sample of entrepreneurs, with a richer micro-level record of personal experience, entrepreneurial history, innovative activities, and performance.
  - Methodology: The empirical framework exploits exogenous deregulation to identify the causal effect of their work experience.
  - Supplemented by household survey evidence
- Enrich the existing literature on:
  - FDI diffusion through the entrepreneurial mobility channel, without denying other well-documented ones
  - Experience and economic behavior
  - Corporate innovation, including measurements
- Policy implication for (de-)globalization

Contribution

- Empirical framework exploits exogenous deregulation to identify the causal effect.
- Enrich the existing literature on:
  - Entrepreneurs' working experience on performance
  - FDI diffusion through the entrepreneurial mobility channel, without denying other well-documented ones
  - Corporate innovation, including measurements
  - Combining surveys and big data

Background

- FDI in China:
  - 1949-1978: Massive shutdown; Little from the Socialist Camp and overseas Chinese; Highly restricted or suspended $\rightarrow$ No "formal" FDI
  - 1979-1991: Trial policies and institutions in select zones; Loan-based
  - 1992-*Present*: Rapid economic growth, becoming the top FDI destination

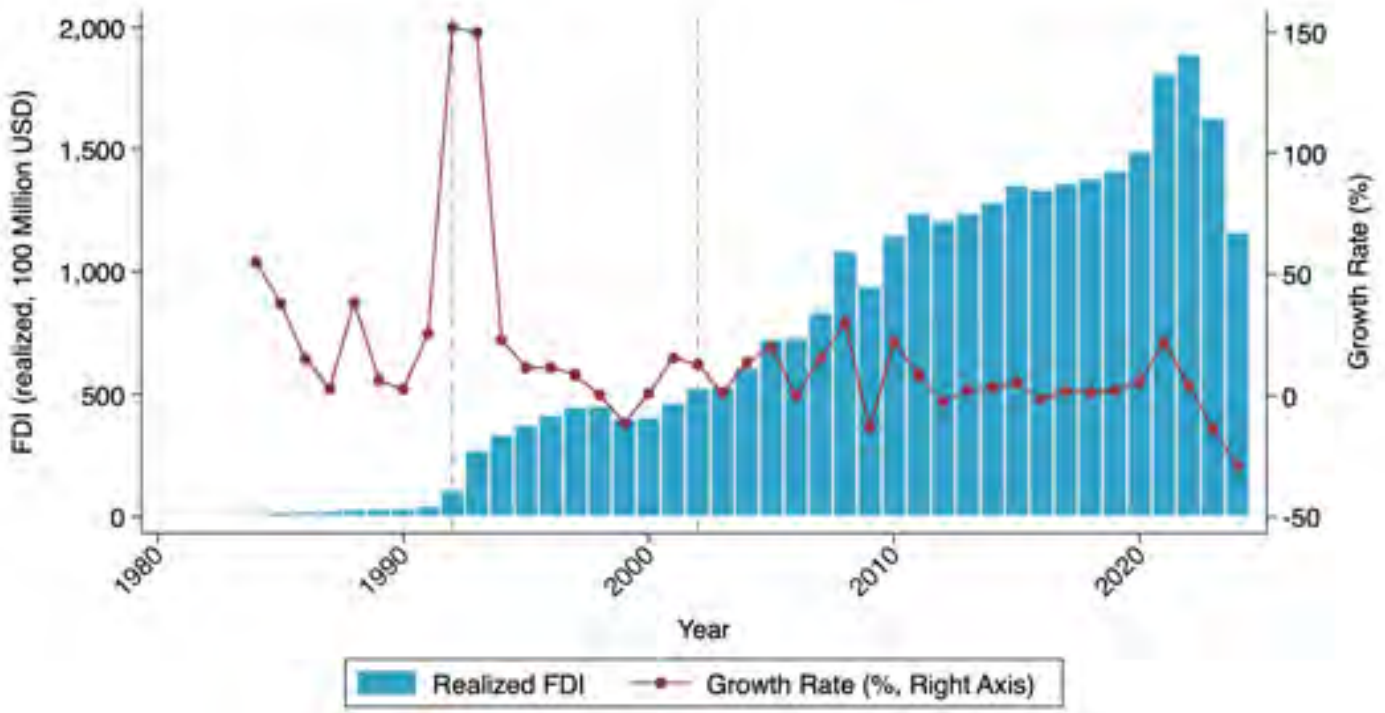
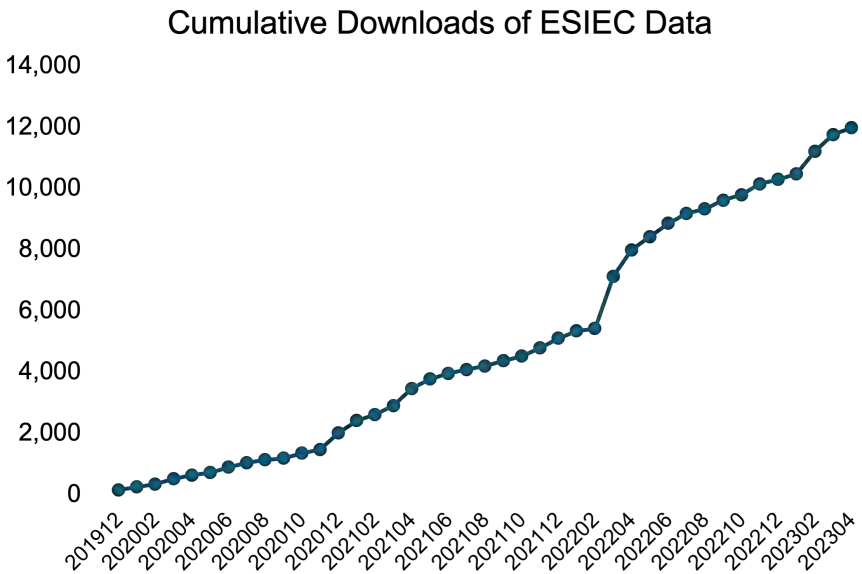


Figure A 1: Foreign Direct Investment (realized) in China

Data source: CEIC, Ministry of Commerce PRC.

Data

- Data in & before 2023 have been released to the public Data
- Cover more small- and medium-sized enterprises (SMEs)



(a) Download

(b) Coverage

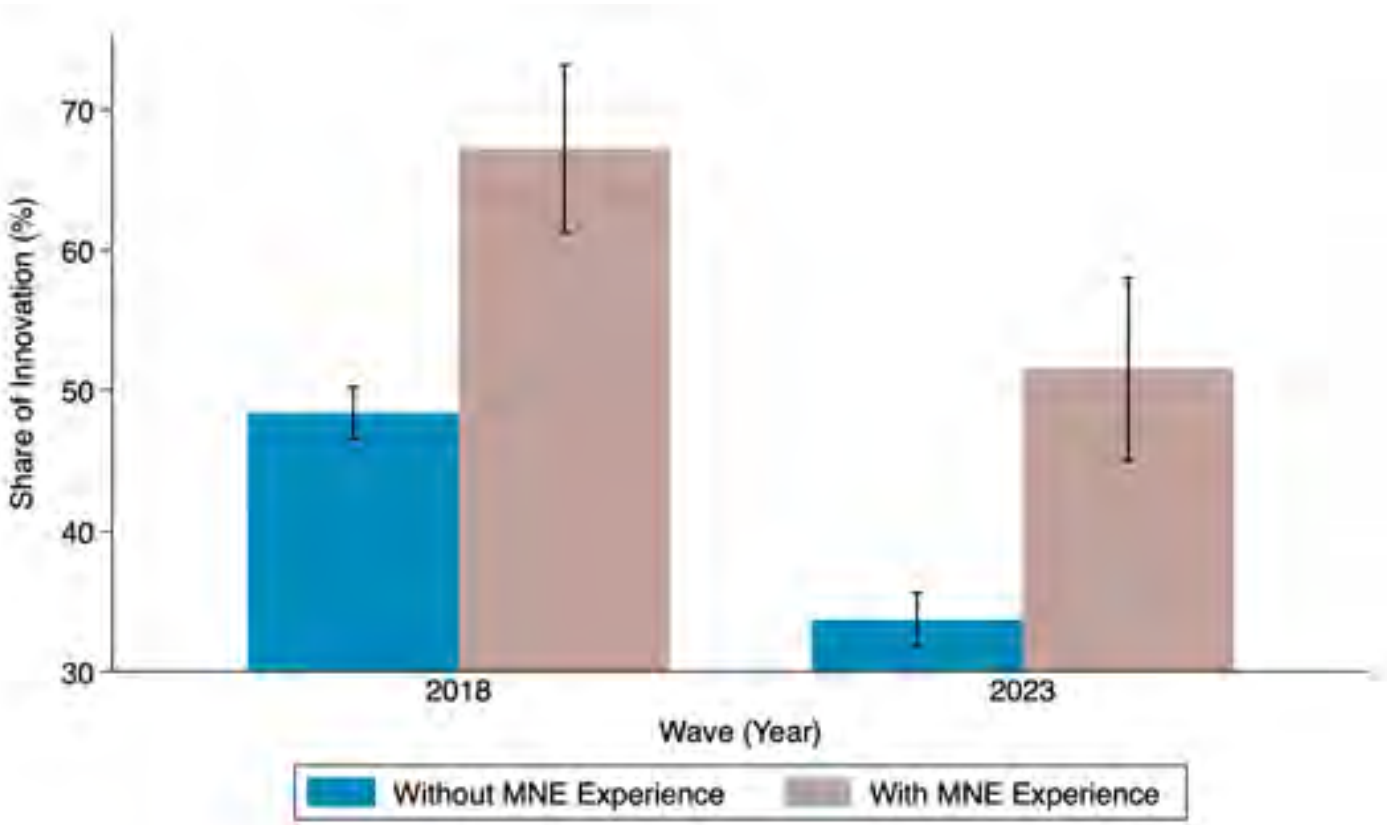
Specification

- The OLS / linear probability model at the individual level i:

$$Y_{i,cjw} = \beta \cdot \text{MNEJob}_i + \beta_S \cdot \text{SOEJob}_i + \text{control}_i' \gamma + \underbrace{\theta_c + \eta_j + \phi_w}_{\text{FEs}} + \epsilon_i.$$

  - Core dependent variable: self-reported `innovation`
    - Baseline definition: $= 1$ iff it had either product or process innovation.
    - More measures: by category; IP registration; R&D input; benefit from innovation
  - `MNEJob`: MNEs work experience prior to (first) startup
    - Including wholly foreign-owned enterprises and Sino-foreign joint ventures (HMT included).
  - SOE-experience as a more comparable counterfactual of formal organizational experience
  - Control variables: Entrepreneur (age, gender, college education, CCP member), Firm (asset, corporate partner, registered type), Operation & Performance (new investment, export, number of employees, number of technical employees)
    - County (c), 1-digit industry (j), and wave (w) FEs are controlled.

Unconditional Result



Data source: ESIEC 2018 & 2023.

Baseline: OLS

- Entrepreneurs' MNEs experience has a positive impact on innovation: Main
  - County × industry FE for agglomeration and competition effects partially.
  - Robust when adding other characteristics of work experience.
  - Robust when using Probit and PSM.
  - Robust to 2,3,4-digit industry and interaction terms FE_{cj}

Table A 1: OLS Regressions on Innovation

	(1)	(2)	(3)	(4)	(5)	(6)
			OLS: Innovation			
MNE Job	0.166***	0.167***	0.172***	0.175***	0.199***	0.190***
	(0.041)	(0.041)	(0.042)	(0.040)	(0.047)	(0.049)
SOE Job				-0.027	-0.026	-0.030
				(0.023)	(0.028)	(0.028)
Number of Job(s)						0.007
						(0.004)
Control	No	Yes	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes	Yes	Yes
County × Ind FE	No	No	Yes	No	Yes	Yes
Adj. R-sq	0.090	0.136	0.163	0.144	0.211	0.212
Observations			5,538			

Data source: ESIEC 2018 & 2023. Standard errors are clustered at the (birth-)county-year level. Significance level: *p <0.1 **p <0.05 ***p <0.01.

Identification

- Catalog for the Guidance of Foreign Investment Industries (*Catalogue* henceforth)
  - Different versions since 1997
  - Major changes in 2002: WTO-focused institutional deregulation
    - Literature has been using this deregulation to investigate direct FDI effects (Lu *et al.*, 2017; Liang *et al.*, 2024)
  - *Catalogue* classified products into four categories:
    (i) Supported, (ii) Permitted (default), (iii) Restricted, and (iv) Prohibited.
    - Labeled both manually and by LLMs

Bartik IV

- For entrepreneurs born in location b in year y, we construct:

$$\text{Exposure}_{by} = \sum_d \Big[\underbrace{z_{b\to d, Y(y), t=2000}}_{\text{share}} \times \underbrace{\text{Shock}_{d,y+25}}_{\text{shift}} \Big]$$

$$= \sum_d \Big[\underbrace{\frac{\text{Flow}_{b\to d, Y(y), t=2000}}{\text{Pop}_{b, Y(y), t=2000}}}_{\text{share}} \times \underbrace{\sum_j \left(\frac{\text{Firm}_{jd, t=1995}}{\text{Firm}_{d, t=1995}} \times \text{Dereg}_{j,y+25} \right)}_{\text{shift}} \Big].$$

  - 4-digit industry j in the *Catalogue* is labeled as `deregulated` iff:
    - Restricted or prohibited in 1997 $\to$ Supported or permitted in 2002
  - $y+25$: The year when they were likely to join the labor market
    - Year of entering the labor market or startup could be endogenous.
    - Age 25 for default; Robust for ages 20, 30.
  - Aggregation to $\text{Shock}_{d,y+25}$ (shift), weighted by industrial distribution in 1995.

Bartik IV: Pattern

- Spatial distribution of the MNEs exposure in 2002
  - Fair spatial variations and not purely concentrated in coastal areas
  - Distinct b/w the distribution of MNEs entry in 2002

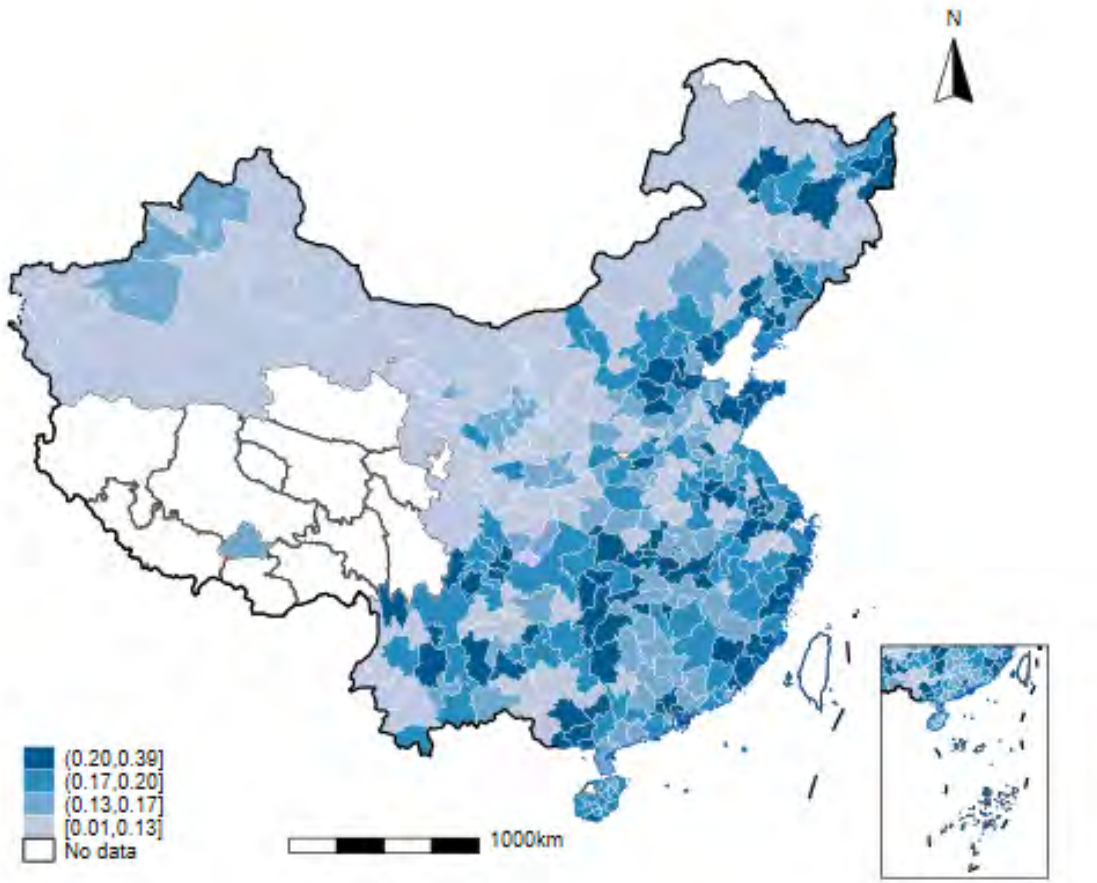


Figure A 2: Spatial Distribution of the Bartik IV in 2002

Data source: Population Census, Business Registration Dataset, the *Catalogue*.

First Stage: Cohort DID

- Though the survey is cross-sectional, regarding the construction of Bartik IV, the first stage corresponds to a Cohort DID specification:

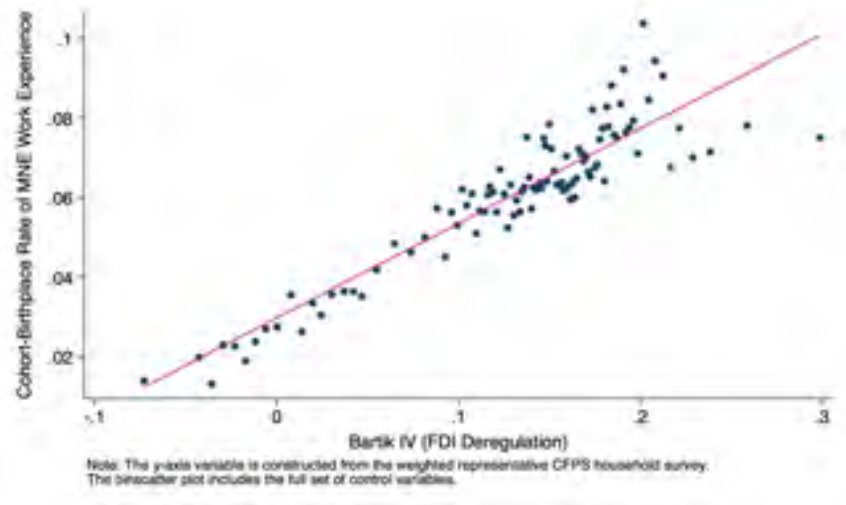
$$\text{MNEJob}_{iby,cj} = \beta \cdot \underbrace{(\text{Treat}_b \times \text{Post}_{y+25})}_{\text{Exposure}_{by}} + \text{control}_i'\gamma + \text{TWFE} + \text{FEs} + \text{trend} + \epsilon_i.$$

  - We control for the two-way FEs as in DID, the control variables, time trend, and industrial & city FEs.
  - Post_{y+25}: Year 2002 as the treatment timing.

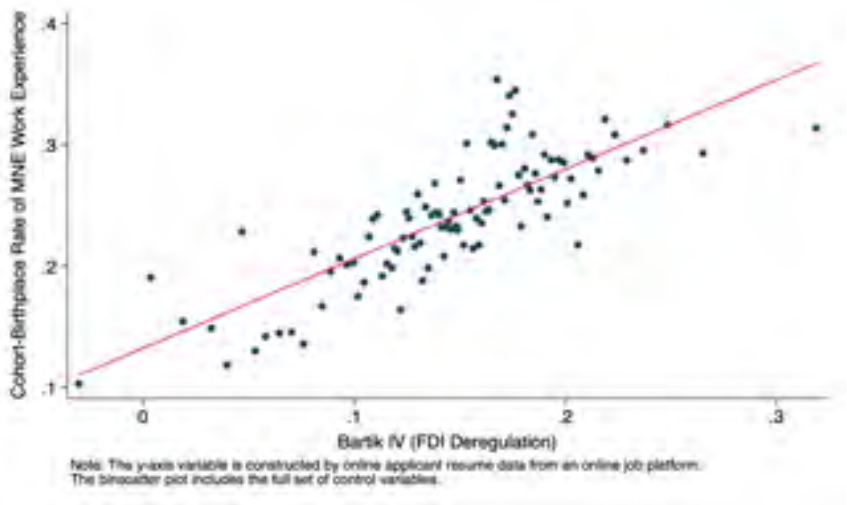
- Main

First Stage: External Validation

- To test the predictive power of our IV on the propensity of working experience in MNEs, we further explore two general datasets: ▸ Main ▸ Eq.
  1. Household survey from China Family Panel Studies (CFPS), aggregated level
  2. Online Resume Data from `51job.com`, $\approx 100,000$ with employment history
     - Self-reported personal information and employment history



(a) Household Survey: CFPS



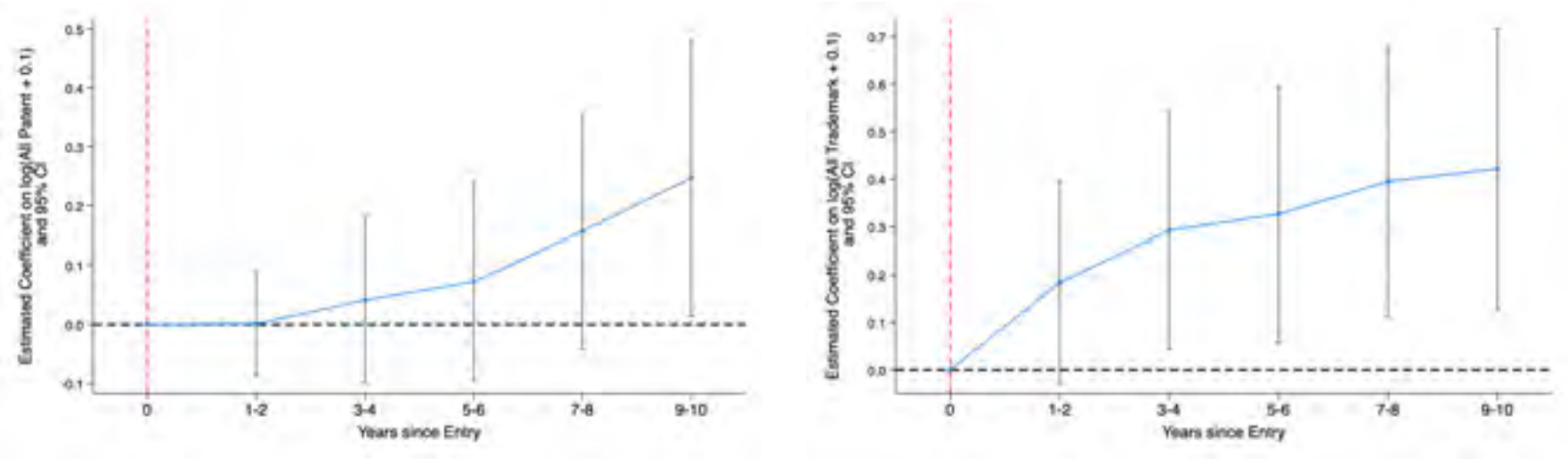
(b) Online Resume: 51job

Figure A 3: Regression of Bartik IV (MNEs Exposure) on MNEs Working Experiences

Data source: CFPS 2010-2022, Online Resume Data from `51job.com`, Population Census, Business Registration, the *Catalogue*.

Baseline: Innovation Dynamics

- Linking 2018 firms to post-entry patent and trademark panels:
  - An accumulative learning effect for patents, but many cannot survive
  - Trademark premium emerges earlier and persists.



(a) Patent (2018 wave)

(b) Trademark (2018 wave)

Figure A 4: Dynamic Effects of MNE Experience on Patent and Trademark Registration Since Entry, 2018 Wave

Data source: ESIEC 2018, *Tianyancha*. Incorporated firm samples in the ESIEC 2018 wave are included and matched. 95% confidence interval is indicated. The *y*-axis presents the coefficient estimation of the interaction term between *MNEJob* and each year group dummy variable.

Main

Channel: Human Capital

- Internal innovative activities:
  - Increased investment in R&D; No advantages in obtaining subsidies.
  - Greater human capital accumulation through employee structure.
  - ESIEC 2023: Bonus, R&D employees, inter-firm R&D cooperation ↑

Table A 2: 2SLS Regressions on Channels: Internal Spillovers

	(1) R&D Expense (log)	(2) College-Edu. Employees (log)	(3) R&D Employees (log)	(4) Gov. Subsidies for Innovation
MNE Job	1.902**	1.960***	1.235**	-0.052
	(0.807)	(0.746)	(0.528)	(0.127)
SOE Job	-0.089	-0.052	-0.033	0.013
	(0.062)	(0.061)	(0.041)	(0.011)
Control	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes
Adj. R-sq	-0.067	0.350	0.100	-0.019
Observations	5,538			

Data source: ESIEC 2018 & 2023, Population Census, Business Registration Dataset, the *Catalogue*. 2SLS regressions are reported. Standard errors are clustered at the (birth-)county-year level. Significance level: *$p<0.1$ **$p<0.05$ ***$p<0.01$. Main

Channel: Formalization

- Learn from MNEs' formal institutional governance and business operations
  - Establish incorporated firms → risk safeguard
  - Professionalization of workforce: On-the-job training, social secure insurance ↑
  - Rely more on contract-based businesses

Table A 3: 2SLS Regressions on Channels: Internal Spillovers

	(1) Register as Firm	(2) On-Job Training	(3) % Social Insurance	(4) Rely on Contract
MNE Job	0.473**	1.060***	0.566**	0.658**
	(0.233)	(0.342)	(0.246)	(0.266)
SOE Job	0.011	-0.051*	-0.044**	-0.023
	(0.017)	(0.028)	(0.019)	(0.028)
Control	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes
Adj. R-sq	0.018	-0.225	-0.126	-0.115
Observations	5,538		4,742 (firms)	

Data source: ESIEC 2018 & 2023, Population Census, Business Registration Dataset, the *Catalogue*. 2SLS regressions are reported. Standard errors are clustered at the (birth-)county-year level. Significance level: *p <0.1 **p <0.05 ***p <0.01. ▸ Main

Motivation

Narrative from Cai *et al.* (2007)

A notable example of local engineers' learning by doing in MNEs and their subsequent spin-offs from the MNEs is the start-up of TechFaith, a cell-phone software company. The CEO of TechFaith, Defu Dong, had formally been a sales manager of Motorola in China. Several years of close contact with suppliers and clients made him familiar with the whole process of cell phone production and marketing, and especially China's dynamic market. In the late 1990s, many MNEs started to enter China's cell phone industry and set up their R&D centers in the Z-Park, which triggered fierce competition in China's market. While the whole industry suffered from profit erosion during 1999-2001, Dong realized that a good business opportunity emerged in the software design of cell phones which was typically outsourced by MNEs. Dong jumped at this golden opportunity and quit from Motorola in 2002, together with a dozen of designers and engineers who were his colleagues in Motorola and had experiences in its R&D unit. He set up his own company TechFaith in the Z-Park

Motivation

Narrative from Cai *et al.* (2007)

which specialized in software design and development for cell phones. The later success proved that Dong's judgment was right: the company's sales and profits grew by over 100-200% in the first 3 years. The promising prospect attracted several prominent venture capitalists to pour further investment in the company. Remarkably, TechFaith succeeded in going public in the NASDAQ in 2005. In May 2006, it signed an R&D alliance agreement with Microsoft which promised to cooperate in the R&D of mobile entertainment based on Windows Mobile and Windows Media technologies.

▸ Return

Motivation

Narrative

医学生的转型

崔哥大学是在天津医科大学学习医学影像，在本科期间就已在天津的三甲医院实习。实习结束后，他已经获得了实习所在医院的入职资格，毕业后就能直接到医院就职。看似稳定的铁饭碗，可是崔哥却看到了工作后的危机，他并不喜欢这份工作：一是因为医学影像技术越来越自动化和智能化，电脑分析的水平赶上了人工分析；二是这份工作不仅枯燥，而且并没有太大的发展前途和上升空间。于是，崔哥放弃了这份工作，直接到与本专业毫不相关的单位工作。

在创业之前，崔哥一共有过两份在上海外企的工作，都是与红酒相关。第

一份工作的老板是丹麦首富。在这份工作中，崔哥最难忘的一件事就是陪着老板一起出席在杭州举办的全球企业家峰会，受到了李克强总理的接见。第二份工作则是在一家上海的美资企业，也正是在这份工作中，崔哥萌生了自己创业的想法。他还饶有兴致地拿星巴克的运营模式举例："一个饮品企业的原料来源很重要，这直接影响着饮品质量，而品牌推广和市场定位也同样重要。"他还悄悄告诉我们："其实星巴克旗下是有酒业的，叫'红潮'。"经过这两份工作的历练，崔哥深入了解了酒业市场，悟到了红酒乃至高端饮品的运作规律，也学到了与红酒相关的很多知识和运营经验。最重要的是，他正是发现了国内高端红酒的市场机遇，才毅然决定下海经商。

Policy Background

```
Processing rows 261 to 261
Assistant:  [
    {"中类": "627", "名称": "机械、电子设备制造业", "status": 0}
]

解析成功: [{'中类': '627', '名称': '机械、电子设备制造业', 'status': 0}]


Processing rows 262 to 262
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Processing rows 263 to 263
Assistant:   [
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]

解析成功: [{'中类': '629', '名称': '废弃资源回收制造业', 'status': 0}]
```

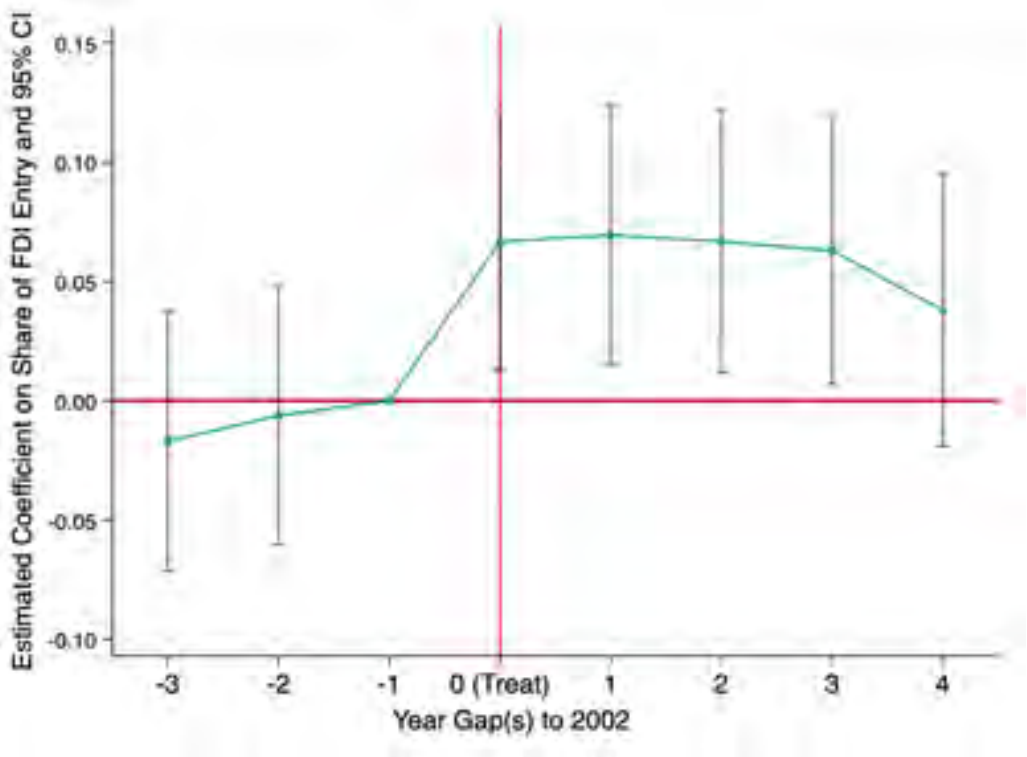
Return

Policy Background

Direct effect on MNEs entry

- Aggregated level specification for city c at year t: Return

$$(\text{Share of MNE Entry})_{ct} = \beta \cdot \underbrace{\text{Shock}_{ct}}_{\text{shift}} + \text{TWFE} + \epsilon_i.$$



Data source: Business Registration Dataset, the *Catalogue*. 95% confidence interval is indicated.

Bartik IV

二〇〇二年三月十一日

Encouraged

外商投资产业指导目录

鼓励外商投资产业目录

一、农、林、牧、渔业

1. 中低产农田改造
2. 蔬菜（含食用菌、西甜瓜）、水果、茶叶无公害栽培技术及产品系列化开发、生产
3. 糖料、果树、花卉、牧草等农作物优质高产新技术、新品种（转基因品种除外）开发、生产
4. 花卉生产与苗圃基地的建设、经营
5. 农作物秸秆还田及综合利用、有机肥料资源的开发生产
6. 中药材种植、养殖（限于合资、合作）
7. 林木（竹）资源及良种培育
8. 天然橡胶、剑麻、咖啡种植
9. 优良种畜种禽、水产良种繁育（不含我国特有的珍贵优良品种）
10. 名特优水产品养殖、深水网箱养殖
11. 防治荒漠化及水土流失的植树种草等生态环境保护工程建设、经营

二、采掘业

1. 石油、天然气的风险勘探、开发

Restricted

限制外商投资产业目录

一、农、林、牧、渔业

1. 粮食（包括马铃薯）、棉花、油料种子开发生产（中方控股）
2. 珍贵树种原木加工（限于合资、合作）

二、采掘业

1. 钨、锡、锑、钼、重晶石、萤石等矿产勘查、开采（限于合资、合作）
2. 贵金属（金、银、铂族）勘查、开采
3. 金刚石等贵重非金属矿的勘查、开采
4. 特种、稀有煤种勘查、开发（中方控股）
5. 硬煤石及硬镁质矿石开采
6. 天青石开采

三、制造业

Prohibited

禁止外商投资产业目录

一、农、林、牧、渔业

1. 我国稀有的珍贵优良品种的养殖、种植（包括种植业、畜牧业、水产业的优良基因）
2. 转基因植物种子生产、开发
3. 我国管辖海域及内陆水域水产品捕捞

二、采掘业

1. 放射性矿产的勘查、开采、选矿
2. 稀土勘查、开采、选矿

三、制造业

（一）食品加工业

1. 我国传统工艺的绿茶及特种茶加工（名茶、黑茶等）

Bartik IV

- For entrepreneurs born in location b in year y, we construct:

$$\begin{aligned}
\text{Exposure}_{by} &= \sum_d \Big[\underbrace{z_{b\to d, Y(y), t=2000}}_{\text{share}} \times \underbrace{\text{Shock}_{d,y+25}}_{\text{shift}} \Big] \\
&= \sum_d \Big[\underbrace{\frac{\text{Flow}_{b\to d, Y(y), t=2000}}{\text{Pop}_{b, Y(y), t=2000}}}_{\text{share}} \times \underbrace{\sum_j \Big(\frac{\text{Firm}_{jd, t=1995}}{\text{Firm}_{d, t=1995}} \times \text{Dereg}_{j,y+25} \Big)}_{\text{shift}} \Big] \\
&= \sum_d \Bigg[\underbrace{\frac{\sum_{|y'-y|\le 3} \text{Flow}_{b\to d, y', t=2000}}{\sum_{|y'-y|\le 3} \text{Pop}_{b, y', t=2000}}}_{\text{share}} \times \underbrace{\sum_j \Big(\frac{\text{Firm}_{jd, t=1995}}{\text{Firm}_{d, t=1995}} \times \text{Dereg}_{j,y+25} \Big)}_{\text{shift}} \Bigg].
\end{aligned}$$

  - Birthplace-industry share: Mismatch in CIC code level and missing values.
  - The spatial **density of MNEs** can also serve as the shift term, as a generic Bartik way.
  - Home bias: Share of working and/or starting businesses in their birthplace.

Return

Bartik IV

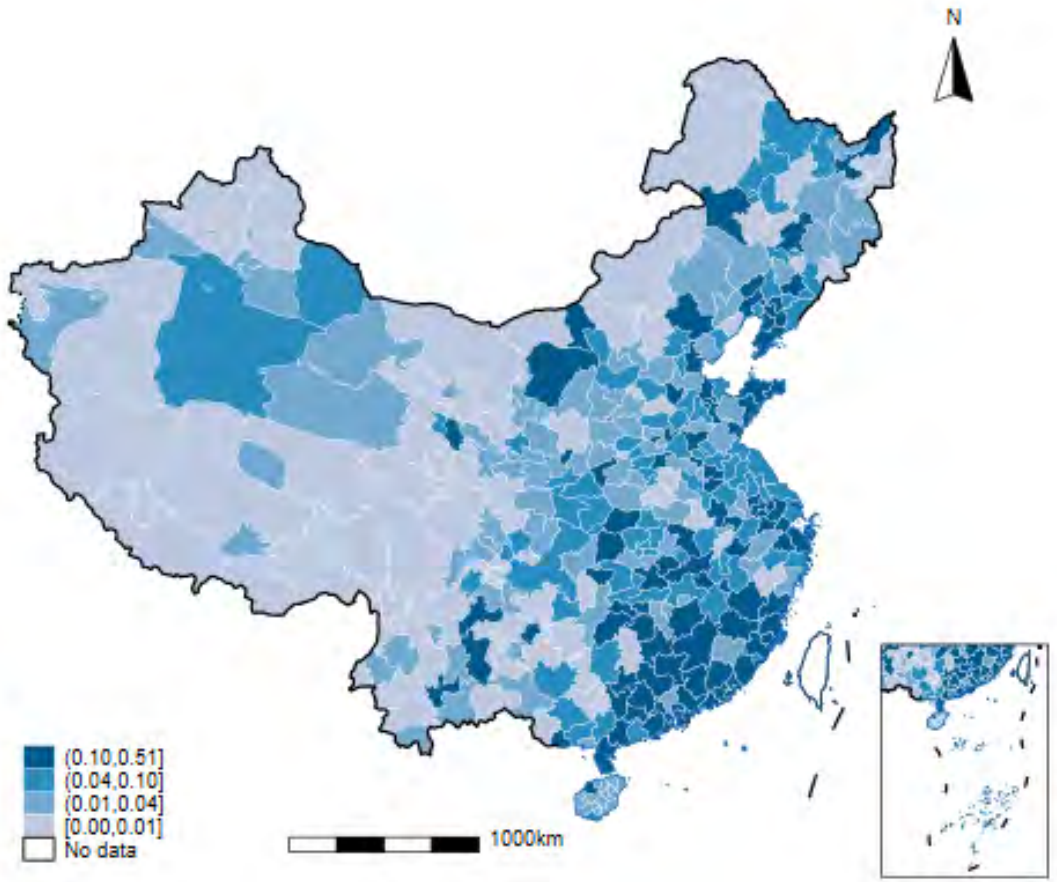
- Entrepreneurs' age distribution when they started work or businesses:

Subsample	Age when starting the:	Mean	p10	p50	p90
w/ MNE working experience	latest job	26.1	20.0	25.0	33.0
	first business	31.0	23.0	31.0	40.0
w/o MNE working experience	latest job	24.2	18.0	23.0	32.0
	first business	30.9	22.0	29.0	42.0
w/o working experience	latest job	-	-	-	-
	first business	29.7	20.0	27.0	42.0

Data source: ESIEC 2018 & 2023. Only newly established businesses are included. Return

MNEs Entry in 2002

- Spatial distribution of the MNEs entry in 2002:

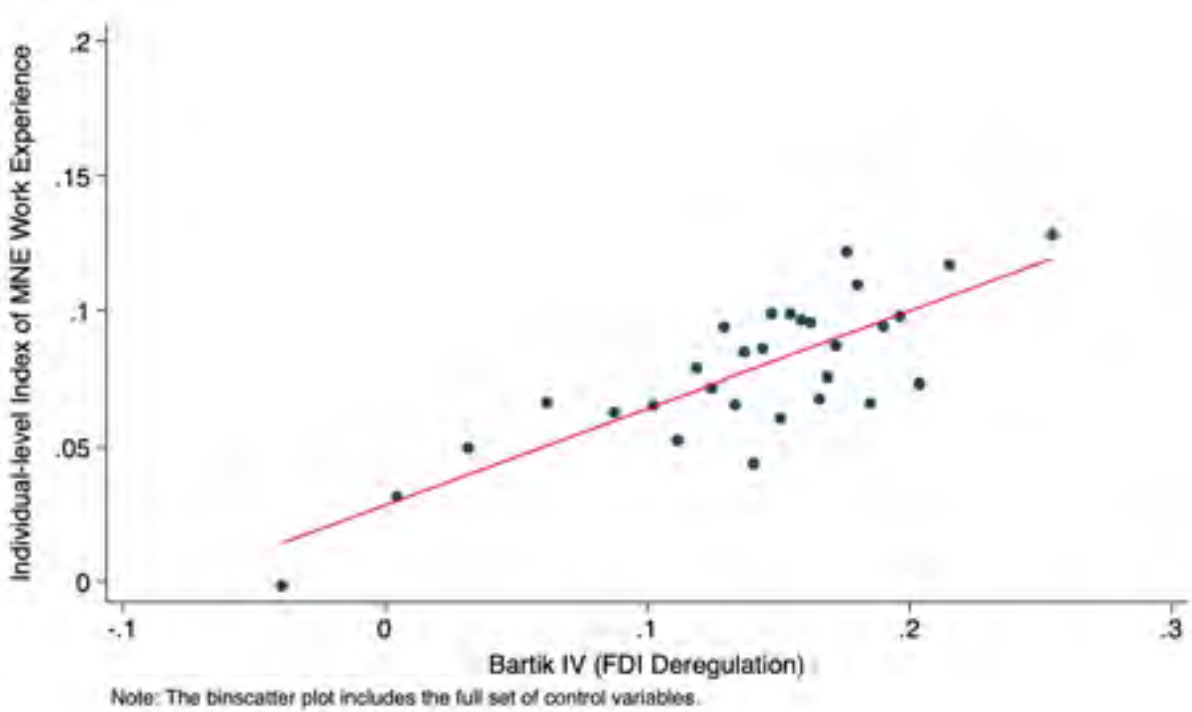


Data source: Population Census, Business Registration Dataset.

Return

First Stage

- Binned scatterplot:



Data source: ESIEC 2018 & 2023, Population Census, Business Registration Dataset, the *Catalogue*.

Return

Summary Stat.

Table A 1: Summary Statistics in ESIEC 2018 and 2023

Variable	(1) Mean	(2) S.D.	(3) Mean by: w/ MNE Job	(4) Mean by: w/o MNE Job	(5) Mean Diff. (t-test)	(6) Mean by: w/ SOE Job but w/o MNE Job	(7) Mean Diff. (t-test)
MNE Job	0.085	0.278	n.a.	n.a.	n.a.	n.a.	n.a.
SOE Job	0.157	0.363	0.235	0.149	0.085***	n.a.	n.a.
IV	0.139	0.084	0.175	0.136	0.038***	0.124	0.050***
Innovation Dummy	0.432	0.495	0.595	0.417	0.178***	0.402	0.193***
Age $\geq$ 35	0.653	0.476	0.699	0.649	0.051*	0.705	-0.006
Female	0.243	0.429	0.247	0.243	0.005	0.222	0.025
College educated	0.328	0.469	0.448	0.316	0.131***	0.470	-0.008
CCP member	0.156	0.363	0.126	0.158	-0.033**	0.217	-0.091***
log(asset)	4.435	2.062	4.676	4.412	0.263***	4.580	0.095
Corporate Shareholder	0.066	0.248	0.070	0.065	0.005	0.069	0.002
Register as firm	0.856	0.351	0.915	0.851	0.064***	0.888	0.027
New asset	0.465	0.499	0.463	0.465	-0.002	0.487	-0.025
Export	0.037	0.190	0.062	0.035	0.027**	0.032	0.030**
log(employee)	1.401	1.223	1.453	1.396	0.056	1.372	0.081
Observations	5,538		469	5,069		757	

Data source: ESIEC 2018 & 2023. Significance level: *p <0.1 **p <0.05 ***p <0.01.

Return

Summary Statistics: Control Variables

Variable	(1) Mean	(2) S.D.	(3) By MNE Job: MNE job	(4) By MNE Job: No MNE job	(5) By MNE Job: Difference MNE–Non	(6) Comparison with SOE Job: SOE job, no MNE job	(7) Comparison with SOE Job: Difference MNE–SOE
Age ≥ 35	0.653	0.476	0.699	0.649	0.051*	0.705	−0.006
Female	0.243	0.429	0.247	0.243	0.005	0.222	0.025
College educated	0.328	0.469	0.448	0.316	0.131***	0.470	−0.008
CCP member	0.156	0.363	0.126	0.158	−0.033**	0.217	−0.091***
log(assets)	4.435	2.062	4.676	4.412	0.263***	4.580	0.095
Corporate shareholder	0.066	0.248	0.070	0.065	0.005	0.069	0.002
Registered as a firm	0.856	0.351	0.915	0.851	0.064***	0.888	0.027
New investment	0.465	0.499	0.463	0.465	−0.002	0.487	−0.025
Export	0.037	0.190	0.062	0.035	0.027**	0.032	0.030**
log(employment)	1.401	1.223	1.453	1.396	0.056	1.372	0.081
Observations	5,538		469	5,069		757	

Notes: Columns (5) and (7) report differences in means. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Return

First Stage Using Alternatives

- The same baseline specification using alternative variables related to job experiences before starting the business:

Table A 2: First-stage Regression using Alternative Variables

	(1)	(2)	(3)	(4)	(5)	(6)
	Job(s) before Starting Business:					Military
	Outside Hometown	Number of Job(s)	in SOEs	in Gov.	as Managers	
Bartik IV	-0.110	0.269	-0.042	0.021	0.079	0.066
	(0.075)	(0.519)	(0.097)	(0.070)	(0.093)	(0.048)
Control	Yes	Yes	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-sq	0.184	0.051	0.024	0.054	0.043	0.069
Observations			5,538			

Data source: ESIEC 2018 & 2023, Population Census, Business Registration Dataset, the *Catalogue*. OLS regressions are reported. Standard errors are clustered at the (birth-)county-year level. Significance level: *p <0.1 **p <0.05 ***p <0.01.

Return Return

Baseline

Alternative specification

Table A 3: Alternative Specifications

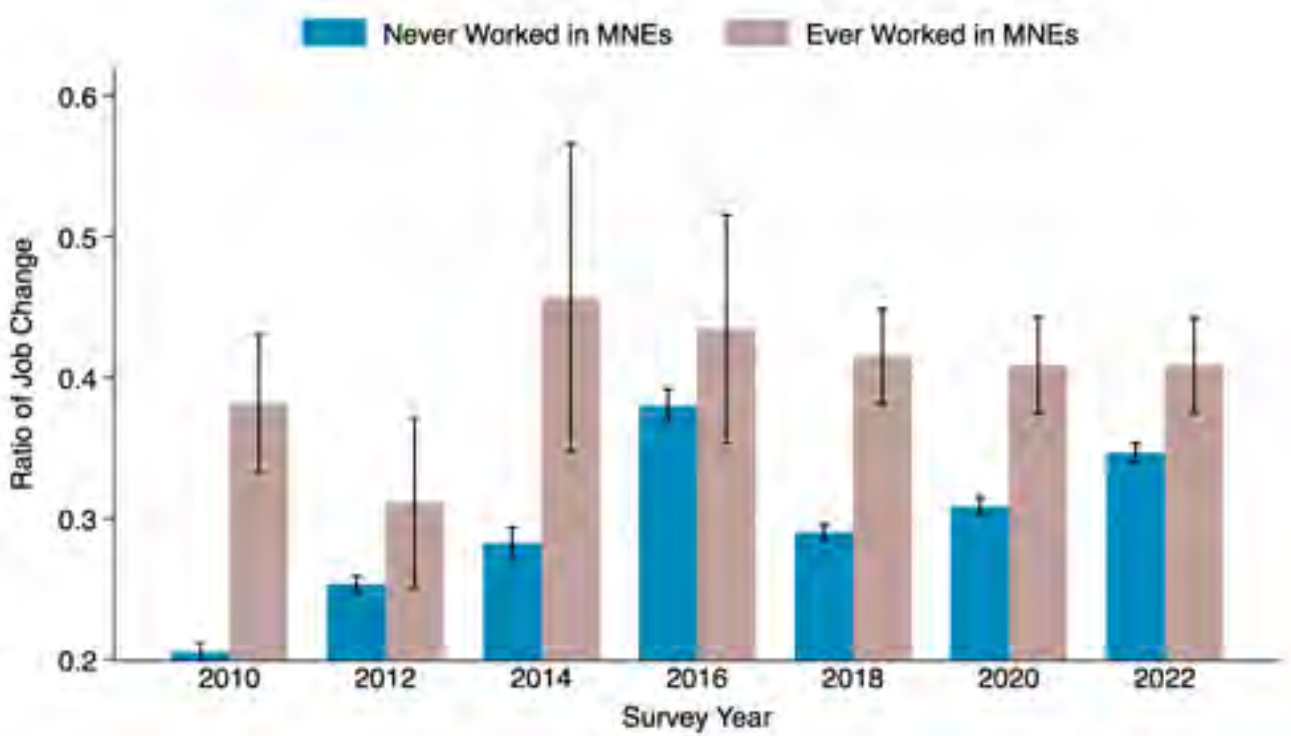
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Innovation				
	OLS	2SLS	OLS	2SLS	OLS	OLS	OLS	OLS
MNEJob	0.161***	0.979**						
	(0.042)	(0.380)						
Number of Job(s)	0.004	-0.013						
	(0.004)	(0.009)						
Most Recent Job in MNEs			0.137***	2.851**				
			(0.047)	(1.277)				
Family's Job in MNEs					0.119			
					(0.073)			
Job(s) in SOEs						-0.021		
						(0.023)		
Job(s) in Gov.							0.009	
							(0.035)	
Job outside Hometown								0.022
								(0.022)
Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-sq	0.136	-0.169	0.130	-0.952	0.129	0.128	0.128	0.128
Observations				5,538				

Data source: ESIEC 2018 & 2023, Population Census, Business Registration Dataset, the *Catalogue*. Standard errors are clustered at the (birth-)county-year level. Significance level: *$p<0.1$ **$p<0.05$ ***$p<0.01$.

Return

Job Change

$$\text{SelfEmp}_{it} = \beta \cdot (\text{MNEJob}_{it} \times \text{Post}_{it}^{\text{Job Change}}) + \alpha_i + \gamma_t + \epsilon_{it}.$$



Data source: CFPS 2010-2022. 95% confidence interval is indicated.

Return

Entrepreneurial Motivation

Table A 4: 2SLS Regressions on Income and Social Level upon Entering

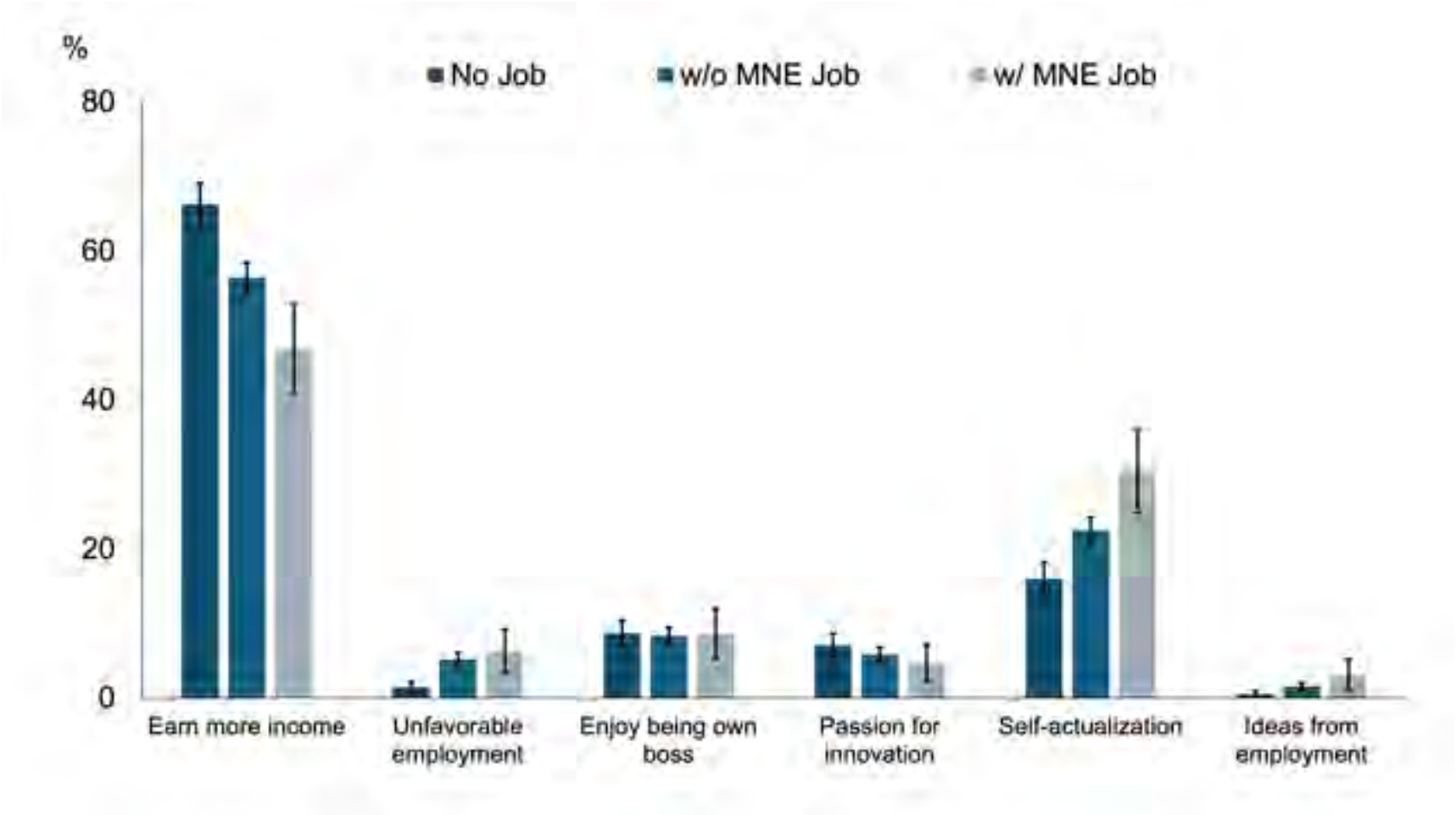
	(1) Income level	(2) Social level
MNEJob	-1.995**	-2.171**
	(0.919)	(0.947)
Control	Yes	Yes
FEs	Yes	Yes
Adj. R-sq	-0.411	-0.479
Observations	3,003	

Data source: ESIEC 2018, Population Census, Business Registration Dataset, the *Catalogue*. 2SLS regressions are reported. Standard errors are clustered at the (birth-)county-year level. Significance level: *p <0.1 **p <0.05 ***p <0.01.

▶ Return

Entrepreneurial Motivation

- Self-reported: `The most important reason to start the business:`



Data source: ESIEC 2023. 95% confidence interval is indicated.

Return

Baseline: Innovation

- Controlling for clustering index and competition: Return

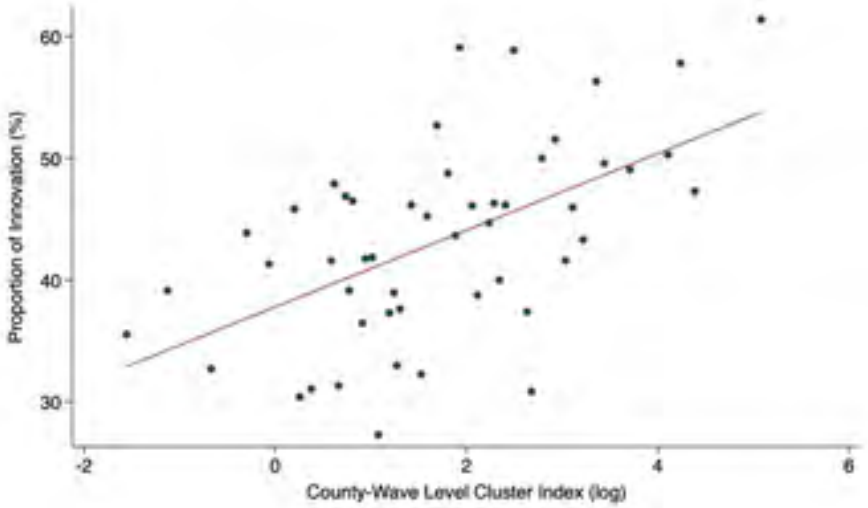
Table A 5: OLS and 2SLS Regressions on Innovation with Indexes

	(1)	(2)	(3)	(4)
	Innovation			
	OLS		2SLS	
MNEJob	0.167***	0.145***	0.945***	1.295**
	(0.041)	(0.048)	(0.359)	(0.552)
Cluster Index	0.012	0.012	0.020	0.024
	(0.013)	(0.013)	(0.015)	(0.016)
HHI	0.007	0.004	0.066	0.177
	(0.103)	(0.106)	(0.114)	(0.173)
MNEJob × Cluster Index		0.001		-0.005
		(0.001)		(0.007)
MNEJob × HHI		0.083		-2.876
		(0.266)		(3.044)
Control	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes
Adj. R-sq	0.136	0.136	-0.154	-0.213
Observations		5,538		

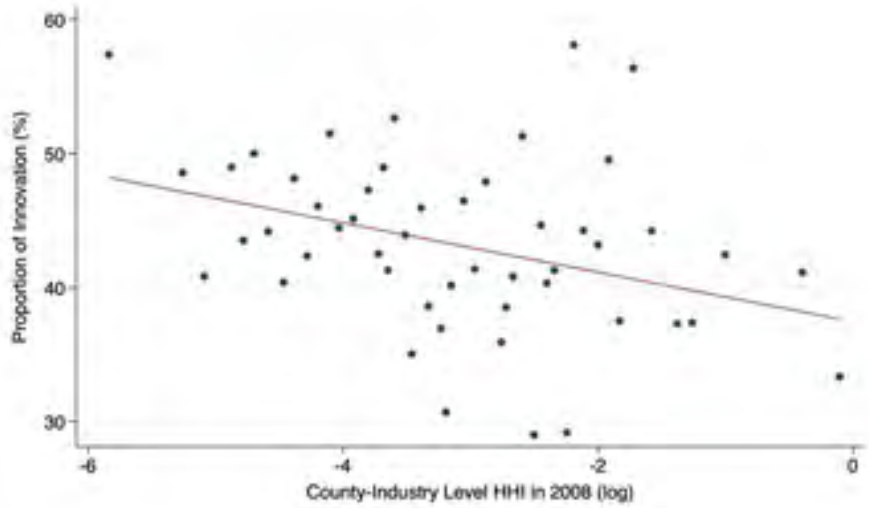
Data source: ESIEC 2018 & 2023, Population Census, Business Registration Dataset, the *Catalogue*, China Economic Census 2008. The clustering index is calculated by Ruan and Zhang (2015). Standard errors are clustered at the (birth-)county-year level. Significance level: *p <0.1 **p <0.05 ***p <0.01.

Innovation: Clustering and Competition

- Innovation is positively correlated with both clustering and competition effects:



(a) Clustering Index



(b) HHI

Data source: ESIEC 2018 & 2023, China Economic Census 2008, Business Registration Dataset. The clustering index is calculated by Ruan and Zhang (2015). Binned scatter plots are presented.

Return

- Probit and IV-Probit regressions (marginal effect) are robust.

Table A 6: Probit and IVProbit Regressions on Innovation

	(1)	(2)	(3)	(4)	(5)	(6)
	Innovation					
	Probit			IVProbit		
MNEJob	0.143***	0.143***	0.151***	0.937***	0.783***	0.744***
	(0.036)	(0.036)	(0.035)	(0.123)	(0.153)	(0.163)
Control	No	Yes	Yes	No	Yes	Yes
FEs	Yes	Yes	Yes	Yes	Yes	Yes
County × Ind FE	No	No	Yes	No	No	Yes
pseudo R-sq	0.065	0.106	0.139	0.061	0.106	0.122
Observations	5,538					

Data source: ESIEC 2018 & 2023, Population Census, Business Registration Dataset, the *Catalogue*. Marginal effect is reported. Standard errors are clustered at the (birth-)county-year level. Significance level: *p <0.1 **p <0.05 ***p <0.01.

Return

- Propensity Score Matching (PSM):

Table A 7: PSM Result

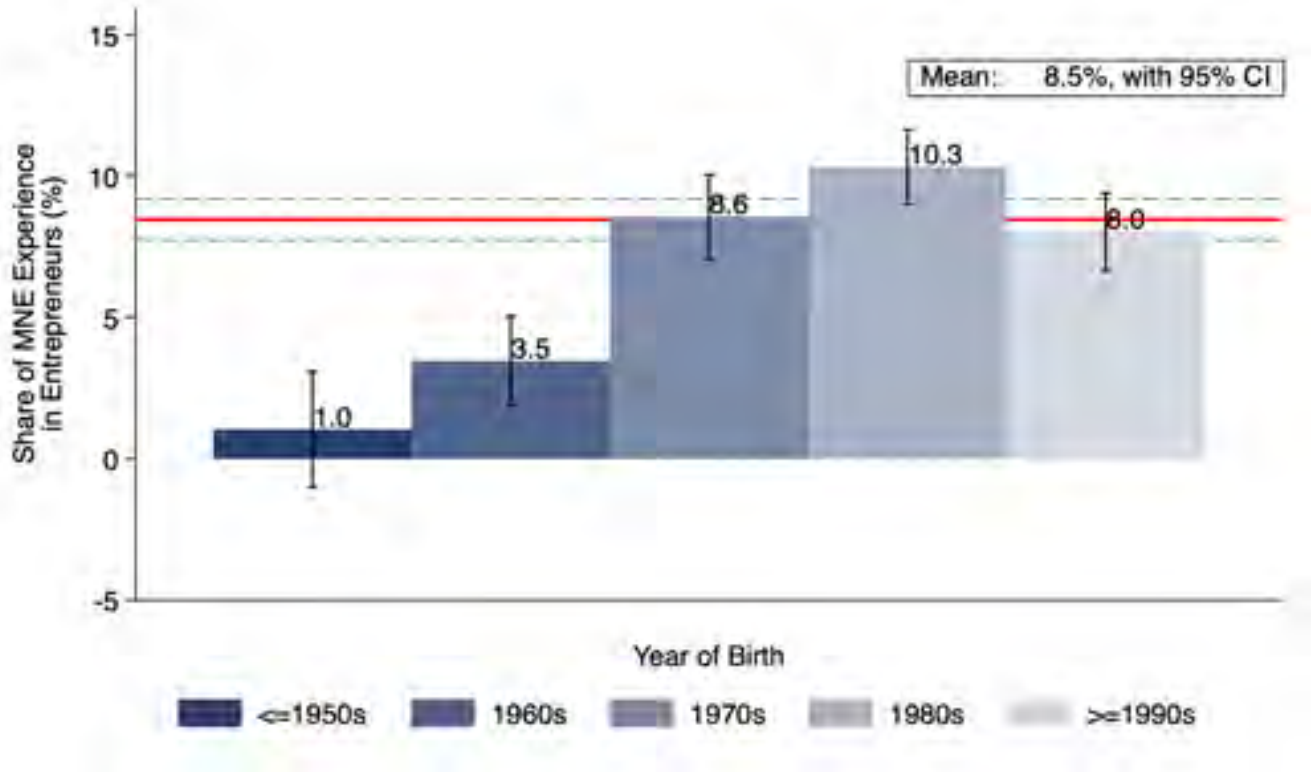
	(1)	(2)	(3)
	Matching Methods:		
	Nearest Neighbor	Kernel	Radius
Treatment Effect (ATT)	0.146***	0.123***	0.158**
	(0.043)	(0.037)	(0.088)
Matched Sample Size		2,212	

Data source: ESIEC 2018. Standard errors are calculated using Bootstrap. Significance level: *p <0.1 **p <0.05 ***p <0.01.

Return

Alternatives

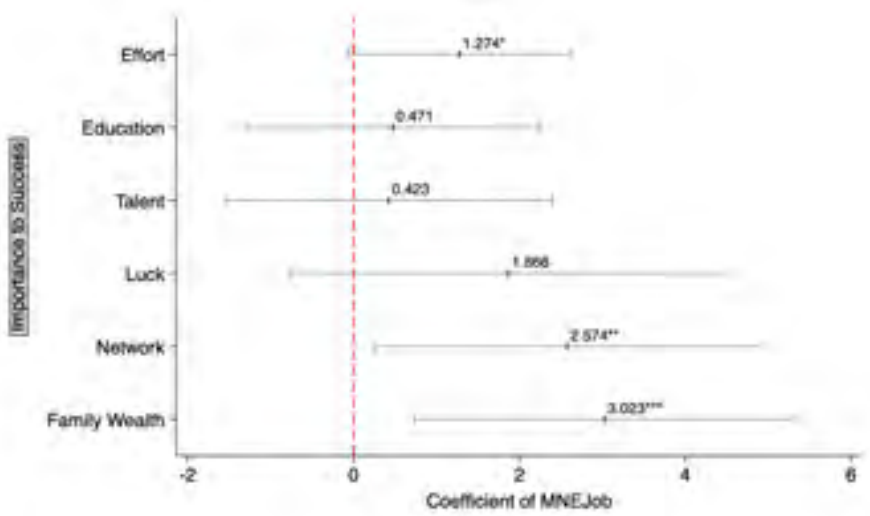
- Control for the time trend:
  - Year FE is controlled.
  - Regression with interaction terms with birth cohort dummies remains robust.



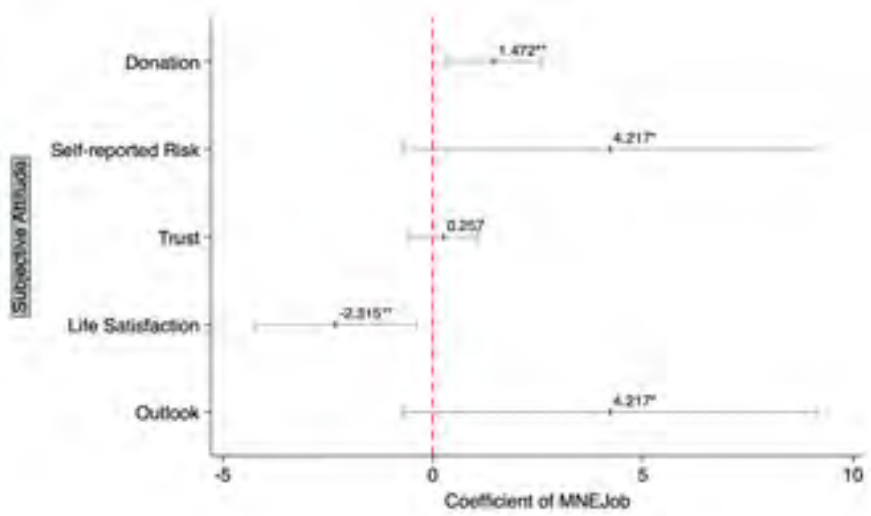
Data source: ESIEC 2018 & 2023. 95% confidence interval is indicated.

▸ Ubran Emp. ▸ Specification ▸ Equation ▸ Return

Subjective Attitude



(c) Locus of Control



(d) Others

Data source: ESIEC 2018 & 2023, Population Census, Business Registration Dataset, the *Catalogue*. 95% confidence interval is indicated. Significance level: $*p<0.1$ $**p<0.05$ $***p<0.01$.

▶ Return

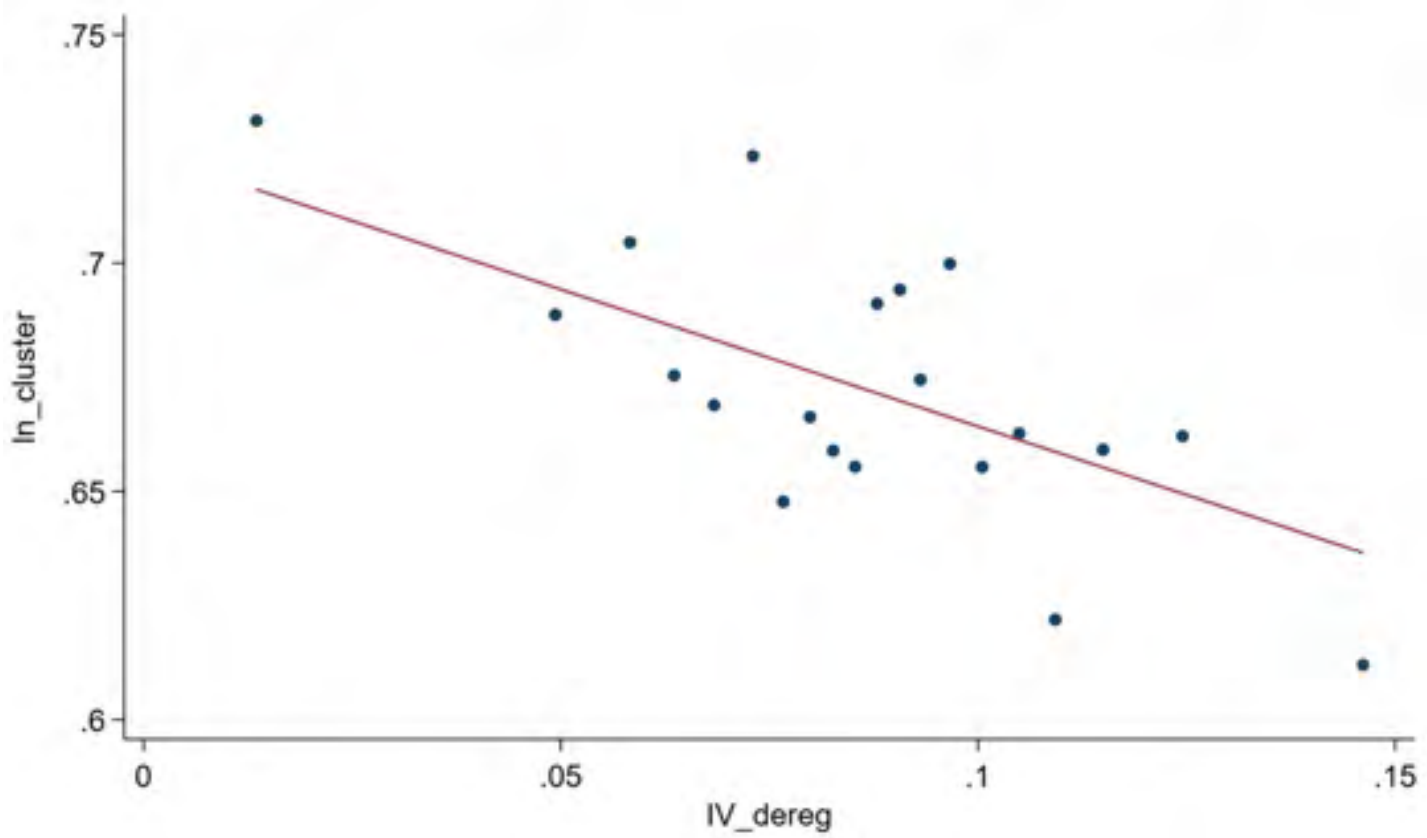
Table A 8: Regressions on Digital Adoption in ESIEC 2023 Data

	(1)	(2)	(3)	(4)	(5)	(6)
	App Adoption		Digital Device		AI Knowledge	
	OLS	2SLS	OLS	2SLS	OLS	2SLS
MNE Job	0.105***	1.383**	0.077**	1.808***	0.176***	1.422**
	(0.034)	(0.673)	(0.037)	(0.592)	(0.036)	(0.586)
SOE Job	-0.026	-0.055*	-0.046**	-0.086**	0.022	-0.006
	(0.023)	(0.029)	(0.022)	(0.038)	(0.023)	(0.026)
Control	Yes	Yes	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-sq	0.114	-0.486	0.264	-0.840	0.163	-0.427
Weak IV F Stat.			20.032 (for 2SLS only)			
Observations	3,678 (ESIEC 2023)					

Data source: ESIEC 2023, Population Census, Business Registration Dataset, the *Catalogue*. Standard errors are clustered at the (birth-)county-year level. Significance level: *p <0.1 **p <0.05 ***p <0.01.

Return

Cluster Index

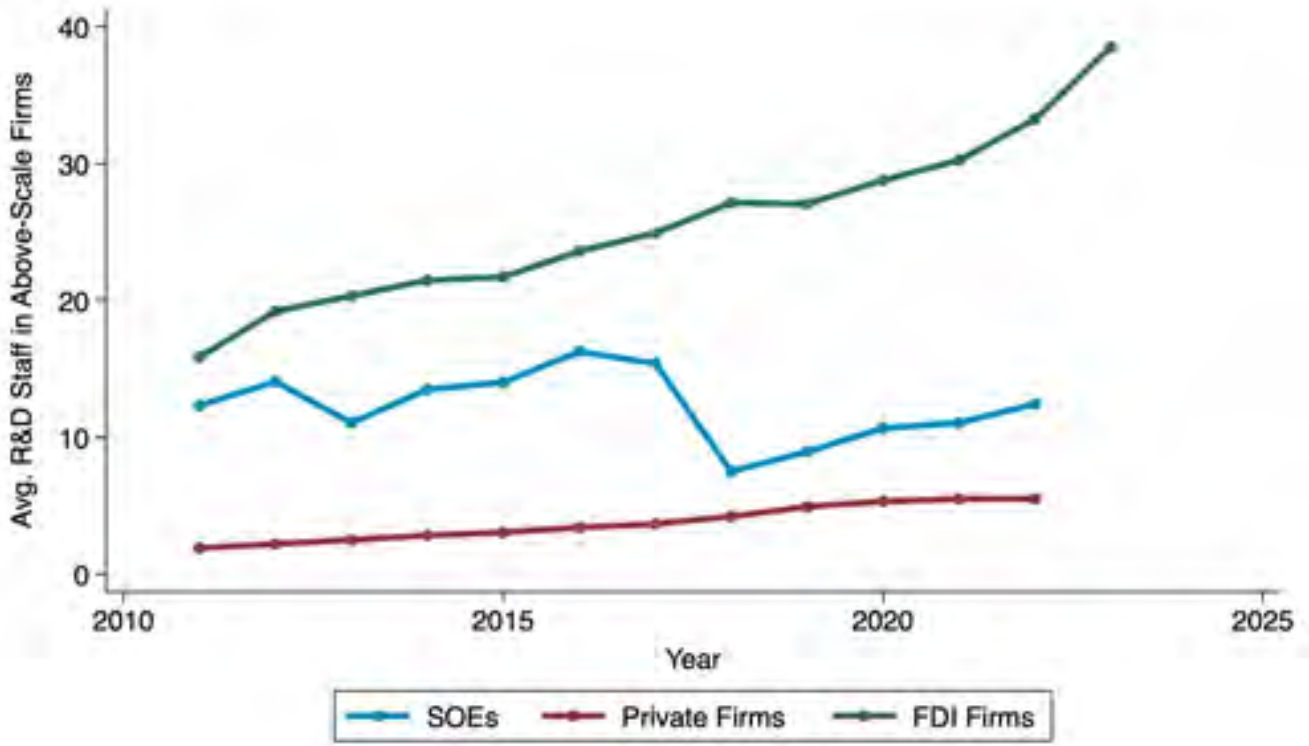


Data source: Population Census, Business Registration Dataset, the *Catalogue*, Cluster indices by Ruan and Zhang (2015).

Return

R&D Intensity

$$\text{Avg.} = \frac{\text{Total R\&D Employment}}{\text{Number of Above-Scale Firms}}$$

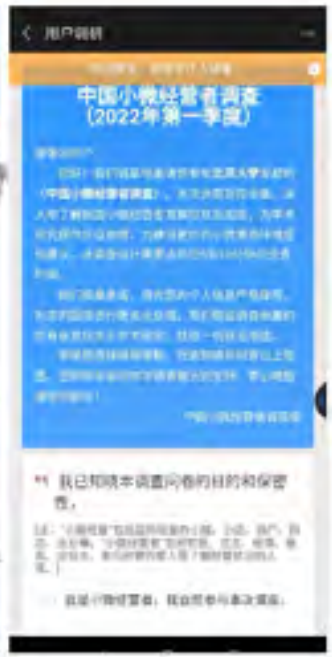


Data source: CEIC, National Bureau of Statistics, PRC.

Return

OSOME

- Online Survey of Micro-and-small Enterprises (OSOME)
  - Quarterly frequency since 2020Q3
  - Online questionnaire via the Alipay platform
  - Sample: *active* users with explicit transaction criteria
  - Around 6,000-10,000 received every period, nearly half are **unregistered**



Return

Appendix II

ESIEC sample

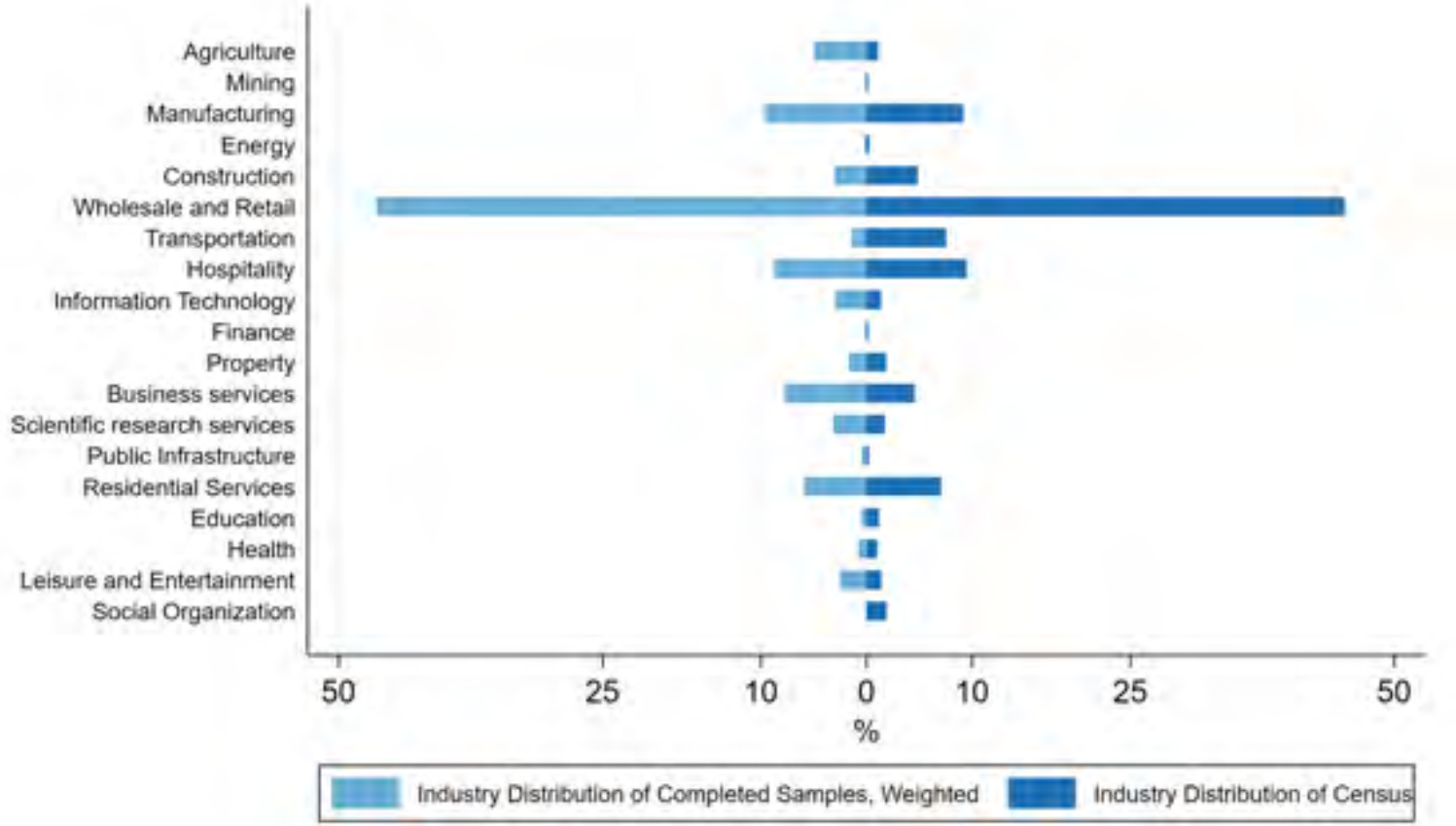


Figure B 1: Industrial Distribution of the Completed ESIEC Sample and of the China Economic Census of 2018

Return

Appendix II

ESIEC sample

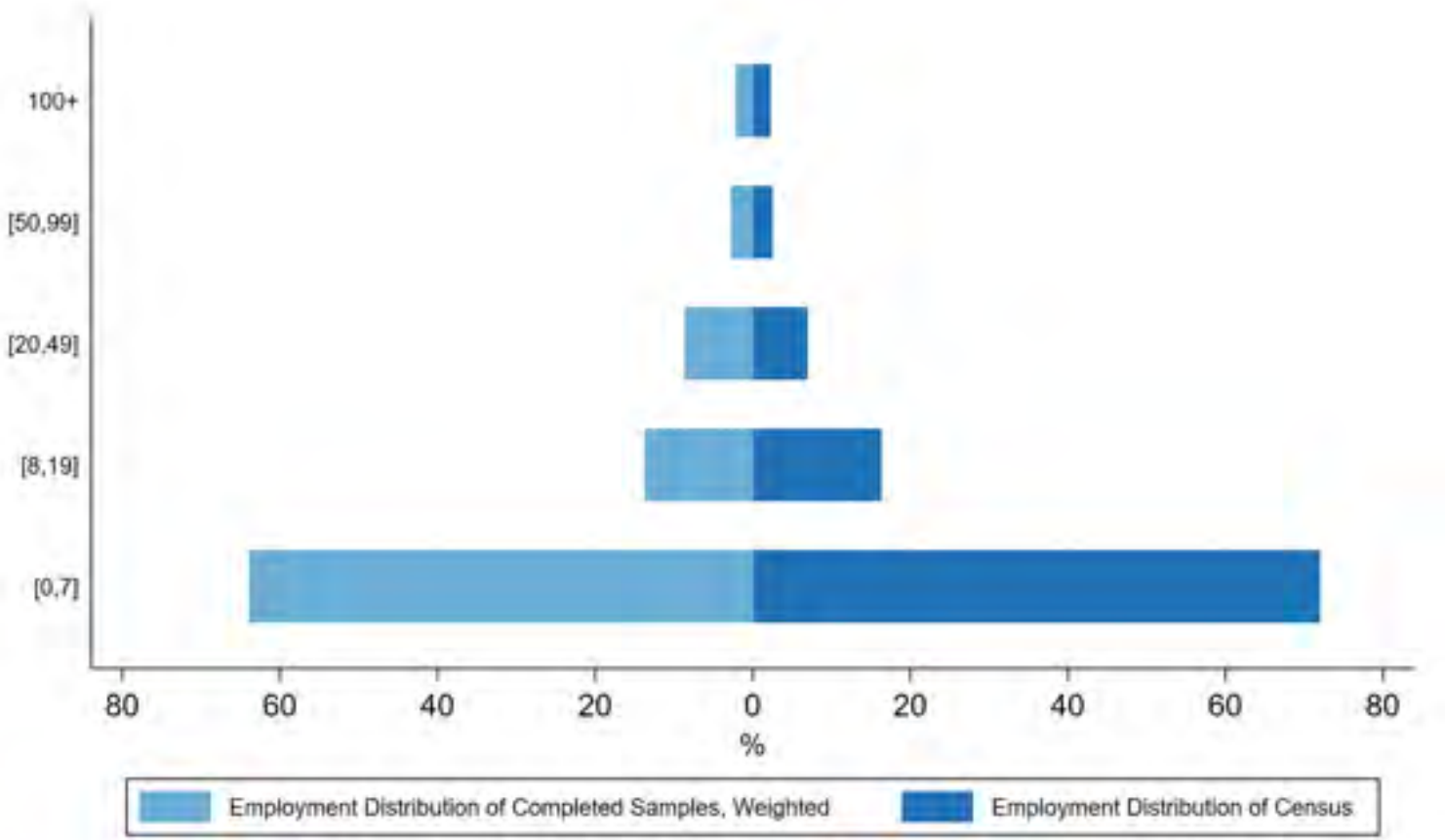
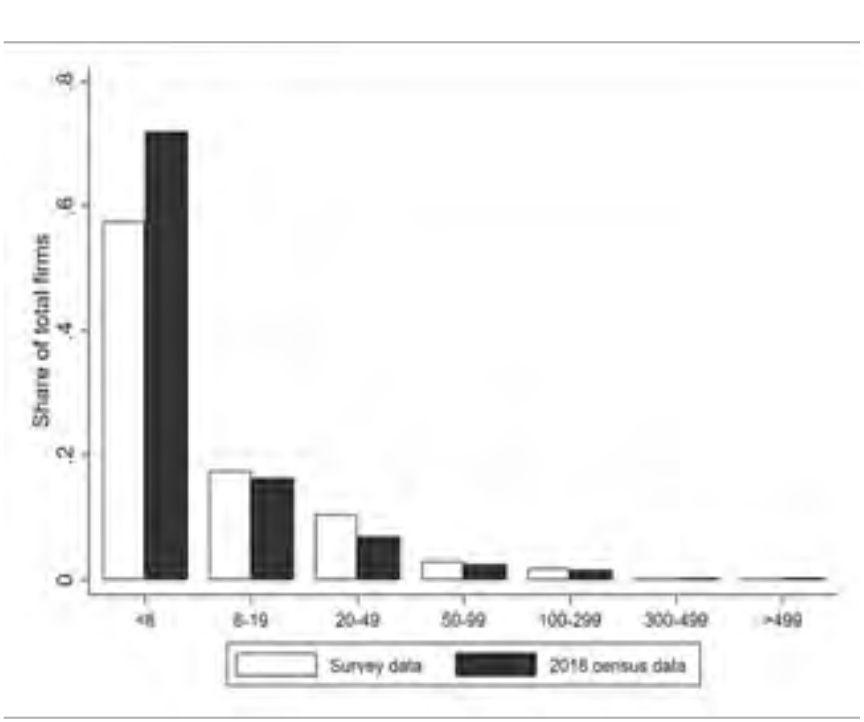


Figure B 2: Size Distribution of the Completed ESIEC Sample and of the China Economic Census of 2018

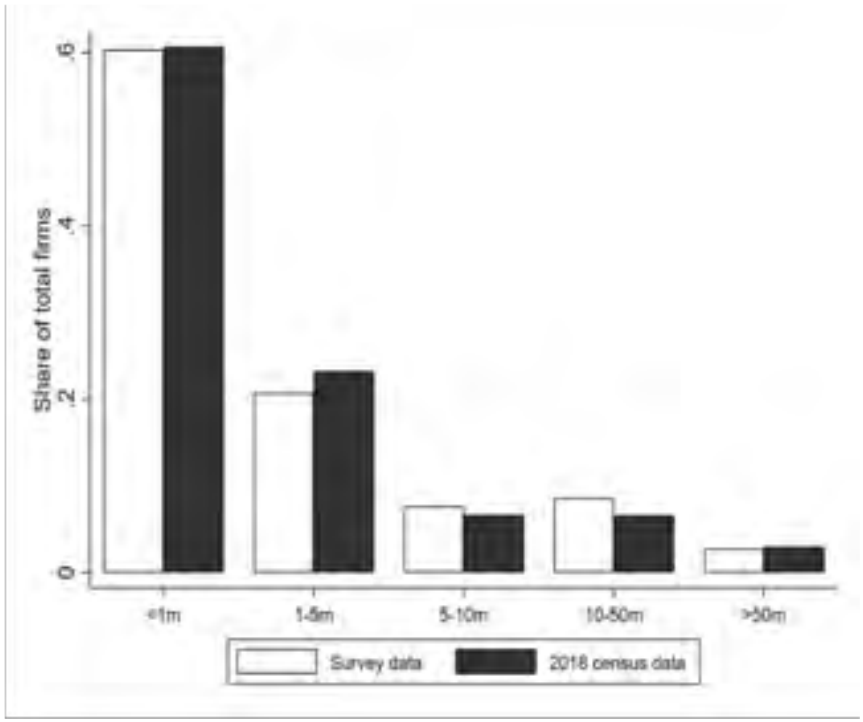
▸ Return

Appendix II

ESIEC sample



(a) Employment



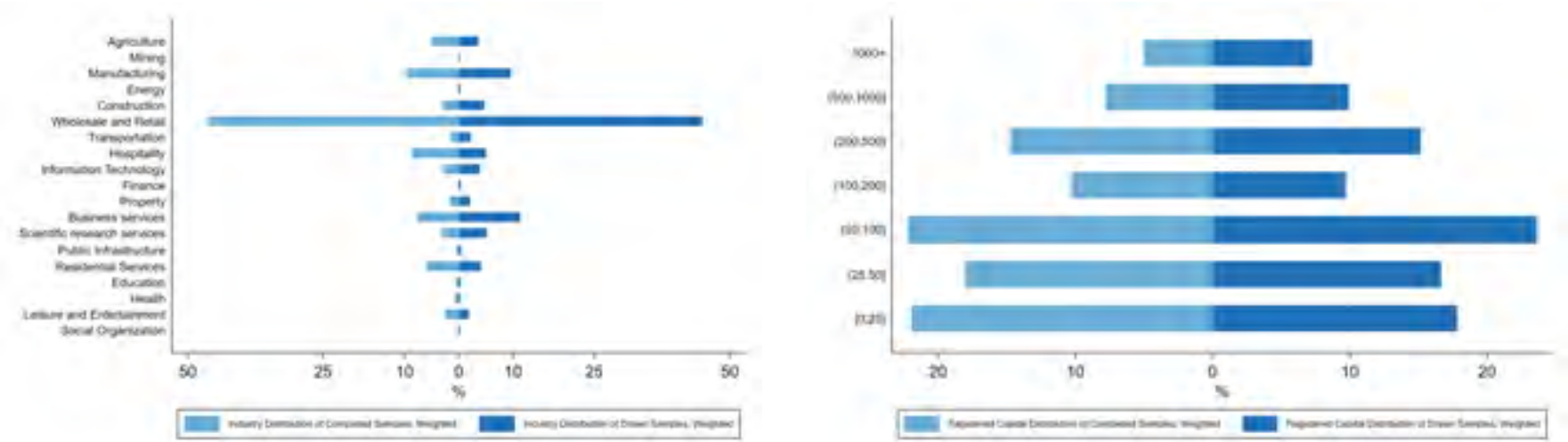
(b) Revenue

Figure B 3: Size Distribution of the ESIEC Sample and of the China Economic Census of 2018 (Dai *et al.*, 2021b)

Return

Appendix II

ESIEC sample



(a) Industry

(b) Registered Capital

Figure B 4: Industrial and Size Distribution of the ESIEC Drawn Sample and the Completed Sample

▶ Return

Literature

- Experience matters:
  - E.g., politician (Guo *et al.*, 2024), investor (Koudijs and Voth, 2016), scientist (Wang *et al.*, 2019), education (Huang and Dong, 2025), ...
  - Challenges to record experience and identify the causal effect.
- Literature on CEOs' experience:
  - Disaster (Bernile *et al.*, 2017; Ru *et al.*, 2025), family (Cronqvist and Yu, 2017), military (Benmelech and Frydman, 2015), banking crises (Yu, 2025), ...
  - ... Primarily emphasizing the long-lasting **imprint** effect (Malmendier, 2021).
- Research gap:
  - Less is known about the impact of work experience (Custódio and Metzger, 2014).
  - CEOs are not necessarily entrepreneurs, and they are often found in large, listed firms.
  - Outcome: Lack of a more comprehensive record on internal innovative activities.
- Little on effect on entrepreneurship and innovation:
  - MNE (Görg and Strobl, 2005), immigrant (Chodavadia *et al.*, 2024; Liu *et al.*, 2024), AI education (Gofman and Jin, 2025), political connection (Zhong and Zheng, 2024).

Literature

- FDI spillover on entrepreneurial activities: Inconclusive
  - Mixed effects via different channels → Overall close to zero (Hong *et al.*, 2021)
  - Cai *et al.* (2007)'s study on Zhongguancun took MNEs as technological leaders
- FDI spillover on innovation: Inconclusive
  - Cheung and Lin (2004) found a positive effect on innovation through demonstration, and Chen *et al.* (2022) through competition effect. MNEs' innovation improves local firms' productivity via technology diffusion (Gong, 2023).
  - Lu *et al.* (2017) found a negative overall effect, but little on innovation. Ding *et al.* (2024) documented a financial spillover.
  - Little direct micro-level evidence on mobility channel.
- Relatively rare micro-level studies in China:
  - Yuan and Lu (2005) found a trivial impact on larger-sized private firms, while Liu *et al.* (2014) found that entrepreneurs with MNE experience outperformed.
  - Mao (2019) reveals that R&D capabilities and financing constraints are critical, yet little on labor mobility (Todo *et al.*, 2009) or startups.
  - Innovative learning by exporting (Liang *et al.*, 2024), while a negative effect on export quality due to domestic competition (Liu *et al.*, 2024). Return Return

Baseline

Alternative specification

Table B 1: Alternative Specifications

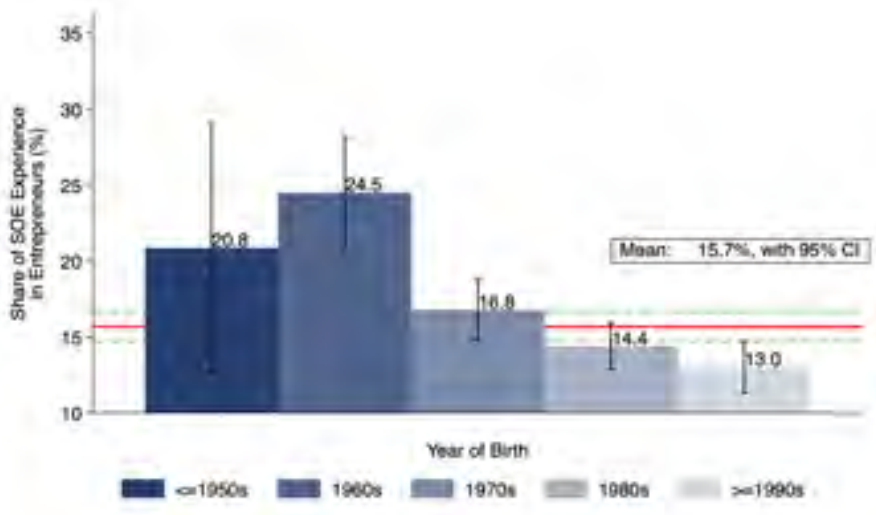
	(1)	(2)	(3)	(4) Innovation	(5)	(6)	(7)	(8)
	OLS	2SLS	OLS	2SLS	OLS	OLS	OLS	OLS
MNEJob	0.161***	0.979**						
	(0.042)	(0.380)						
Number of Job(s)	0.004	-0.013						
	(0.004)	(0.009)						
Most Recent Job in MNEs			0.137***	2.851**				
			(0.047)	(1.277)				
Family's Job in MNEs					0.119			
					(0.073)			
Job(s) in SOEs						-0.021		
						(0.023)		
Job(s) in Gov.							0.009	
							(0.035)	
Job outside Hometown								0.022
								(0.022)
Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-sq	0.136	-0.169	0.130	-0.952	0.129	0.128	0.128	0.128
Observations				5,538				

Data source: ESIEC 2018, Population Census, Business Registration Dataset, the *Catalogue*. Standard errors are clustered at the (birth-)county-year level.

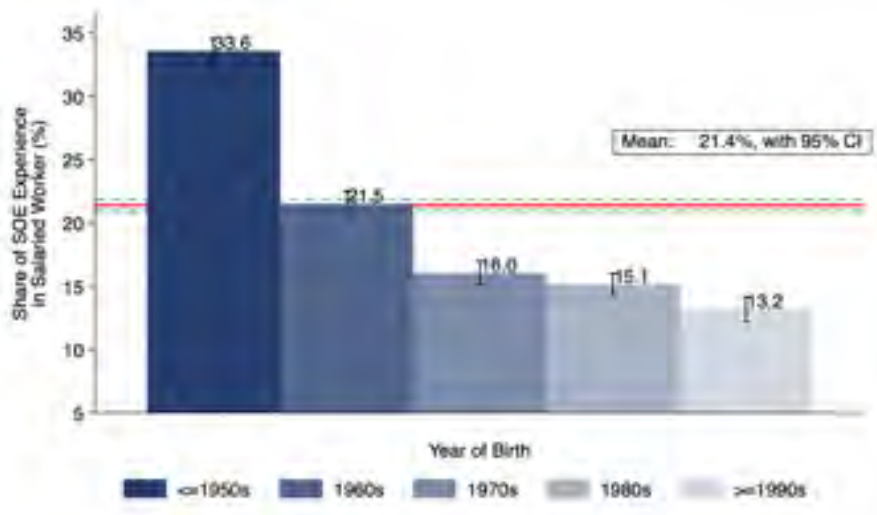
Significance level: *p <0.1 **p <0.05 ***p <0.01.

Return

Extensive Margin



(a) SOE Experience in Entrepreneurs (ESIEC)



(b) SOE Experience in Entrepreneurs (CFPS)

Figure B 1: Share of SOE Experience in Entrepreneurs and Salaried Workers, by Birth Cohort

Data source: ESIEC 2018 & 2023, CFPS 2010-2022. 95% confidence interval is indicated.

Return

Unconditional Result

- Entrepreneurs with prior MNE work experience exhibit a higher propensity to introduce process or product innovations; Less pronounced regarding patents.
- Patent-based measures may underestimate innovation among SME.

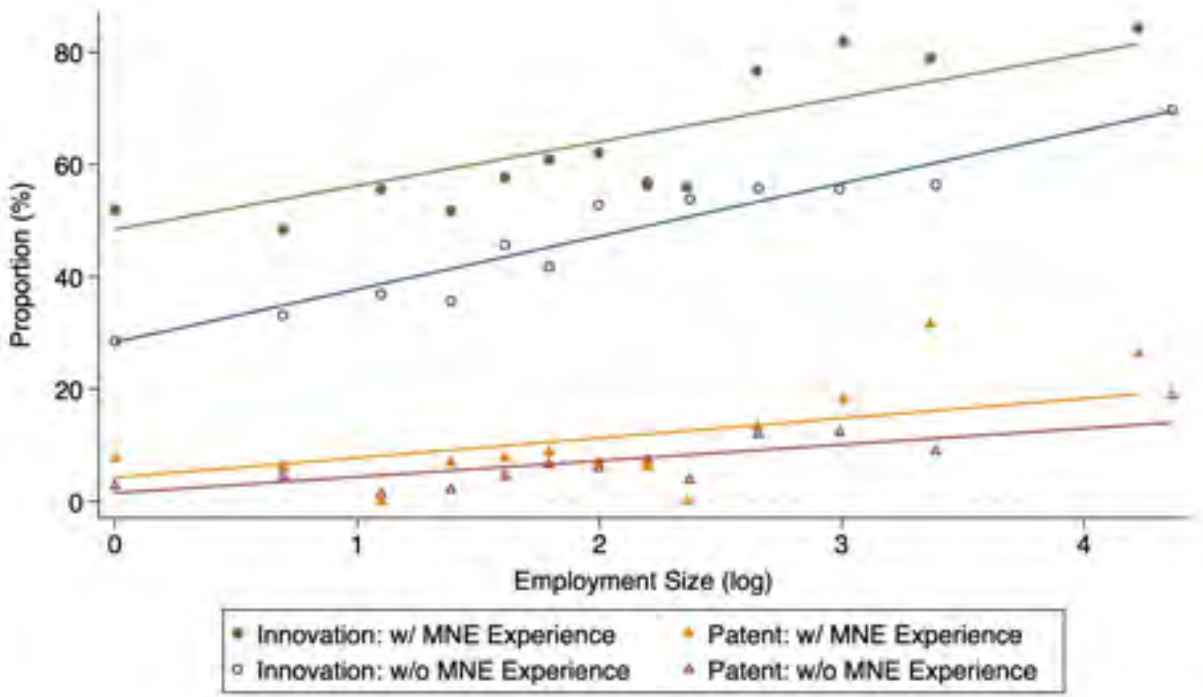


Figure B 2: The Proportion of Reporting Innovation and Patent with Employment Size

Data source: ESIEC 2018 & 2023. Return

Channel

- Bonus incentives for employees, a larger share of R&D employees (excluding external staff), and other R&D-related activities also matter.
- More inter-firm R&D cooperation, but not with research institutes.

Table B 2: Supplementary 2SLS Regressions on Potential Channels in ESIEC 2023 Data

	(1)	(2)	(3)	(4)	(5)	(6)
	Dummy for Incentives:		R&D Related	R&D	R&D with External:	
	Bonus	Equity	Activities	Emp. (log)	Firms	Institutions
MNEJob	0.970*	-0.078	0.636**	2.850***	0.485**	-0.103
	(0.509)	(0.187)	(0.313)	(1.057)	(0.240)	(0.288)
Control	Yes	Yes	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-sq	-0.226	-0.047	-0.141	-0.405	-0.381	-0.001
Observations	2,535 (firms in ESIEC 2023)					

Data source: ESIEC 2023, Population Census, Business Registration Dataset, the *Catalogue*. 2SLS regressions are reported. Standard errors are clustered at the (birth-)county-year level. Significance level: *$p<0.1$ **$p<0.05$ ***$p<0.01$.

Return

Extensive Margin: Entry

The MNE experience also increased entrepreneurship on the extensive margin:

1. Aggregate level: The exposure increased marginally the non-FDI entries
   - Aggregated specification for city c at year t:

$$(\text{Non-FDI Entry})_{ct} = \sum_{k=-3}^{4} \beta_k \cdot \text{Exposure}_c \cdot \mathbb{I}(t = k) + \text{TWFE} + \epsilon_i.$$

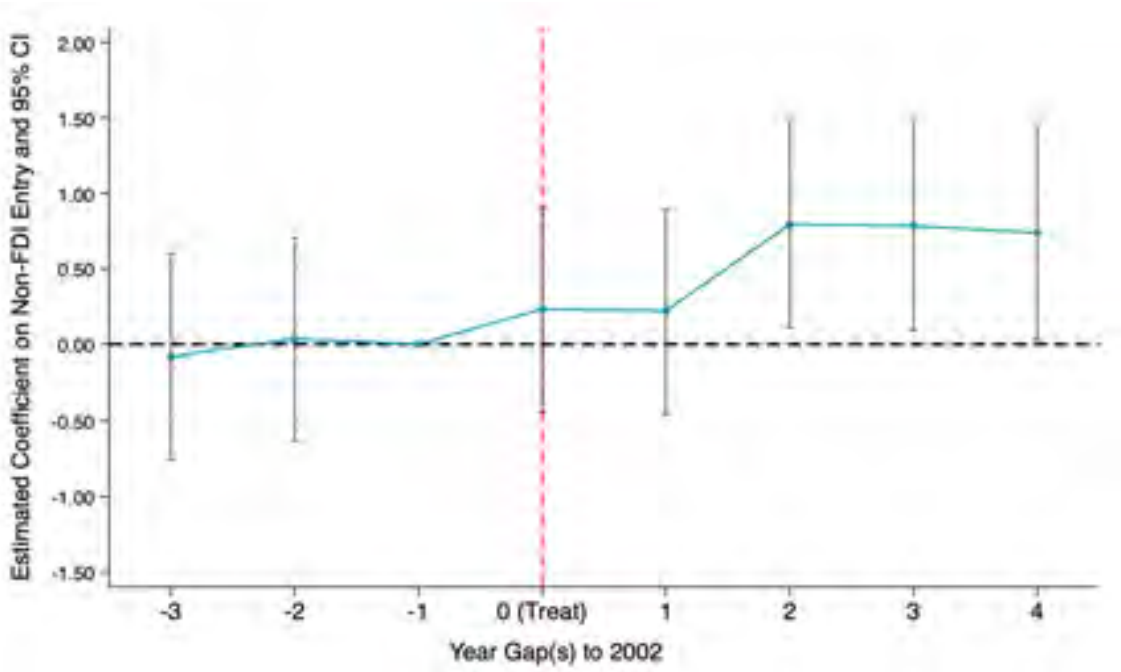


Figure B 3: Event Study of Bartik IV (MNEs Exposure) on Entries at Birthplace

Data source: Population Census, Business Registration Dataset, the *Catalogue*. 95% confidence interval is indicated.

Extensive Margin: Entry

The MNE experience also increased entrepreneurship on the extensive margin:

2. Micro level: Workers with MNE experience were more likely to start a business upon changing jobs than other workers
   - Tracking adults' work history: MNE experience (as treated group) and their first job change during the observation period (as post indicator) from household survey

Table B 3: Regressions on Adults' Entrepreneurship Upon Job Changes

	(1)	(2)	(3)	(4)	(5)
	Outcome: Start Self-Employed upon Job Change				
	OLS		Staggered DID Method		
	Full Sample	Subsample with Job Change	Full Sample	Not-yet-treated as control	Subsample with Job Change
ATT	0.145***	0.151***	0.126***	0.126***	0.132***
	(0.028)	(0.030)	(0.034)	(0.034)	(0.034)
Individual FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Adj. R-sq	0.566	0.494	-	-	-
Observations	150,039	86,635	150,039	150,039	86,635

Data source: CFPS 2010-2022. Callaway and Sant'Anna (2021) method is applied for Columns (3)-(5). Significance level: *p <0.1 **p <0.05 ***p <0.01.

Extensive Margin: Entry

The MNE experience also increased entrepreneurship on the extensive margin:

2. Micro level: Workers with MNE experience were more likely to start a business upon changing jobs than other workers
   - Tracking adults' work history: MNE experience (as treated group) and their first job change during the observation period (as post indicator) from household survey

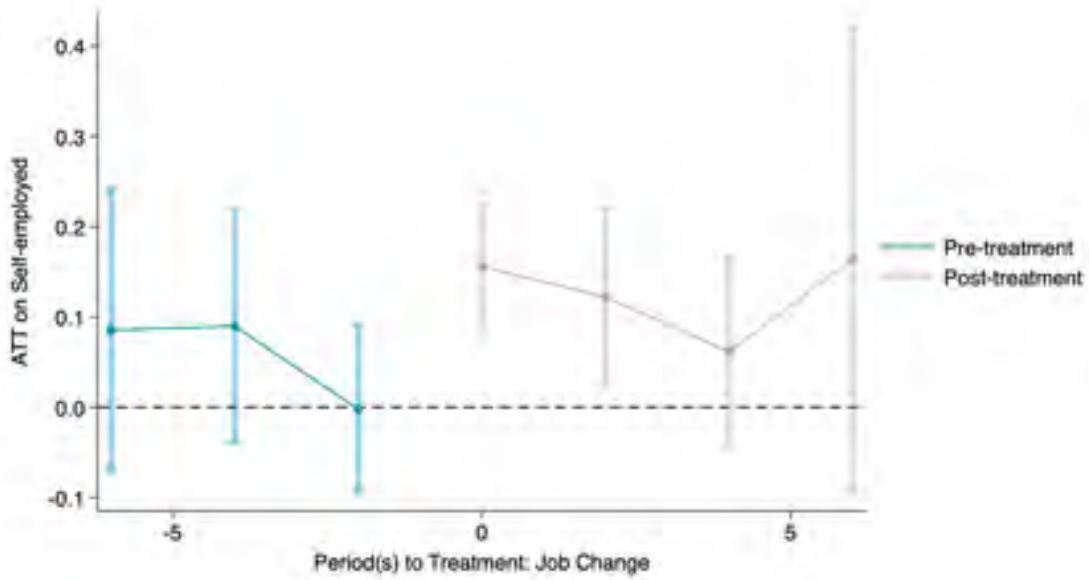


Figure B 4: Event Study of Adults' Entrepreneurship Upon Job Changes

Data source: CFPS 2010-2022. 95% confidence interval is indicated. Callaway and Sant'Anna (2021) method is applied.

Extensive Margin: Entry

- Entrepreneurial history for those with MNE experience:
  - More likely to be formal and registered as a joint-venture firm; Not serial
  - Did not rely on private loans, credit, government subsidies, or network.
  - More likely to venture into the same industry as their previous jobs (compared to counterparts with other working experience)
  - Upon starting business, the wealth and social status were not high ▸.

Table B 4: 2SLS Regressions on Entry Histories

	(1) Firm	(2) Serial	(3) Gov. Network	(4) Joint	(5) Borrow or Credit	(6) Subsidies	(7) Same Ind. ($\geq$ 1 Job(s))
MNEJob	0.406*	-0.089	-0.470**	0.967***	-0.219	-0.236	0.801***
	(0.245)	(0.294)	(0.205)	(0.269)	(0.276)	(0.166)	(0.265)
Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R-sq	0.069	-0.006	-0.202	-0.199	-0.025	-0.072	-0.270
Observations			5,538				4,063

Data source: ESIEC 2018 & 2023, Population Census, Business Registration Dataset, the *Catalogue*. 2SLS regressions are reported. Standard errors are clustered at the (birth-)county-year level. Significance level: *p <0.1 **p <0.05 ***p <0.01.

▸ Return

Patent-level

Table B 5: 2SLS Regressions on Innovation Performance: Patent-level

	(1) Similarity to overseas patents	(2) Inactive status	(3) Forward citation within 5 years
MNE Job	0.443**	-0.339*	0.425
	(0.183)	(0.202)	(0.464)
SOE Job	-0.133*	-0.114	-0.105
	(0.079)	(0.081)	(0.148)
Control	Yes	Yes	Yes
FEs	Yes	Yes	Yes
IPC FE	Yes	Yes	Yes
Publication Year FE	Yes	Yes	Yes
Adj. R-sq	-0.091	-0.044	-0.101
Observations (Patent-level)	1,935		1,033

Data source: ESIEC 2018 & 2023, Population Census, Business Registration Dataset, the *Catalogue*, Google Patents, and CNIPA. The sample consists of patents matched to the surveyed firms. 2SLS regressions are reported. Standard errors are clustered at the (birth-)county-year level. Significance level: *$p<0.1$ **$p<0.05$ ***$p<0.01$.

▶ Return

Motivation

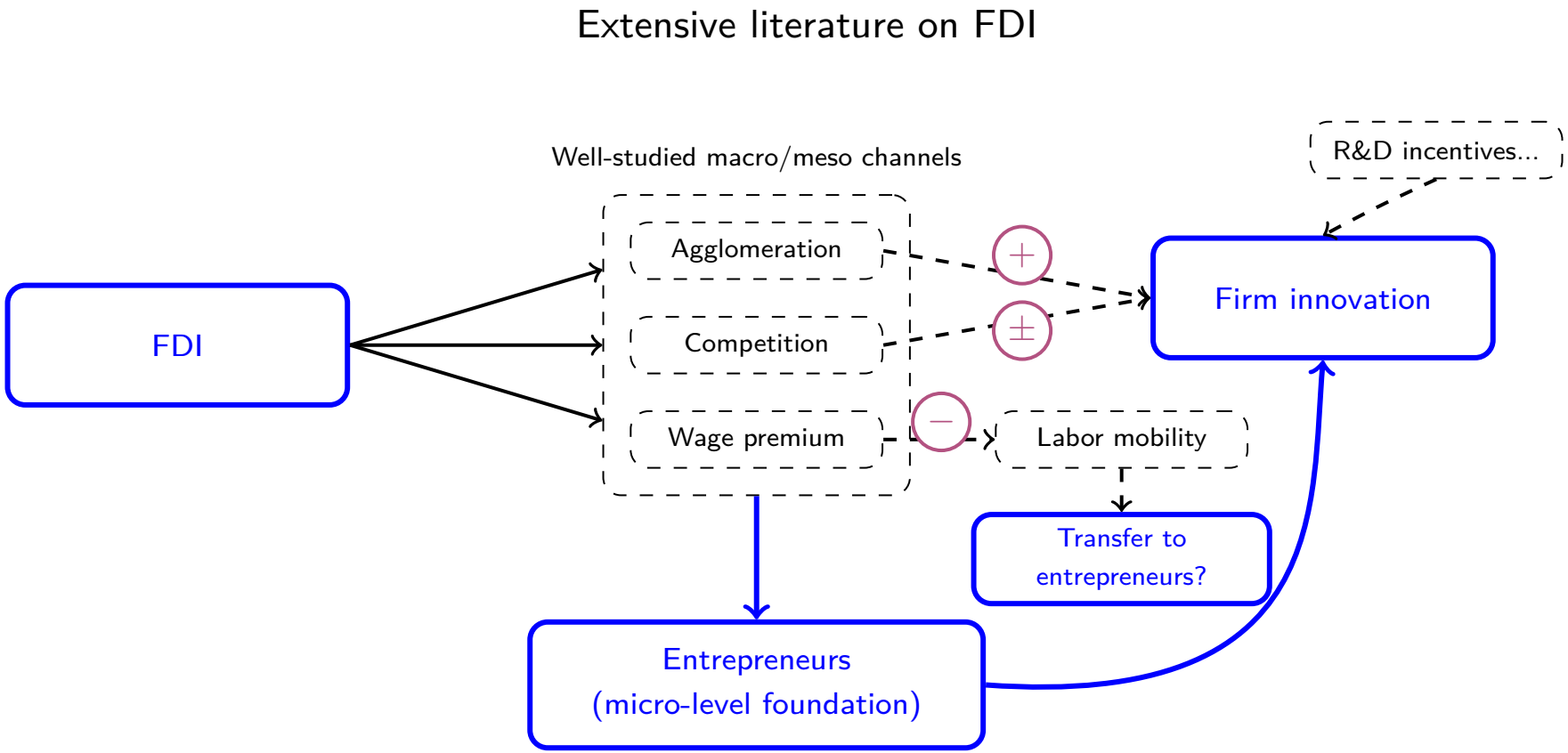
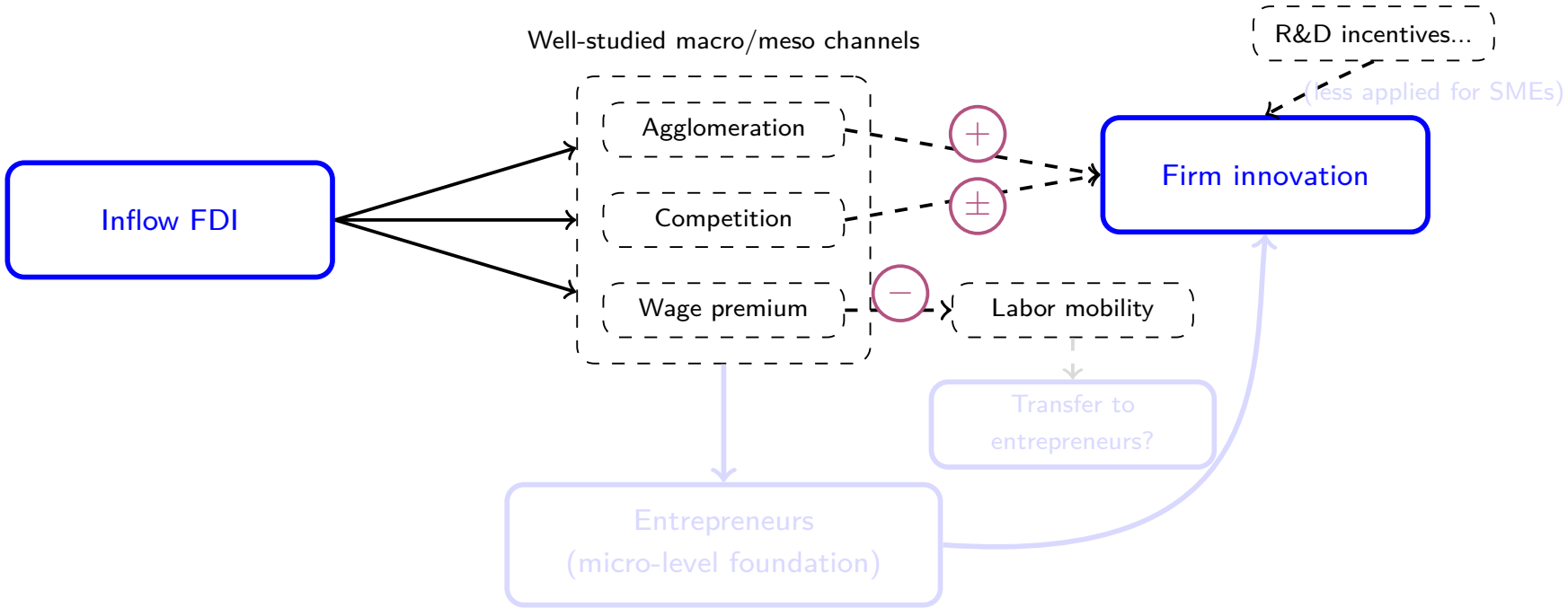


Figure B 5: The FDI literature has extensively studied macro- and meso-level channels such as agglomeration spillovers, competition, and wage premiums. Yet these effects often need to be realized through entrepreneurs as a micro-level foundation. This entrepreneurial channel remains underexplored.

Motivation

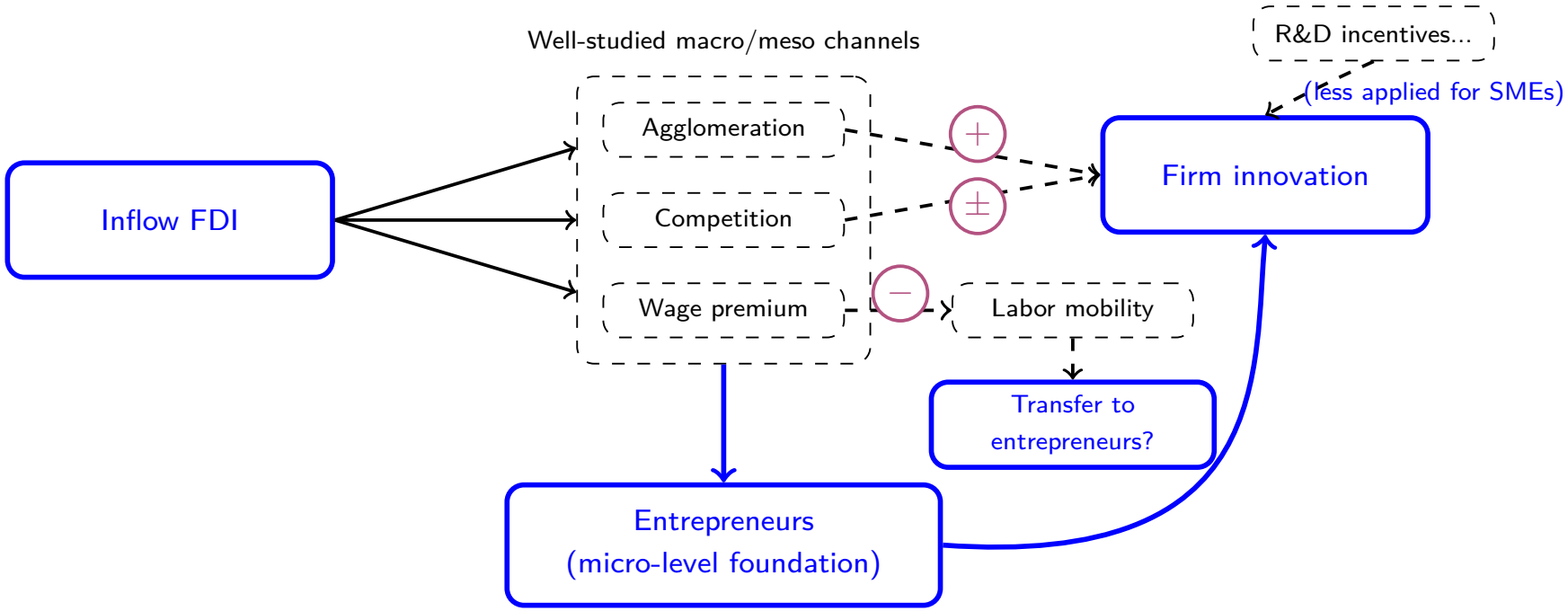
Extensive literature on FDI



Critical but underexplored micro foundation

Motivation

Extensive literature on FDI



Critical but underexplored micro foundation