"AI as Cofounder":
Generative AI for Entrepreneurship

Jeff Cai
Notre Dame

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Asian Bureau of Finance and Economic Research, 2026

Startups are Getting Smaller!

Forbes
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The Billion-Dollar Company Of One Is Coming Faster Than ...

Aug 20, 2025 — The first AI-powered **billion-dollar** solo startup is coming by 2028 driven by AI agents, no-code tools, and global digital distribution.

The Wall Street Journal
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Midjourney

AI-powered visual design with minimal staff.

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AI-native code editor: small team, fast adoption among developers.

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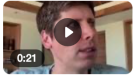

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The "One Person + GenAI = Billion Dollar Startup" Vision

"One-person billion dollar company."

— Sam Altman

- **Sam Altman's vision: Solopreneurship**

  One Person + GenAI = Billions Dollar Business.

- **Idea:** GenAI compresses the organizational cost structure and complexity of running a business.

Motivation

- **GenAI drastically reduces the cost of knowledge work and coordination.**
  - LLMs perform a sequence of complex tasks, previously requiring specialized human teams: writing, coding, design, analysis etc.
  - Scaling up individual capability: transforming a single person into a small, multi-skilled organization.
- **Examples of lean start-ups suggest a structural shift in firm formation.**
  - GenAI may fundamentally alter the optimal size and composition of start-ups.
- **Our central question:**

How does GenAI reshapes entrepreneurial dynamics:
Who starts new firms, where they emerge, and how they scale?

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What We Do

- **Questions:** How does the diffusion of Generative AI reshape entrepreneurship?
  - Does it stimulate new firm formation?
  - Through which channels and for whom?
- **Empirical setting:** China's response to global release of **ChatGPT** (Nov 2022)
- **Data:**
  - Universe of 12.8 million firms registered between 2021.01–2024.12, each geolocated by latitude and longitude.
  - Universe of AI and non-AI patents (2010–2019) from CNIPA, with inventor and assignee addresses (Fang, Gu, Yan, Zhu, 2025, 2026).
  - Partition entire country into a roughly 160,000 H3 hexagonal grids ($\sim 5\,km^2$ each).
- **Identification:**
  - Difference-in-differences (DiD): compare pre/post ChatGPT release in grids with high vs. low pre-2019 AI patent density (AI human capital proxy).
  - Include grid-by-calendar-quarter and city-by-quarter fixed effects to control for local seasonality and local city-level dynamics.

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Main Findings

Main Findings I: Baseline Results

- **GenAI significantly boosted new firm formation.**
  - High-AI (v.s. Low-AI) grids: a sharp rise in new entries after ChatGPT's release.
  - Magnitude: ∼5 additional firms per grid-quarter (sample average, 4.82)
  - Event-study estimates: no pre-trends.
- **Effects concentrated among small entrants.**
  - The boosting effect is entirely driven by small-scale firms;
  - Entries of large firms decline.
  - Suggests a reduction in the entry cost of starting a business.
- **Industry heterogeneity.**
  - Strongest in downstream, adoption-oriented sectors (e.g., retail, services, digital applications).
  - Weaker in upstream, capital-intensive AI-production industries.

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Main Findings II: Mechanisms and Implications

- **Who enters?**
  - Share of **first-time founders** ↑
  - Generative AI reduces the need for prior entrepreneurial experience.
- **How firms are organized?**
  - Number of shareholders ↓
  - Initiated capital ↓
  - Start-up team-size ↓
- **Placebo tests.**
  - Grids with high v.s. low Non-AI patents: Shrink by 90% and no significant effect.
  - Grids with high v.s. low pre-existing entrepreneurial activity: Effect exists but shrink by 80%.
- **A suite of robustness tests.**

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Contributions: Firm Entry and Market Structure

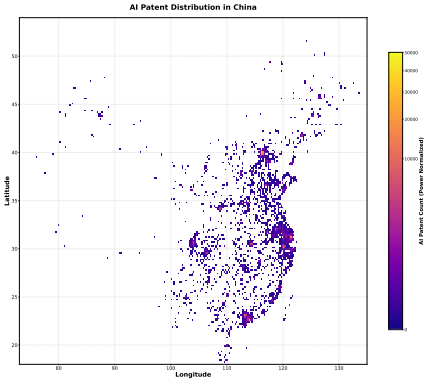
- **Causal Evidence on Tech-Driven Entry**
  - While technological breakthrough is known to drive "creative destruction" (Schumpeter, 1943), identifying causal effects is difficult due to slow technological diffusion.
  - We exploit the **ChatGPT shock** (exogenous to China) and universal firm registration data to provide the first large-scale evidence of GenAI facilitating firm entry.
- **GenAI as a Pro-Competitive Force**
  - *Existing Literature:* Suggests AI may favor large incumbents due to data moats, compute costs, and product innovation, increasing concentration (e.g., Babina et al., 2024).
  - *Our Contribution:* We document a **de-concentrating effect**.
    - GenAI disproportionately boosts **small, resource-constrained** firm entry while large-firm entry declines.
    - Suggests GenAI acts as an equalizer, reducing the minimum efficient scale rather than reinforcing "superstar" dominance.

Contributions: Labor Markets and Mechanisms

- **From Displacement to Creation**
  - *Existing Literature:* Focuses on the "race" between machine and human, fearing displacement of high-skilled labor (Acemoglu and Restrepo, 2020; Eloundou et al., 2024).
  - *Our Contribution:* We highlight the **entrepreneurial channel**.
    - GenAI lowers fixed costs of knowledge work (coding, marketing, legal), allowing new firms to form. This creation effect counteracts potential displacement (Lichtinger and Maasoum, 2025).
- **The "Co-Founder" Mechanism & Human Capital**
  - GenAI substitutes for managerial labor and early-stage team size, enabling **inexperienced founders** to enter.
  - The effect is driven by local **AI-specific human capital** (Babina et al., 2023, Gofman, M. and Jin, Z, 2024).
- **Expanding the Scope of AI Impact**: AI on academic research (Korinek, 2023; Cong and Zhu, 2024), financial market (Cong et al., 2025; Croom, 2025; Ashraf, 2025; Xue et al., 2025), innovation (Wu et al., 2025; Wang and Wu, 2025), and international trade (Antoniades et al., 2025).

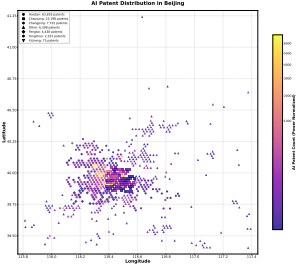
Geographical Distribution of AI Patents and AI Human Capital

- Use pre-ChatGPT AI patents to proxy for AI human capital
- A high resolution AI classification algorithm (Fang, Gu, Yan, Zhu, 2025, 2026)
- Each point is a $\sim 5km^2$ grid cell.
- Clear concentration in major AI hubs.
- But still large dispersion in AI-specific human capital nationwide.

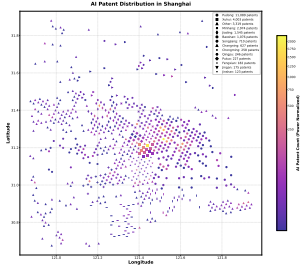


AI-specific human capital proxied by AI inventor and patent activity, 2010–2019.

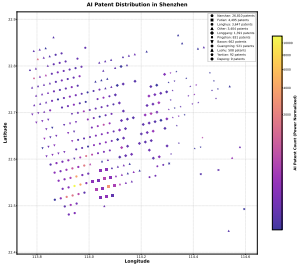
Large Variation Within Cities



Beijing



Shanghai



Shenzhen

Identification Strategy: Difference-in-Differences Setup

- **Idea:** Exploit spatial variation in pre-existing AI capabilities (2010–2019) and compare firm entry before vs. after the release of ChatGPT.
- **Treatment Definition:**
  - $\text{HighAI}_g = 1$ if grid g belongs to the top quartile of pre-2019 AI patent density;
  - $\text{HighAI}_g = 0$ for otherwise.
- **Empirical Design:**

$$Y_{gt} = \beta \left(\text{Post}_t \times \text{HighAI}_g \right) + \mu_{g \times q(t)} + \lambda_{c(g) \times t} + \varepsilon_{gt},$$

  - Y_{gt}: new firm entries in grid g at time t.
  - $\mu_{g \times q(t)}$: grid-by-calendar-quarter FE (controls for local seasonal cycles).
  - $\lambda_{c(g) \times t}$: city-by-quarter FE (absorbs time-varying city shocks).
  - β captures the differential post-ChatGPT jump for AI-intensive grids within the same city.

Impact of GenAI on New Firm Formation

	(1) Num new firms	(2) Num small firms	(3) Num large firms
Post × HighAI	5.038*** (1.395)	7.704*** (1.222)	-3.120*** (0.671)
Constant	4.668*** (0.0427)	1.847*** (0.0374)	2.564*** (0.0205)
Observations	2,658,304	2,658,304	2,658,304
R-squared	0.810	0.625	0.790
City × Quarter FE	Yes	Yes	Yes
Grid × Cal QTR FE	Yes	Yes	Yes

- Significant surge in firm entry in high-AI grids after ChatGPT release.
- Driven entirely by small firms; entry of large firms declines.
- Suggests a structural shift toward leaner ventures.
- Average baseline entry per grid per quarter: 4.82 firms.

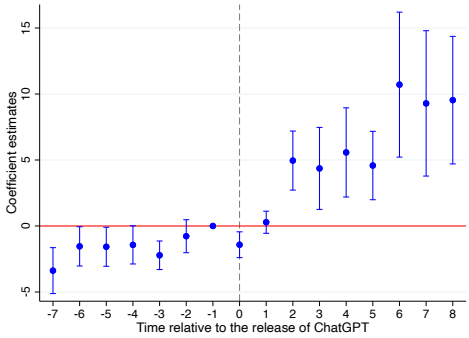
Dynamic Effect Estimation: Event-Study Specification

- To assess dynamics and verify parallel trends, we estimate period-specific effects:

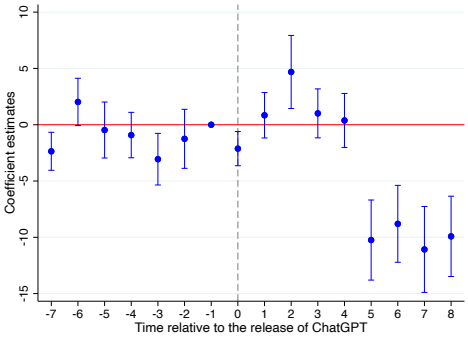
$$Y_{gt} = \sum_{k \neq -1} \beta_k \cdot 1\{t - t_0 = k\} \times \text{HighAI}_g + \gamma_g + \lambda_{c(g) \times t} + \varepsilon_{gt}.$$

  - $t_0 =$ 2022Q4 (ChatGPT release).
  - Coefficients β_k trace the evolution of treatment effects relative to the pre-GPT baseline ($k = -1$).
- **Interpretation:**
  - $\hat{\beta}_k \approx 0$ for $k < 0 \rightarrow$ validates parallel pre-trends.
  - $\hat{\beta}_k > 0$ for $k \geq 0 \rightarrow$ indicates a post-GPT surge in entrepreneurship in high-AI grids.

Dynamic Effect of ChatGPT on Firm Entry: Small vs Large



Panel B: Small Businesses



Panel C: Large Businesses

Estimated quarterly coefficients (β_k) from event-study regressions. Post-GPT divergence is pronounced among small businesses, indicating that generative AI disproportionately stimulates entry by leaner serial entrepreneurs.

Constructing Firm-Level AI Relevance Scores

- **Step 1: Textual Factor Representation: Business Description to Semantic Topics)**
  - Apply Textual Factor Model to firm's business description to capture semantically coherent topics (Cong, Liang, Zhang, Zhu, 2025).
  - Each firm i obtains a topic loading vector $\boldsymbol{\theta}_i = (\theta_{i,1}, \ldots, \theta_{i,K})$, representing its mixture across K semantic topics.
- **Step 2: LLM-Based Topic Annotation**
  - For each topic k, use GPT-4 to assign four scores (s_k) based on topic description:
    1. **AI Overall** (AI relevance)
    2. **AI Upstream** (core AI development: model, data, infrastructure)
    3. **AI Downstream** (Applies AI to products/services (e.g., education, media, healthcare))
    4. **Entrepreneurship Helpfulness** (content creation, solo business)
- **Step 3: Firm-Level Aggregation:** Each score of firm i is $\text{Score}_i^{(\text{avg})} = \frac{\sum_k \theta_{i,k} s_k}{\sum_k \theta_{i,k}}$.

Heterogeneity by AI Relevance

Boosting effect is concentrated in **downstream and AI-facilitated sectors**, but not upstream.

	(1) Num high upstream	(2) Num low upstream	(3) Num high downstream	(4) Num low downstream	(5) Num high entrep	(6) Num low entrep
Post × HighAI	0.846**	4.199***	3.323***	1.722**	5.892***	-0.848***
	(0.388)	(1.225)	(0.789)	(0.753)	(1.302)	(0.300)
Constant	0.944***	3.721***	2.393***	2.272***	3.437***	1.228***
	(0.0119)	(0.0375)	(0.0242)	(0.0231)	(0.0399)	(0.00918)
Observations	2,658,304	2,658,304	2,658,304	2,658,304	2,658,304	2,658,304
R-squared	0.834	0.770	0.857	0.638	0.797	0.746
City × Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Grid × Cal QTR FE	Yes	Yes	Yes	Yes	Yes	Yes

Industry-Level Heterogeneity: Where Does GenAI Matter Most?

Industry Name	Count	Coef	SE	p-value
Retail Industry	2,019,644	1.6256	0.5447	0.0030
Business Services	1,135,654	0.9771	0.2921	0.0009
Technology Promotion and Application Services	1,301,263	0.8712	0.2316	0.0002
Wholesale Industry	2,061,046	0.4547	0.2466	0.0661
Entertainment Industry	137,133	0.2223	0.0534	0.0000
Catering Industry	199,082	0.1970	0.0389	0.0000
Culture and Arts Industry	289,160	0.1806	0.0579	0.0020
Resident Services Industry	169,229	0.1464	0.0294	0.0000
Internet and Related Services	118,450	0.0963	0.0277	0.0006
Software and IT Services	503,900	0.0556	0.1064	0.6016
Broadcasting, Television, Film, and Audio Production	48,885	0.0443	0.0155	0.0045
Electricity, Heat, Gas, and Water Supply	42,173	0.0400	0.0055	0.0000
Leasing Industry	152,152	0.0388	0.0215	0.0720
Agriculture	233,704	0.0360	0.0172	0.0370
Chemical Raw Materials and Chemical Products Manufacturing	28,633	0.0340	0.0149	0.0232

Application-oriented industries:

- **Retail:** Automation of customer interaction, inventory management, and marketing.
- **Business Services:** Use of GenAI in consulting, legal, and administrative workflows.
- **Technology & Promotion:** AI-assisted product development, digital marketing, and SaaS tools.

Serial Entrepreneurship: Who Benefits Most?

GenAI disproportionately benefits **first-time founders** rather than serial entrepreneurs.

- Share of firms founded by serial entrepreneurs **declines**, especially among small firms in high-AI grids post-ChatGPT.
- For large firms, the share of serial entrepreneurs **increases slightly**, consistent with experience advantages at larger scale.

	(1) Pct serial entrep	(2) Pct serial entrep small	(3) Pct serial entrep large
Post × HighAI	-0.405** (0.201)	-2.456*** (0.266)	0.648** (0.294)
Constant	27.47*** (0.0116)	17.82*** (0.0154)	21.25*** (0.0170)
Observations	863,869	863,869	863,869
R-squared	0.433	0.420	0.425
City × Quarter FE	Yes	Yes	Yes
Grid × Cal QTR FE	Yes	Yes	Yes

Firm Composition: Number of Shareholders

Generative AI leads to leaner founding structures.

- The average number of shareholders per new firm **declines by approximately 2%** in high-AI grids after ChatGPT.

	(1) Tot shareholders	(2) Tot shareholders small	(3) Tot shareholders large
Post × HighAI	-0.0211*** (0.00747)	-0.0134* (0.00755)	-0.0173** (0.00781)
Constant	1.513*** (0.000444)	1.412*** (0.000646)	1.639*** (0.000598)
Observations	827,286	512,172	585,030
R-squared	0.423	0.434	0.427
City × Quarter FE	Yes	Yes	Yes
Grid × Cal QTR FE	Yes	Yes	Yes

Founding Team Size: Executive Members

Generative AI enables leaner founding teams.

- The average number of executive members per firm **declines** after ChatGPT.
- The effect is concentrated among small firms and high-AI grids.
- Suggests AI tools allow founders to multitask across roles traditionally held by a team.

	(1) Exec team size	(2) Exec team size small	(3) Exec team size large
Post × HighAI	-0.0161*** (0.00392)	-0.0187*** (0.00401)	-0.00373 (0.00441)
Constant	2.032*** (0.000249)	1.976*** (0.000382)	2.091*** (0.000349)
Observations	765,404	452,023	560,617
R-squared	0.568	0.611	0.546
City × Quarter FE	Yes	Yes	Yes
Grid × Cal QTR FE	Yes	Yes	Yes

New v.s. Old Invested Capital by Serial Entrepreneurs

GenAI allows serial entrepreneurs to downsize the capital of new ventures.

- Post-ChatGPT firms (high v.s. low AI grids) are **significantly smaller** in size.
- Suggests GenAI enables experienced founders to launch leaner ventures.

	Ratio of New-to-Previous Firm Registered Capital		
	(1)	(2)	(3)
	All firms	Small firms	Large firms
Post × HighAI	-1.983***	-7.100***	-0.180***
	(0.560)	(1.148)	(0.0230)
Constant	9.601***	16.64***	1.200***
	(0.0612)	(0.124)	(0.00249)
Observations	366,604	370,610	370,861
R-squared	0.375	0.359	0.405
City × Quarter FE	Yes	Yes	Yes
Grid × Cal QTR FE	Yes	Yes	Yes

Placebo Tests

Placebo Tests

- **Goal:** Capture effect of generative AI rather than pre-existing innovative or entrepreneurial intensity.
- **Approach:**
  1. Re-define treatment variables in ways unrelated to true AI exposure.
  2. Estimate the same DiD specifications.
  3. Coefficients should be close to zero if the design isolates the causal effect of AI.
- **Two Placebos:**
  - **(1) Non-AI Patent Intensity:** Grids with many non-AI patents but little AI innovation.
  - **(2) Residualized AI Exposure:** Remove correlations between AI patents and pre-existing entrepreneurship.

Placebo Test 1: Non-AI Patent Exposure

- Define High non-AI grids using (top 25%) residuals of log(non-AI patents)∼log(AI patents).
- Estimated effects shrink by nearly **90%** relative to the baseline.
- Coefficients become **statistically insignificant**, suggesting the main effects are not driven by general innovation or human capital.

	(1) Num new firms	(2) Num small firms	(3) Num large firms
Post × High nonAI	0.159	0.558	-0.427*
	(0.478)	(0.485)	(0.249)
Constant	16.69***	7.063***	8.721***
	(0.0589)	(0.0599)	(0.0308)
Observations	546,768	546,768	546,768
R-squared	0.818	0.645	0.791
City × Quarter FE	Yes	Yes	Yes
Grid × Cal QTR FE	Yes	Yes	Yes

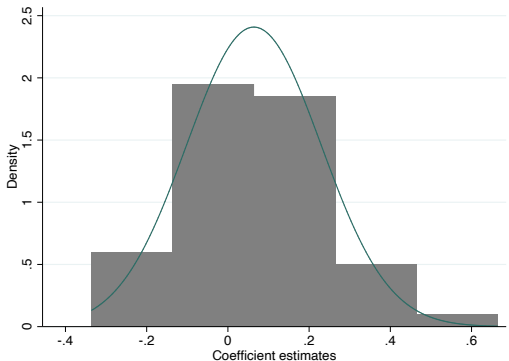
Placebo Test 2: Residualized AI Exposure

- Define HighResid as grids with above-median residuals from log(pre-GPT firm entries) $\sim$ log(AI patents).
- Residual captures entrepreneurial activity *orthogonal* to AI-specific human capital.
- Estimated effects shrink by nearly **80%**, though remain statistically significant.
- Suggests AI-specific human capital plays the dominant role.

	(1) Num new firms	(2) Num small firms	(3) Num large firms
Post × HighResid	0.782*** (0.173)	1.216*** (0.143)	-0.481*** (0.0601)
Constant	4.629*** (0.0427)	1.782*** (0.0352)	2.587*** (0.0149)
Observations	2,658,304	2,658,304	2,658,304
R-squared	0.810	0.623	0.790
City × Quarter FE	Yes	Yes	Yes
Grid × Cal QTR FE	Yes	Yes	Yes

Alternative Placebo: Random Assignment of AI Exposure

No effect when AI exposure labels are randomly assigned to 10,183 grids.



Distribution of estimated interaction effect of *Post* × *HighAI* across 100 simulations.
Mean coefficient: 0.064, Standard deviation: 0.166.

Robustness Checks

Robustness I: Alternative Samples and Exclusions

- **Concern:** Baseline effects might be driven by a few first-tier provinces (Beijing, Shanghai, Guangdong) or by grids with zero AI patent activity.
- **Excluding First-Tier Provinces**
  - Re-estimate DiD excluding Beijing, Shanghai, and Guangdong.
  - Coefficients on $Post \times HighAI$ remain positive and significant.
  - Small firm entry continues to rise; large firm entry declines.
  - $\Rightarrow$ Effects not concentrated in superstar innovation hubs.
- **Restricting to AI-Active Grids**
  - Limit sample to grids with $\geq$1 AI patent before 2019.
  - Treatment contrast: "high" vs. "moderate" AI exposure.
  - Results remain strong — small-firm surge (+11.6 firms) and large-firm decline (–5.9 firms).
  - $\Rightarrow$ Results reflect intensity of AI exposure, not mere AI presence.

Robustness II: Matched Designs and Alternative Definitions

- **Matched Comparison with Nearby Non-AI Grids**
  - For each AI-active grid, match to five geographically nearest non-AI grids.
  - DiD results robust: $\uparrow$ entry in AI grids ($+4.3$ firms), driven by small businesses.
  - $\Rightarrow$ Findings not driven by spatial heterogeneity.
- **Alternative Capital Thresholds for "Small" Firms**
  - Re-define small firms using 2M, 3M, and 5M RMB cutoffs.
  - Across thresholds, treatment effect on small entries remains positive and highly significant.
  - Large-firm effects consistently negative.
  - $\Rightarrow$ Size asymmetry not driven by arbitrary classification.
- **Matching on Pre-GPT Firm Density**
  - Within each city, match grids by pre-ChatGPT firm density.
  - Results persist: stronger effects for small entrants in AI-intensive areas.
  - $\Rightarrow$ Not explained by baseline entrepreneurial activity.

Conclusion

Conclusion: What We Learn from Generative AI and Entrepreneurship

- **Core finding:** The diffusion of Generative AI (proxied by the release of ChatGPT) led to a **sharp, localized surge in new firm formation** in AI-intensive regions.
- **Mechanisms and heterogeneity:**
  - Effects driven entirely by **small and lean entrants**; large-firm entry declines.
  - Firms start with **fewer shareholders and executives**.
  - Entrepreneurs without prior experience are likely to launch business.
  - **Serial entrepreneurs** deliberately launch smaller ventures after GPT.
  - **Downstream AI-application sectors** experience the strongest increases in new firm formation, while upstream AI-production sectors show limited response.
- **Identification:**
  - Robust across grid-by-quarter $\times$ city-by-quarter fixed effects.
  - Placebo tests confirm the effect is **specific to AI exposure.**
  - Excluding first-tier provinces, AI-active only subsamples, and matched designs yield consistent results.

Broader Implications and Takeaways

Generative AI is not just a new technology;
it is a new architecture of entrepreneurship.

- **Economic implications**
  - AI lowers fixed costs of knowledge work, coordination, and creativity.
  - Shifts entrepreneurship toward **smaller, agile, and digital-native ventures**.
  - **AI-adoption (downstream) industries** benefit most: reflecting immediate productivity spillovers rather than new AI invention.
  - Expands the frontier of participation: new founders, new regions.
- **Policy implications**
  - Invest in AI-complementary skills and digital infrastructure.
  - Facilitate financing and regulation for solo and micro-entrepreneurs.
  - Support diffusion beyond top innovation hubs to avoid regional divergence.