Does Access to Equity Promote Trade? Evidence from IPO Approvals in China

Robin Kaiji Gong[1], Yao Amber Li[2], Stephen Teng Sun[3]

2023 HKUST Conference on International Economics
December 8, 2023

[1] The Hong Kong University of Science and Technology. Email: rkgong@ust.hk.
[2] The Hong Kong University of Science and Technology. Email: yaoli@ust.hk.
[3] City University of Hong Kong. Email: tengsun@cityu.edu.hk.

Motivation

Financial markets play a crucial role in international trade.

- ▶ Financial institution is a source of comparative advantage.
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- ▶ Various ways of financing trade
  - ▶ Bank loans (Paravisini et al., 2015)
  - ▶ Trade credit (Ahn, Amiti and Weinstein, 2011; Antras and Foley, 2015)
  - ▶ **Public/private equity**?
    - ▶ External equity is *different* from debt: "risk capital" due to information asymmetry, riskiness, and lack of collateral value (Brown, Fazzari and Petersen 2009).
    - ▶ Firms gain access to the public equity market through initial public offerings (IPOs).
    - ▶ Identification is challenging: IPOs are endogenous and may coincide with firms' certain life-cycle stages (Pastor, Taylor and Veronesi 2009).
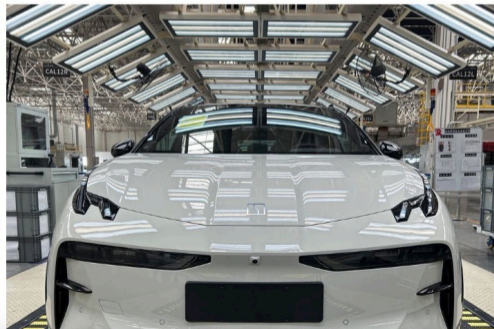
Geely's stalled IPO discounts global expansion

Reuters

December 1, 2023 10:28 PM GMT+8 · Updated 13 hours ago

Commentary | By Reuters

Shein files for U.S. IPO, could begin trading next year

Shein has confidentially filed to go public in the U.S. as the Chinese-founded fast-fashion juggernaut looks to expand its global reach with a long-rumored initial public offering, CNBC has learned.

This Paper: IPO and Exports

Research question: how does **access to public equity** affect firm exports?

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- ▶ Setting: IPO approvals in China
    - ▶ China: the "World factory" with its stock market cap ranked #2 globally
    - ▶ An approval-based system regulated by the China Securities Regulatory Commission, or CSRC (Zhang, 2013; Piotroski and Zhang, 2014; Shi, Sun, and Zhang, 2018)
        - ▶ Regular review meetings held by the Stock Issuance Examination and Verification Committee (SIEVC) determine IPO application outcomes.
        - ▶ Other countries with approval-based systems: France, South Korea, India, Indonesia, ...

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    - ▶ Other countries with approval-based systems: France, South Korea, India, Indonesia, ...

- ▶ Research design: cohort-based stacked difference-in-differences (DiD)
  - ▶ Comparing exports of successful and unsuccessful first-time IPO applicants in the same application year cohort
  - ▶ Identification: Exploiting review meeting records to categorize rejections and exclude rejections based on **revenue/profitability-related clauses**

Preview of Findings

1. IPO and firm-level exports

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     $\uparrow$ # destination-product markets; $\sim$ exports per destination-product market

3. The effect is more pronounced on
   - Firms with low financial leverage, high sales expenses, and less export experience
   - Less tangible, R&D intensive, and advertisement intensive products

   $\Rightarrow$ Consistent with IPO facilitating investments into intangible capital, particularly **customer capital** (Gourio and Rudanko 2014)
   - Supported by anecdotal evidence from textual analysis on IPO prospectuses

Literature

▶ International trade: novel empirical evidence on equity financing and trade

▶ <u>Financial constraints in trade</u>: Beck (2002), Manova (2008, 2013); Antràs and Foley (2015); Manova, Wei, and Zhang (2015); Manova and Yu (2016)

▶ <u>Bank loans and trade finance</u>: Ahn, Amiti, and Weinstein (2011); Amiti and Weinstein (2011); Feenstra, Li and Yu (2014); Paravisini et al. (2014); Antràs and Foley(2015); Muûls (2015); Niepmann and Schmidt-Eisenlohr (2017); Demir and Javorcik (2018); Paravisini, Rappoport, and Schnabl (2023)

▶ <u>Searching, learning, and informational frictions</u>: Arkolakis (2010); Albornoz et al. (2012); Allen (2014); Chaney (2014); Macchiavello and Morjaria (2015); Berman et al. (2021); Eaton et al. (2021); Fitzgerald, Haller and Yedid-Levi (2023)

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- IPO and equity financing: new question, new setting, and new empirical strategy
    - <u>IPO decisions and Post-IPO performance</u>: Lerner (1994); Pagano, Panetta, and Zingales (1998); Ritter and Welch (2002); Brown, Fazzari, and Petersen (2009); Pástor et al. (2009); Ferreira, Manso, and Silva (2014); Bernstein (2015, 2022); Acharya and Xu (2017); Cong and Howell (2021); Larrain, et al. (2023)
    - <u>China's stock market</u>: Fan, Wong, and Zhang (2007); Guo and Zhang (2012); Liu, Tang, and Tian (2013); Piotroski and Zhang (2014); Shi, Sun, and Zhang (2018); Brunnermeier, Sockin, and Xiong (2020); Carpenter and Whitelaw (2020)

Data and Empirical Strategy

The IPO Process in China

A multi-step process tightly regulated by the CSRC

1. The applicant (IPO issuing firm) restructures/re-establishes itself as a qualified stock share limited company.

   ▶ The applicant conducts due diligence and receives "tutoring" from financial professionals to meet compliance requirements.

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   - Applications are reviewed on a first-come, first-served basis.

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3. The applicant (with its underwriters) attends a review meeting held by the SIEVC.

   ▶ Seven members from the SIEVC will discuss and vote on whether to approve or reject the IPO application based on the applicant's submitted materials and Q&A responses.

   ▶ Applications receiving no less than five votes will be approved.

   ▶ Once approval has been granted, the applicant must complete the listing process within a certain period of time (6 months before 2013; 12 months after 2013).
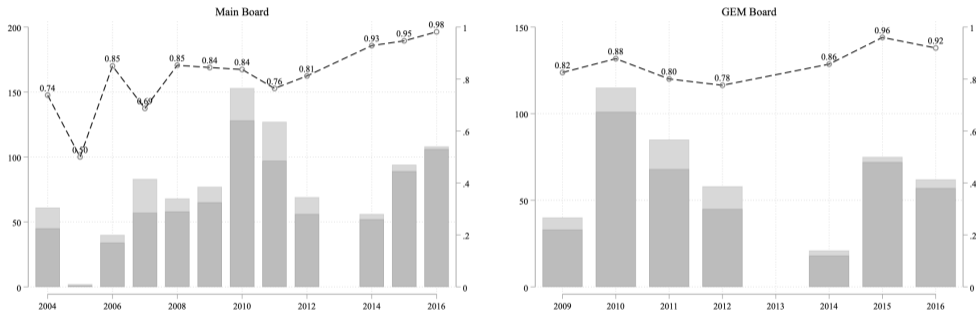
↠ Examination Procedure

The CSRC Building

IPO Review Meeting by SIEVC

IPO Approval Rate

Figure: Number of IPO Applications and Approval Rates

Note: The figure illustrates the number of approved and rejected IPO applications and the corresponding shares of approved applications on the Main Board from 2004 to 2016 (Panel A) and on the GEM Board from 2010 to 2016 (Panel B). The dark bars represent the number of approved IPO cases, while the light bars represent the number of rejected IPO cases. The dashed line displays the shares of approved IPO cases.

Data

- ▶ Wind IPO Examination Database (WIND, 2000-2020)
    - ▶ Universe of IPO applications (**Main Board**, **Growth Enterprise Market (GEM) Board**, Sci-Tech Board)
    - ▶ Records of review meetings: meeting date, applicant identity, committee members, application outcome, etc.
    - ▶ Starting from 2010: the CSRC began to disclose the **reasons** and **clauses** used to make rejection decisions.

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- ▶ Chinese Customs Trade Statistics (CCTS, 2000-2016)
  - ▶ Universe of export and import transactions
  - ▶ Transaction-level product code, country, value, quantity (before 2015), etc.
  - ▶ *Matching is non-trivial*: firms normally change names before IPO applications

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- ▶ Sample selection
  - ▶ Include firms in the manufacturing sector
  - ▶ Exclude meetings before 2006's stock market reforms (Tan et al., 2020)
  - ▶ Exclude meetings prior to IPO suspensions (Cong and Howell, 2021)

Empirical Specifications

$$y_{it} = \sum_{k=-4}^{k=6} \beta_k \cdot \mathbb{1}(k = t - \tau(i)) \cdot \mathbb{1}(\text{IPO\_Approval}_i = 1) + \alpha_i + \kappa_{\tau(i),t} + \lambda_{s(i),t} + \mu_{b(i),t} + \epsilon_{ist}$$

- y_{it}: firm i's log exports in year t
- $\mathbb{1}(k = t - \tau(i))$: an indicator for the year gap between year t and firm i's review meeting year $\tau(i)$ being k
- $\mathbb{1}(\text{IPO\_Approval}_i = 1)$: an indicator for the approval of firm i's IPO application
- α_i: firm fixed effects
- $\kappa_{\tau(i),t}$: application cohort-year fixed effects
    - <u>Comparison</u>: approved/rejected applicants **in the same application year cohort**
- $\lambda_{s(i),t}$, $\mu_{b(i),t}$: HS2 sector-year and board-year fixed effects
- <u>Threat</u>: IPO approval might be related to unobserved shocks that affect exports
    - Productivity shocks, foreign market shocks, etc.
    - <u>Solution</u>: exclude rejections due to revenue/productivity risks.

Categorization of Rejections

▶ Clause 37 (Main) or Clause 14 (GEM): circumstances affecting revenue/profitability

  ▶ The underlying factors may directly affect firms' export performance

Figure: Shares of Most Cited Clauses in Rejections
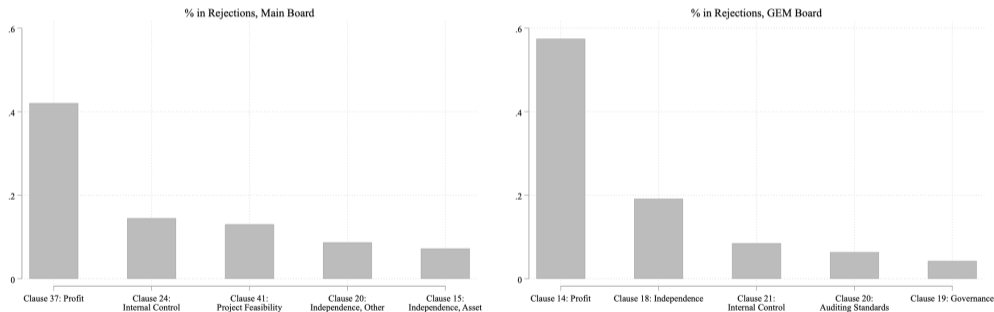
Note: The figure displays the distribution of the most commonly cited clauses in rejection cases for both the Main Board and the GEM Board from 2010 to 2016.

▶ Details of the Clauses

Categorization of Rejections

What circumstances are included in **clause 37** (main board) and clause 14 (GEM board)?

- ▶ 37.1&37.2: There has been or will be a material change in...
    - ▶ the business model, product or service mix of the issuer that has an adverse effect on the continued profitability of the issuer;
    - ▶ the issuer's industry position or the industry's business environment that has an adverse effect on the continued profitability of the issuer;

- ▶ 37.3: Significant reliance on related parties or customers with significant uncertainties in the issuer's operating income or net profit for the most recent year;

- ▶ 37.4: The issuer's net profit for the most recent year was mainly derived from investment income outside the scope of the consolidated financial statements;

- ▶ 37.5: Risk of adverse changes in the acquisition or use of important assets or technologies such as trademarks, patents, proprietary technologies and franchises in use by the issuer;

- ▶ 37.6: Other circumstances that may have an adverse effect on the continued profitability of the issuer.

↠ Clause 14 for IPOs on the GEM Board   ↠ Original Documentation (in Chinese)

Reasons of Rejections

Example 1: Chongqing Jinguan Automobile (Main, clause 37; 16 March, 2011)

- ▶ Since 2009, your company's product mix and customers have undergone significant changes. Sales to new customers and revenue declined significantly in 2010, which constitutes a major adverse impact on your company's continued profitability.

Example 2: Shenzhen Meikai Electronics (Main, clause 37; 1 November, 2010)

- ▶ Your company's leading products include digital TV system equipment, electronic transformers, and power supply products. The three product categories have significant differences in terms of sales channels and customers. The company's business is relatively fragmented and its operation is volatile.

Example 3: Sinomine Resource Group (GEM, clause 12; 29 September, 2010)

- ▶ Your company has competition and transactions with direct or indirect shareholders and other related parties, and it is impossible to judge the fairness of related transactions and whether your company has the ability to operate directly and independently.

↠ Reasons related to Global Market Risks

Identification Assumption

<u>Assumption</u>: rejections *not* based revenue/profitability-related clauses are not directly related to the unobserved applicant characteristics that affect export performance.
Similar to Romer and Romer (2004, 2023)'s "narrative approach"

- ▶ Other commonly cited clauses
  - ▶ Clause 19 (Main)/Clause 18 (GEM): operational independence
    - ▶ Most common cases: competition or transactions with related parties
    - ▶ Unrelated to fundamentals; mostly domestic activities
  - ▶ Clause 24 (Main)/Clause 21 (GEM): internal control
    - ▶ Most common cases: financial reporting reliability; regulatory compliance
    - ▶ Normally petty misdemeanors; also common among public firms; limited monitoring capacity of SIEVC (Huang and Li, 2016; Fang et al., 2020)
  - ▶ Clause 41 (Main)/Clause 27 (GEM): investment project feasibility
    - ▶ Related to planned investment activities after fundraising through IPOs

Summary Statistics

	Mean	Std. Dev.	25 pct	50 pct	75 pct
Panel A. Full Sample					
Exports (in million RMB)	23.67	58.13	0.77	5.53	22.98
# Products	6.83	10.78	2.00	3.00	7.00
# Destinations	19.00	20.04	4.00	12.00	27.00
# Prod-dest pairs	41.18	79.12	6.00	18.00	44.00
Avg. exports per pair (in million RMB)	1.07	5.88	0.08	0.25	0.69
IPO approval rate	0.84	0.36			
Expected POP	11.88	5.60	8.12	10.75	14.31
Expected fund raised (in million RMB)	429.75	489.46	207.09	300.91	474.60
# Observations			8283		
Panel B. Restricted Sample					
Exports (in million RMB)	22.13	52.96	0.78	5.48	22.81
# Products	6.71	10.99	2.00	3.00	7.00
# Destinations	18.60	19.79	4.00	12.00	26.00
# Prod-dest pairs	40.34	78.37	6.00	18.00	44.00
Avg. exports per pair (in million RMB)	1.19	6.83	0.08	0.25	0.69
IPO approval rate	0.94	0.24			
Expected POP	12.20	5.82	8.43	11.10	14.55
Expected fund raised (in million RMB)	449.44	438.00	225.07	326.35	504.33
# Observations			5606		

Note: The table presents the summary statistics of the main firm-level variables used in our analysis, including the value of exports, number of products, destinations, and destination-product pairs, average exports per destination-product pair, IPO approval rate, expected Public Offering Price (POP), and expected funds raised through the IPO. Panel A encompasses all WIND-CCTS-matched firm-year observations, while Panel B excludes IPO filings before 2010 and revenue- or profitability-related IPO rejection cases.

Balance Test

| | IPO application approved | | | |
| | Full sample | | Restricted sample | |
	(1)	(2)	(3)	(4)
log(exports)	0.0132	0.00609	0.0590	0.0632
	(0.0554)	(0.0621)	(0.0612)	(0.0581)
log(# destination-product markets)	-0.0137	-0.0122	-0.0531	-0.0618
	(0.0553)	(0.0625)	(0.0611)	(0.0582)
log(average exports per market)	-0.0186	-0.0102	-0.0535	-0.0599
	(0.0560)	(0.0621)	(0.0613)	(0.0581)
log(expected funds raised)	0.0644***	0.0754***	0.00237	0.0108
	(0.0214)	(0.0280)	(0.0163)	(0.0207)
log(expected POP)	-0.0312	-0.0782**	0.0204	0.0119
	(0.0263)	(0.0332)	(0.0220)	(0.0286)
Cohort fixed effects	No	Yes	No	Yes
HS2 fixed effects	No	Yes	No	Yes
Board fixed effects	No	Yes	No	Yes
# Observations	744	724	588	568
p-value	0.101	0.0785	0.442	0.722

Note: The table reports covariate balance tests for IPO approvals. Columns 1 and 2 encompass all WIND-CCTS-matched firms that filed IPO applications between 2007 and 2016. Columns 3 and 4 include WIND-CCTS-matched firms that filed IPO applications between 2010 and 2016, excluding revenue- or profitability-related IPO rejection cases. The regressors include log exports, log number of destination-product markets, log average exports per destination-product market, log expected funds raised through the IPO, and log expected Public Offering Price (POP). Exports, number of destination-product markets, and average exports per destination-product market are averaged over the four years before each firm's IPO review meeting. Cohort fixed effects, HS2 fixed effects, and Board fixed effects are controlled in Columns 2 and 4. The p-value reports the probability that the covariates measured in the year of application do not influence the probability of an IPO approval.
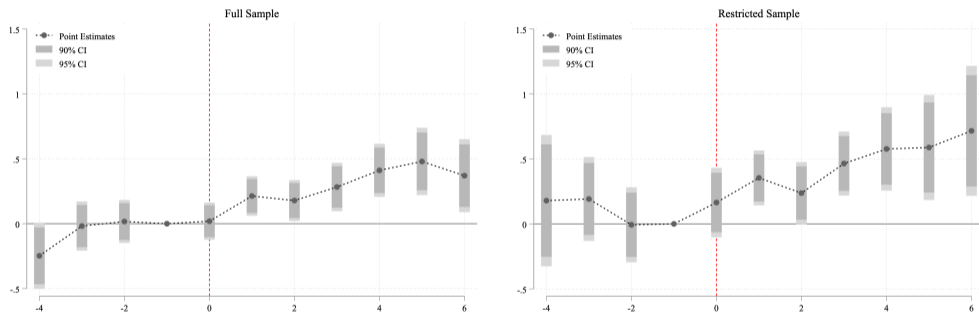
Findings

IPO and Exports

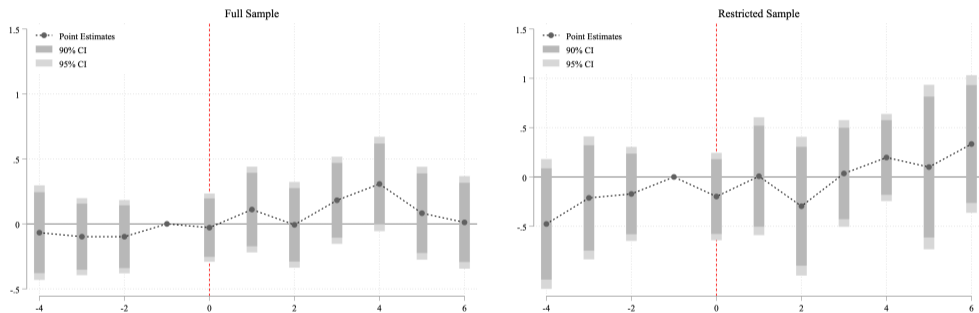## Figure: Effect of an IPO Approval on Firm Exports
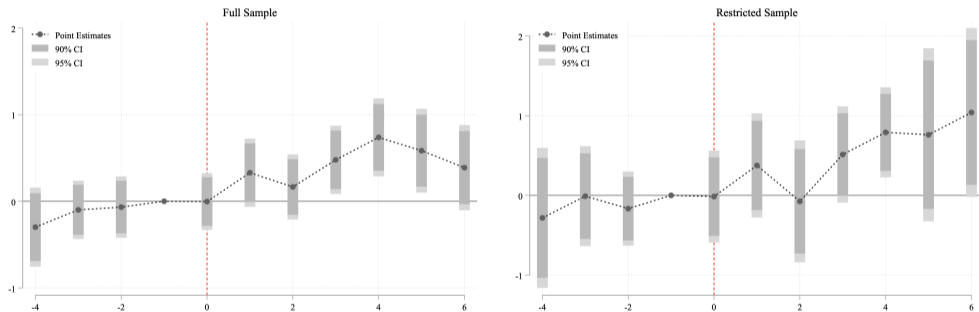
Note: The figure plots the event study coefficients for the difference-in-differences specification that estimates the effect of IPO approval on log exports. The underlying regressions control for firm fixed effects, application cohort-year fixed effects, HS2-year fixed effects, and board-year fixed effects. The full sample refers to all WIND-CCTS-matched firm-year observations. The restricted sample refers to WIND-CCTS-matched firm-year observations that exclude IPO filings before 2010 and revenue- or profitability-related IPO rejection cases. Robust standard errors are clustered at the firm level.

Extensive Margins of Exports: # Destination-Product Markets

Figure: Effect of an IPO Approval on # Destination-Product Markets

Note: The figure plots the event study coefficients for the difference-in-differences specification that estimates the effect of IPO approval on log number of destination-product markets. The underlying regressions control for firm fixed effects, application cohort-year fixed effects, HS2-year fixed effects, and board-year fixed effects. The full sample refers to all WIND-CCTS-matched firm-year observations. The restricted sample refers to WIND-CCTS-matched firm-year observations that exclude IPO filings before 2010 and revenue- or profitability-related IPO rejection cases. Robust standard errors are clustered at the firm level.

↪ # Products and # Destinations

Intensive Margins of Exports: Average Exports

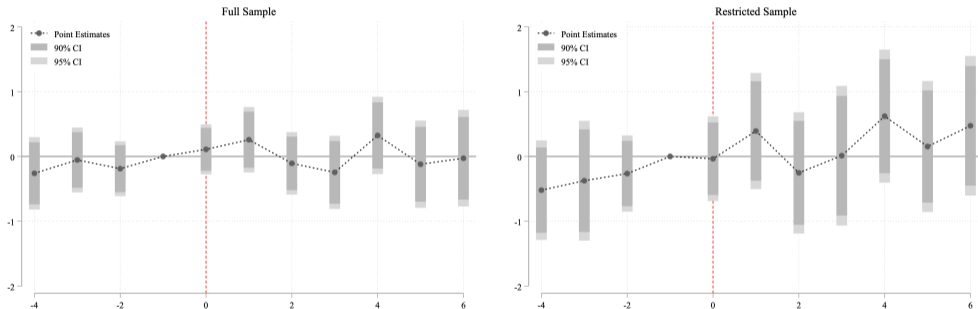Figure: Effect of an IPO Approval on Average Exports per Destination-Product Market

Note: The figure plots the event study coefficients for the difference-in-differences specification that estimates the effect of IPO approval on log average exports per destination-product market. The underlying regressions control for firm fixed effects, application cohort-year fixed effects, HS2-year fixed effects, and board-year fixed effects. The full sample refers to all WIND-CCTS-matched firm-year observations. The restricted sample refers to WIND-CCTS-matched firm-year observations that exclude IPO filings before 2010 and revenue- or profitability-related IPO rejection cases. Robust standard errors are clustered at the firm level.

↠ Average Value of Incumbent Destination-Product Markets

Intensive Margins of Exports: Top Exports

Figure: Effect of an IPO Approval on Exports of Top Destination-Product Market

Note: The figure plots the event study coefficients for the difference-in-differences specification that estimates the effect of IPO approval on log exports in the firm's top destination-product market. The underlying regressions control for firm fixed effects, application cohort-year fixed effects, HS2-year fixed effects, and board-year fixed effects. The full sample refers to all WIND-CCTS-matched firm-year observations. The restricted sample refers to WIND-CCTS-matched firm-year observations that exclude IPO filings before 2010 and revenue- or profitability-related IPO rejection cases. Robust standard errors are clustered at the firm level.

Regression Estimates

Panel A. Full Sample

	log exports (1a)	log des-prod markets (2a)	log avg. exports per market (3a)	log exports top market (4a)
IPO Approval×Post	0.459***	0.300***	0.161	0.109
	(0.158)	(0.0743)	(0.123)	(0.203)
# Observations	6514	6514	6514	4843

Panel B. Restricted Sample

	log exports (1b)	log des-prod markets (2b)	log avg. exports per market (3b)	log exports top market (4b)
IPO Approval×Post	0.447**	0.303***	0.138	0.359
	(0.226)	(0.109)	(0.191)	(0.297)
# Observations	4511	4511	4511	3470

Note: The table reports the estimated effects of IPO approval on firms' export outcomes. The dependent variables include log exports, log number of destination-product markets, log average exports per destination-product market, and log exports of top destination-product market. The variable IPO Approval is an indicator that takes a value of 1 if the firm's IPO application is approved by the SIEVC. The variable Post takes a value of 1 if the year is equal to or after the SIEVC review meeting year. All columns control for firm fixed effects, application cohort-year fixed effects, HS2-year fixed effects, and board-year fixed effects. Robust standard errors, clustered at the firm level, are shown in parentheses. ***, **, and * denote statistical significance at the 1%, 5% and 10% level, respectively.

⯈ Destination-Product Level Analysis

Robustness

- ▶ Alternative restricted IPO sample
  - ▶ Excluding full Chapter 4 (Main) or its equivalents (GEM) ↪ Results

- ▶ Time-varying effects of IPO characteristics
  - ▶ Controlling for expected funds raised and expected price per share ↪ Time-varying controls

- ▶ Entry and Exit in Foreign Markets
  - ▶ Export participation ↪ Participation

- ▶ Permutation tests (Chetty, Looney, and Kroft, 2009)
  - ▶ Distribution of placebo estimates ↪ Results

How Do IPO Approvals Affect Exporters' Activities?

Potential Channels

IPO approvals may affect firm exports through various non-mutually exclusive channels:

- ▶ Financing channels
  - ▶ Working capital and physical investment (similar to bank credits)
    (Ahn, Amiti and Weinstein 2011; Amiti and Weinstein 2011; Cingano, Manaresi and Sette 2016)
  - ▶ Intangible capital investment
    (Brown, Fazzari and Petersen 2009; Hall and Lerner 2010; Falato et al. 2022)

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- ► Non-financing channels
  - ► Information disclosure and certification
    (Demers and Lewellen 2003; Chemmanur and Yan 2009; Hsu, Reed and Rocholl 2010; Tetlock 2014)
  - ► Others: risk-sharing, corporate governance, etc.
    (Fan, Wong, and Zhang 2007; Bodnaruk, et al. 2008; Chod and Evgeny 2011; Krishnan et al. 2011)

Foreign Market Expansion by Firm Characteristics

Dependent variable: log exports

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
IPO Approval×Post	-0.0127	1.026***	0.802*	0.290	1.029***	0.264	0.954*	0.237	0.775**	0.0748	0.242	0.801**
	(0.335)	(0.372)	(0.470)	(0.309)	(0.350)	(0.312)	(0.504)	(0.288)	(0.319)	(0.411)	(0.209)	(0.374)
p-value of difference		0.043		0.377		0.111		0.226		0.189		0.203
Sample	Leverage > p(50)	Leverage <= p(50)	Liquidity > p(50)	Liquidity <= p(50)	Invt% > p(50)	Invt% <= p(50)	# Patents > p(50)	# Patents <= p(50)	SE% > p(50)	SE% <= p(50)	Tenure > p(50)	Tenure <= p(50)
Observations	1769	1752	1708	1795	1720	1824	1468	2130	1795	1733	1961	2366

Note: The table reports the heterogeneous effects of IPO approval on firms' export outcomes. The dependent variable is log exports. The variable IPO Approval is an indicator that takes a value of 1 if the firm's IPO application is approved by the SIEVC. The variable Post takes a value of 1 if the year is equal to or after the SIEVC review meeting year. All columns control for firm fixed effects, application cohort-year fixed effects, HS2-year fixed effects, and board-year fixed effects. Robust standard errors, clustered at the firm level, are shown in parentheses. ***, **, and * denote statistical significance at the 1%, 5% and 10% level, respectively.

The export-promoting effect of IPO approvals is more pronounced for firms with

▶ less stringent credit constraints (low financial leverage; high liquidity)

▶ more tangible and intangible investment activities (physical investment; innovation; selling expenses)

▶ fewer years of export experience

Foreign Market Expansion by Product Characteristics

Panel A. Dependent variable: log exports

	(1a)	(2a)	(3a)	(4a)	(5a)	(6a)	(7a)	(8a)	(9a)	(10a)	(11a)	(12a)
IPO Approval×Post	0.466**	0.352	0.608***	0.0548	-0.197	0.661***	0.424**	0.263	0.564**	0.0356	0.615***	-0.0820
	(0.182)	(0.329)	(0.186)	(0.361)	(0.299)	(0.197)	(0.192)	(0.349)	(0.271)	(0.521)	(0.235)	(0.245)
p-value of difference	0.700		0.132		0.003		0.594		0.425		0.020	
Sample	Ext. dep. > p(50)	Ext. dep. <= p(50)	Liq. need > p(50)	Liq. need <= p(50)	Tan. > p(50)	Tan. <= p(50)	R&D int. > p(50)	R&D int. <= p(50)	Adv. int. > p(50)	Adv. int. <= p(50)	Differentiated	Non-differentiated
Observations	17439	10020	18534	8926	8273	19187	19633	8037	17189	10482	20309	6198

Panel B. Dependent variable: log number of destinations

	(1b)	(2b)	(3b)	(4b)	(5b)	(6b)	(7b)	(8b)	(9b)	(10b)	(11b)	(12b)
IPO Approval×Post	0.275***	0.158**	0.226***	0.230***	0.209**	0.232***	0.245***	0.126	0.218***	0.212**	0.282***	0.123
	(0.0509)	(0.0730)	(0.0505)	(0.0885)	(0.0949)	(0.0491)	(0.0510)	(0.0892)	(0.0678)	(0.0993)	(0.0544)	(0.0944)
p-value of difference	0.183		0.970		0.840		0.216		0.968		0.141	
Sample	Ext. dep. > p(50)	Ext. dep. <= p(50)	Liq. need > p(50)	Liq. need <= p(50)	Tan. > p(50)	Tan. <= p(50)	R&D int. > p(50)	R&D int. <= p(50)	Adv. int. > p(50)	Adv. int. <= p(50)	Differentiated	Non-differentiated
Observations	17439	10020	18534	8926	8273	19187	19633	8037	17189	10482	20309	6198

Note: The table reports the effects of IPO approval on firm-product level log number of destinations. The variable IPO Approval is an indicator that takes a value of 1 if the firm's IPO application is approved by the SIEVC. The variable Post takes a value of 1 if the year is equal to or after the SIEVC review meeting year. All columns control for firm-product fixed effects, application cohort-year fixed effects, HS4-year fixed effects, and board-year fixed effects. Robust standard errors, clustered at the firm level, are shown in parentheses. ***, **, and * denote statistical significance at the 1%, 5% and 10% level, respectively.

The export-promoting effect of IPO approvals is more pronounced for products with

▶ high liquidity needs and low asset tangibility

▶ high R&D intensity and advertisement intensity

▶ quality differentiation

Other Dimensions of Firm Outcomes

Caveat: limited length of post-period (≤ 3 years); data quality of ASIE after 2008.

After IPO approvals, firms have

1. improved overall sales

2. increased selling expenses

3. increased assets, lower leverage, improve liquidity

4. more patents (invention + utility model)

Panel A. Operational outcomes

	Log sales (1)	Log employment (2)	Operating profit (3)
IPO Approval×Post	0.190*	-0.0596	0.0104
	(0.102)	(0.229)	(0.0209)
	2708	2708	2708

Panel B. Expenses

	Selling expenses (1)	Mgmt expenses (2)	Acct expenses (3)
IPO Approval×Post	0.0158**	0.0161	-0.00273
	(0.00767)	(0.0108)	(0.00518)
	2708	2708	2708

Panel C. Financial outcomes

	Log assets (1)	Leverage (2)	Liquidity (3)
IPO Approval×Post	0.499***	-0.124***	0.137*
	(0.114)	(0.0443)	(0.0709)
	2708	2708	2708

Panel C. Investment and innovation outcomes

	Invt. intensity (1)	Invention patents (2)	All patents (3)
IPO Approval×Post	0.0429	0.448	0.993*
	(0.0461)	(0.463)	(0.573)
	2702	2142	1729

Note: The table reports the effects of IPO approval on firms' operational and financial outcomes constructed from the ASIE data. All columns control for firm fixed effects, application cohort-year fixed effects, CIC2-year fixed effects, ownership type-year fixed effects, and board-year fixed effects. Robust standard errors, clustered at the firm level, are shown in parentheses. ***, **, and * denote statistical significance at the 1%, 5% and 10% level, respectively.

Potential Channels: Empirical Evidence

1. IPO approvals alleviate both short-term and long-term financial constraints in firms' export activities.

   ▶ <u>Evidence</u>: products with high external finance dependence and high liquidity needs; changes in assets, leverage, and liquidity

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4. IPO approvals reduce informational friction in export activities

   ▶ <u>Evidence</u>: firms with less export experience; differentiated products

   ▶ Changes in firms' composition of foreign markets
     ↪ Composition of Foreign Markets

Textual Analysis: LDA Model

"What do firms talk about when they talk about IPO?"

- ▶ Textual data from **Business Development Goals (BDG)** and **Usage of Raised Funds (URF)** in the IPO prospectuses of approved firms on the Main Board and GEM Board (2007–2016) ↳ Details

- ▶ Procedure of Textual Analysis
    - ▶ <u>Preprocessing</u>: separate text into sentences; remove punctuations and stopwords
    - ▶ <u>Tokenization and Vectorization</u>: generate a *bag of words* and vectorize sentences
        - ▶ Exclude words that appear in less than 50 sentences or more than 20% sentences
    - ▶ <u>Topic Modeling</u>: apply the Latent Dirichlet Allocation(LDA) algorithm on each section's textual data to generate and assign topics
        - ▶ For each topic, the algorithm generates a list of representative words and their frequencies
        - ▶ Use coherence scores to determine the optimal number of topics
        - ↳ Example

Textual Analysis: Results

- ▶ <u>BDG</u>: 102,485 sentences ⇒ 12 topics
  - ▶ Competitiveness, Innovation, Talent, Client, Fundraising, Marketing, Uncertainty, Revenue, Board, Liquidity, Assets, Management
  - ▶ International market-related[a]: 8,020 (7.82%)

- ▶ <u>URF</u>: 319,178 sentences ⇒ 12 topics
  - ▶ Competitiveness&Innovation, Production line, Client, Market Potential, Capacity, Fixed Assets, Liquidity, Environment, Global Market, Land use, Fundraising, Board
  - ▶ International market-related: 23,036 (7.22%)

↳ Wordcloud

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[a]Note: International market-related sentences refer to sentences containing the following keywords: international, global, world, foreign, export, import.

Competitiveness (BDG)

Competitiveness&Innovation (URF)

Textual Analysis: Average Share of Topics
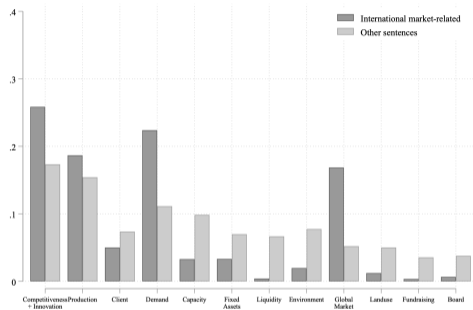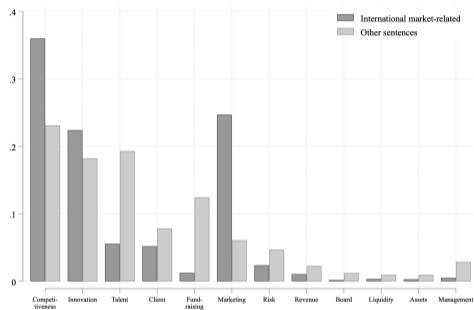
Note: The figure shows the average shares of the top 6 topics in international market-related sentences and other sentences in the BDG and the URF sections of IPO prospectuses of approved firms on the Main Board and GEM board from 2007 to 2016. The shares are computed as the number of international market-related (other) sentences with the focal topic as the dominant topic divided by the total number of international market-related (other) sentences in the BDG/URF section of each firm's IPO prospectus. A sentence is defined as international market-related if it contains the following keywords: international, global, world, foreign, export, and import. The topics are categorized based on the LDA algorithm.

Textual Analysis: Topic Shares and Post-IPO Export Growth

Panel A. Topic Shares in BDG

Panel B. Topic Shares in URF
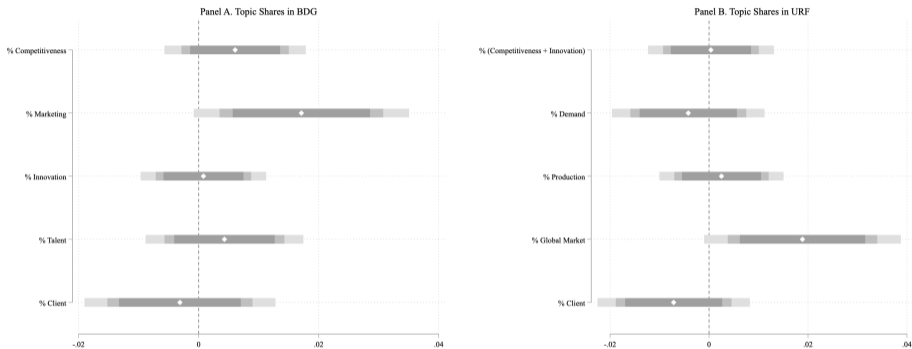
Note: The figure shows the estimated coefficients and their 90%, 95%, and 99% confidence intervals of regressing the difference of each firm's export growth pre- and post-IPO on the shares of the 5 most frequent topics in the firm's IPO prospectus after controlling for cohort fixed effects.

↠ Conceptual Framework

Concluding Remarks

Concluding Remarks

- ▶ New question, new setting, and new empirical strategy

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► New question, new setting, and new empirical strategy

► IPOs promote firms' exports
  ► Expansion on the **extensive margins**: increases in export range and product scope
  ► Robust to a battery of specification checks

Concluding Remarks

- New question, new setting, and new empirical strategy

- IPOs promote firms' exports
  - Expansion on the **extensive margins**: increases in export range and product scope
  - Robust to a battery of specification checks

- IPO's role: financing intangible investment and mitigating of informational frictions
  - Firm heterogeneity: financial leverage and liquidity; investment, innovation, and selling activities; export experience
  - Product heterogeneity: external finance dependence and liquidity needs; asset tangibility and R&D and advertisement intensity; product differentiation
  - Textual analysis: market-driven expansion

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  ▶ Textual analysis: market-driven expansion

▶ Policy implications: public equity financing for (top) exporters in emerging economies

Appendix

IPO Examination Procedure
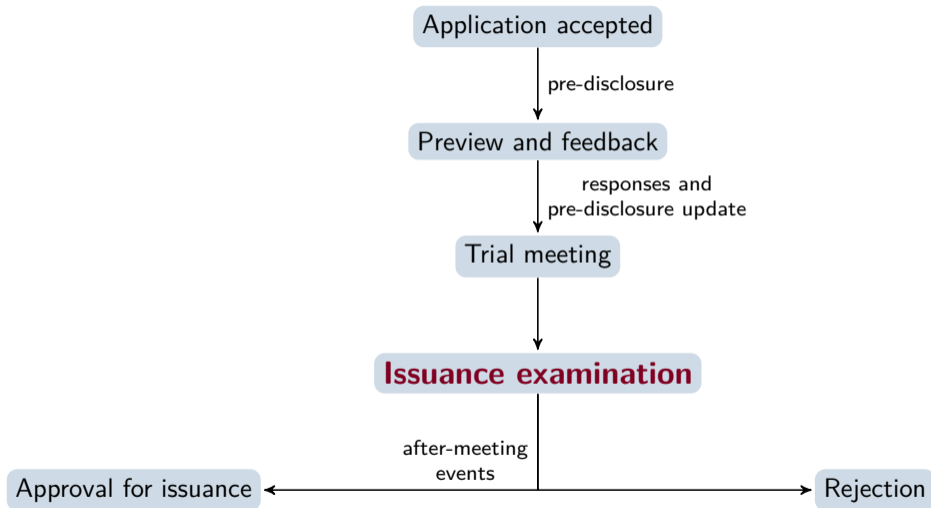
Categorization of Rejections

Clause	# Cases	Percentage	Details of the clause
Panel A. Main board (Administrative Measures for Initial Public Offering and Listing of Shares)			
All	79		
Clause 37	29	36.71	The issuer shall not have the following circumstances affecting the continued profitability
Clause 24	10	12.66	There has been no significant change in the main business and directors and senior management of the issuer and no change in the actual controller in the last three years.
Clause 41	9	11.39	The board of directors of the issuer should carefully analyze the feasibility of the investment projects of the proceeds, be sure that the investment projects have good market prospects and profitability, effectively prevent investment risks and improve the efficiency of the use of proceeds.
Panel B. GEM board (Interim Measures for the Administration of Initial Public Offering of Shares and Listing on GEM)			
All	55		
Clause 14	27	49.09	The issuer should have sustained profitability and not have the following circumstances.
Clause 18	9	16.36	The issuer has complete assets, independent business and personnel, finance and institutions, and has a complete business system and the ability to operate independently directly to the market. There is no competition with the controlling shareholder, the actual controller and other enterprises under their control, as well as connected transactions that seriously affect the independence of the company or are unfair.
Clause 21	4	7.27	The information disclosed by the issuer in accordance with the law must be true, accurate and complete and must not contain false records, misleading statements or material omissions.

Note: The table provides a breakdown of the most frequently cited clauses in rejection cases in the Main Board and the GEM board from 2010 to 2016, including the clause titles, the number of cases, their percentage in all rejected cases, and the specific clause details.

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Categorization of Rejections

What circumstances are included in clause 37 (main board) and **clause 14** (GEM board)?

- 14.1&14.2: There has been or will be a material change in...
  - the business model, product or service mix of the issuer that has an adverse effect on the continued profitability of the issuer;
  - the issuer's industry position or the industry's business environment that has an adverse effect on the continued profitability of the issuer;
- 14.3: Risk of adverse changes in the acquisition or use of important assets or technologies such as trademarks, patents, proprietary technologies and franchises in use by the issuer;
- 14.4: Significant reliance of the issuer's operating income or net profit on related parties or customers with significant uncertainty in the most recent year;
- 14.5: The issuer's net profit for the most recent year was mainly derived from investment income outside the scope of the consolidated financial statements;
- 14.6: Other circumstances that may have an adverse effect on the continued profitability of the issuer.

Original Documentation of Clause 37 (in Chinese)

中国证券监督管理委员会令

第 32 号

《首次公开发行股票并上市管理办法》已经2006年5月17日中国证券监督管理委员会第180次主席办公会议审议通过，现予公布，自2006年5月18日起施行。

主 席 尚福林

二〇〇六年五月十七日

第三十七条 发行人不得有下列影响持续盈利能力的情形：

（一）发行人的经营模式、产品或服务的品种结构已经或者将发生重大变化，并对发行人的持续盈利能力构成重大不利影响；

（二）发行人的行业地位或发行人所处行业的经营环境已经或者将发生重大变化，并对发行人的持续盈利能力构成重大不利影响；

（三）发行人最近1个会计年度的营业收入或净利润对关联方或者存在重大不确定性的客户存在重大依赖；

（四）发行人最近1个会计年度的净利润主要来自合并财务报表范围以外的投资收益；

（五）发行人在用的商标、专利、专有技术以及特许经营权等重要资产或技术的取得或者使用存在重大不利变化的风险；

（六）其他可能对发行人持续盈利能力构成重大不利影响的情形。

Reasons of Rejections (Global Risks Related)

Example 1: Wuxi Shangji Automation (GEM, clause 14; 10 April, 2012)

▶ Since the second half of 2011, due to the European debt crisis, European countries have reduced subsidies for photovoltaic power generation, which suppressed the overall demand of the industry. Some of your orders have been cancelled and delayed, and the fluctuation of demand in the downstream industry will have an adverse impact on your company's operation.

Example 2: Shenzhen Meikai Electronics (Main, clause 37; 1 November, 2010)

▶ Your company relies heavily on imported raw materials of high performance carbon fiber, and the purchase quantity and purchase amount of imported carbon fiber accounted for 47.70% and 48.96% respectively in 2013.

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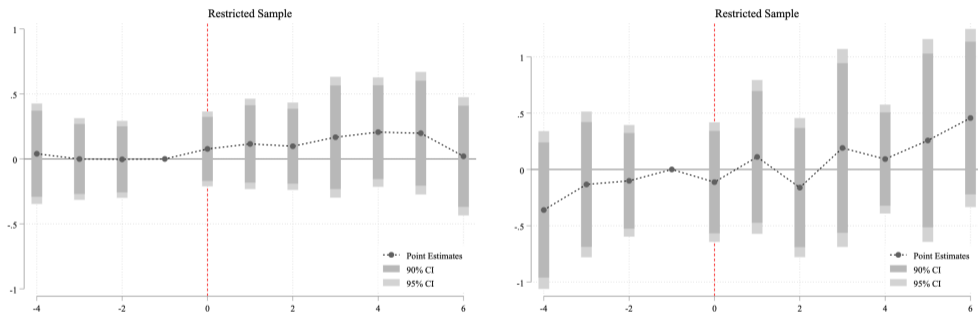# Extensive Margins of Exports: # Destinations

Figure: Effect of an IPO Approval on # Destinations
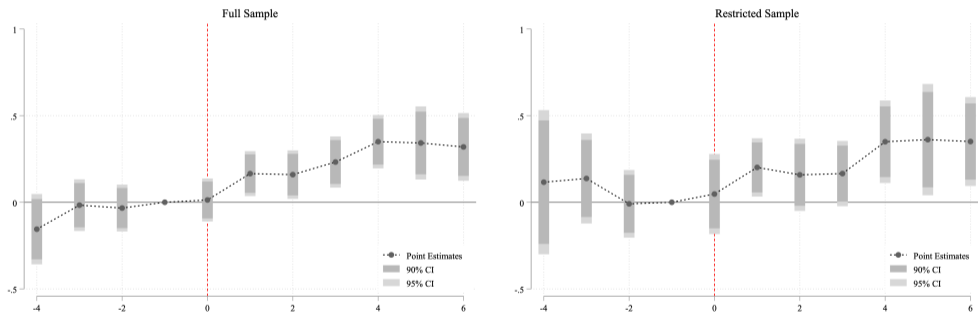
Note: The figure plots the event study coefficients for the difference-in-differences specification that estimates the effect of IPO approval on log number of destinations. The underlying regressions control for firm fixed effects, application cohort-year fixed effects, HS2-year fixed effects, and board-year fixed effects. The full sample refers to all WIND-CCTS-matched firm-year observations. The restricted sample refers to WIND-CCTS-matched firm-year observations that exclude IPO filings before 2010 and revenue- or profitability-related IPO rejection cases. Robust standard errors are clustered at the firm level.

Extensive Margins of Exports: # Products

Figure: Effect of an IPO Approval on # Products
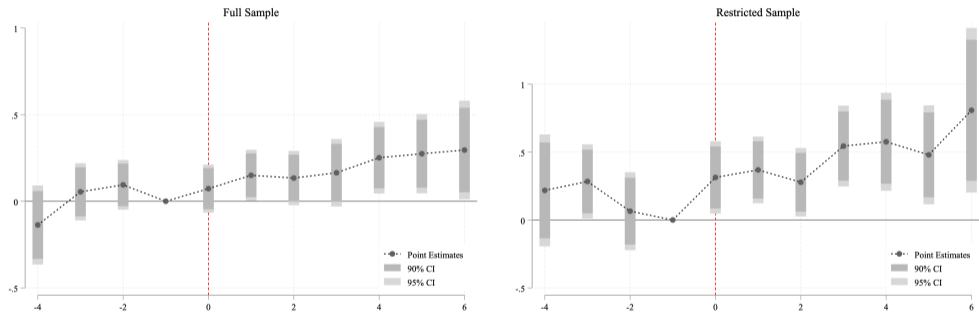
Note: The figure plots the event study coefficients for the difference-in-differences specification that estimates the effect of IPO approval on log number of products. The underlying regressions control for firm fixed effects, application cohort-year fixed effects, HS2-year fixed effects, and board-year fixed effects. The full sample refers to all WIND-CCTS-matched firm-year observations. The restricted sample refers to WIND-CCTS-matched firm-year observations that exclude IPO filings before 2010 and revenue- or profitability-related IPO rejection cases. Robust standard errors are clustered at the firm level.

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Intensive Margins of Exports: Average Exports

Figure: Effect of an IPO Approval on Average Exports per Incumbent Destination-Product Market

Note: The figure plots the event study coefficients for the difference-in-differences specification that estimates the effect of IPO approval on log average exports per *incumbent* destination-product market in the firm's *ex-ante* export portfolio. The underlying regressions control for firm fixed effects, application cohort-year fixed effects, HS2-year fixed effects, and board-year fixed effects. The full sample refers to all WIND-CCTS-matched firm-year observations. The restricted sample refers to WIND-CCTS-matched firm-year observations that exclude IPO filings before 2010 and revenue- or profitability-related IPO rejection cases. Robust standard errors are clustered at the firm level.

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Destination-Product Level Analysis

Panel A. Full Sample

	participation (1a)	log exports (2a)	log quantity (3a)	log price (4a)
IPO Approval×Post	0.0155 (0.0222)	0.132 (0.0861)	0.161* (0.0881)	-0.0283 (0.0437)
# Observations	945875	220123	220123	220123

Panel B. Restricted Sample

	participation (1b)	log exports (2b)	log quantity (3b)	log price (4b)
IPO Approval×Post	0.0707*** (0.0225)	0.199 (0.144)	0.312* (0.163)	-0.110 (0.102)
# Observations	590286	146628	146628	146628

Note: The table reports the effects of IPO approval on firm-destination-product level export outcomes. The dependent variables include an indicator variable of participation in each destination-product market, log exports, log quantity, and log price at each destination-product market conditional on participation. The variable IPO Approval is an indicator that takes a value of 1 if the firm's IPO application is approved by the SIEVC. The variable Post takes a value of 1 if the year is equal to or after the SIEVC review meeting year. All columns control for firm-destination-product fixed effects, application cohort-year fixed effects, HS4-year fixed effects, destination-year fixed effects, and board-year fixed effects. Robust standard errors, clustered at the firm level, are shown in parentheses. ***, **, and * denote statistical significance at the 1%, 5% and 10% level, respectively.

▸ Back

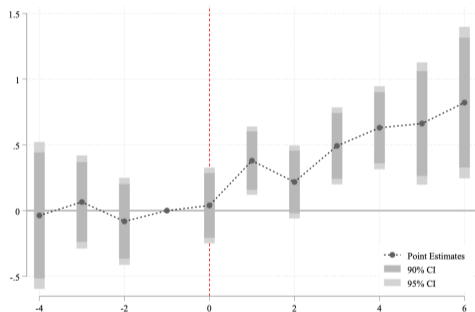# Robustness: Alternative Restricted Sample
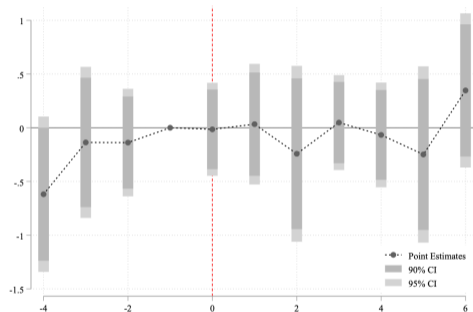
Dep. variable: log exports
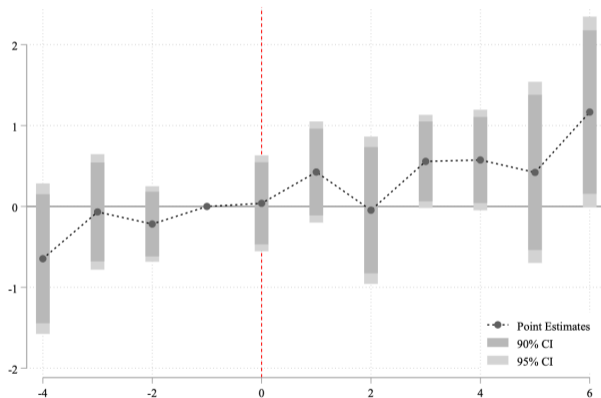
Note: The figure plots the event study coefficients for the difference-in-differences specification that estimates the effect of IPO approval on log exports. The underlying regressions control for firm fixed effects, application cohort-year fixed effects, HS2-year fixed effects, and board-year fixed effects. The sample includes WIND-CCTS-matched firm-year observations despite those with IPO filings before 2010 or IPO rejections based on Chapter 4 (Main) or its equivalents (GEM). Robust standard errors are clustered at the firm level.

Robustness: Alternative Restricted Sample

Dep. variable: log # of markets

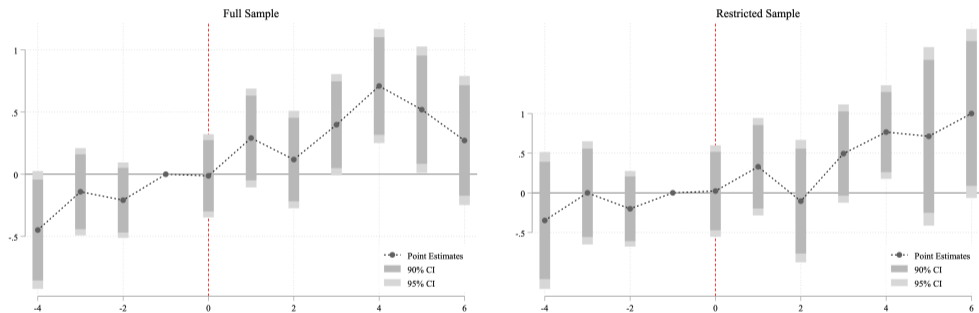Dep. variable: log avg. exports per market

Note: The figure plots the event study coefficients for the difference-in-differences specification that estimates the effect of IPO approval on log number of destination-product markets and log average exports per market. The underlying regressions control for firm fixed effects, application cohort-year fixed effects, HS2-year fixed effects, and board-year fixed effects. The sample includes WIND-CCTS-matched firm-year observations despite those with IPO filings before 2010 or IPO rejections based on Chapter 4 (Main) or its equivalents (GEM). Robust standard errors are clustered at the firm level.

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# Robustness: Controlling for IPO Characteristics

Figure: Effect of an IPO Approval on Exports, Controlling for Time-varying Effects of IPO Characteristics

Note: The figure plots the event study coefficients for the difference-in-differences specification that estimates the effect of IPO approval on log exports. The underlying regressions control for firm fixed effects, application cohort-year fixed effects, HS2-year fixed effects, board-year fixed effects, and IPO characteristics interacted with year dummies. The full sample refers to all WIND-CCTS-matched firm-year observations. The restricted sample refers to WIND-CCTS-matched firm-year observations that exclude IPO filings before 2010 and revenue- or profitability-related IPO rejection cases. Robust standard errors are clustered at the firm level.

Robustness: Export Participation

Figure: Effect of an IPO Approval on Export Participation
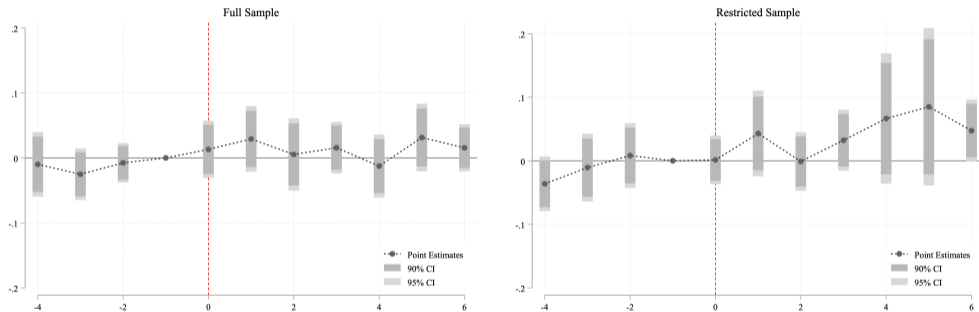
Note: The figure plots the event study coefficients for the difference-in-differences specification that estimates the effect of IPO approval on export participation. The underlying regressions control for firm fixed effects, application cohort-year fixed effects, HS2-year fixed effects, and board-year fixed effects. The full sample refers to all WIND-CCTS-matched firm-year observations. The restricted sample refers to WIND-CCTS-matched firm-year observations that exclude IPO filings before 2010 and revenue- or profitability-related IPO rejection cases. Robust standard errors are clustered at the firm level.

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Robustness: Permutation Test

Full Sample

Restricted Sample
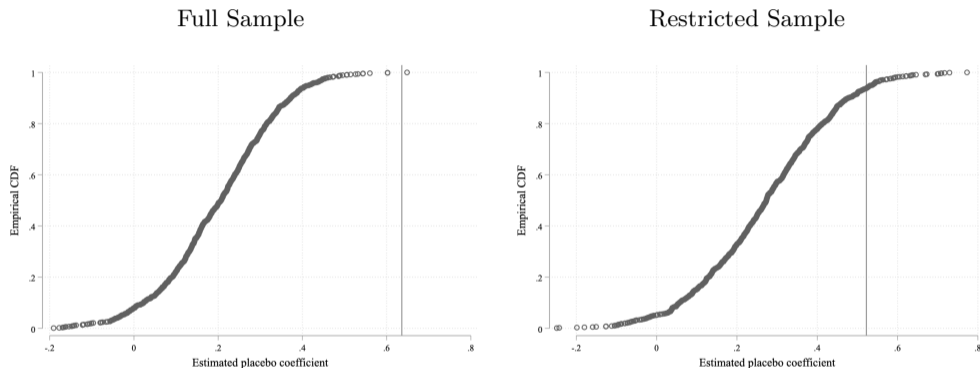
Note: These figures present the empirical distribution of placebo estimates for the difference-in-difference specification examining the effect of IPO on log exports. The full sample refers to all WIND-CCTS-matched firm-year observations. The restricted sample refers to WIND-CCTS-matched firm-year observations that exclude IPO filings before 2010 and revenue- or profitability-related IPO rejection cases. The CDFs are constructed from permuting treatment status to IPO applicant firms 500 times and estimating the corresponding coefficients. Dotted vertical lines represent the true estimates.

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Composition of Foreign Markets

Dependent variable: share of destinations					
	% long distance (1)	% non-WTO (2)	% high-income (3)	% low CHN penetration (4)	% IFRS adoption (5)
IPO Approval×Post	0.0191	0.00451	0.0370*	0.0645**	0.0542**
	(0.0372)	(0.0172)	(0.0214)	(0.0289)	(0.0233)
# Observations	26280	26280	26280	26280	26280

Note: The table reports the effects of IPO approval on the firm-product level composition of destination markets. The variable IPO Approval is an indicator that takes a value of 1 if the firm's IPO application is approved by the SIEVC. The variable Post takes a value of 1 if the year is equal to or after the SIEVC review meeting year. All columns control for firm-product fixed effects, application cohort-year fixed effects, HS4-year fixed effects, and board-year fixed effects. Robust standard errors, clustered at the firm level, are shown in parentheses. ***, **, and * denote statistical significance at the 1%, 5% and 10% level, respectively.

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Details of Prospectus Sections

- ▶ The section of *Business Development Goals* includes:
  - ▶ Medium- and long-term strategic planning
  - ▶ Measures taken to achieve the strategic objectives and their implementation
  - ▶ Measures planned for the future
  - ▶ Assumptions for the formulation of strategic objectives and specific plans
  - ▶ Possible difficulties in implementation

- ▶ The section of *Usage of Raised Funds* includes:
  - ▶ Management for the investment and use of raised funds
  - ▶ The contribution of the proceeds to the issuer's main business, the impact on the issuer's future business strategy, and its role in the issuer's innovation
  - ▶ Investment direction and arrangement for the use of the raised funds
  - ▶ Relationship between the fund-raising investment projects and the main business and core technology
  - ▶ Disclosure of usage of proceeds based on materiality principle

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Example: LDA Procedure

Take the following sentence from the Business Development Goals section of Huaiji Dengyun Auto-parts (Holding) Co. (002715.SZ) as an example:
In terms of overseas market expansion, we make full use of the good relationships we have already established with international companies to sell our valve products by leveraging our partners' global network channels and experience.

- ▶ <u>Preprocessing</u>: we separate the sentence from the text and remove punctuations and stopwords, such as "of," "the," "have," and "by."

- ▶ <u>Tokenization and Vectorization</u>: we tokenize and map the sentence to a vector space
  - ▶ overseas, market, expansion, full use, company, international, companies, establish, good, relationship, leverage, partner, global, network, channel, experience, sell, company, valve, product

- ▶ <u>Topic Modeling</u>: apply the LDA algorithm on the text corpus to identify topics
  - ▶ The dominant topic of the sentence is marketing/branding-related: Market, Client, Network, Brand, ...

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Market/Tech-related Topics (BDG)

Figure: Competitiveness

Figure: Marketing

Figure: Client

Figure: Innovation

Market/Tech-related Topics (URF)

Figure: Competitiveness&Innovation

Figure: Market Potential

Figure: Client

Figure: Global Market

Finance-related Topics (BDG)

Figure: Fundraising

Figure: Assets

Figure: Liquidity

Figure: Revenue

Finance-related Topics (URF)

Figure: Fundraising

Figure: Fixed Assets

Figure: Liquidity

Figure: Capacity

Conceptual Framework: Setup

- ▶ Following Arkolakis (2010), a firm of productivity ϕ in country i reach consumers in a destination country j with probability $n_{ij}(\phi)$

- ▶ Effective demand:
$$q_{ij}(\phi) = n_{ij}(\phi) \frac{Y_j}{P_j} \left(\frac{p_{ij}(\phi)}{P_j}\right)^{-\sigma}$$

  - ▶ Y_j: national income in j
  - ▶ P_j: price index in j

- ▶ Marginal cost of export: $c_{ij}(\phi) = \tau_{ij}/\phi$ (normalize wage in i to 1)

- ▶ Fixed cost: $f_{ij}^P + f_{ij}^M(n)$

  - ▶ f_{ij}^P: physical fixed cost (Property, Plant, and Equipment, or PP&E)
  - ▶ $f_{ij}^M(n_{ij}(\phi))$: intangible fixed cost (product innovation; marketing; etc.)

    - ▶ Assumption: $\frac{df_{ij}^M(n)}{dn} > 0$, $\frac{d^2 f_{ij}^M(n)}{dn^2} > 0$, $f_{ij}^M(0) = 0$

Conceptual Framework: Debt and Equity Financing

- Firms rely on external financing (debt D and equity E) to fund the fixed costs
    - Collateralized debt: borrow $D \leq \lambda f^P$, where $\lambda \leq 1$
        - Cost of debt: R^d normalized to 1
    - External equity: raise $E = f^P + f^M(n) - D$ by selling $1 - s$ of equity
        - Outside option return on equity: $R^e > R^d = 1$ (risks, agency costs, tax shield, other frictions)

- Given capital structure (D, E), profit will be divided in the following ways:
    1. Payoff to debtholders: $R^d D$
    2. Division between external equity holder and the entrepreneur:
        - External equity holders: $(1 - s)$ of residual profit $\geq R^e E$ (participation constraint)
        - Entrepreneur: s of residual profit

Conceptual Framework: Firm Problem

▶ An entrepreneur chooses price p, consumer reach n, external equity E, and ownership share s for each destination market to maximize residual profit.

  ▶ Pricing strategy is independent of capital structure and consumer reach: $p^*(\phi) = \frac{\sigma}{\sigma-1}\frac{\tau}{\phi}$

    ▶ $\pi^*(\phi) \equiv \frac{1}{\sigma}(\frac{\sigma}{\sigma-1})^{1-\sigma}\frac{Y}{P^{1-\sigma}}(\frac{\tau}{\phi})^{1-\sigma}$

▶ Profit-maximization problem:

$$\max_{n,s,E} \quad s(n\pi^*(\phi) - (f^P + f^M(n) - E))$$
$$\text{s.t.} \quad f^P + f^M(n) - E \leq \lambda f^P$$
$$R^e E \leq (1-s)(n\pi^*(\phi) - (f^P + f^M(n) - E))$$

 ▶ Both borrowing constraint and participation constraint bind for exporting firms.

    ▶ $D = \lambda f^P$, $E = (1-\lambda)f^P + f^M(n)$, $s = \frac{n\pi^*(\phi) - \lambda f^P - R^e((1-\lambda)f^P + f^M(n))}{n\pi^*(\phi) - \lambda f^P}$

    ▶ Profit-maximization problem reduce to: $\max_n n\pi^*(\phi) - \lambda f^P - R^e((1-\lambda)f^P + f^M(n))$

Conceptual Framework: Comparative Statics

Proposition 1. (intensive margin) For any given ϕ, the profit-maximizing level of consumer reach, $n^*(\phi; R^e)$, is decreasing in R^e.

▶ First-order condition: $\pi^*(\phi) = R^e \frac{df_M(n)}{dn}$
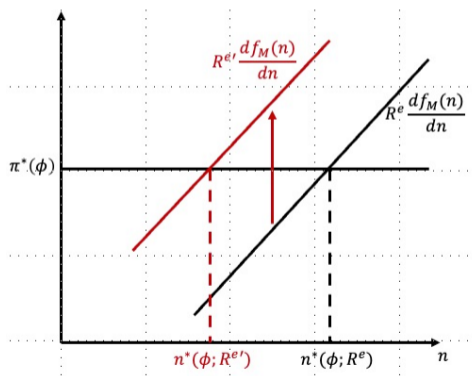
Conceptual Framework: Comparative Statics

Proposition 2. (extensive margin) The cutoff productivity, $\underline{\phi}$, is increasing in R^e.

▶ $\underline{\phi}$ fulfills the breakeven condition: $n^*(\underline{\phi})\pi^*(\underline{\phi}) - \lambda f^P - R^e((1-\lambda)f^P + f^M(n^*(\underline{\phi}))) = 0$

▶ **Corollary.** (tangibility) $\frac{d\underline{\phi}}{dR^e}$ is decreasing in λ.