Techno-Industrial FDI Policy and China's Export Surge

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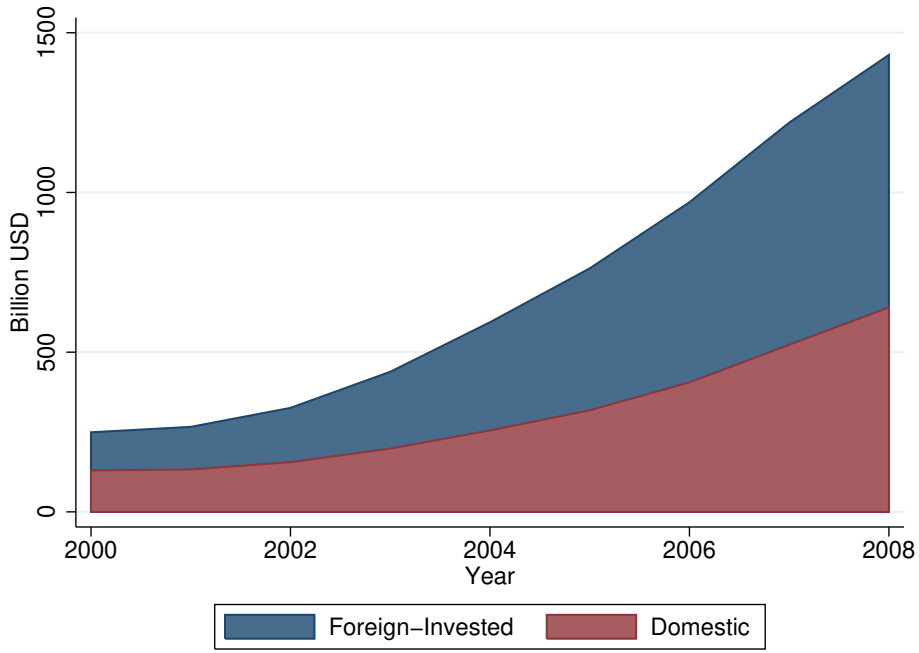
Motivation

- China's exports surged, rising from $380 B in 2001 to $1.62 T by 2008.
  - for the US: $87 B to $330 B
- This one-time 'China Shock' has been used to study:
  - The effects of Chinese import competition (Autor, Dorn, and Hanson '13, ...)
  - Why is it exogenous to importing countries?
- Early studies explained the China's export surge due to
  - Domestic firms' productivity shock (Brandt et al '12...)
  - Importing countries trade policy uncertainty (Handley and Limão '15, Pierce & Schott '16, Feng, Li and Swenson '16, Crowley, Meng and Song '17)
- Missing story: How does the Chinese domestic FDI policy affect the China's export surge?
- Our paper studies the extent to which Chinese domestic FDI policy shapes this export surge.

Motivation

- This export growth was highly concentrated by industry.
  - 43% electronics& machinery, 14% textile apparels, chemicals, instruments... (UN Comtrade, 2008)

- The exports surged in sectors where foreign invested enterprises account for a large share of exports. Electronics has a share over 70%.



Source: China Custom Records by WIND

This Paper

- **Question:** Does foreign investment activity change when a sector's FDI regulation is changed?
  - Outcomes: entry, exporters, export values
  - Setting: compare activity patterns over time, using diff-in-diff methods.
- How important are foreign-invested enterprises to the growth in Chinese exports following its WTO accession.
  - counterfactual
- Can we account for possible policy endogeneity?
  - event-study analysis
- Is activity being driven by other factors?
  - add controls
  - triple-differencing method

Roadmap of Talk

1. Background
2. Empirical Approach
3. Data
4. Results
5. Conclusion

Trajectory of Chinese Techno Policy

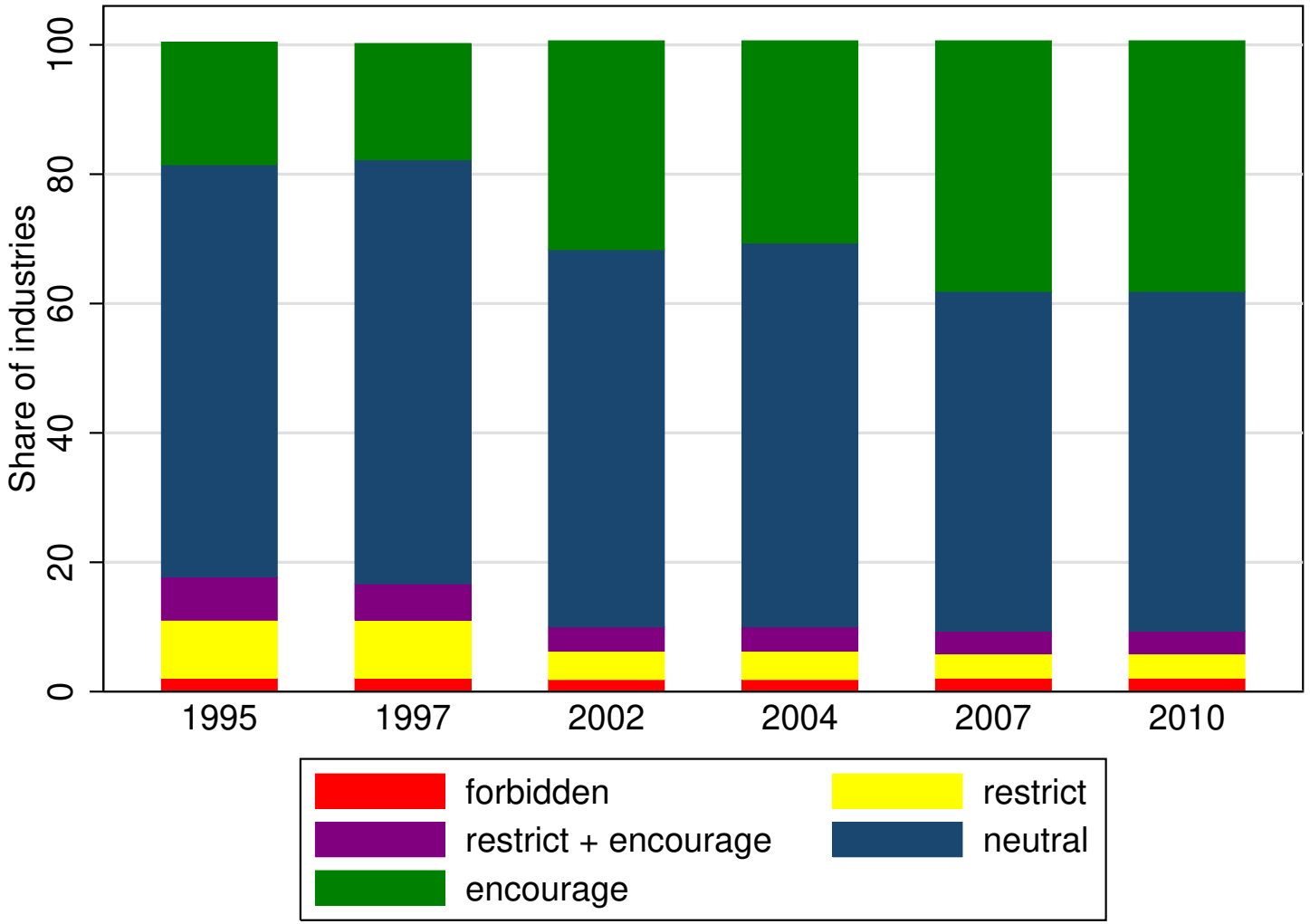
- Until 2003, China used market reforms and technological "catch-up" to advance its development. Dramatic reduction in intervention.
- According to Ling and Naughton (2016), this hands off phase ended in 2003, when China returned to "techno-industrial" policies.
- Techno policies may cause trade frictions.
- Yet, implications of these policies for trade are largely unexplored even as conflict builds.

Guidelines Categorize Sectors by Openness to Investment

- Forbidden: no foreign investment permitted.
- Restricted: investment by permission and only as minority shareholder in a joint venture.
- Encouraged: preferences available on a deal-by-deal basis.
- Investment in all other industries is allowed, with no explicit restrictions on ownership, subject to approval.

What do we expect the policy to do?

- Encouraged: policies are deal specific, but they may lower fixed costs of entry and, by lowering corporate tax rate, encourage entry and raise exports.
- Restricted: sectors are closed to wholly owned foreign investment, so liberalization should reduce encourage by this mode and raise exports by such firms.



Source: Policy designation at SCIC four-digit taken from Sheng and Yang (2016). Grouping and calculations by authors.

Which industries are designated as high tech? (some examples)

- Chemicals (also capital intensive)
- Medical and pharmaceutical products (also cap int)
- Special equipment manufacturing (also cap int)
- Communications, computers, other electronics
- Instruments, meters, office machinery

Empirical Approach

Baseline Specification (Difference-in-Differences)

$$\ln Y_{jt} = \alpha + \beta_1 Encouraged_{jt} + \beta_2 Restricted_{jt} + \mu_j + \eta_t + \epsilon_{jt}$$

- $j =$ industry, $t =$ year
- *Encouraged* $= 1$ if industry j contains encouraged item in the FDI catalogue
- *Restricted* $= 1$ if industry j contains restricted item in the FDI catalogue
- μ_j, η_t are industry and year fixed effects
- Standard errors are two-way clustered at the industry and year level.

Identification Assumption

- Plausible exogeneity of the policy intervention.
- Recall that there are three sources of endogeneity: (i) measurement error, (ii)reverse causality/simultaneity, and (iii) unobserved omitted variables.

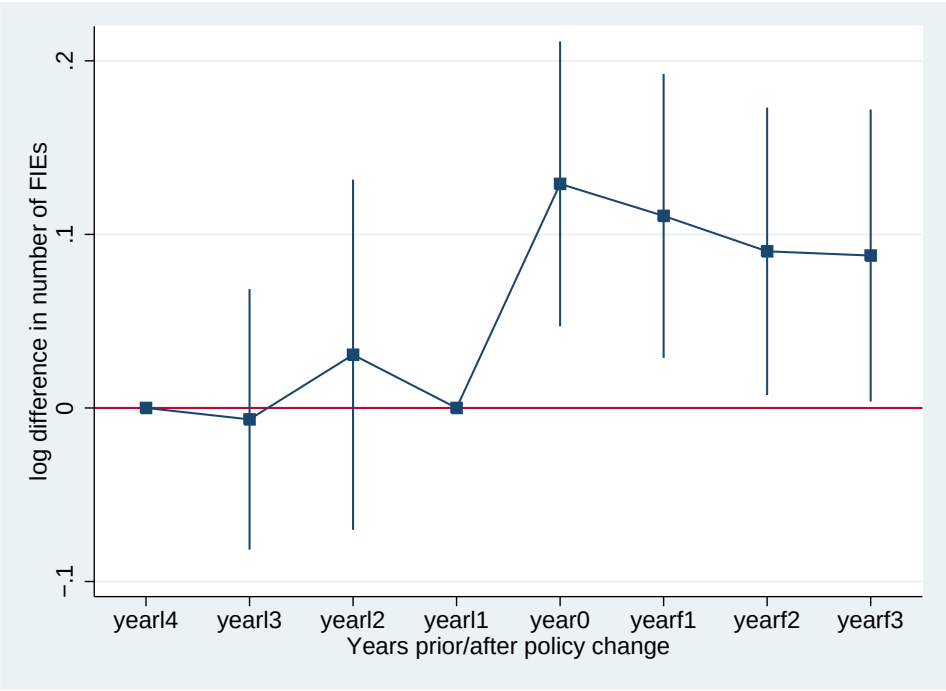
Event Study

$$\ln Y_{jt} = \alpha + \sum_{t=-3}^{4} \beta_{1t} Encouraged_{jt} + \sum_{t=-3}^{4} \beta_{2t} Restricted_{jt} + \mu_j + \eta_t + \epsilon_{jt}$$

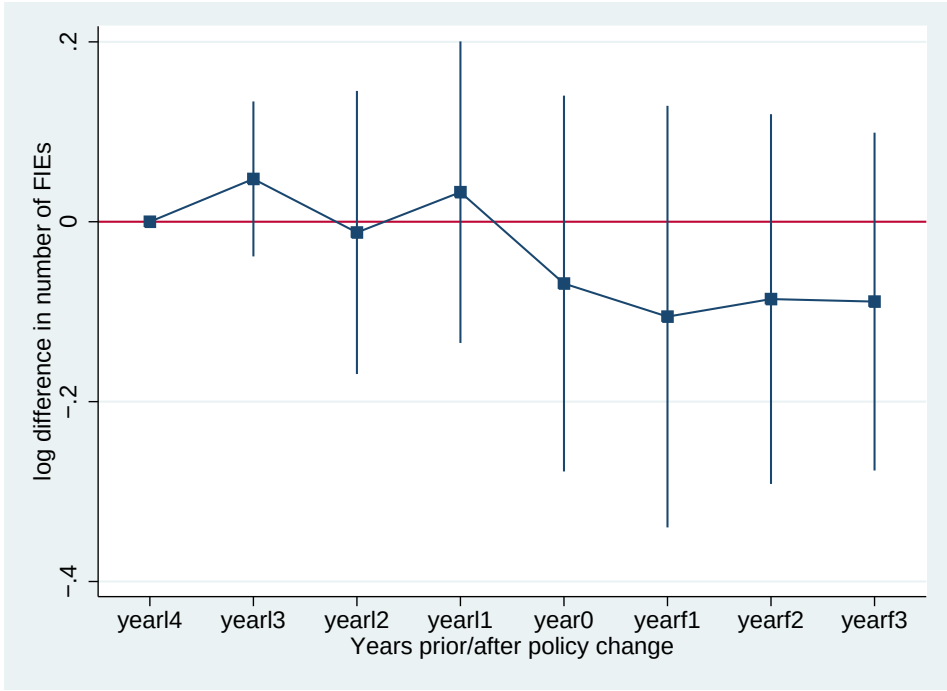
Event Study

Number of FIE firms

Number of FIE Firms



(a) Encouraged

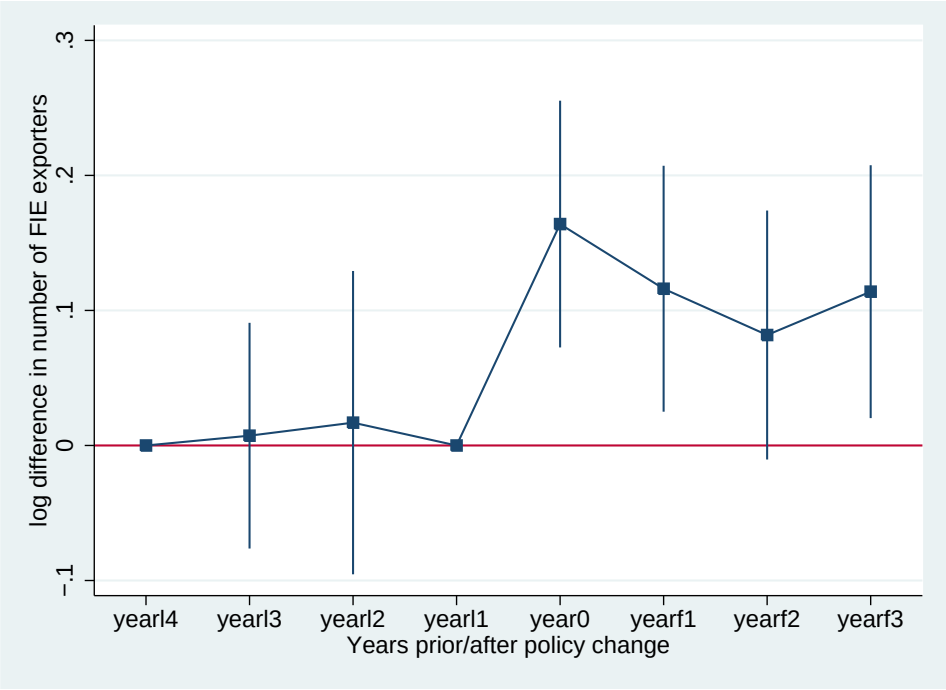


(b) Restricted

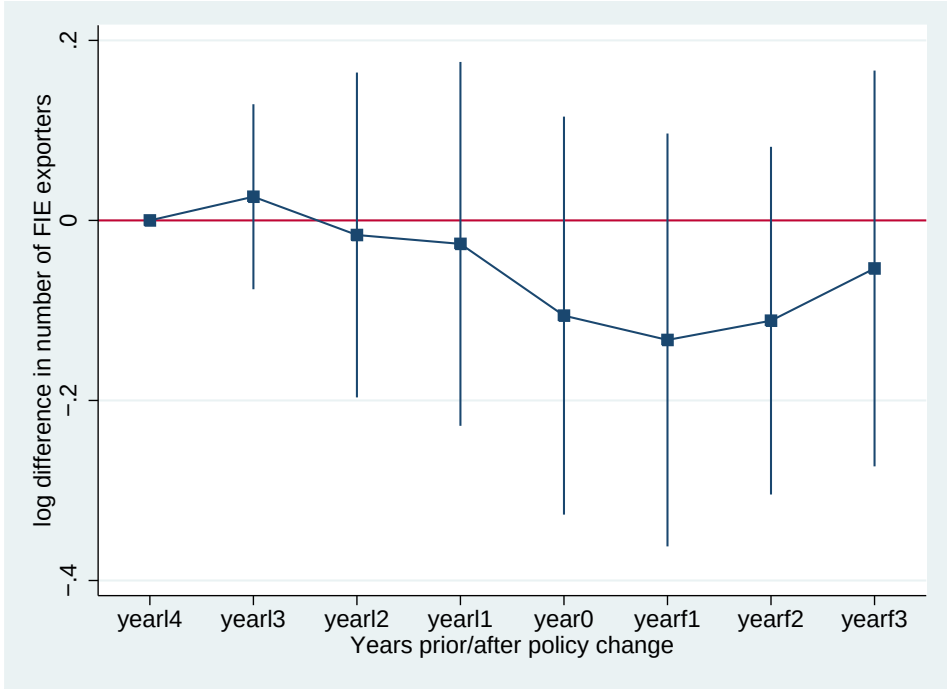
Event Study

Number of FIE exporters

Number of FIE Exporters



(a) Encouraged

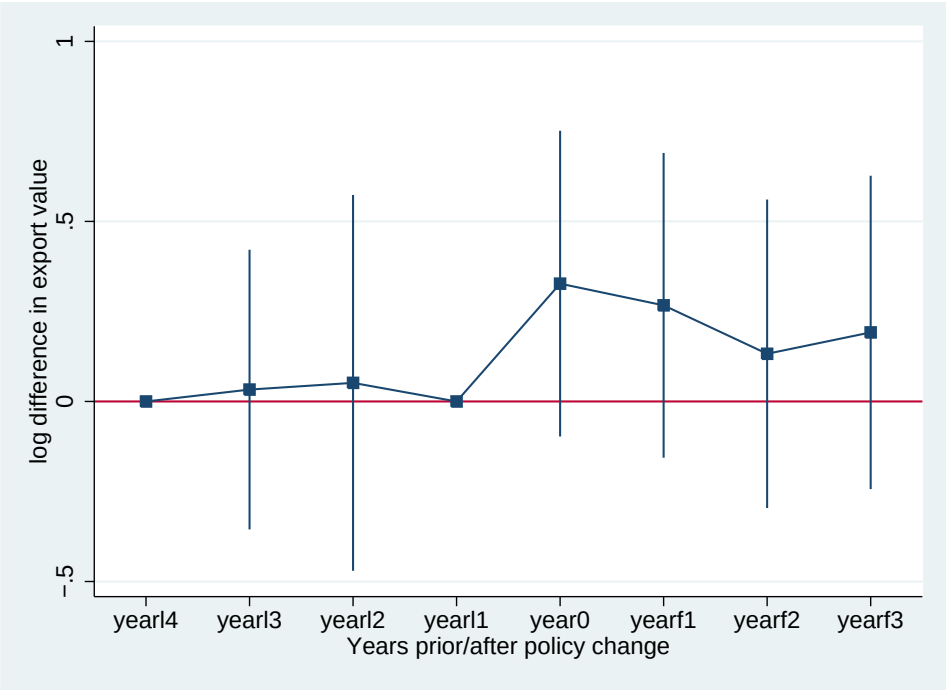


(b) Restricted

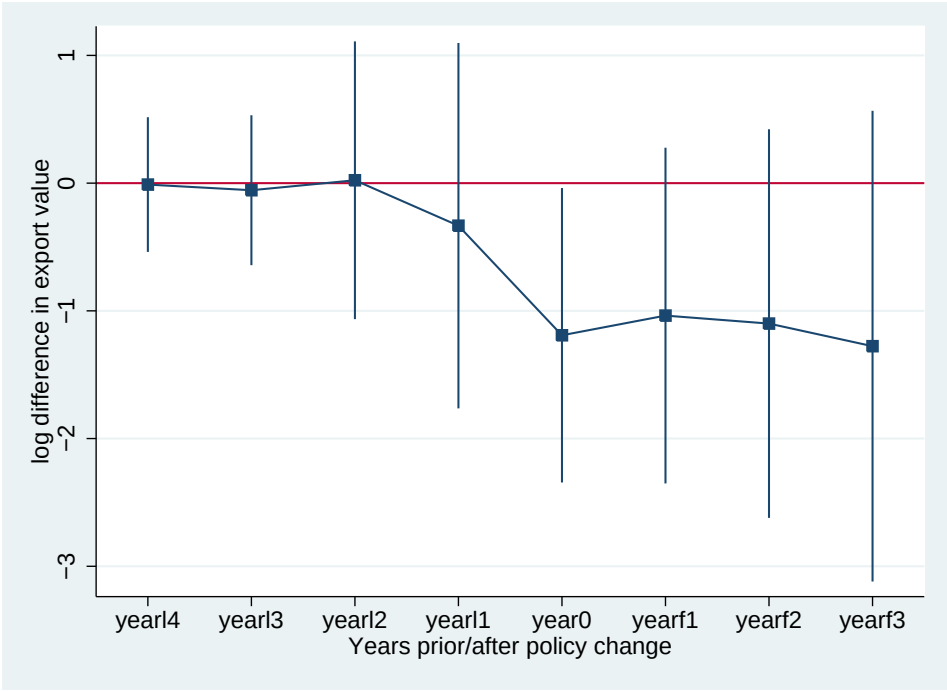
Event Study

Export values for FIEs

Export values for FIEs



(a) Encouraged



(b) Restricted

Other Possible Threats to Identification

- ~~reverse causality/simultaneity~~
- concurrent policies (OVB)

Selection only on Observables

- NTR gap
- Chinese import tariffs
- Non-tariff barriers

Triple Differencing: Domestic Firms as Controls

$$\begin{aligned}\ln Y_{ijt} = \alpha &+ \beta_1 Encouraged_{jt} \times FIE_i + \beta_2 Restricted_{jt} \times FIE_i \\ &+ \gamma_{jt} + FIE_i \times \mu_j + FIE_i \times \eta_t \\ &+ FIE_i + \mu_j + \eta_t + \epsilon_{jt},\end{aligned}$$

- γ_{jt}= industry-by-year fixed effects
- $i = 1$ if if outcome variable refers to foreign-invested enterprises in industry j
- $j =$ industry, $t =$ year
- *Encouraged* $= 1$ if industry j contains encouraged item in the FDI catalogue
- *Restricted* $= 1$ if industry j contains restricted item in the FDI catalogue
- μ_j, η_t are industry and year fixed effects
- Standard errors are two-way clustered at the industry and year level.

What Data We Use?

- Chinese manufacturing firm census, 1998-2010
  - Omits the smallest firms
  - Provides number of firms, ownership, export value
- Chinese Customs Records, 2000-2013 Universe of exports
  - Provides information on ownership type
  - Provides product and destination information
- Sheng and Yang (2016) - policy designations

Results

Which activities do we expect to be influenced by FDI policy?

- Entry of new foreign enterprises into China
- Entry of foreign enterprises into exporting
- Export volume of foreign firms
- Other aspects of export behavior:
  - Intensity of existing relationships
  - Export of new products to new destinations
  - Exports to the United States only

Baseline Results: DID

Regression DD Estimates of FDI Policy Effects

	(1) FIE	(2) JV	(3) WOFE	(4) Domestic
(*Panel A: Depvar = ln Number of Firms*)				
Encouraged	0.141***	0.142***	0.102**	0.077
	(0.044)	(0.042)	(0.046)	(0.059)
Restricted	-0.005	0.029	-0.147**	-0.034
	(0.045)	(0.039)	(0.067)	(0.062)
(*Panel B: Depvar = ln Number of Exporters*)				
Encouraged	0.153***	0.138***	0.101*	0.021
	(0.047)	(0.041)	(0.055)	(0.069)
Restricted	-0.047	0.024	-0.197**	0.000
	(0.049)	(0.042)	(0.074)	(0.065)
(*Panel C: Depvar = ln Export Values*)				
Encouraged	0.357**	0.382*	0.261	-0.171
	(0.141)	(0.177)	(0.185)	(0.123)
Restricted	0.173	0.207	-0.493	0.195*
	(0.153)	(0.195)	(0.329)	(0.104)
Observations	5615	5483	5194	5425

Baseline Results: DID

Regression DD Estimates, with Industry-Specific Year Trends

	(1) FIE	(2) JV	(3) WOFE	(4) Domestic
(*Panel A: Depvar = ln Number of Firms*)				
Encouraged	0.098**	0.112**	0.044	0.013
	(0.037)	(0.038)	(0.038)	(0.041)
Restricted	0.023	0.039	-0.134*	-0.044
	(0.045)	(0.040)	(0.073)	(0.053)
(*Panel B: Depvar = ln Number of Exporters*)				
Encouraged	0.116**	0.107**	0.053	-0.081
	(0.040)	(0.039)	(0.047)	(0.048)
Restricted	-0.005	0.049	-0.180**	0.002
	(0.050)	(0.047)	(0.075)	(0.059)
(*Panel C: Depvar = ln Export Values*)				
Encouraged	0.461**	0.333	0.425**	-0.354***
	(0.154)	(0.187)	(0.175)	(0.104)
Restricted	0.246	0.211	-0.485	0.265**
	(0.157)	(0.212)	(0.301)	(0.095)
Industry Specific Year Trends	Yes	Yes	Yes	Yes
Observations	5615	5483	5194	5425

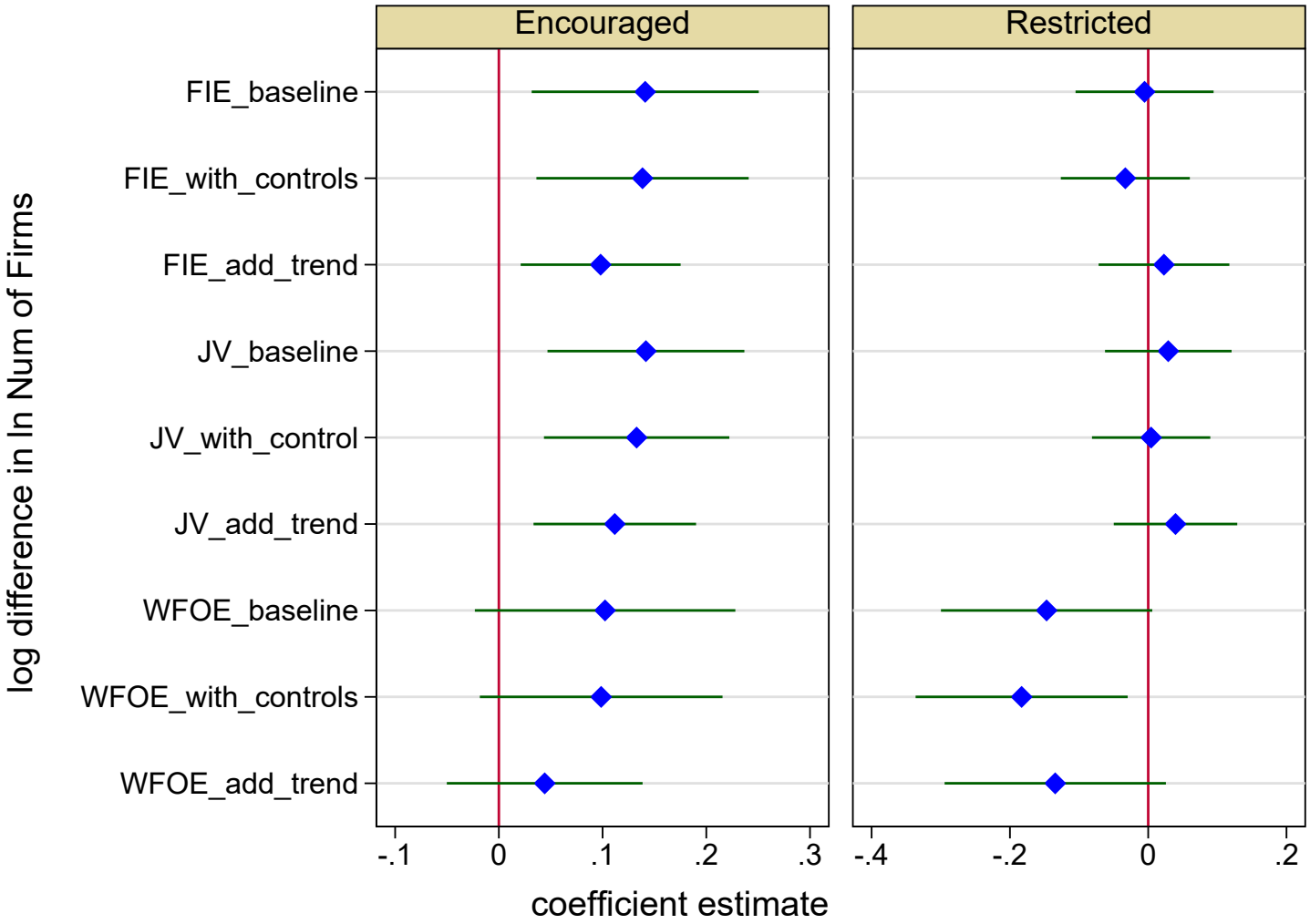
Adding Controls

DD Regressions with Controls

	ln Num of Firms			ln Num of Exporters			ln Export Values		
	(1) FIE	(2) JV	(3) WOFE	(4) FIE	(5) JV	(6) WOFE	(7) FIE	(8) JV	(9) WOFE
Encouraged	0.139**	0.133***	0.099*	0.153**	0.131***	0.098	0.349**	0.367*	0.098
	(0.047)	(0.041)	(0.054)	(0.051)	(0.039)	(0.062)	(0.125)	(0.175)	(0.092)
Restricted	-0.033	0.004	-0.183**	-0.067	0.013	-0.230**	0.198	0.229	-0.264*
	(0.043)	(0.039)	(0.070)	(0.050)	(0.045)	(0.082)	(0.163)	(0.185)	(0.137)
NTR Gap	0.730***	0.622***	0.594***	0.850***	0.720***	0.767***	-0.515	0.534	0.130
	(0.184)	(0.156)	(0.188)	(0.209)	(0.175)	(0.191)	(0.695)	(0.676)	(0.416)
ln Output Tariff	0.013	0.122***	-0.007	-0.016	0.119**	-0.047	-0.239*	0.126	-0.239
	(0.034)	(0.033)	(0.045)	(0.041)	(0.049)	(0.048)	(0.126)	(0.268)	(0.136)
Non-Tariff Barriers	0.255**	0.168**	0.301**	0.181*	0.033	0.270*	-0.379	-0.421*	0.449
	(0.096)	(0.063)	(0.125)	(0.098)	(0.081)	(0.146)	(0.404)	(0.223)	(0.337)

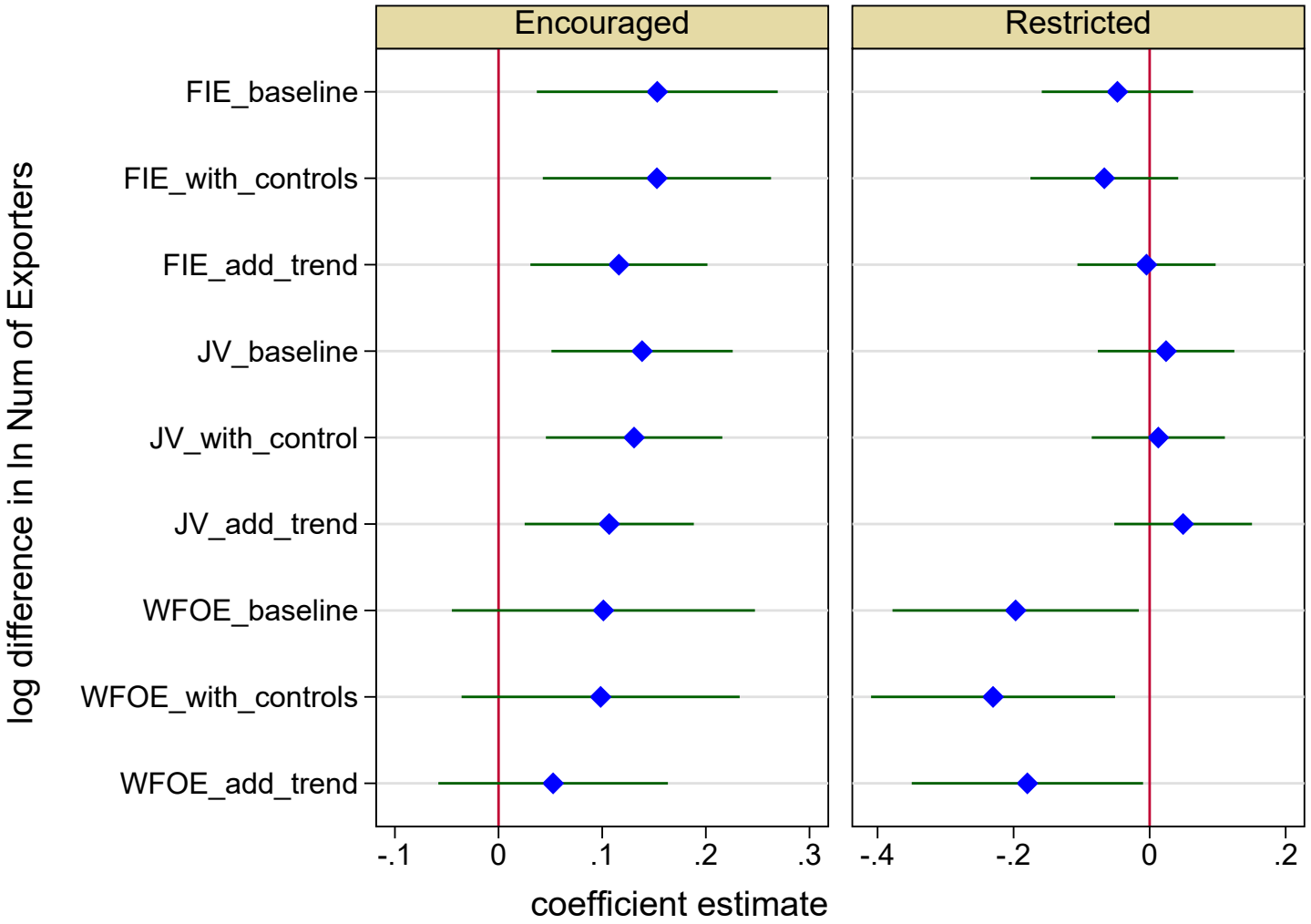
Robustness Check

of Firms



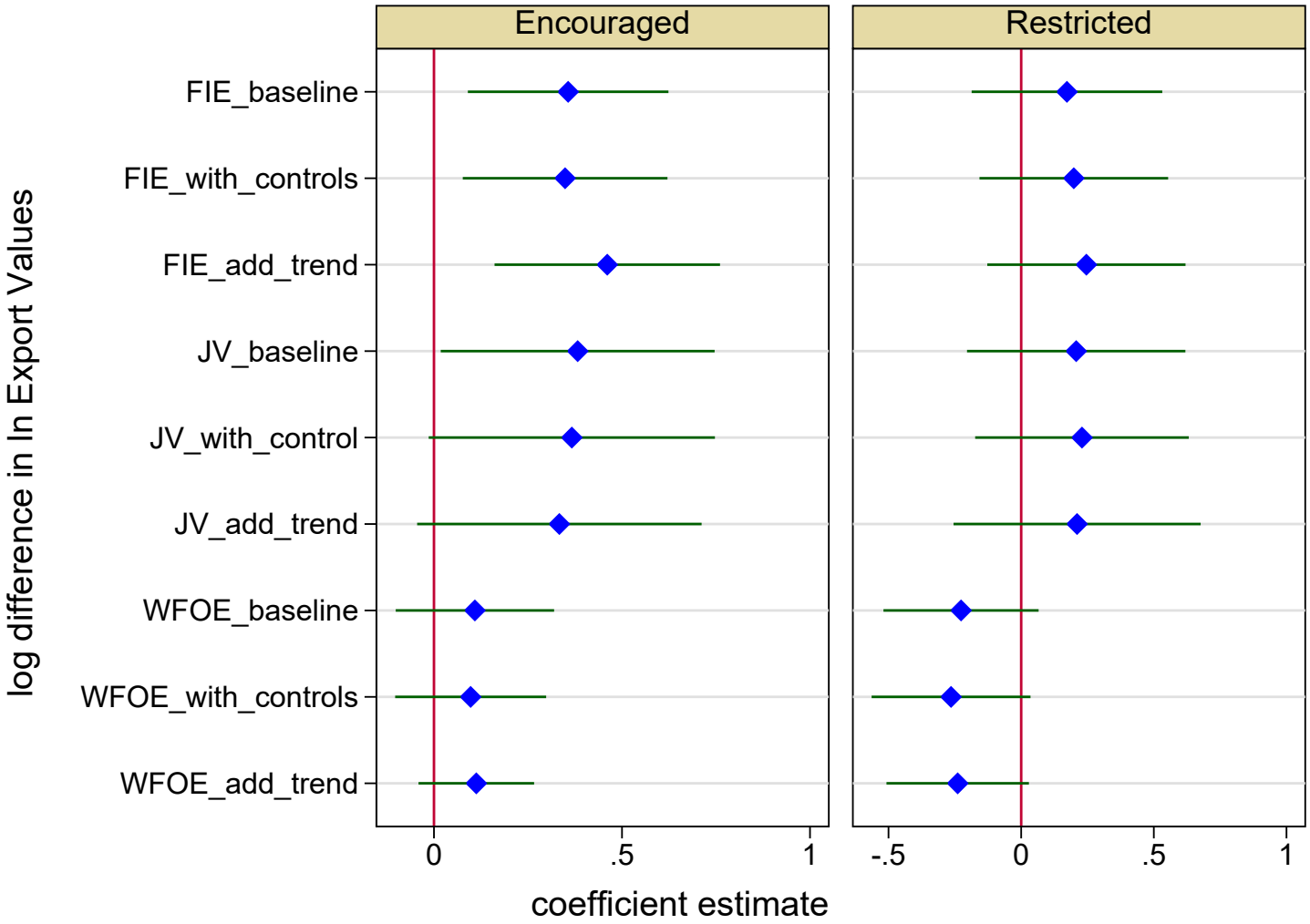
Robustness Check

of Exporters



Robustness Check

Export Values



Results: Triple-Differencing

Regression DDD Estimates of FDI Policy Effects

	(1) FIE	(2) JV	(3) WOFE
(*Panel A: Depvar = ln Number of Firms*)			
DDD Enc	0.115***	0.116***	0.076*
	(0.028)	(0.031)	(0.036)
DDD Res	0.015	0.049	-0.127**
	(0.044)	(0.045)	(0.052)
(*Panel B: Depvar = ln Number of Exporters*)			
DDD Enc	0.180***	0.165***	0.128***
	(0.039)	(0.040)	(0.041)
DDD Res	-0.024	0.048	-0.173**
	(0.056)	(0.056)	(0.058)
(*Panel C: Depvar = ln Export Values*)			
DDD Enc	0.224**	0.341***	0.323**
	(0.109)	(0.118)	(0.130)
DDD Res	0.156	0.241	-0.095
	(0.159)	(0.174)	(0.201)

DDD Extensive Margins

- We concord industry-level policies to the product level and estimate a triple-differenced specification.
- We use Chinese Customs Records to capture all exporters and to observe both products and destinations. Allows us to explore extensive margins.
- Extensive margins
  - # of firms exporting to a HS6 product-country cell
  - # of HS8 products exported to a HS6 product-country cell

$$\ln Y_{cjt} = \alpha + \beta_1 Encouraged_{jt} + \beta_2 Restricted_{jt} + \mu_{ct} + \delta_{cj} + \epsilon_{cjt}$$

Extensive margins for all countries and US only

DD Estimates of Policy Effects on Extensive Margins, Total Exports and US Only

	To All countries			To the US		
	(1) FIE	(2) WOFE	(3) JV	(4) FIE	(5) WOFE	(6) JV
Enc	0.093***	0.096***	0.058***	0.195***	0.195***	0.155***
	(0.019)	(0.020)	(0.016)	(0.052)	(0.051)	(0.043)
Res	0.032	0.012	0.006	0.040	0.053	0.001
	(0.048)	(0.041)	(0.042)	(0.050)	(0.062)	(0.035)
Observations	4262156	4262156	4262156	64030	64030	64030
FE	HS#C,C#Y	HS#C,C#Y	HS#C,C#Y	HS,Y	HS,Y	HS,Y

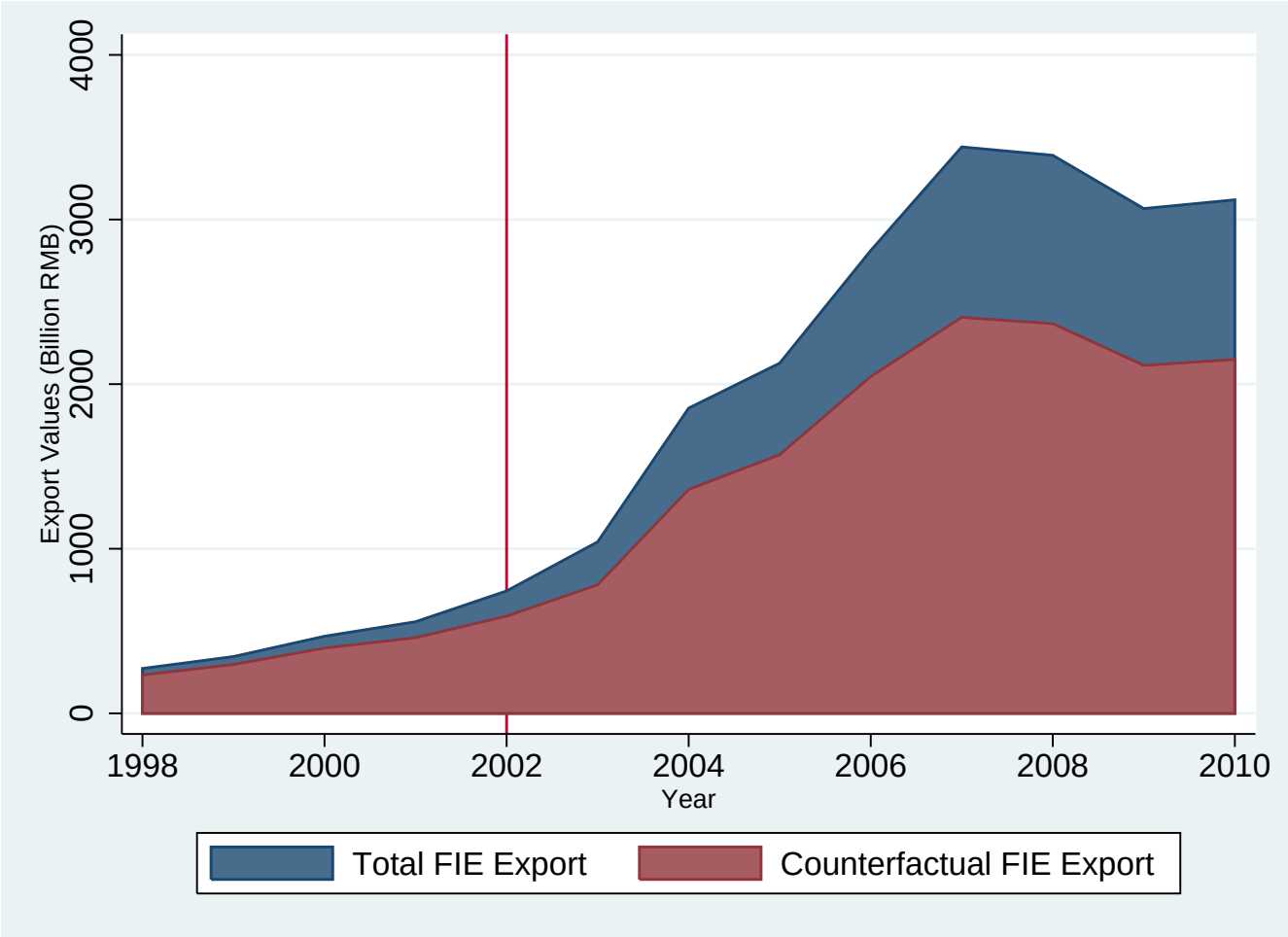
Magnitudes: Counterfactuals

- Use the regression coefficients and actual trade flows to calculate predicted exported values in absence of encouragement.

$$\Delta Export_t = \sum_j X_{jt} \cdot (e^{\beta_1 \cdot \mathbb{1}\{\text{Encouraged}_{jt}\}} - 1)$$

FIE export counterfactual, actual vs. without encouragement

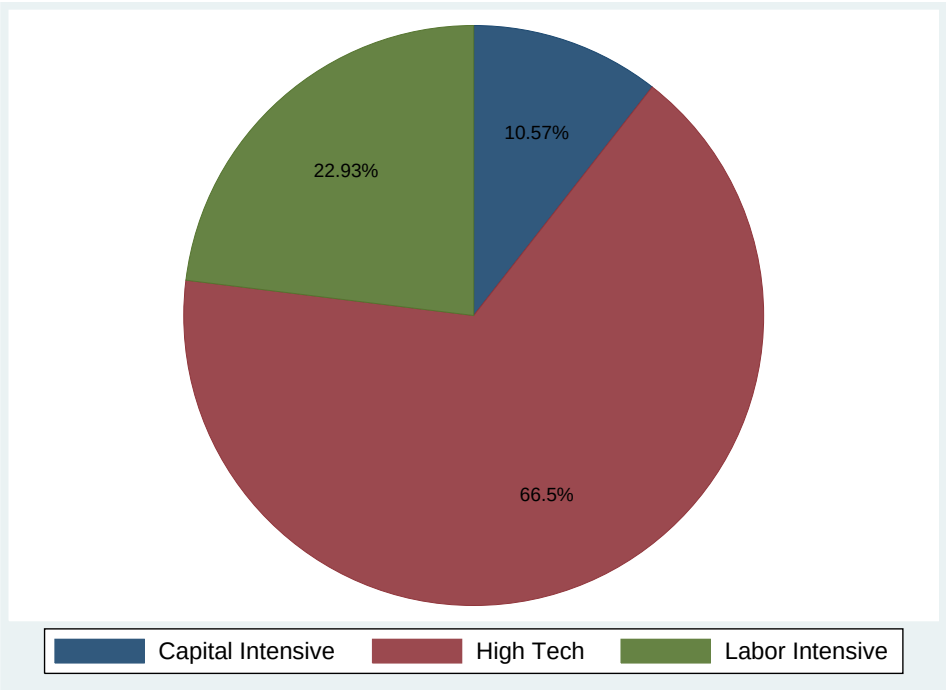
FIE Export Values, Actual v. Counerfactual, 1998-2010



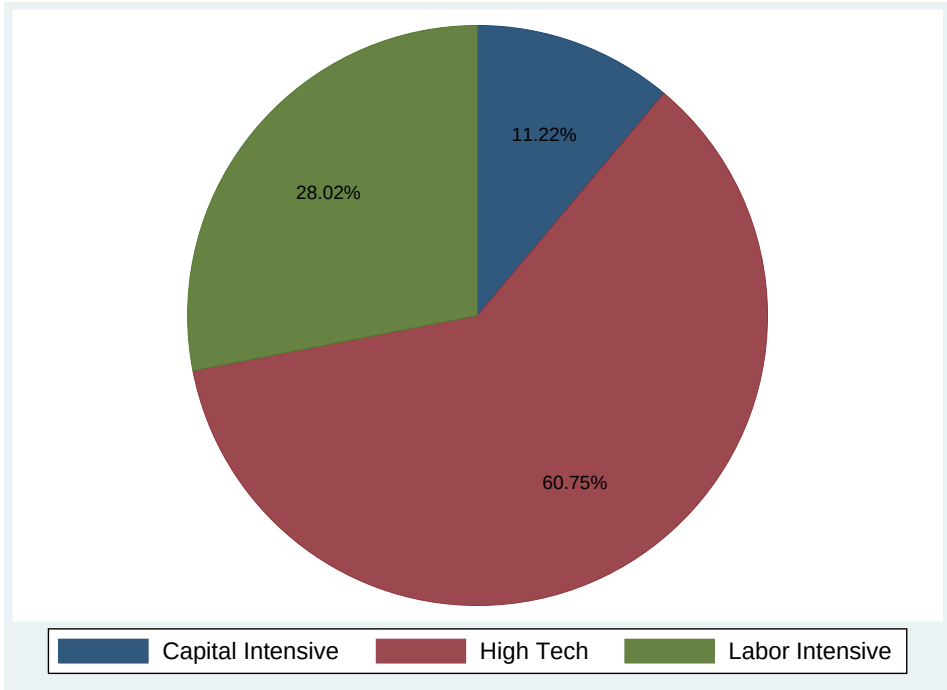
Source: Source of export data is the ASIP.

Export composition in 2010, actual and counterfactual

Share of FIE Export Values by Group, Actual v. Counterfactual, 2010



(a) Actual



(b) Counterfactual

Source: Source of export data is the ASIP. Grouping and calculations by authors.

Conclusion

- Encouraged investment
  - Raises the number of foreign enterprises by 14%
  - Raises the number of foreign exporters by 15%
  - Raises the value of exports from foreign-invested enterprises by 36%
  - FDI promotion policies have no effect on domestic enterprises.
- Removing Restrictions
  - Removing restrictions limiting wholly owned foreign firms raises the number of such firms by 15%.
  - Raises the value of exports from WFOEs.
  - Has no significant effect on activity of joint ventures.
  - Reduces the value of exports from domestic enterprises.

Conclusion

- Encouraging investment increases the number of new products sent to new destinations.
- This outcome is consistent with technology upgrading of FIE firms in the aggregate.
- This extensive-margin effect is powerful for the US.

Thank you!