China's Pure Exporter Subsidies

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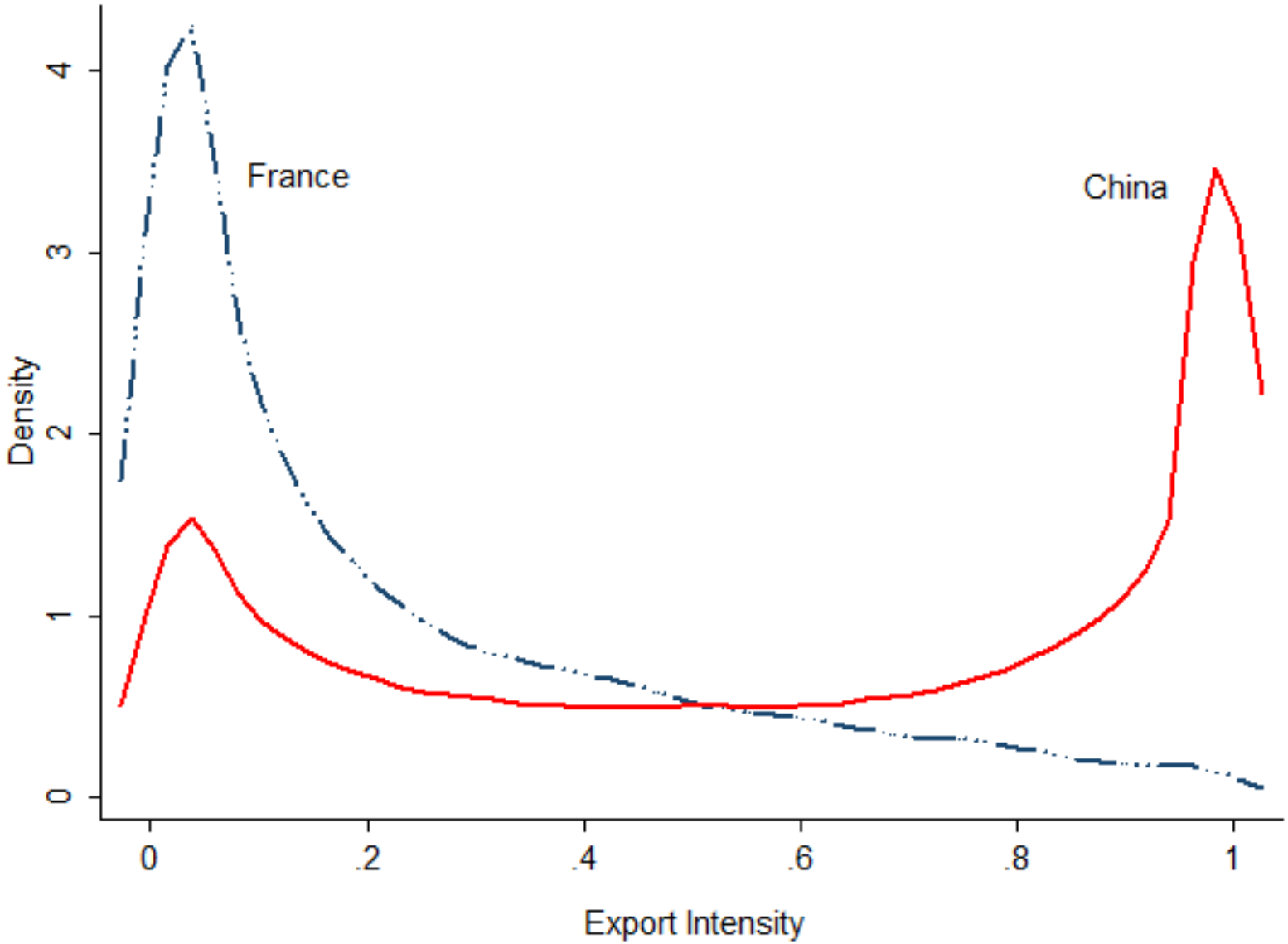
Export intensity distribution of Chinese and French mfg. exporters



Motivation

> *"In certain zones, companies are apparently only allowed to locate when they* **enter obligations to export a certain minimum percentage amount of their production***. [C]an China please explain how such practices are compatible with the obligations resulting from the accession protocol [?]"*

Questions by the European Communities with regard to China's Transitional Review Mechanism at the Committee on Subsidies and Countervailing Measures. World Trade Organization, September 21, 2004.

Some examples:

- Shanghai Foreign Investment Center: Firms exporting the majority of their production enjoy:
  - priority in the supply of water, electricity, transport and telecommunications charged at the same price as SOEs,
  - priority for short term funds or other necessary loans,
  - preferential charge for land use,
  - firms exporting more than 70% of their output are exempt from local income tax and a reduction of their corporate tax rate from 30% to 10%.
- In the Shenzhen city SEZ, firms that export all their production qualify for a cash subsidy of 5% their sales. The land use fee charge for "enterprises-for-export" is reduced by half.
- "Famous Export Brand," "China World Top Brand," and "China Name Brand Products" initiatives.

Corporate income tax rates, 1991-2008

	National tax rate	Special Economic Zones	Coastal Development Zones	Yangtze and Pearl Economic Zones	Industrial Parks*
Export/sales ratio					
			Foreign-Invested Enterprises		
Below 70%	30%	15%	24%	24%	15%
Over 70%	15%	10%	10%	10%	10%
			Production Enterprises		
Below 70%	30%	15%	15%	15%	15%
Over 70%	30%	10%	10%	10%	10%

* Industrial Parks includes "Economic and Technological Development Zones", "High-Technology Industrial Development Zones" and "Export Processing Zones."

Motivation

- An important feature of China's trade policy regime is its dualistic nature $\Rightarrow$ a highly protected domestic economy coexisting with a system of export-oriented enclaves.
- Feenstra (1998) described it as "one country, two systems."
- Policies favoring **Pure Exporters**, i.e. firms exporting all or most of their production, have been pervasive in China since the early 1980s.
- They can be found in local, city, prefecture, provincial and national-level regulations.
- Most of these policies are targeted towards 3 types of firms:
  - Foreign-Invested Enterprises (FIEs)
  - Processing Trade Enterprises (PTEs)
  - Firms located in Free Trade Zones (FTZs)

What we do:

- We study the welfare implications of pure-exporter subsidies in a two-country, heterogeneous-firm model of international trade.
- We provide empirical evidence in support of the model's implications using a dataset combining firm-level and customs transactions for Chinese manufacturing firms for the period 2000-2006.
- We conduct two counterfactual policy experiments:
  1. What would happen to welfare in China and the rest of the World if the Chinese government were to stop using pure-exporter subsidies?
  2. What would be the welfare effect of trade liberalization in China in the presence of pure exporter subsidies?

Summary of our results:

1. We find that pure-exporters exhibit an intermediate level of productivity, greater than that of domestic firms but lower than that of regular exporters.
2. We also find that pure exporters paid on average lower taxes than domestic firms and regular exporters.
3. We show that an increase in the pure-exporter subsidy is worse for China's welfare than a revenue-neutral increase in the the standard export subsidy.
4. We find that unlike a standard export subsidy, the pure-exporter subsidy increases aggregate exports while at the same time providing protection for low productivity firms.
5. Scrapping all pure-exporter subsidies would result in an increase in China's welfare of 3.2%, with a reduction in welfare for the rest of the World of 1.14%.
6. A bilateral trade liberalization consistent with the observed increase in the share of pure exporters in China would result in a welfare loss for China of 0.75% and a welfare gain for the rest of the World of 1.45%.

Related literature

- Papers that quantify the welfare/productivity effect of China's reforms related to its accession to the WTO (both for China and its trading partners):
  - Bajona & Chu (2010)
  - Khandelwal et al. (forthcoming)

- Recent literature investigating the quantitative implications of the rise of China in multi country/sector environments:
  - Lu (2010)
  - Hsieh & Ossa (2011)
  - di Giovanni et al. (2012)

- Trade policy in a heterogeneous-firm setting:
  - Chor (2009)
  - Demidova & Rodríguez-Clare (2009)
  - Felbermayr et al. (forthcoming)

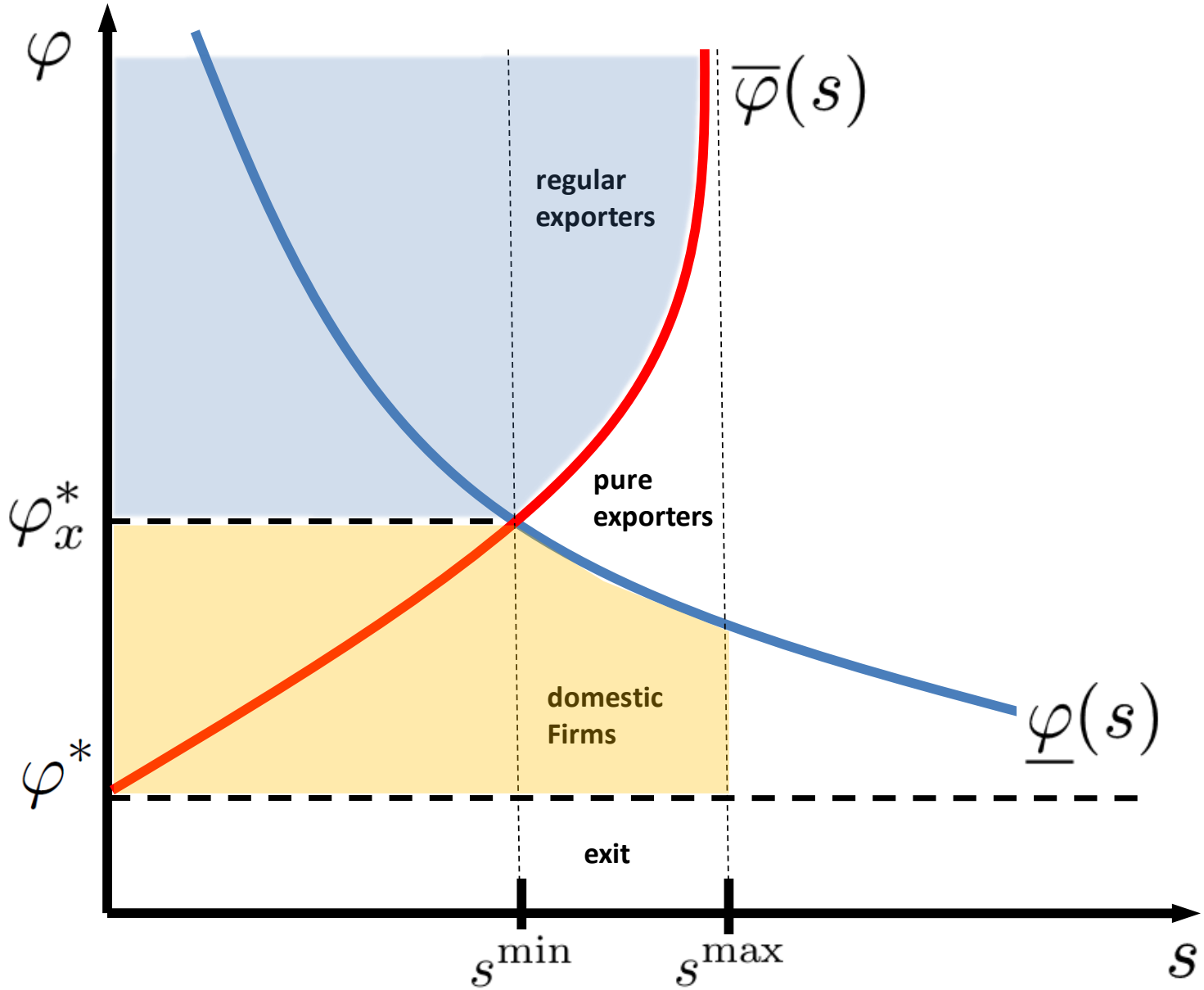
A partial equilibrium model of pure exporters

- Firms in China face the following isoelastic demand function:

$$q_i = A_i p_i^{-\sigma}, \quad i \in \{c, f\}.$$

- Production: $q = \varphi l$.
- Chinese firms can choose among 3 modes of operation $k \in \{d, x, p\}$:
  - domestic: produce for the domestic market alone by paying a fixed cost f_d,
  - regular exporter: produce for the domestic and foreign market by paying a fixed cost $f_d + f_x$,
  - pure exporter: produce only for the foreign market by paying a fixed cost f_x, receiving an ad-valorem revenue subsidy $(1 + s)$.
- We seek to encompass in a parsimonious way the wide range of policies that are contingent on firms selling the majority of their output abroad.

Production decision



Data

- We use the Annual Survey of Chinese Manufacturing Firms from the National Bureau of Statistics (NBS) in China for the period 2000-2006.
- The dataset includes SOEs and privately-owned enterprises with sales above 5 million Chinese Yuan.
- The survey covers approx. 95% of China's industrial output and 98% of its manufacturing exports.
- The final sample consists of 1,100,600 firm-year obs. with 386,185 different firms.
- **A pure exporter is a firm exporting more than 90% of its production in a given year.**

Data, cont'd

- As mentioned before, policies favoring pure-exporters target mainly:
  - Foreign-invested enterprises (FIEs).
  - Processing-trade enterprises (PTEs).
  - Firms located in Free-Trade zones (FTZs).
- The NBS data allows us to identify FIEs but not PTEs.
- **A FIE is a firm with positive level of foreign capital, but that does not satisfy the requirement to be considered a PTE.**
- We merge the NBS data with transaction-level customs data from the Chinese General Administration of Customs, following Wang and Yu (2011).
- **A PTE is a firm that sells $\geq 90\%$ of its exports through the processing trade regime.**
- The NBS data does not explicitly record whether a firm is located in a FTZ or not.
- **FTZs are identified as prefecture-level cities promoted as Special Economic Zones, Coastal Development Zones and cities belonging to the Yangtze and Pearl River Delta Economic zones.**

Summary statistics

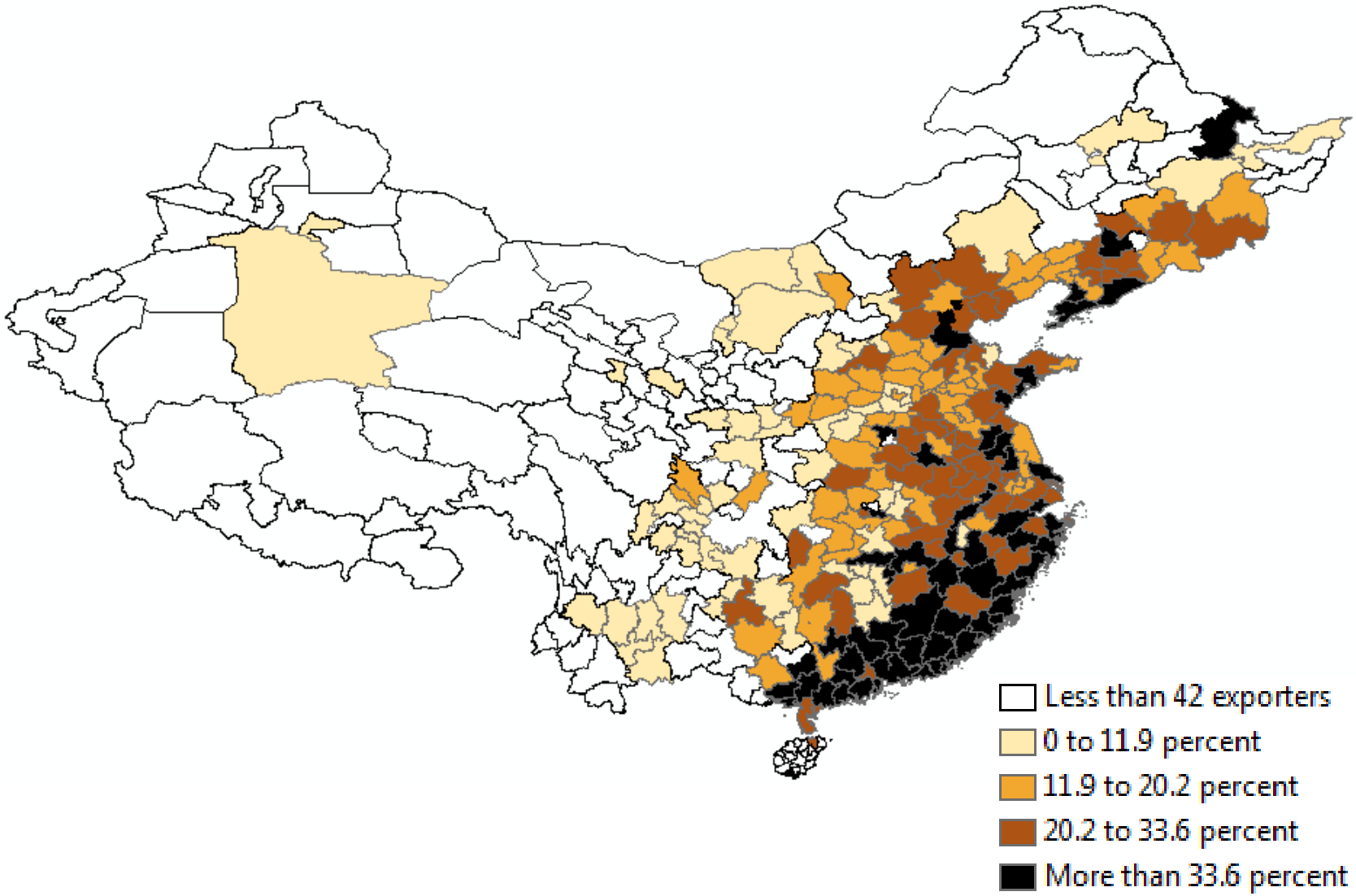
- NBS manufacturing survey:

	Manufacturing Survey, 2000-2006		
	# obs.	% obs.	% exporters
Pure exporters	105,543	9.59	**34.37**
Regular exporters	201,563	18.31	65.63
Domestic firms	793,494	72.10	
Total	1,100,600	100	100

- NBS manufacturing survey matched with transaction-level customs data:

	Matched Data, 2000-2006		
	# firms	% firms	% exporters
Pure exporters	51,113	5.40	**33.58**
Regular exporters	101,104	10.69	66.42
Domestic firms	793,494	83.90	
Total	945,711	100	100

Geographic distribution of pure exporters



Summary statistics, cont'd

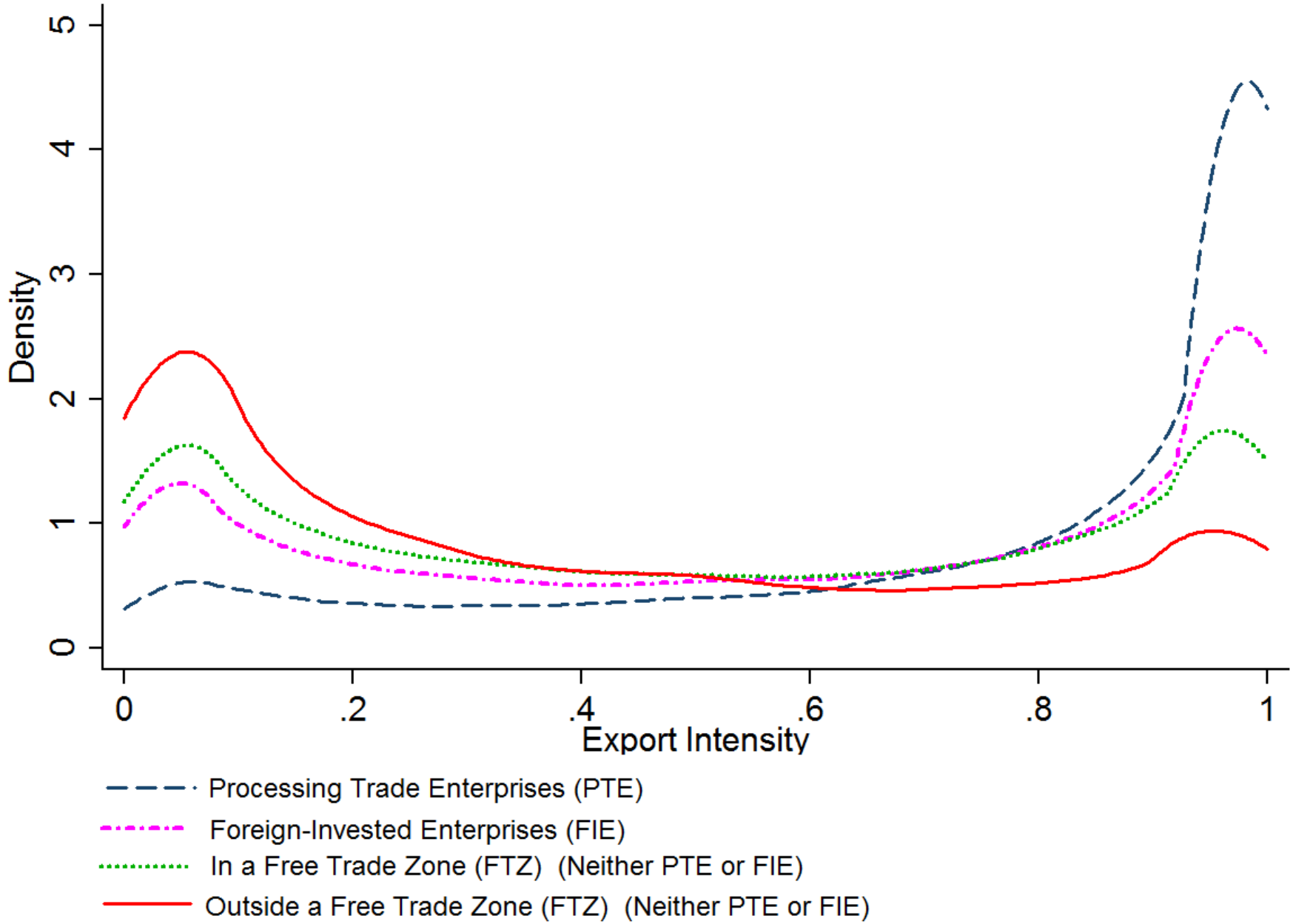
Panel A: Share of exporters

	PTE	FIE	Neither FIE nor PTE	Total
In a FTZ	22.63	35.79	24.08	82.51
Outside a FTZ	1.42	5.66	10.41	17.49
Total	24.06	41.45	34.49	100.00

Panel B: Share of pure exporters among exporters

	PTE	FIE	Neither FIE nor PTE	All Exporters
In a FTZ	52.63	34.67	22.49	36.04
Outside a FTZ	35.56	27.85	16.85	21.93
All locations	51.62	33.74	20.79	33.58

Export intensity distribution by firm type and location



Share of pure exporters, 2000 vs. 2006

- There has been substantial growth in the number of pure exporters between 2000 and 2006:

Year	Mfg. Survey	Matched Data			
	All Exporters	FIEs	PTEs	Neither FIEs nor PTEs in a FTZ	outside a FTZ
2000	30.36	32.23	52.28	19.25	12.40
2006	40.59	38.57	57.55	26.13	20.97

- This is an interesting pattern. One would have expected that the share of pure exporters would have declined after joining the WTO.
- However, our simple model predicts that a reduction in trade costs ($\downarrow \tau$) keeping the pure exporter subsidy rate constant, leads to an increase in the share of pure exporters.

Pure-exporter premia: size and productivity

	Comparison group: **All domestic firms**		
	(1)	(2)	(3)
	log sales	TFP LP	TFP OLS
Pure exporters	0.467^a	0.307^a	0.011^b
	(0.007)	(0.006)	(0.005)
	Comparison group: **Regular exporters**		
Pure exporters	-0.420^a	-0.299^a	-0.145^a
	(0.008)	(0.006)	(0.005)
Year fixed effects	✓	✓	✓
Sector fixed effects	✓	✓	✓
Prefecture-city fixed effects	✓	✓	✓
# observations	1,100,600	1,100,600	1,100,600
# firms	386,185	386,185	386,185
R^2	0.165	0.223	0.280

Standard errors clustered at the firm-level.

Pure-exporter premia: taxes

	Comparison group: **All domestic firms**		
	(1)	(2)	(3)
	Income tax	VAT	Sales Tax
	as share of value-added		
Pure exporters	-0.687^a	-3.325^a	-1.082^a
	(0.019)	(0.042)	(0.023)
	Comparison group: **Regular exporters**		
Pure exporters	-0.471^a	-1.881^a	-0.171^a
	(0.020)	(0.043)	(0.023)
Year fixed effects	✓	✓	✓
Sector fixed effects	✓	✓	✓
Prefecture-city fixed effects	✓	✓	✓
# observations	1,100,600	1,100,600	1,100,600
# firms	386,185	386,185	386,185
R^2	0.060	0.103	0.120

Standard errors clustered at the firm-level.

Pure-exporter premia: by pure exporter type

	Comparison group: **All domestic firms**		
	log sales	TFP LP	TFP OLS
FIE	0.569^a	0.395^a	0.096^a
	(0.012)	(0.010)	(0.009)
PTE	0.972^a	0.602^a	-0.017
	(0.019)	(0.015)	(0.012)
Neither FIE	0.696^a	0.445^a	0.074^a
nor PTE	(0.016)	(0.013)	(0.011)
	Comparison group: **Each regular exporter type**		
FIE	-0.624^a	-0.448^a	-0.206^a
	(0.014)	(0.012)	(0.010)
PTE	-0.337^a	-0.286^a	-0.281^a
	(0.025)	(0.020)	(0.015)
Neither FIE	-0.197^a	-0.155^a	-0.044^a
nor PTE	(0.017)	(0.014)	(0.011)
Year fixed effects	✓	✓	✓
Sector fixed effects	✓	✓	✓
Prefecture-city fixed effects	✓	✓	✓
# observations	945,711	945,711	945,711
# firms	348,860	348,860	348,860
R^2	0.178	0.228	0.285

Standard errors clustered at the firm-level.

Pure-exporter premia: by pure exporter type, cont'd

	Income tax	VAT	Sales tax
	Comparison group: **All domestic firms**		
	as share of value-added		
FIE	-1.110^a	-5.914^a	-2.095^a
	(0.036)	(0.008)	(0.033)
PTE	-1.092^a	-8.621^a	-2.023^a
	(0.034)	(0.072)	(0.032)
Neither FIE	-0.194^a	-3.239^a	-0.859^a
nor PTE	(0.052)	(0.102)	(0.050)
	Comparison group: **Each regular exporter type**		
FIE	-0.460^a	-3.497^a	-0.049
	(0.041)	(0.088)	(0.039)
PTE	-0.330^a	-4.299^a	-0.236^a
	(0.047)	(0.103)	(0.043)
Neither FIE	-0.413^a	-0.501^a	-0.183^a
nor PTE	(0.056)	(0.107)	(0.054)
Year fixed effects	✓	✓	✓
Sector fixed effects	✓	✓	✓
Prefecture-city fixed effects	✓	✓	✓
# observations	945,711	945,711	945,711
# firms	348,860	348,860	348,860
R^2	0.061	0.122	0.118

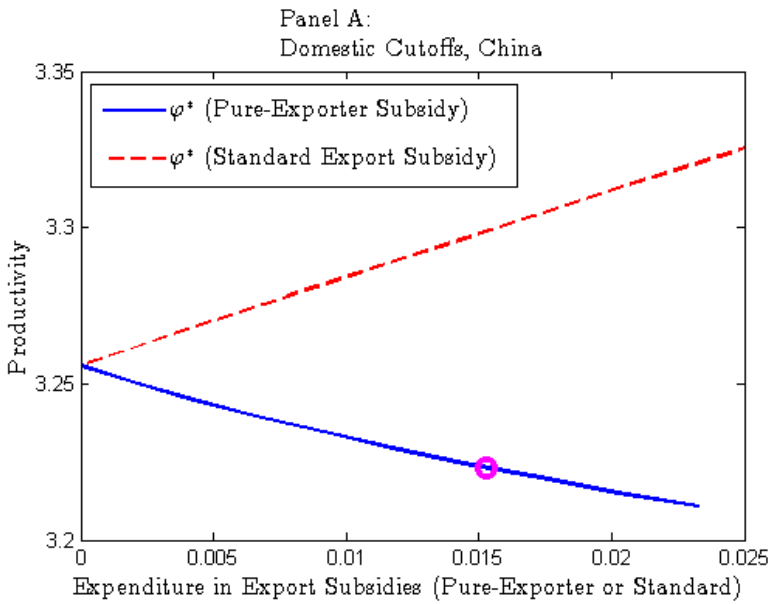
Standard errors clustered at the firm-level.

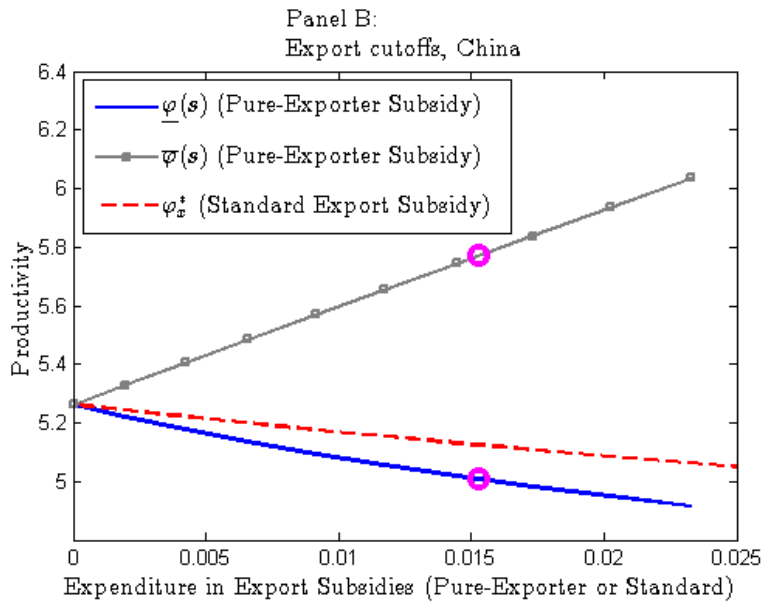
Calibration

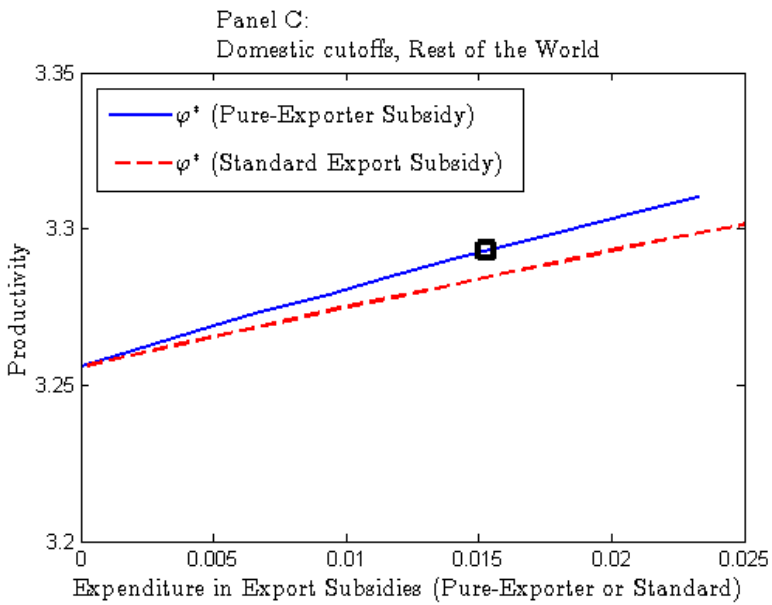
Parameter	Description	Value
L_i	Country i's size, $i \in \{c, f\}$	1.00
σ	Elasticity of substitution	3.00
δ	Probability of exit shock	0.025
f_e	Entry cost	2.00
a	Pareto distribution shape parameter	2.76
f_d	**Fixed cost of operation in the domestic market**	**0.352**
f_x	**Fixed cost of exporting**	**0.635**
τ	**Iceberg transportation cost**	**1.204**
s	**Pure-exporter subsidy**	**0.274**

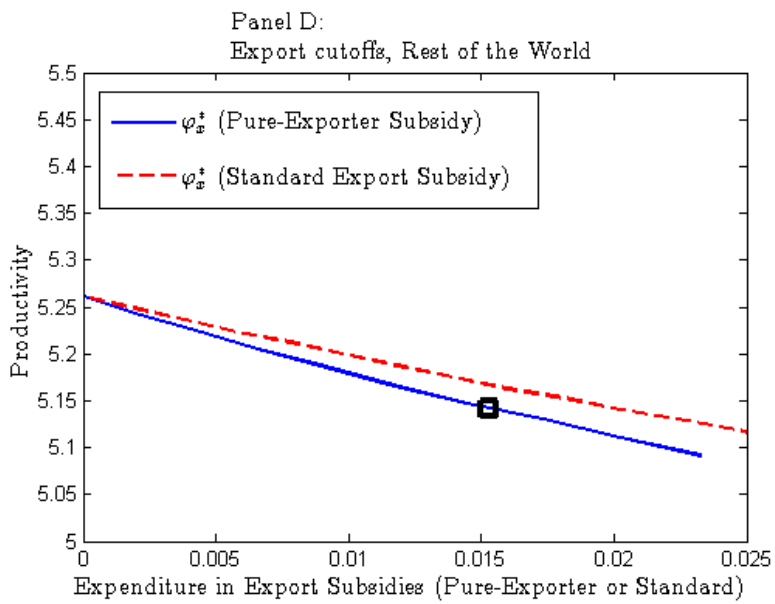
Statistic	Data	Model
Share of regular exporting firms in China	0.179	0.200
Share of pure exporters in China	0.096	0.096
Export intensity of regular exporters in China	0.392	0.392
Productivity premia pure exporters relative to domestic firms	0.359	0.372

Comparative statics: productivity cutoffs









Productivity cutoffs: standard export subsidy

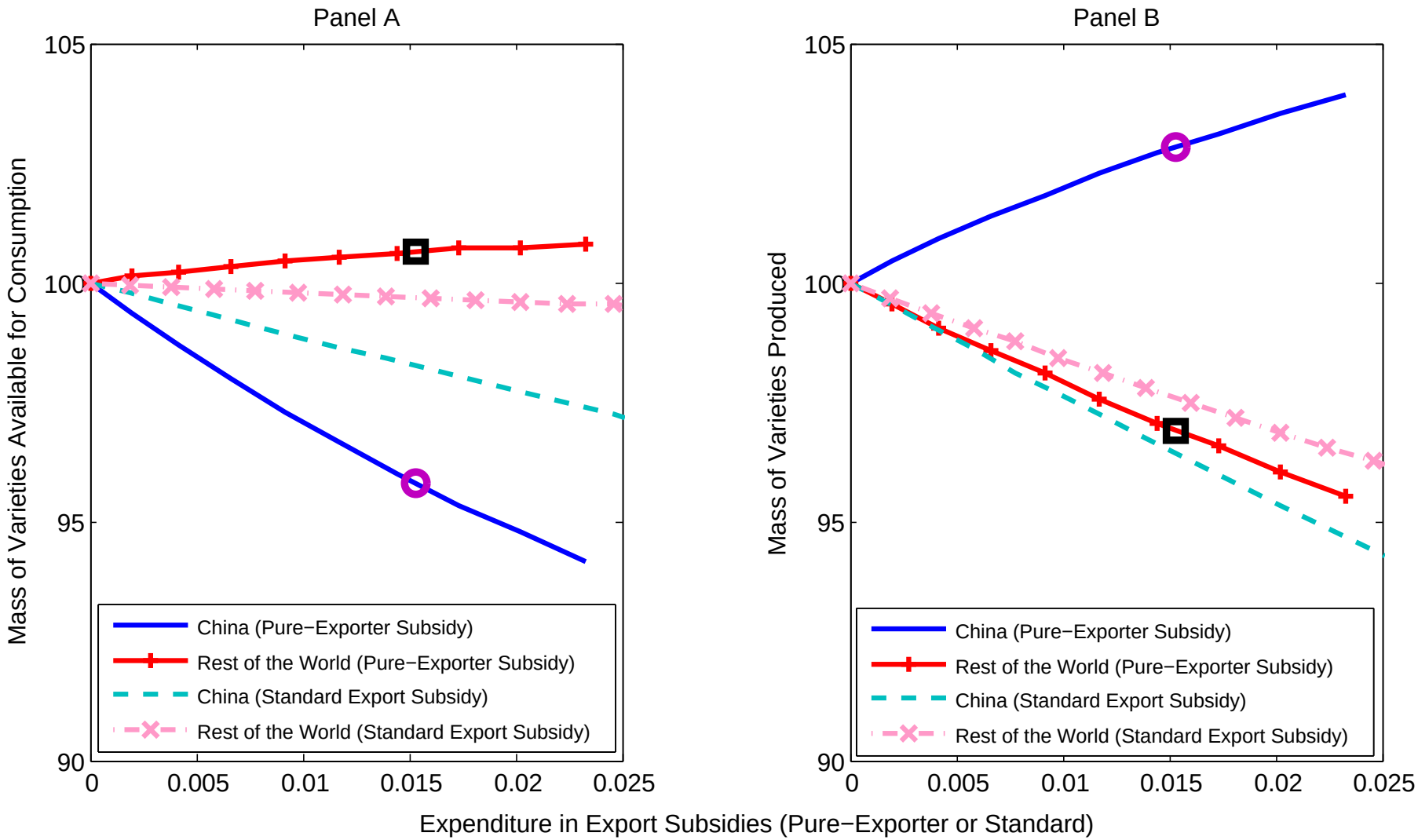
- **Standard export subsidy:**
  - China: $\uparrow s_x \Rightarrow \uparrow$ profitability of becoming an exporter $\Rightarrow \downarrow \varphi_x^*$.
  - Expansion of exporters in China $\Rightarrow$ tougher competition in the domestic market $\Rightarrow$ exit of least productive firms and reallocation of labor towards exporters $\Rightarrow \uparrow \varphi^*$.
  - ROW: tougher import competition $\Rightarrow \downarrow$ profitability of operating in the domestic market: $\uparrow \varphi_x^*$.
  - $\uparrow$ aggregate productivity in ROW + balanced trade condition $\Rightarrow \downarrow \varphi_x^*$.

- **Pure exporter subsidy:**
  - China: $\uparrow s$ only benefits pure exporters. As more firms (both domestic producers and regular exporters) switch to become pure exporters, the varieties that these firms produce stop being available to Chinese consumers $\Rightarrow \uparrow P_c$.

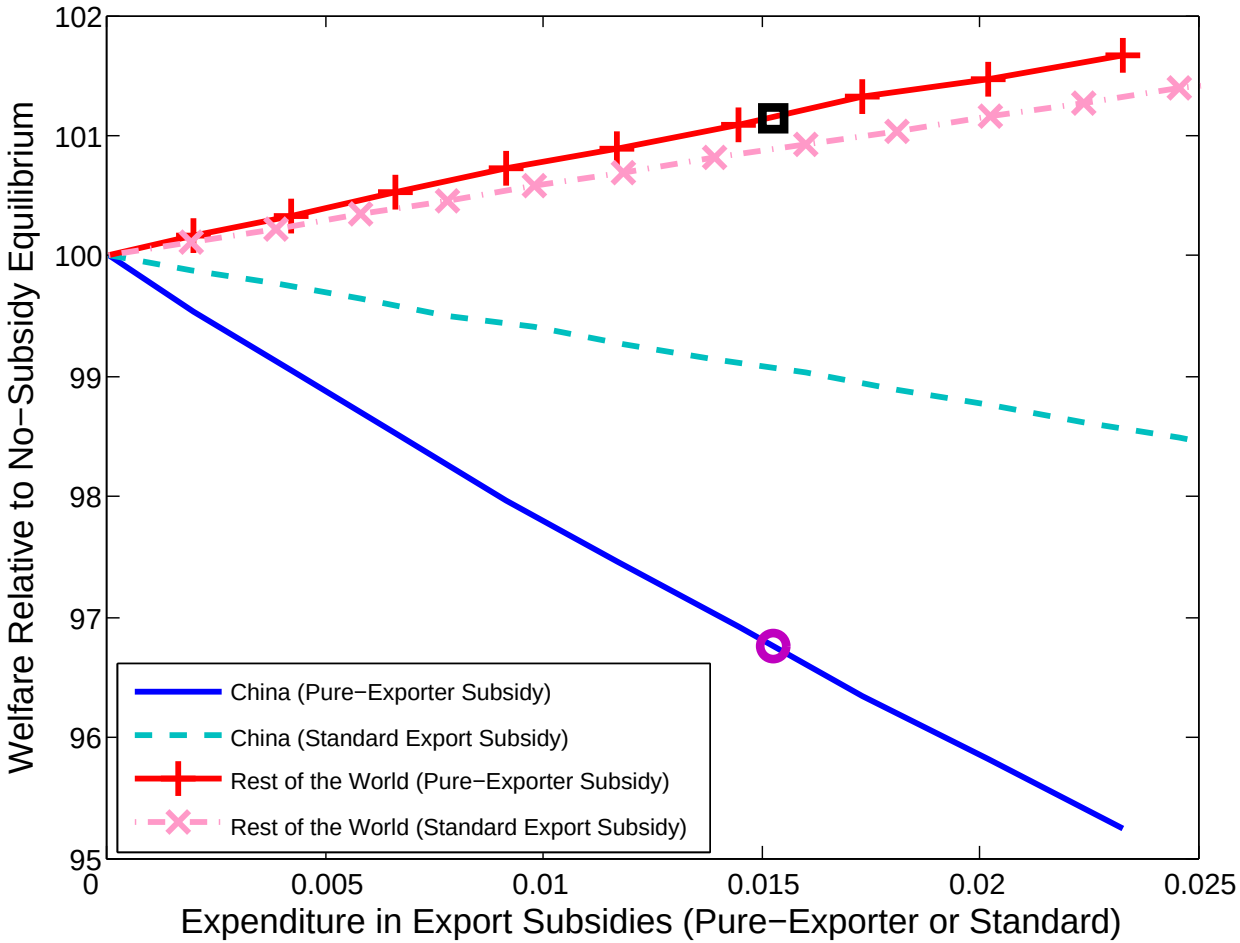
$$P_c = \left[\int p_c(\varphi)^{1-\sigma} (M_c - M_c^p) d\mu_c(\varphi) + \int p_f^*(\varphi)^{1-\sigma} M_f^x d\mu_f(\varphi) \right]^{\frac{1}{1-\sigma}}$$

  - Contrary to the standard export subsidy $\uparrow P_c$ relaxes competition in the domestic market $\Rightarrow \uparrow$ profitability of operating in the domestic market $\Rightarrow \downarrow \varphi^*$. Greater protection for low-productivity, domestic firms.

Comparative statics: mass of varieties consumed and produced



Comparative statics: welfare



Welfare falls in China because of:

- worsening terms-of-trade,
- lower consumption variety, and
- lower aggregate productivity due to the sheltering of domestic firms.

Counterfactual experiments

- % in Welfare (change in real income) following each policy change:

Experiment	China	ROW
Eliminating pure exporter subsidy	+3.2	-1.14
Bilateral trade liberalization ($\downarrow \tau$ 17%)	-0.75	+1.44

- The welfare gain that China would experience if it eliminates the pure exporter subsidy is equivalent to **halving bilateral trade costs** (i.e. reducing τ from 1.2 to 1.1) in a situation without pure exporter subsidies!
- A 17% reduction in τ increases the share of pure exporters (among all exporting firms) from 30 to 40% in equilibrium, a similar change to what we observe between 2000 and 2006. This is a much smaller change than the reduction in average tariffs from 16 to 8% observed between 2000 and 2006.

Conclusions

- We have provided theoretical and empirical evidence that points to policies favoring pure-exporters as an explanation for China's unusually high frequency of firms exporting all or almost all their output.
- China stands to achieve significant welfare gains if it stops using pure exporter subsidies.
- In our current setup, we have abstracted from market failures such as labor market frictions or the existence of productivity/knowledge spillovers associated to foreign-owned firms setting up pure-exporter facilities.
- In future work we are interested in exploring whether policies favoring pure-exporters would arise as second-best policies in the presence of these distortions.