Advanced Topics in Trade

Lecture 6 - The Impact of Import Competition from Low Wage Countries on Advanced Economies

Heiwai Tang - SAIS

March 2, 2016

Introduction

- The surge in exports from low-wage countries, particularly China, has led to substantial economic restructuring across the world.
- Negative effects on labor market outcomes in a wide range of countries (e.g., Autor, Dorn, and Hanson, 2013; Acemoglu et al., 2014; and Pierce and Schott, 2014 for the U.S., as well as Hummels et al., 2014 for Denmark)
- Positive effects: reallocation of resources from the less productive to the more productive firms, and within-firm technology and quality upgrading (e.g., Bloom, Draca, and van Reenen, 2012; Amiti and Khandelwal, 2013; Iacovone, Rauch, and Winters, 2013; Martin and Mejean, 2014).
- How did some countries handle the headwind of import competition from low-wage countries better than others?
- Within a country, how some firms fare better than others?

Today's Agenda

- Two papers on the effects of competition from China.
  - Bloom et al. (2015) on EU countries' firms' innovation
  - Fernandes and Tang (2016) on Portugal's clothing industry

Bloom et al. (2015)

Exploring the effects of Chinese imports on technology upgrading

- Within-firm Tech Upgrading Specification:
- $$\ln TECH_{ijkt} = \alpha IMP^{CH}_{jkt-1} + \beta x_{ijkt} + \varepsilon_{ijkt}$$
$$\Delta \ln TECH_{ijkt} = \alpha \Delta IMP^{CH}_{jkt-1} + \beta \Delta x_{ijkt} + \nu_{ijkt}$$
- Firm i, industry j, year t and country k. x_{ijkt} stands for firm-level controls.
- $TECH_{ijkt}$ includes measures such as nb of patent; IT spending per worker; R&D spending; TFP.
- Reallocation Specification:
- $$\begin{aligned}\Delta \ln N_{ijkt} &= \alpha^N \Delta IMP^{CH}_{jkt} + \beta^N \Delta x_{ijkt} + \gamma^N \left(TECH_{ijkt-5} \times \Delta IMP^{CH}_{jkt} \right) \\ &\quad + \delta^N TECH_{ijkt-5} + \nu^N_{ijkt}\end{aligned}$$
- $\Delta \ln N_{ijkt}$ is firm i's employment growth.

Chinese Import Shares

FIGURE 1: Share of all imports in the EU and US from China and all low wage countries

Technological Change

TABLE 1: TECHNICAL CHANGE WITHIN INCUMBENT FIRMS AND PLANTS

PANEL A: BASELINE RESULTS

	(1)	(2)	(3)
Dependent variable:	**Δln(PATENTS)**	**Δln(IT/N)**	**ΔTFP**
Estimation method	**5 year diffs**	**5 year diffs**	**5 year diffs**
Change in Chinese Imports ΔIMP_{jk}^{CH}	0.321*** (0.102)	0.361** (0.076)	0.257*** (0.072)
Sample period	2005-1996	2007-2000	2005-1995
Number of Units	8,480	22,957	89,369
Number of country by industry clusters	1,578	2,816	1,210
Observations	30,277	37,500	292,167

Exogenous Multi-fibre Agreement Liberalization

TABLE 3: WITHIN FIRM EFFECTS – INCLUDING FIRM-SPECIFIC TRENDS WITH QUOTAS; TEXTILE AND CLOTHING INDUSTRY

	PATENTING				TOTAL FACTOR PRODUCTIVITY			
Dependent Variable:	**(1) Δln(PATENTS)**	**(2) Δln(PATENTS)**	**(3) Δln(PATENTS)**	**(4) Δln(PATENTS)**	**(5) ΔTFP**	**(6) ΔTFP**	**(7) ΔTFP**	**(8) ΔTFP**
Quotas removal *I(year>2000)	0.129** (0.063)	0.216** (0.105)			0.143*** (0.018)	0.178*** (0.037)		
Quotas removal * # years after 2000			0.047** (0.020)	0.075** (0.033)			0.043*** (0.005)	0.033* (0.017)
Firm-specific trends?	No	Yes	No	Yes	No	Yes	No	Yes
Sample period	2005-1992	2005-1992	2005-1992	2005-1995	2005-1995	2005-1995	2005-1995	2005-1995
Number of firms	2,435	2,435	2,435	2,435	16,495	16,495	16,495	16,495
Number industry clusters	159	159	159	159	187	187	187	187
Observations	14,768	14,768	14,768	14,768	55,791	55,791	55,791	55,791

Differential Effects Across Sectors

TABLE 4: BETWEEN FIRM EFFECTS - EMPLOYMENT AND SURVIVAL

PANEL A: EMPLOYMENT

Dep. Variable: EMPLOYMENT GROWTH, $\Delta \ln N$	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Technology variable (TECH)	**PATENTS**	**PATENTS**	**IT**	**IT**	**TFP**	**TFP**
Change in Chinese Imports	-0.361***	-0.434***	-0.203**	-0.379***	-0.377***	-0.377***
ΔIMP_{jk}^{CH}	(0.134)	(0.136)	(0.086)	(0.105)	(0.094)	(0.096)
Change in Chinese imports*technology at t-5		1.434**		0.385**		0.795**
ΔIMP_{jk}^{CH} *$TECH_{t-5}$		(0.649)		(0.157)		(0.307)
Technology at t-5	0.389***	0.348***	0.241***	0.230***	0.152***	0.136***
$TECH_{t-5}$	(0.043)	(0.049)	(0.010)	(0.010)	(0.012)	(0.012)
Number of Units	6,335	6,335	22,957	22,957	89,369	89,369
Number of country by industry clusters	1,375	1,375	2,816	2,816	1,210	1,210
Observations	19,844	19,844	37,500	37,500	292,167	292,167

PANEL B: SURVIVAL

Dependent Variable: SURVIVAL	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Technology variable (TECH)	**PATENTS**	**PATENTS**	**IT**	**IT**	**TFP**	**TFP**
Change in Chinese Imports	-0.065	-0.089	-0.118**	-0.182**	-0.207***	-0.208***
ΔIMP_{jk}^{CH}	(0.047)	(0.050)	(0.047)	(0.072)	(0.051)	(0.050)
Change in Chinese imports*technology at t-5		0.261**		0.137		0.110*
ΔIMP_{jk}^{CH} *$TECH_{t-5}$		(0.114)		(0.112)		(0.059)
Technology at t-5	-0.006	-0.014	0.001	-0.002	-0.007	-0.003
$TECH_{t-5}$	(0.007)	(0.009)	(0.005)	(0.006)	(0.003)	(0.003)
Survival Rate for Sample (mean)	0.977	0.977	0.886	0.886	0.927	0.927
Number of country by industry clusters	1,647	1,647	2,863	2,863	1,242	1,242
Observations (and number of units)	7,985	7,985	28,624	28,624	60,883	60,883

Fast Fashion: Theory and Evidence from Portuguese Textile and Clothing Firms (Fernandes and Tang, 2016)

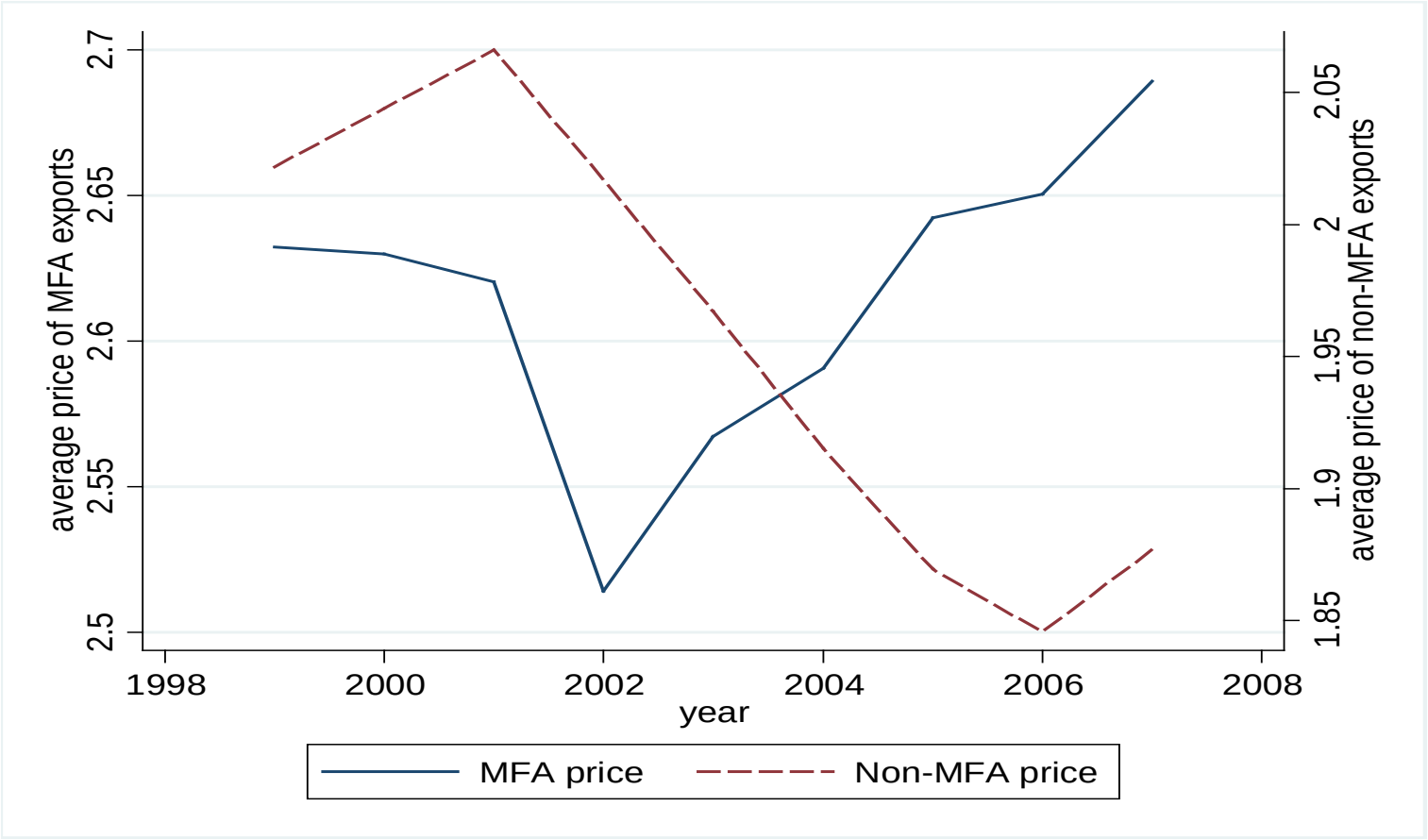
What we do in this paper?

- Describe and analyze the micro mechanisms about how firms respond to import competition by exploiting their competitive advantage in fast trade and quality upgrading of products sold at home and abroad.
  - transaction-level data on prices and quantities of domestic sales, exports, domestic and foreign intermediate inputs purchased of essentially all textile and clothing (T&C) manufacturers in Portugal (12%, 23%, and 12% of gross manufacturing value added, employment, and exports in 2005).
- Exploit a unique episode of the sharp and permanent removal of the Multi-fiber Arrangement (MFA) quotas on Chinese textile and clothing exports to the European Union (EU) and the United States (US) in 2005 to conduct a diff-in-diff analysis.
- Build a model with heterogeneous firms and multiple quality segments.

Anecdotes

- *"The logic of selling cheaper man-hours is gone, it is via innovation, ability to deliver the needed quantities on time, hearing the client and integrating the production chain that one becomes competitive."*
- *"There is quality and craftsmanship there that you don't find in Chinese or Turkish flannel."* Luis Rodrigues, head of sales at Lameirinho.

Weighted average of the unit values, quota- and non-quota-bound products

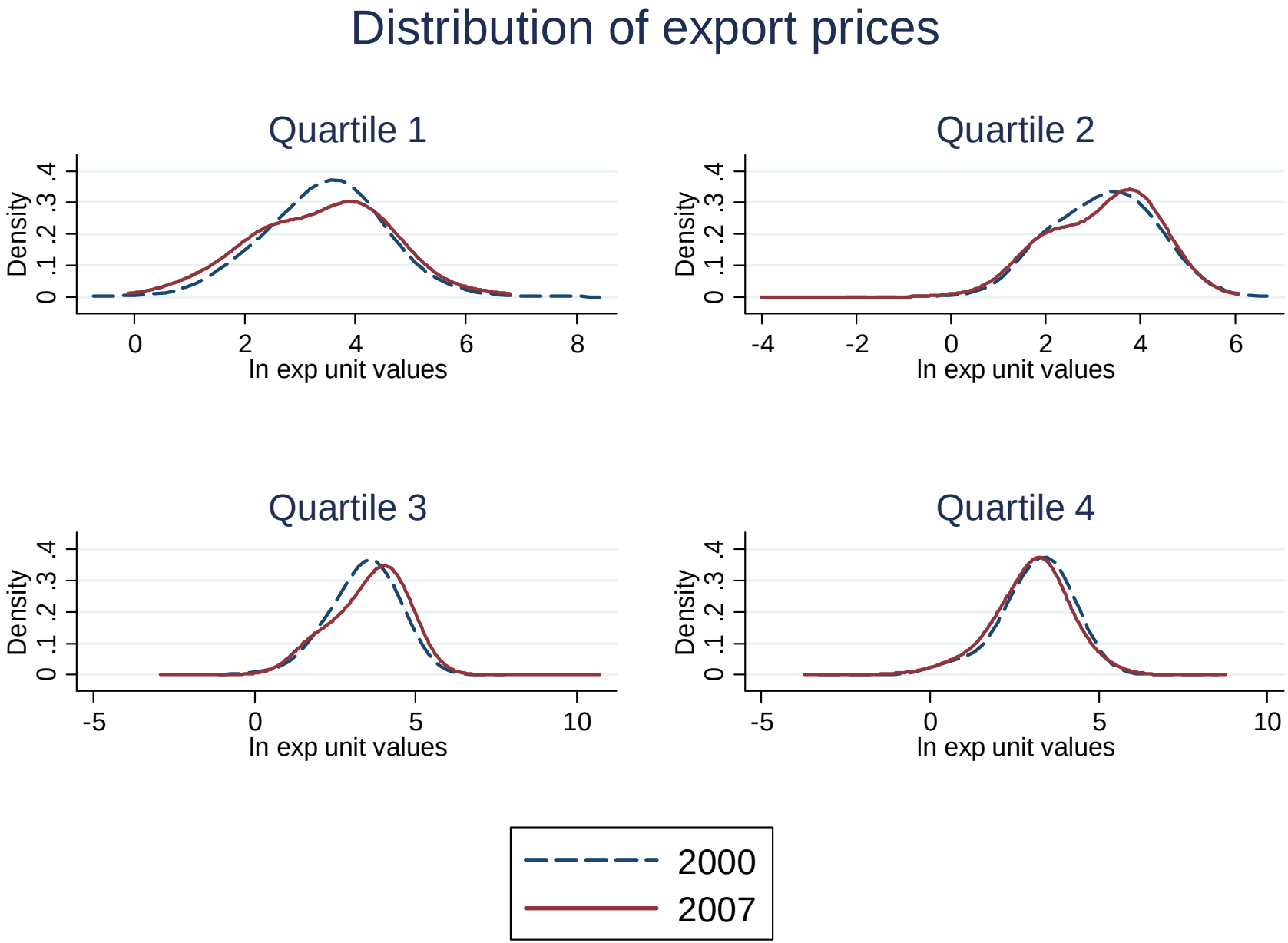


Number of T&C firms & exporters

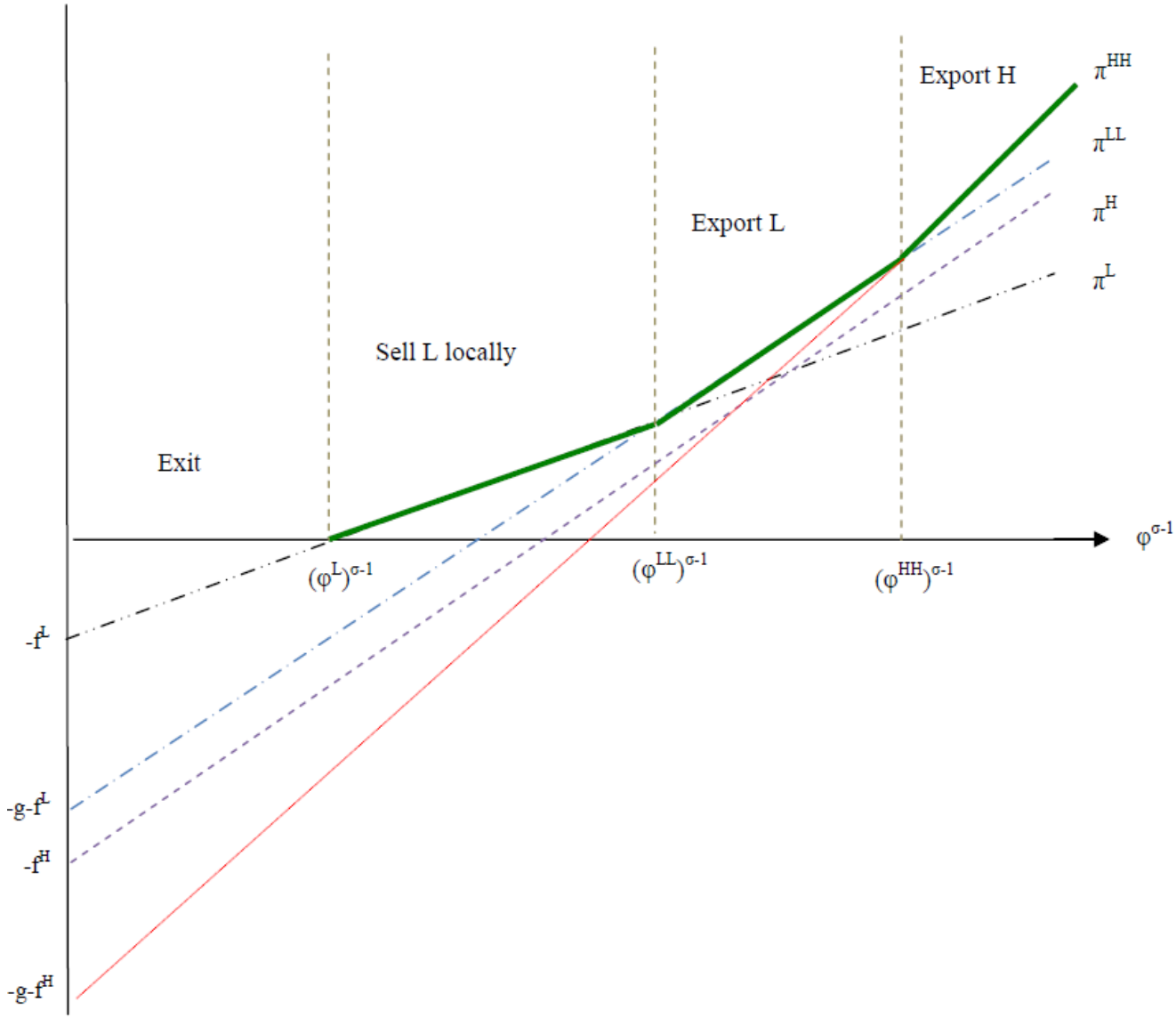
Results

1. The average unit values of exports and total sales increased after 2005 for quota-bound products, relative to quota-free.
   - suggestive evidence of quality upgrading.
2. The import distance decreased and both the frequency of exports and the share of air transport increased.
   - firms more likely to switch to Fast-Fashion post-MFA.
3. **Heterogeneous effects**: upgrading and fast trade more pronounced for medium-sized exporters.
4. Firms become more specialized in output and input varieties.
5. Export competition (in third markets) more important than import competition in driving these patterns.
6. **Mechanism**: upgrading and fast trade accompanied by importing more expensive materials, hiring more skilled workers, substituting foreign for domestic outsourcing, and specializing in exports to closer destinations.

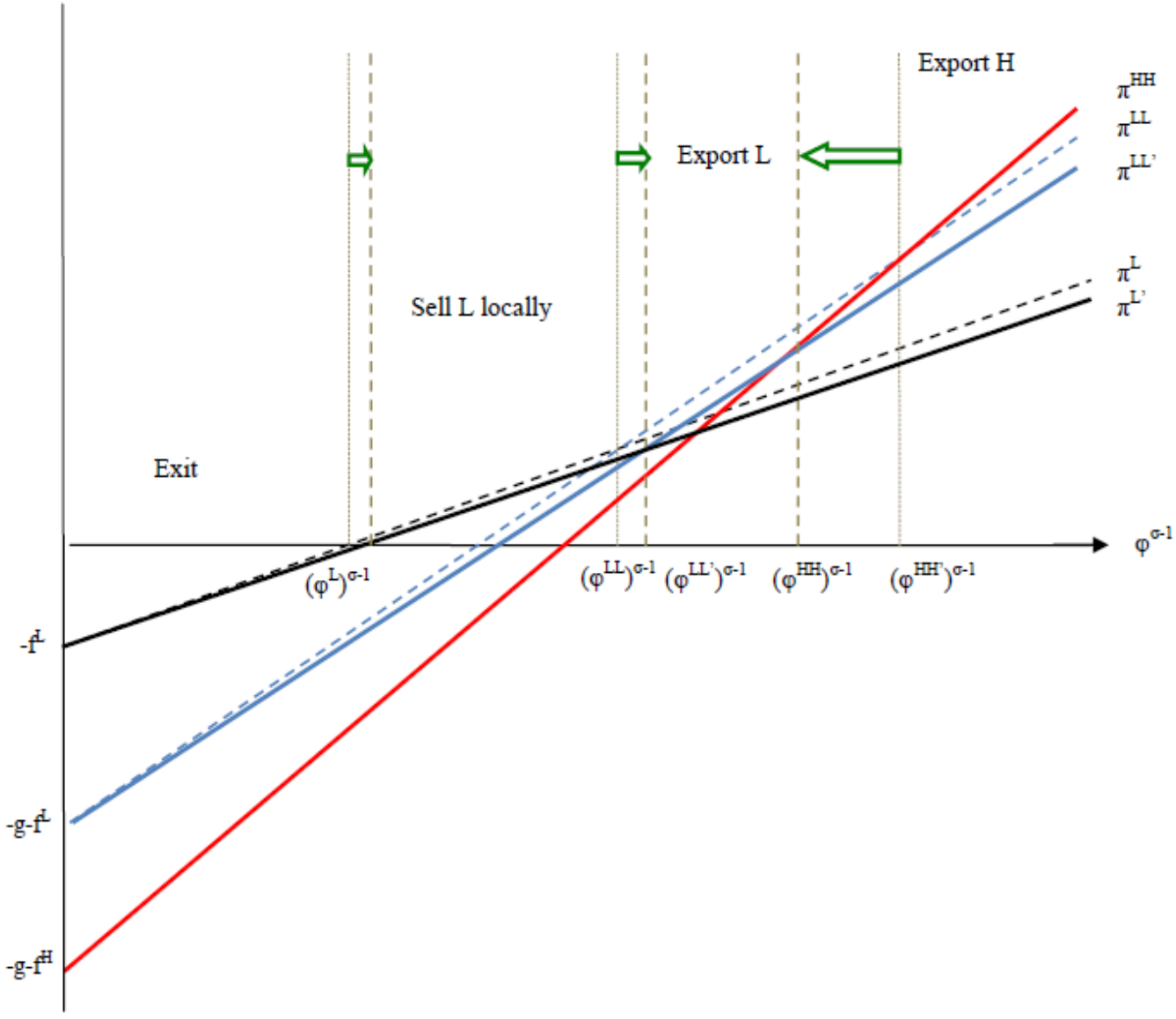
Heterogeneous effects



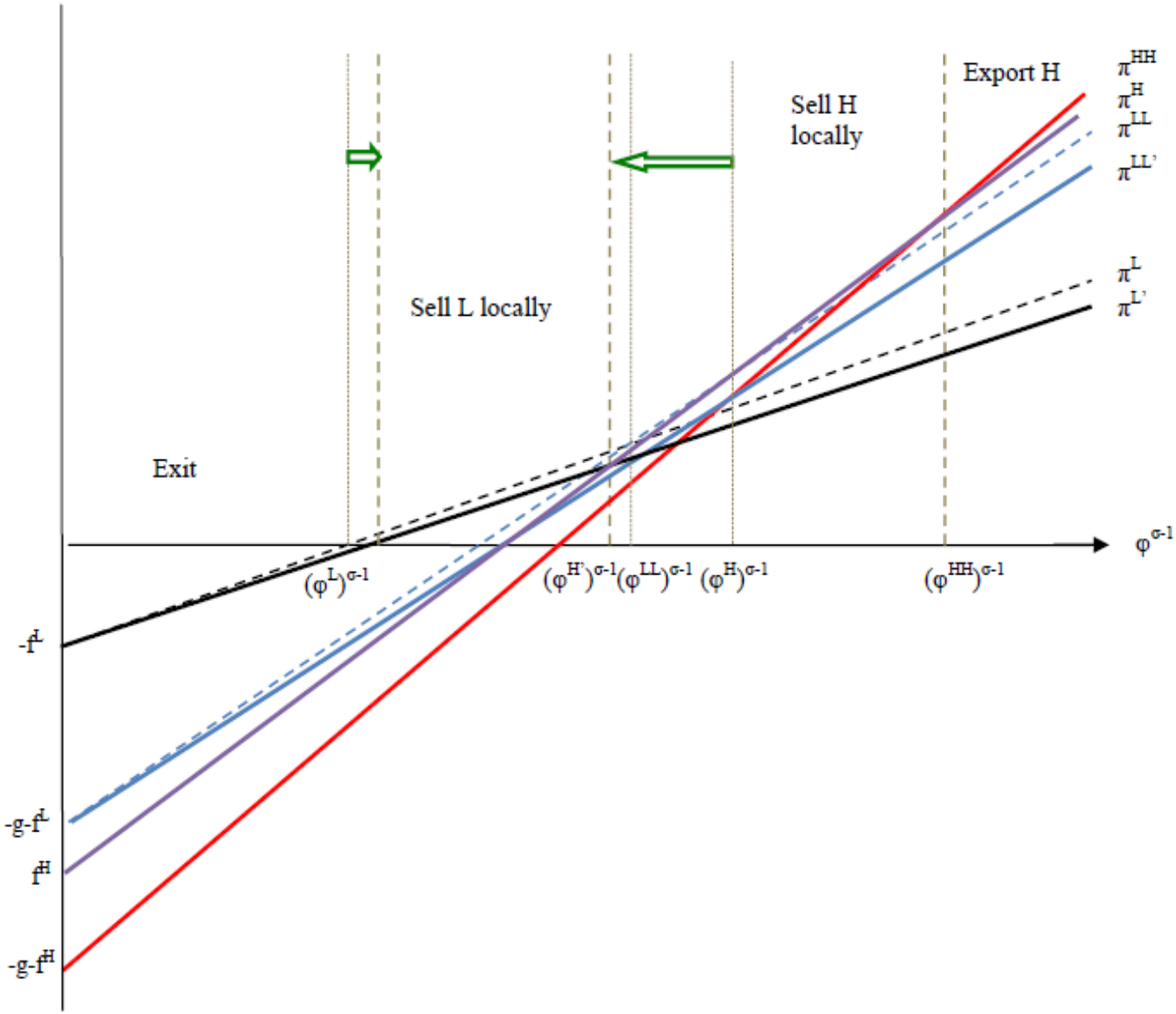
Firms sorting into different markets and segments



After the low-income trade shocks (baseline)



After the low-income trade shocks (if fixed cost of upgrading is sufficiently low)



Predictions

Import competition from low-wage countries

1. at home induces the low-productivity firms to drop out from the market.
2. abroad induces the low-productivity exporters to quit exporting.
3. at home and/or abroad induce the medium-productivity exporters, conditional on continuously exporting, to upgrade product quality.

Brief history of MFA liberalization

- The Multifibre Arrangement (MFA) was introduced to curb the T&C imports from low-wage countries to developed countries (US, EU, Canada) from 1974-2004.
- Uruguay Round (1995): The new Agreement on Textiles and Clothing (ATC) to eliminate the quotas over 4 stages (January of 1995, 1998, 2002,& 2005).
- By 2005, the remaining (49%) import quotas were eliminated.
- Products that were more susceptible to competition were usually liberalized in the final phase to delay competition from low-wage countries. Quotas removed last (2005) were the most binding (Khandelwal et al., 2012).
- Bloom et al. (2012), Khandelwal et al. (2011), Utar (2012), Martin and Mejean (2014).

Multi-Fibre Agrement (MFA) Quota Fill Rates

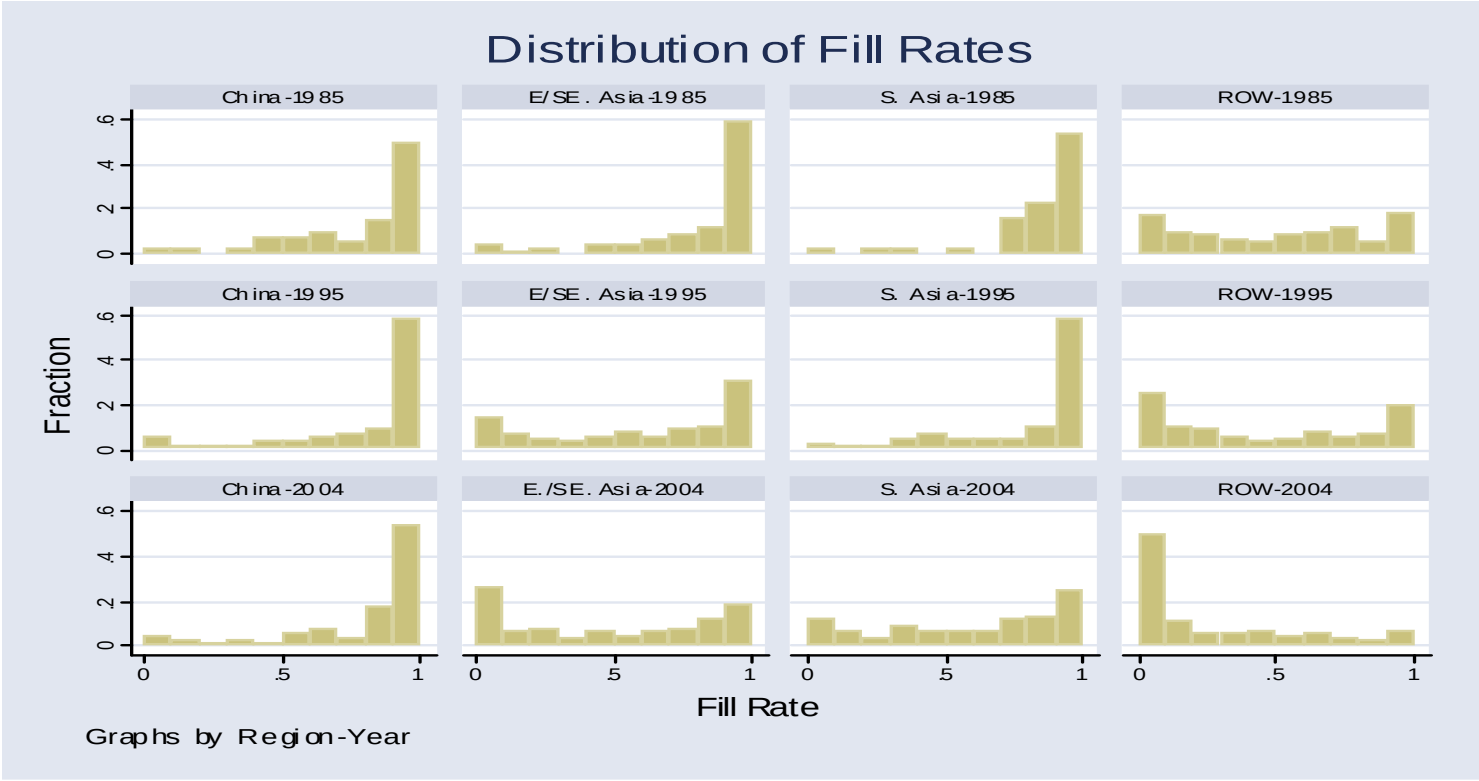


Figure 2: Fill Rates by Region, 1984-2004

- Source: Brambilla, Khandelwal, Schott (2009)

TC Export Boom (in square meter equivalent)

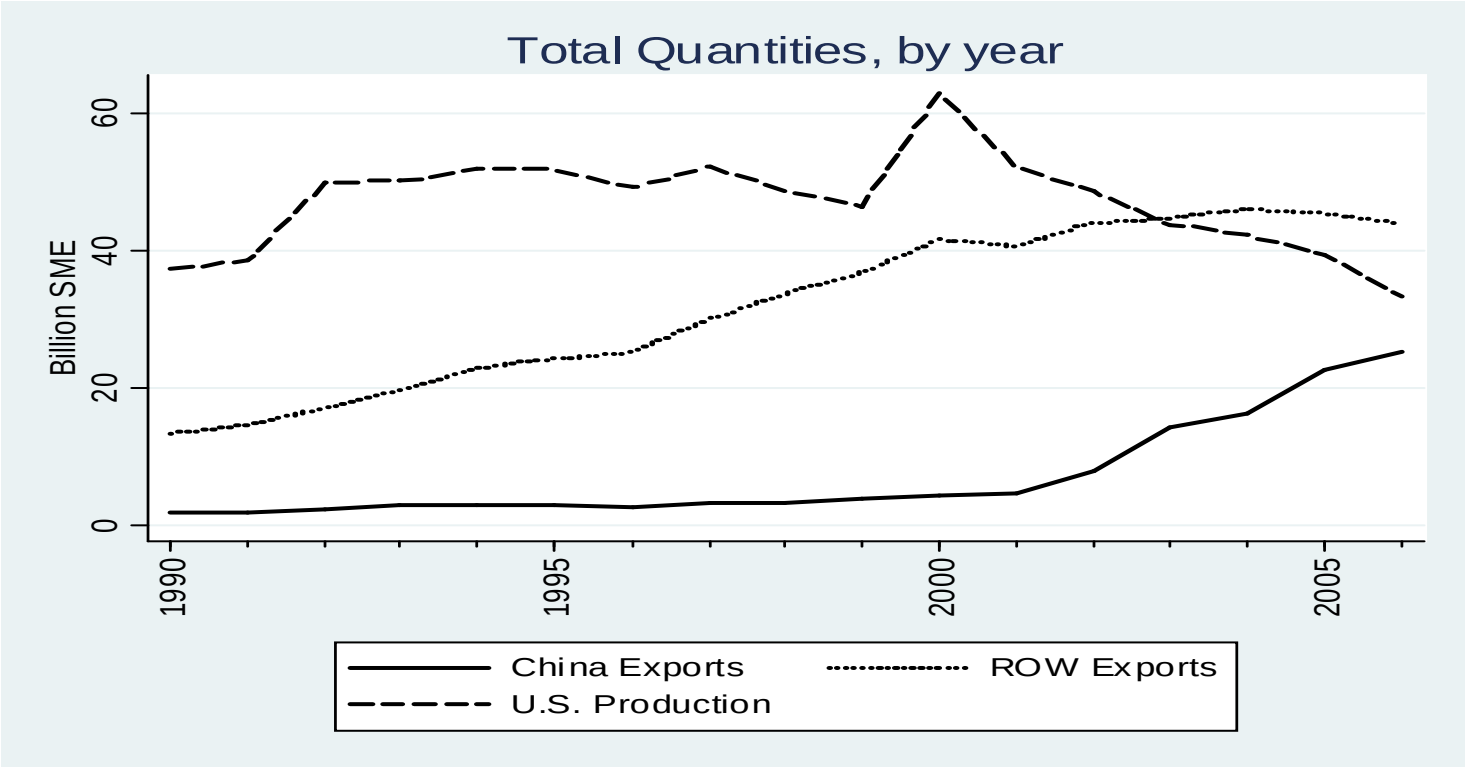


Figure 4: T&C Quantities, by Region

- Source: Brambilla, Khandelwal, Schott (2009)

Binding quota distribution

Table A2: Number and export share of T&C HS6 with binding quotas in 2004

	2000	2002	2004	2006
share of PT exp to the EU	83.1%	83.3%	85.4%	86.4%
share of PT exp to the US	8.9%	8.2%	7.1%	6.4%
share of quota-bound exp in total PT exp	54.7%	53.1%	54.6%	53.8%
share of quota-bound exp to the EU in total PT exp	47.5%	47.0%	49.5%	49.4%
share of quota-bound exp to the US in total PT exp	7.3%	6.2%	5.1%	4.4%
share of quota-bound exp to the EU in total exp to EU	57.1%	56.4%	57.9%	57.2%
share of quota-bound exp to the US in total exp to US	81.6%	75.4%	72.0%	68.9%
Nb. T&C hs6 exported (with binding quotas)	708 (258)	715 (265)	714 (267)	724 (251)
Nb. T&C hs6 exported to EU (with binding quotas)	678 (187)	668 (183)	680 (185)	671 (181)
Nb. T&C hs6 exported to US (with binding quotas)	326 (159)	361(180)	358 (176)	352 (167)

Data

Data set 1: Domestic output and input data set

- Annual Survey of Industrial Production (IAPI) (1996-2007) by the Portuguese National Statistics Office (INE).
  - 15,000 firms; 13% are in the T&C sectors.
- Values and physical quantities for each product sold (incl exports) and input purchased of the firm, at the 8-digit EU Prodcom (PC) level (3000 different input & 5000 different products categories).

Data

Data set 2: Foreign trade statistics (1996-2007)

- census of export and import transactions at the firm-product (HS6)-country level, both quantity and value.

Data set 3: Portuguese matched employer-employee data (LEED), by the Ministry of Labor and Social Security

- census of private sector firms in Portugal and all of their workers.

Main specification

- Diff-in-diff:

$$Y_{it} = \alpha + \beta Quota_i \times Post05_t + \mathbf{X}_{it}\Gamma + F_i + F_t + \epsilon_{it},$$

- Y_{it} is the firm's outcome (e.g., sales, exports, imports, input variety, prices, employment structure, etc.)
- Several ways to construct $Quota_i$. Baseline: the firm has 25% of sales or exports in 2000 that were protected by MFA binding quotas (90% filled rates in 2004).
- Results are robust to using other measures of $Quota_i$ (e.g., a dummy for different share thresholds of quota-bound products).
- α = constant; F_i = firm FE; F_t = year FE.

Impact of T&C shock on firm size

Table 2: Impact of T&C trade shock on sales, employment, wages and value added (firm-level)

Dep. Var:	ln(sales)	ln(val. Added)	ln(output)	ln(employm.)	ln(wages)	sd.(wages)
	(1)	(2)	(3)	(4)	(5)	(6)
Quota x Post05	-0.0189	0.0209	0.0163	0.0261	0.00806	-0.0271
	(-0.44)	(0.86)	(0.88)	(1.22)	(0.98)	(-0.36)
Firm FE	yes	yes	yes	yes	yes	yes
year FE	yes	yes	yes	yes	yes	yes
ln sales t-1	no	yes	yes	yes	yes	yes
Num of Obs	5854	4138	4191	5660	4622	4577
R-sq	.106	.239	.476	.163	.0645	.0661

Within-firm product churning

Table 3: Impact of T&C trade shock on sales, exports, outsourcing and imports (Firm-level)

Panel A: Exports and Total Sales						
Dep. Var:	Num of Produced Products			Num of Exported Products		
	Total	New	Dropped	Total	New	Dropped
	(1)	(2)	(3)	(4)	(5)	(6)
Quota x Post05	-0.0507***	-0.142***	0.265***	-0.0431	-0.00272	0.0784*
	(-3.09)	(-6.68)	(10.74)	(-1.22)	(-0.05)	(1.71)
Controls	Firm FE, Year FE, ln(revenue)t-1					
Num of Obs	5854	5854	5854	4525	4525	4525
R-sq	.0365	.341	.411	.0158	.0127	.104
Panel B: Imports and Inputs						
Dep. Var:	Num of Intermediate Inputs			Num of Imported Inputs		
	Total	New	Dropped	Total	New	Dropped
	(1)	(2)	(3)	(4)	(5)	(6)
Quota x Post05	-0.134**	-0.103	-0.147***	-0.0457	-0.122**	0.0345
	(-2.48)	(-1.39)	(-2.72)	(-1.15)	(-2.32)	(0.68)
Controls	Firm FE, Year FE, ln(revenue)t-1					
Num of Obs	1470	1470	1470	4348	4348	4348
R-squared	.218	.0447	.489	.0279	.038	.163

Firm-product-level regressions

$$\begin{aligned} Y_{isct} &= \alpha + \beta Quota_{sc} \times Post05_t \\ &\quad + \mathbf{X}_{it}\Gamma + [FE_{isc} + FE_t] + \zeta_{isct}, \end{aligned}$$

- s for product and c for country.
- $Quota_{sc}$ is a product-country level measure of the trade shock, which takes the value of one if country c (any EU member country or the US) imposes a quota on Chinese imports of product s that was binding in 2004 and permanently removed in 2005
- 0 otherwise (products with quotas with fill rates below 90% and any quota-free product-country pairs are included in the control group).

Product prices (firm-product level)

Table 4: Impact of T&C trade shock on sales and export prices, firm-product(-country) level

Dep Var: ln(P)isct	Sales Price		Export Price	
Sample:	All	Cont	All	Cont
	(1)	(2)	(3)	(4)
Quota x Post05	0.0432	0.0500*	0.0485***	0.0481***
	(1.35)	(1.66)	(4.88)	(4.75)
ln(sales)t-1	yes	yes	yes	yes
Firm-product(-country) FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
Num of Obs	28325	25839	116126	98113
R-sq	.0172	.0187	.00592	.00651

Product prices - heterogeneous effects (firm-product level)

Table 5: Impact of T&C trade shock on prices, firm-product(-country), heterogenous effects

Dep Var: ln(P)isct	Sales Price		Export Price	
Sample:	All	Cont	All	Cont
	(1)	(2)	(3)	(4)
Quota x Post05 x				
1st size quartile	-0.0388	-0.0384	-0.0227	-0.0121
	(-1.21)	(-1.30)	(-0.44)	(-0.24)
2nd size quartile	0.0149	0.0201	0.0495*	0.0344
	(0.25)	(0.35)	(1.68)	(1.10)
3rd size quartile	0.0876***	0.0984***	0.0847***	0.0904***
	(2.80)	(3.16)	(3.91)	(4.17)
4th size quartile	0.0711	0.0792	0.0388***	0.0377***
	(1.39)	(1.61)	(3.21)	(3.07)
Firm-product(-country) FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
quartile-year FE	yes	yes	yes	yes
Num of Obs	28325	25839	116126	98113
R-sq	.0193	.0209	.00703	.00791

Import vs. export competition

Table 6: Assessing the effects of import vs export competition

Dep Var: ln(P)it	Sales Prices	
Sample:	All	Cont
	(1)	(2)
Quota(sales) x Quota(exp) x Post05	0.0740***	0.0729***
	(2.92)	(2.78)
Quota(sales) x Post05	0.0313	0.0356
	(1.11)	(1.26)
ln(sales)t-1	yes	yes
Year FE	yes	yes
Firm FE	yes	yes
Num of Obs	5407	5377
R-sq	.0421	.0451

Importing from closer source countries (firm level)

Table 8: Impact of T&C trade shock on the distance of importing inputs

	(1) dist	(2) distcap	(3) distw
Quota x Post05 x			
1st size quartile	0.191	0.183	0.156
	(1.45)	(1.42)	(1.35)
2nd size quartile	0.142	0.126	0.137
	(0.79)	(0.70)	(0.78)
3rd size quartile	-0.385***	-0.390***	-0.348***
	(-3.55)	(-3.63)	(-3.40)
4th size quartile	-0.00800	0.00178	-0.0294
	(-0.11)	(0.02)	(-0.44)
quartile-year FE	yes	yes	yes
Firm FE	yes	yes	yes
Year FE	yes	yes	yes
Num of Obs	3917	3917	3917
R-sq	.0149	.0149	.013

Exporting at a higher frequency (firm-product level)

Table 9: Impact of T&C trade shock on the frequency of export transactions

Dep Var: ln(# shipments)isct			
Sample:	Europe	Below-med dist	All destinations
	(1)	(2)	(3)
Quota x Post05 x			
1st size quartile	-0.0790	-0.0951*	-0.0858
	(-1.36)	(-1.76)	(-1.60)
2nd size quartile	0.0185	0.0182	0.0186
	(0.54)	(0.55)	(0.56)
3rd size quartile	0.0478**	0.0590***	0.0306
	(2.10)	(2.66)	(1.41)
4th size quartile	0.0229	0.0135	-0.00462
	(1.32)	(0.82)	(-0.29)
Firm-product-country FE	yes	yes	yes
year FE	yes	yes	yes
quartile-year FE	yes	yes	yes
Num of Obs	133402	147818	161531
R-sq	.00519	.00495	.00447

Increase in the share of trade carried on airplanes

Table 10: Impact of T&C trade shock on the air-share transport mode

Dep Var:	ln(export air-share)		ln(import air-share)	
	(1)	(2)	(3)	(4)
Quota x Post05 x				
1st size quartile	-0.0240	-0.0268	0.0282	0.0261
	(-0.71)	(-0.76)	(1.35)	(1.21)
2nd size quartile	-0.00850	-0.00592	-0.0189	-0.0202
	(-0.52)	(-0.36)	(-0.88)	(-0.95)
3rd size quartile	0.0403**	0.0431***	0.0320*	0.0331*
	(2.56)	(2.67)	(1.89)	(1.92)
4th size quartile	0.00622	0.00509	-0.0104	-0.0106
	(0.49)	(0.41)	(-1.04)	(-1.05)
ln(sales)t-1	no	yes	no	yes
quartile-year FE	yes	yes	yes	yes
Firm FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
Num of Obs	4383	4227	4447	4344
R-sq	.0147	.0169	.00907	.00938

Changes in domestic outsourcing/ offshoring (firm level)

Table A8: Impact of T&C trade shock on outsourcing or offshoring

Dep. Var.: (ln)	imp/material	dom mat/sales	mat/sales	material
	(1)	(2)	(3)	(4)
Quota x Post05	0.314**	-0.308***	-0.0979	-0.0535
	(2.12)	(-2.85)	(-1.53)	(-0.60)
Firm FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
Num of Obs	1703	1711	2388	2435
R-sq	.0159	.0266	.0573	.217

Conclusions

- Competition from China causes Portuguese T&C firms (both domestic sellers and exporters) to exploit their competitive advantage in fast trade and quality upgrading.
- Export competition (in third markets) appears to be more important than import competition in driving these patterns.
- Heterogeneous effects: mostly observed for medium-sized firms, accompanied by
  - importing more expensive materials;
  - hiring more skilled workers;
  - importing from closer markets;
  - exporting at a higher frequency (JIT);
  - substituting foreign sourcing for domestic outsourcing.
- Firms become more specialized.
- A model of heterogeneous firms with multiple quality segments can rationalize some of these results.