Let's Try Next Door: Technical Barriers to Trade and Multi-Destination firms

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Motivation

- Technical Barriers to Trade (TBTs): quality, labeling, technical standards and conformity assessment procedures that have to be satisfied in the imposing country.

- Legal framework: covered by a WTO agreement:
  - Transparent, non-discriminatory
  - Notification
  - Dedicated committee: TBT concerns

- Stringent TBTs increase the cost of exporting into the country adopting such measures discouraging exporters from serving markets with TBTs
  - Fixed cost of exporting (product adaptation)
  - Variable cost of exporting (upgrading or adaptation of the product or packaging)
  - Variety of standards across markets $\rightarrow$ loss of economies of scale

Research Questions

- Exporters compare:
  - Fixed and variable cost of complying with the new standard
  - Cost of diverting shipments at the intensive and/or extensive margin
    - ⋆ IM: diversion towards an existing destination → *incremental cost of reaching marginal consumers* (Arkolakis, JPE 2010)
    - ⋆ EM: diversion towards new destination → fixed cost of entry

- The higher the cost of complying with the TBT, the higher the probability of trade diversion towards existing markets (IM) and/or new markets (EM)

- The higher the marginal cost of reaching a consumer, the higher the probability of prospecting *new* markets

Research Questions

- In a model with heterogeneous firms (Chaney, AER 2008):
  - Productivity cut-off differs by destination (due to the presence of different TBTs)
  - Selection of firms on more difficult destinations (with stringent TBTs)

- Not all firms exit because of TBTs: multi-destination firms have the option of diverting trade to other destinations that *do not* impose TBTs. They have lower diversion cost.

Hypothesis 1: *Stringent TBTs lead exporters to divert trade towards TBT-free destinations. And the more so for multi-destination firms*.

Hypothesis 2: *Multi-destination firms will look for new destinations and expand their geographical scope.*

Research Questions

- Aggregate Implications:
  - Trade cost elasticity is exacerbated in less heterogeneous sectors, where more output is concentrated among small and less productive firms.
  - Trade cost elasticity at the aggregate level is thus increasing with the homogeneity of the sector (Chaney AER, 2008; Berman et al. QJE, 2012).

Table : Number of exporting firms and export share over total French exports.

	Number of exporting firm-HS4		Export Share (in %)	
	2000	2005	2000	2005
$Multi-Destination\ (if\ k_{i,s,1995} > 17)$	1417	1294	32	33
$Other firms$	121275	112056	68	67

Hypothesis 3: *When total sector-destination exports are concentrated on multi-destination firms, the aggregate effect of TBT imposition is attenuated.*

Preview of our results

1. **Result 1**: TBTs induce the exit of exporters.
   - This effect is stronger for *multi-destination* firms
   - Multi-destination firms that stay in the market and cope with the TBT, enjoy reduced competition at destination and *increase* their exports.
   - TBTs push multi-destination (high-productive) firms out of the market and reduce the average productivity of incumbent firms ($\downarrow$ welfare).

2. **Result 2**: TBTs push exporters to bear the fixed cost of entering into new markets.
   - This effect is magnified for *multi-destination* firms.

3. **Result 3**: TBTs reduce export flows at sector-destination level with a bigger extend for homogeneous sectors (i.e. where export sales are concentrated among smaller and less productive firms).
   - negative effect on aggregate exports + null effect on the intensive margin of firms = TBTs increase fixed (more than variable) trade cost.

Literature

- Impact of alleviating TBTs: regional or deep integration agreements
  - Harmonization (-) versus mutual recognition (+)
  - Impact on third countries
  - Specific impact on developing countries
  - Baller (wp, 2007), Chen & Mattoo (CJE, 2008), Essaji (JIE, 2008), Disdier, Fontagné & Cadot (WBER, 2015)
- Impact on trade margins: Bao & Qiu (RIE, 2012)
  - Aggregate data
  - Gravity, TBT notifications 1995 - 2008
  - Negative impact on EM, positive on IM

Data

1. Focus on trade *restrictive* TBTs
   - Specific Trade Concerns
   - Raised by affected exporting countries at the TBT committee
   - Exporting country concentrate claims on the most restrictive TBTs (allocation of time)
   - $\rightarrow$ focus on TBT-market pairs spotted by trade representatives in committee
   - No continuous measure of stringency: (0,1)

2. Universe of exporters from a country (France)
   - Firm level custom data (ID-CN8-destination-time)
   - EU acts as a single country in WTO committees: restricted to extra-EU export flows
   - Definition: "exporter" $\rightarrow$ legal unit (ID = SIREN) exporting within an HS4
   - HS4 chosen for coherence with TBT data
   - Clean for churning: keep firms exporting at least 4 times over 1995-2008
     - ⋆ Different definition of churning, i.e. drop firm-HS4-destination units that stop exporting after TBT concern and re-export the year after, with the same TBT concern still active.

Data

More on TBT concerns:

- 13,000 TBT notifications (1995-2009)
- 318 Specific Trade Concerns raised at the TBT committee (1995-2011)
- $\rightarrow$ the most stringent TBTs: fits our theoretical argument
- Concerns raised by the EU over the period 1995-2007 (coherence with trade data)
- Consider 1997-2007 period due to lagged specification

Data

Example of STCs on TBT

- The representative of the European Communities raised concerns on a TBT measure imposed by China on wine. Such measure was notified by China in May 2006, and specifies the terminologies, definitions, technical requirement and labelling of imported wines.

- In particular, this measure fixed a level of sulphur dioxide consistently below the level fixed by international standards. The EU delegation considered such measure being unnecessarily restrictive for their wine exporters.

Empirical Strategy

We test the three following hypothesis:

1. **Hypothesis 1**: Stringent TBTs push firms out of market imposing the measure. The more so for multi-destination firms (low diversion cost).

2. **Hypothesis 2**: Multi-destination exporters look for new markets as a result of stringent TBTs.

3. **Hypothesis 3**: Aggregate exports elasticity to trade cost is bigger in homogeneous sectors - where multi-destination firms are relatively less important (Chaney 2008).

Empirical Strategy: **Definition of multi-destination dummy**

- Multi-destination firms switch destination easily because of lower diversion cost:
  - IM: they already serve many TBT-free destinations

- Multi-destination status of the firm is $I_{i,s,1995}(k_{i,s,1995} > \overline{k})$.

- Dummy equal to one if the number of TBT-free destinations served by firm-product is in 1995 - $k_{i,s,1995}$ - is above a certain threshold $\overline{k}$:
  - Top-10 percentile of $k_{i,s,1995}$
  - Top 5th and 1st percentile of $k_{i,s,1995}$ (robustness)

- Rob check: we use the number of destinations (instead of TBT-free destinations). Results hold.

Hypothesis 1: empirical strategy

Hypothesis 1: *Stringent TBTs push exporters out of the imposing market. The more so for multi-destination firms*.

$$
\begin{aligned}
y_{i,s,j,t} \quad = \quad & \alpha + \beta_1 TBT_{s,j,t} + \beta_2 (TBT_{s,j,t}) * I_{i,s,1995}(k_{i,s,1995} > \overline{k}) \\
& + \beta_3 I_{i,s,1995}(k_{i,s,1995} > \overline{k}) + \beta_4 (TBT_{s,j,t} * ln(size)_{i,1995}) \\
& + \beta_5 (TBT_{s,j,t} * Domestic_{i,s,1995}) + \beta_6 Ln(tariff + 1)_{s,j,t} \\
& + \phi_{HS2,t,j} + \mu_i + \varepsilon_{i,s,j,t}, \qquad (1)
\end{aligned}
$$

- Where $y_{i,s,j,t}$ is in turn:
  - dummy variable for the legal unit (firm) (is) exiting a certain market j at time t (firm not exporting in year t and $t+1$ but having exported the two previous years)
  - dummy variable for positive trade flows into a certain market
  - firm's export values (in logs)
  - *price* of exported goods (in logs), proxied by unit export values

Hypothesis 1: empirical strategy

Main explanatory variables:

- $TBT_{s,j,t}$ Dummy: TBT concern at time t in product s between the EU and importer country j. NOTICE: $TBT_{s,j,t}$ turns to zero when the TBT concern is solved.

- Interaction TBT dummy with Multi-Destination status of the firm $(I_{i,s,1995}(k_{i,s,1995} > \overline{k}))$ $\rightarrow$ investigates how TBT concerns shape the adjustment of multi-destination exporters

Hypothesis 1: empirical strategy

Other covariates:

- Interaction $Size_{i,1995}$ - TBT dummy $\rightarrow$ controls for the heterogeneous effect of TBT across the firm size distribution
  - We do not have exhaustive information on French exporters' balance sheets. We use total exports: $ln(size)_{i,1995} = \sum_{s \subset S} \sum_{j \subset J} exports_{i,s,j,1995}$
- $Ln(tariff + 1)_{s,j,t}$: applied tariff at HS4 level
- Firm FE and Country-HS2-Year FE in all specifications
  - Rob check: HS4-destination fixed effects also included.
- Interact the TBT dummy for $Domestic_{i,s,1995}$, i.e dummy equal to one if the firms was pure domestic in 1995 (no a priori), but needed when squaring the matrix: number of TBT-free destinations in 1995 $\rightarrow$ zero for firms exporting only in destinations with TBT and also for firms that did not export to any destination in 1995.) but started exporting afterwards)

Hypothesis 1: empirical strategy

Endogeneity:

- The inclusion of firm and country-HS2-time fixed effects drastically reduces any endogeneity concern due to the omitted variables bias
- Reverse causality if the government of a certain destination imposes a TBT to face imports from a specific French firm
  - *plausible claim?* TBT concerns raised by the EU as a whole (and not STCs raised specifically by France $\rightarrow$ might be imposed to face German or Italian firms).
- We pick this up by introducing a variable controlling for the visibility of the firm in a given destination j, HS2 chapter in 1995 - $Visibility_{i,HS2,j,1995}$.
  - Share of exports of a firm in a certain market-HS2 sector over total French exports in the same market and sector.
  - Introduced also as an interaction with the TBT dummy.
  - Rationale: if a government imposes a TBT to face a big exporting firm $\rightarrow$ high-visible exporter must suffer from the TBT imposition to a larger extend.
- **2SLS** strategy and other robustness checks in a while....

Hypothesis 1: results - exit probability

Dep. Var.	Exit Dummy				
	(1)	(2)	(3)	(4)	(5)
TBT	0.025***	0.016**	0.015*	0.015*	0.016*
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
TBT*$I_{i,s,1995}(k_{i,s,1995} > \overline{k})$			0.011*	0.011*	0.014*
			(0.006)	(0.006)	(0.008)
$I_{i,s,1995}(k_{i,s,1995} > \overline{k})$			-0.011***	-0.011***	-0.012***
			(0.000)	(0.000)	(0.001)
TBT*Visibility 1995				-0.011	-0.011
				(0.012)	(0.012)
TBT*Firm size 1995		0.002	0.002	0.003	0.003
		(0.001)	(0.002)	(0.002)	(0.002)
TBT*Domestic Dummy 1995		0.014***	0.015***	0.015***	0.015***
		(0.005)	(0.005)	(0.005)	(0.005)
Log(tariff+1)	0.007**	0.007**	0.007**	0.007**	0.007**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Firm FE	yes	yes	yes	yes	yes
HS2-Destination-Year FE	yes	yes	yes	yes	yes
$k_{i,s,1995}$	# TBT-free destinations in 1995				# destinations
Observations	5,879,232	5,879,232	5,879,232	5,878,870	5,878,870
R-squared	0.059	0.059	0.059	0.059	0.059

Visibility and Domestic Dummy in 1995 are included but not reported when interacted with TBT.
Clustered standard errors by destination-HS4-year in parentheses.
*** $p < 0,01; * * p < 0,05; * p < 0,1.$

Hypothesis 1: results - participation dummy

Dep. Var.	Participation Dummy				
	(1)	(2)	(3)	(4)	(5)
TBT	-0.046***	-0.065***	-0.064***	-0.065***	-0.065***
	(0.017)	(0.019)	(0.019)	(0.019)	(0.019)
TBT*$I_{i,s,1995}(k_{i,s,1995} > \overline{k})$			-0.046***	-0.044***	-0.056***
			(0.013)	(0.013)	(0.015)
$I_{i,s,1995}(k_{i,s,1995} > \overline{k})$			0.186***	0.186***	0.200***
			(0.001)	(0.001)	(0.001)
TBT*Visibility 1995				0.117***	0.115***
				(0.026)	(0.026)
TBT*Firm size 1995		-0.010***	-0.008**	-0.021***	-0.020***
		(0.003)	(0.003)	(0.004)	(0.004)
TBT*Domestic Dummy 1995		0.081***	0.082***	0.083***	0.083***
		(0.017)	(0.017)	(0.017)	(0.017)
Log(tariff+1)	0.006	0.005	-0.000	-0.000	0.001
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Firm FE	yes	yes	yes	yes	yes
HS2-Destination-Year FE	yes	yes	yes	yes	yes
$k_{i,s,1995}$	# TBT-free destinations in 1995				# destinations
Observations	5,879,232	5,879,232	5,879,232	5,878,870	5,878,870
R-squared	0.108	0.111	0.117	0.117	0.116

Visibility and Domestic Dummy in 1995 are included but not reported when interacted with TBT.
Clustered standard errors by destination-HS4-year in parentheses.
*** $p < 0,01; * * p < 0,05; *p < 0,1.$

Hypothesis 1: results - intensive margin

Dep. Var.	Log of export value				
	(1)	(2)	(3)	(4)	(5)
TBT	0.081	0.083	0.063	0.062	0.075
	(0.076)	(0.079)	(0.076)	(0.076)	(0.076)
TBT*$I_{i,s,1995}(k_{i,s,1995} > \overline{k})$			0.145**	0.146**	0.142*
			(0.070)	(0.070)	(0.079)
$I_{i,s,1995}(k_{i,s,1995} > \overline{k})$			1.244***	1.244***	1.352***
			(0.006)	(0.006)	(0.007)
TBT*Visibility 1995				0.062	0.043
				(0.168)	(0.169)
TBT*Firm size 1995		0.016	-0.011	-0.017	-0.013
		(0.021)	(0.019)	(0.028)	(0.029)
TBT*Domestic Dummy 1995		-0.057	-0.015	-0.015	-0.027
		(0.046)	(0.045)	(0.045)	(0.046)
Log(tariff+1)	-0.126***	-0.128***	-0.161***	-0.161***	-0.155***
	(0.038)	(0.037)	(0.037)	(0.037)	(0.037)
Firm FE	yes	yes	yes	yes	yes
HS2-Destination-Year FE	yes	yes	yes	yes	yes
$k_{i,s,1995}$	# TBT-free destinations in 1995				# destinations
Observations	3,007,840	3,007,840	3,007,840	3,007,660	3,007,660
R-squared	0.324	0.336	0.354	0.354	0.353

Visibility and Domestic Dummy in 1995 are included but not reported when interacted with TBT.
Clustered standard errors by destination-HS4-year in parentheses.
*** $p < 0,01; * * p < 0,05; *p < 0,1.$

Hypothesis 1: results - export price

Dep. Var.	Log of Trade Unit Value				
	(1)	(2)	(3)	(4)	(5)
TBT	0.127***	0.097**	0.101**	0.101**	0.099**
	(0.048)	(0.047)	(0.047)	(0.047)	(0.047)
TBT*$I_{i,s,1995}(k_{i,s,1995} > \overline{k})$			-0.057	-0.056	-0.062
			(0.035)	(0.035)	(0.040)
$I_{i,s,1995}(k_{i,s,1995} > \overline{k})$			-0.099***	-0.099***	-0.122***
			(0.003)	(0.003)	(0.004)
TBT*Visibility 1995				0.022	0.022
				(0.069)	(0.070)
TBT*Firm size 1995		-0.000	0.006	0.004	0.004
		(0.010)	(0.011)	(0.013)	(0.013)
TBT*Domestic Dummy 1995		0.073***	0.065***	0.065***	0.068***
		(0.027)	(0.025)	(0.025)	(0.026)
Log(tariff+1)	-0.271***	-0.271***	-0.268***	-0.268***	-0.268***
	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)
Firm FE	yes	yes	yes	yes	yes
HS2-Destination-Year FE	yes	yes	yes	yes	yes
$k_{i,s,1995}$	# TBT-free destinations in 1995				# destinations
Observations	3,007,840	3,007,840	3,007,840	3,007,660	3,007,660
R-squared	0.771	0.771	0.771	0.771	0.771

Visibility and Domestic Dummy in 1995 are included but not reported when interacted with TBT.
Clustered standard errors by destination-HS4-year in parentheses.
*** $p < 0,01; * * p < 0,05; * p < 0,1.$

Hypothesis 1: robustness checks

- **Binned model**. Our baseline strategy test the specific adjustment of firms with more than 17 destinations. Too strict? $\rightarrow$ a binned model supports our choice.

- **Robustness using also non-EU concerns**.

- **Robustness using lagged TBT**. Concern raised in $t-1$ is related to a measure introduced in $t-2$ or earlier $\rightarrow$ low chance that such concern is driven by exports at time t

- **Robustness excluding top-exporting firms**. Top-exporting French firms might push the EU to raise a TBT concern $\rightarrow$ endogeneity $\rightarrow$ Rob check excluding top-exporting firms - i.e.firms with product-destination exports above the 99th percentile

▸ Excluding top-exporters

Hypothesis 1: robustness checks

- **IV estimations 1**. Our instrument is a dummy $IV\ TBT_{jst}$ equal to one if two conditions hold:
  - at least one third country (other than j) has an active TBT concern on product s at time t
  - if country j has an active TBT concern on at least one product other than s.
  - *Rationale*: probability of having a TBT in country j - product s is correlated with the activism of country j in imposing a measure (on other products than s) and with the sensitivity of product s of being protected by third country.

▸ 2SLS estimations

- **IV estimations 2**. Alternative instrument is a dummy equal to one if at least a third country ($k \neq j$), belonging to the same region as j, has an active TBT concern on product s.

Hypothesis 2: empirical strategy

Hypothesis 2: *In presence of TBT concern the firm may want to exit the market but add a new TBT-free destination. The more so for multi-destination firms.*

$$\begin{aligned} y_{i,s,t} &= \alpha + \beta_1 TBT_{i,s,t-1} + \beta_2 k_{i,s,t-1} + \beta_3 \left(TBT_{i,s,t} * k_{i,s,t-1}\right) + \\ &+ \phi_{s,t} + \mu_i + \varepsilon_{i,s,j,t}, \end{aligned} \tag{2}$$

Where:

- $y_{i,s,t}$ is the number of *new* destination markets served by firm i on product s
- $TBT_{i,s,t-1}$ is a dummy being equal to one if the firm faced at least one TBT measure at (t-1) when exporting a given product.
- $k_{i,s,t-1}$ is the number of TBT-free destinations served by firm i on product s at time $t-1$
- We interact these two variables to test the peculiar behavior of multi-destination firms facing TBT concerns
- Firm FE and HS4-Year FE in all specifications

Hypothesis 2: results - main

	Number of New TBT-free destination			
	(1)	(2)	(3)	(4)
Dummy if TBT dest (t-1)	0.107***	0.063***	0.047***	0.050***
	(0.004)	(0.004)	(0.004)	(0.004)
$k_{i,s,t-1}$		0.048***	0.048***	-0.036***
		(0.001)	(0.001)	(0.001)
Dummy if TBT dest (t-1)*$k_{i,s,t-1}$			0.009***	0.009***
			(0.003)	(0.003)
Firm FE	yes	yes	yes	no
Firm-Sector FE	no	no	no	yes
Sector-Year FE	yes	yes	yes	no
Year FE	no	no	no	yes
Observations	1,653,940	1,653,940	1,653,940	1,653,940
R-squared	0.118	0.144	0.144	0.271

Clustered standard errors by firm-HS4 in parentheses.

*** $p < 0.01; * * p < 0.05; *p < 0.1.$

Hypothesis 2: results - robustness

	Number of New TBT-free destination			
	(1)	(2)	(3)	(4)
Dummy if TBT dest (t-1)	0.107***	0.054***	0.020***	0.050***
	(0.004)	(0.004)	(0.005)	(0.004)
N. of dest (t-1)		0.048***	0.048***	-0.036***
		(0.001)	(0.001)	(0.001)
Dummy if TBT dest (t-1)*N. of dest (t-1)			0.018***	0.012***
			(0.003)	(0.003)
Firm FE	yes	yes	yes	no
Firm-Sector FE	no	no	no	yes
Sector-Year FE	yes	yes	yes	no
Year FE	no	no	no	yes
Observations	1,653,940	1,653,940	1,653,940	1,653,940
R-squared	0.118	0.144	0.144	0.271

Clustered standard errors by firm-HS4 in parentheses.

*** $p < 0.01; * * p < 0.05; *p < 0.1.$

Hypothesis 3: empirical strategy

- TBTs push firms out of the imposing market
- Multi-destination firms switch destination country more easily than other firms, and, move to *new* TBT-free destinations.
- How such firm level mechanism translates into aggregate evidence?
  - Chaney, AER (2008): the trade cost elasticity is exacerbated in less heterogeneous sectors (where more output is concentrated among smaller/less productive firms)
  - The aggregated effect of TBT is expected to be attenuated when (big) multi-destination firms have a predominant role in the sector (i.e. high sector heterogeneity).
  - Chaney, AER (2008): the aggregate effect of fixed trade cost is entirely driven by the extensive margin channel. Are TBTs pure fixed trade cost? (still unclear in the literature)

Hypothesis 3: empirical strategy

We aggregate our dataset at the sector-destination-year level and estimate:

$$\begin{aligned} Log(exports)_{s,j,t} = \; & \alpha + \beta_1 TBT_{s,j,t} + \beta_2 (TBT_{s,j,t}) * ParetoParameter_{HS2,j,t} \\ & + \beta_3 ParetoParameter_{HS2,j,t} + \beta_4 Ln(tariff+1)_{s,j,t} \\ & + \phi_{st} + \phi_{jt} + \varepsilon_{s,j,t}, \end{aligned} \tag{3}$$

Where:

- $TBT_{s,j,t}$ is a dummy for active TBT concern
- $Ln(tariff+1)_{s,j,t}$ is the tariff level faced by French firms in destination j and product s.
- $ParetoParameter$ is the estimated Pareto distribution shape parameter (QQ regression as in Head et al.(2014)) ▸ Details QQ regressions
- Other proxies for the heterogeneity of a sector:
  - # of multi-destination over total # of firms in the sector-destination cell.
  - share of total sector-destination exports held by top-10 and top-5 exporters
  - share of total sector (HS2)-destination exports held by multi-destination firms

Hypothesis 3: results - aggregate estimations

	Log of exports.					
	(1)	(2)	(3)	(4)	(5)	(6)
TBT_t	-0.691***	-0.557***	-0.953***	-0.921***	-0.722***	-0.862***
	(0.055)	(0.059)	(0.109)	(0.156)	(0.066)	(0.079)
TBT_t*Pareto par.		-0.439***				
		(0.092)				
TBT_t*Top-5 exp sh			0.499***			
			(0.179)			
TBT_t*Top-10 exp sh				0.340		
				(0.209)		
TBT_t*Multi-dest exp sh					0.249**	
					(0.116)	
TBT_t*Multi-dest firms sh						0.632***
						(0.176)
Log(tariff+1)	-1.080***	-0.997***	-1.063***	-1.065***	-0.980***	-1.059***
	(0.041)	(0.041)	(0.041)	(0.041)	(0.040)	(0.041)
Sector-Year FE	yes	yes	yes	yes	yes	yes
Destination-Year FE	yes	yes	yes	yes	yes	yes
Observations	399,523	384,492	399,523	399,523	399,523	399,523
R-squared	0.539	0.545	0.541	0.541	0.551	0.540

Robust standard errors in parentheses.
*** $p < 0,01$; ** $p < 0,05$; *$p < 0,1$.

Hypothesis 3: implications

- Chaney, AER (2008): the aggregate effect of fixed trade cost is entirely driven by the extensive margin channel.
- Null effect of TBTs on the intensive margin (firm level)
- Strong effect of TBTs on the exit probability and participation (firm level)
- Strong negative effect of TBTs at the aggregate level
- The 70% of the total (aggregate) effect of TBTs is channeled by the extensive margin ▸ elasticity decomposition

TBTs are increases in the fixed (more than variable) cost of trade

Conclusion

- Theory based testable hypotheses:
  - Small exporters are unable to cope with additional fixed cost of restrictive TBTs $\rightarrow$ leave the imposing market
  - Multi-destination firms reorient their exports away from markets with TBT concerns $\rightarrow$ variable cost of reaching new consumers $<$ cost of TBT
  - Multi-destination firms reach new markets $\rightarrow$ fixed cost of entering TBT-free new markets $<$ cost of TBT

- Empirics:
  - TBT drive the average firm out of the market (competition reduced in the imposing market)
  - Multi-destination firms switch destination more easily: they exit the imposing country with higher likelihood (average productivity,i.e. welfare, reduced in the imposing country)
  - Multi-destination firms exit the imposing country and divert trade toward new TBT-free destinations
  - TBTs are increases in fixed (more than variable) trade cost.

THANK YOU

Hypotheses 1: results - 2SLS estimations

	Exit		Extensive		Log export value		TUV	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TBT	0.098***	0.073**	0.115	-0.391***	0.654	1.005**	-0.333	-0.471
	(0.030)	(0.034)	(0.114)	(0.135)	(0.401)	(0.401)	(0.334)	(0.316)
TBT*$I(k_{i,s,95} > \overline{k})$	0.052*	0.064**	-0.266***	-0.021	2.290***	2.149***	-0.094	-0.035
	(0.026)	(0.025)	(0.060)	(0.065)	(0.396)	(0.372)	(0.136)	(0.130)
TBT*Firm size 1995	-0.017***	-0.014*	-0.113***	-0.046***	-0.347***	-0.395***	0.086*	0.105**
	(0.006)	(0.007)	(0.015)	(0.017)	(0.092)	(0.094)	(0.046)	(0.049)
TBT*Domestic Dummy 1995		0.048*		0.972***		-0.636**		0.249**
		(0.029)		(0.203)		(0.252)		(0.116)
$I_{i,s,95}(k_{i,s,95} > \overline{k})$	-0.011***	-0.011***	0.186***	0.186***	1.237***	1.237***	-0.099***	-0.099***
	(0.000)	(0.000)	(0.001)	(0.001)	(0.006)	(0.006)	(0.003)	(0.003)
Domestic Dummy 1995	-0.004***	-0.004***	-0.081***	-0.084***	-0.618***	-0.617***	0.063***	0.062***
	(0.000)	(0.003)	(0.001)	(0.001)	(0.004)	(0.004)	(0.002)	(0.002)
Log(tariff+1)	0.007**	0.007**	-0.000	-0.000	-0.161***	-0.161***	-0.268***	-0.268***
	(0.003)	(0.003)	(0.007)	(0.007)	(0.037)	(0.037)	(0.021)	(0.021)
First Stage Coefficients								
IV TBT	0.122***	0.124***	0.122***	0.124***	0.088***	0.090***	0.088***	0.090***
IV TBT*$I(k_{i,s,95} > \overline{k})$	0.190***	0.190***	0.190***	0.190***	0.183***	0.184***	0.183***	0.184***
IV TBT*Firm size 1995	0.144***	0.145***	0.144***	0.145***	0.123***	0.123***	0.123***	0.123***
IV TBT*Domestic Dummy 1995		0.158***		0.158***		0.115***		0.115***
Firm F.E.	yes	yes	yes	yes	yes	yes	yes	yes
HS2-Destination-Year F.E.	yes	yes	yes	yes	yes	yes	yes	yes
Observations	5879232	5879232	5879232	5879232	3007840	3007840	3007840	3007840
Joint F-stat	15.48	11.70	15.48	11.70	9.26	6.92	9.26	6.92

Clustered standard errors by destination-HS4-year in parentheses.
*** $p < 0,01$; ** $p < 0,05$; *$p < 0,1$.

Back

Hypotheses 1: results - Excluding Top-exporters

	Exit		Extensive		Exports (log)		TUV	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TBT	0.016**	0.015*	-0.067***	-0.066***	0.063	0.045	0.097**	0.102**
	(0.008)	(0.008)	(0.019)	(0.019)	(0.079)	(0.077)	(0.047)	(0.046)
TBT*$I(k_{i,s,95} > \overline{k})$		0.013**		-0.047***		0.125*		-0.068**
		(0.006)		(0.013)		(0.070)		(0.033)
$I_{i,s,95}(k_{i,s,95} > \overline{k})$		-0.011***		0.184***		1.232***		-0.085***
		(0.000)		(0.001)		(0.006)		(0.003)
TBT*Firm size 1995	0.001	0.000	-0.008**	-0.007*	0.009	-0.016	0.015	0.022*
	(0.001)	(0.001)	(0.004)	(0.004)	(0.020)	(0.019)	(0.010)	(0.012)
TBT*Domestic Dummy 1995	0.013***	0.014***	0.082***	0.083***	-0.057	-0.017	0.081***	0.073***
	(0.005)	(0.005)	(0.017)	(0.017)	(0.046)	(0.045)	(0.027)	(0.026)
Log(tariff+1)	0.006*	0.006*	0.005	0.000	-0.148***	-0.181***	-0.255***	-0.253***
	(0.003)	(0.003)	(0.007)	(0.007)	(0.037)	(0.037)	(0.022)	(0.022)
Firm FE	yes	yes	yes	yes	yes	yes	yes	yes
HS2-Destination-Year FE	yes	yes	yes	yes	yes	yes	yes	yes
$k_{i,s,1995}$	# TBT-free destinations in 1995							
Observations	5,813,410	5,813,410	5,813,410	5,813,410	2,967,494	2,967,494	2,967,494	2,967,494
R-squared	0.059	0.059	0.112	0.117	0.340	0.357	0.774	0.774

Domestic Dummy in 1995 is included but not reported. Clustered standard errors by destination-HS4-year.
*** $p < 0,01$; ** $p < 0,05$; *$p < 0,1$.

Back

Hypothesis 3: results - Pareto shape parameter

- We use the QQ estimator as in Head, Mayer and Thoenig (2014) to recover sector-destination specific Pareto shape parameters.
- The QQ estimator minimizes the sum of the squared errors between the theoretical and the empirical quantiles
  - Empirical quantiles: log of (sorted) export values for a given firm i into a given sector-destination $HS2, j \rightarrow$ CDF function $\widehat{F_{i,HS2,j}} = (i - 0.3)/(n + 0.4)$.
  - Theoretical quantiles: $Q_{i,HS2,j} = ln(x_{min}) - (1/\widetilde{\gamma}) ln(1 - \widehat{F_{i,HS2,j}})$
  - The OLS coefficient of the term $-ln(1 - \widehat{F_{i,HS2,j}})$ gives an inverse measure of the empirical $\widetilde{\gamma}$ with the primitive distribution value of gamma reversed since $\gamma = (\sigma - 1)\widetilde{\gamma}$ (we follow Head et al.2014 and use $\sigma = 4$).
- The shape parameter of the Pareto distribution is directly related to the homogeneity of the sector (i.e. an inverse measure of the heterogeneity of the sector for a given destination)

	Mean across countries	USA	Japan	China	Canada
γ	2.132	1.574	1.658	2.046	1.920
$\widetilde{\gamma}$	1.1563	1.1986	1.883	1.619	1.657
γ in Head et al.(2014)			2.146		
$\widetilde{\gamma}$ in Head et al.(2014)			1.396		

Back

Hypothesis 3: results - aggregate elasticity decomposition

Table : Aggregate export elasticities

	$\widehat{\beta}$	V_i/V	Aggregate Elasticity	Aggregate Elasticity (% of total)
Intensive	-0.663***	0.307	-0.203	32%
Extensive	-0.621***	0.692	-0.429	68%
Total			-0.623	

– $\widehat{\beta}$ is the estimated coefficient for TBT on a gravity type regression having the (log of) total destination-product-year specific export for respectively incumbent and new-entry exporters

– V_i/V is the share of total aggregate exports by respectively incumbent and new-entry exporters

– Aggregate Elasticity=$\widehat{\beta}$*V_i/V

Back