The Sound of Silence

Regolamentazioni tecniche non trasparenti come ostacoli al commercio

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Societa' Italiana d'Economia, 8 Luglio 2021

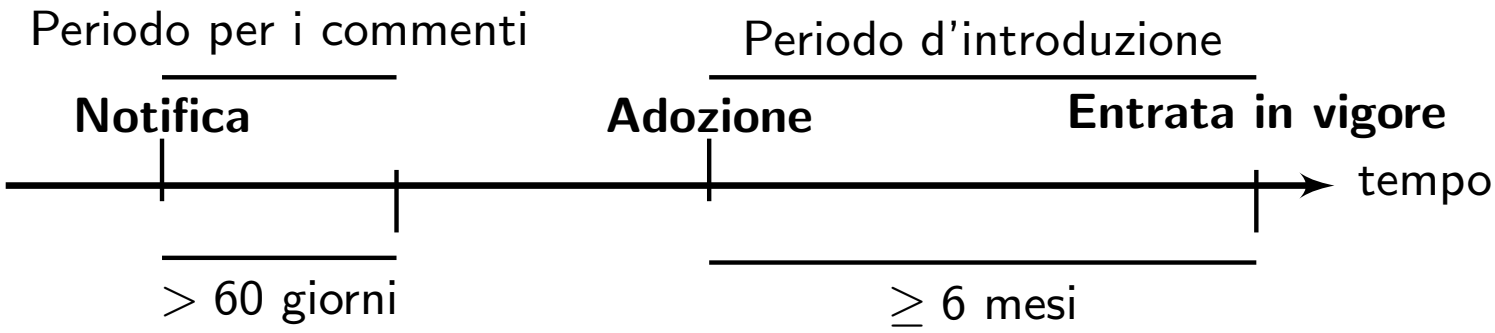
Gli accordi commerciali d'oggi

Fonte: Testo legale del trattato di libero scambio della RCEP siglato a novembre 2020

Quadro istituzionale

Secondo l'Accordo dei paesi OMC sulle barriere tecniche al commercio (TBT), una TBT può essere introdotta

- se persegue un obiettivo politico legittimo
- se e' implementata in maniera trasparente



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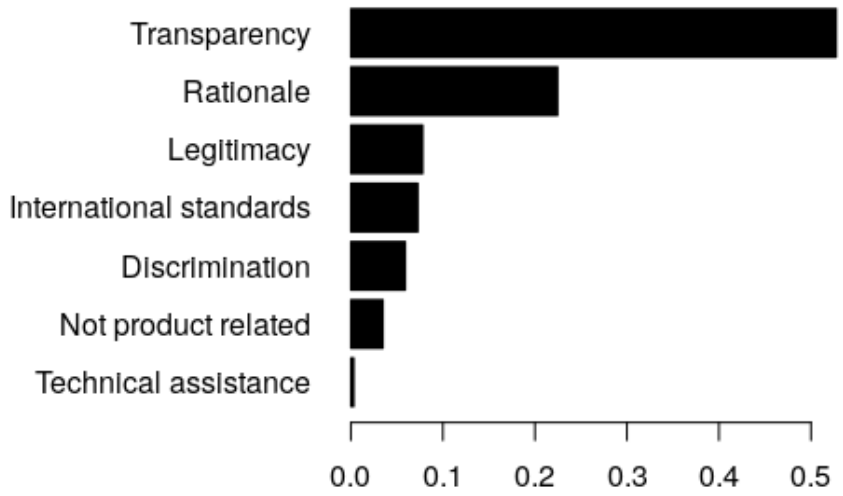


Source: Elaboration from Specific Trade Concerns database of the WTO (1995-2011)

Esempio: il divieto messicano dell'uso di CFC

Nel novembere 1998, gli Stati Uniti contestano il divieto messicano di CFC nella produzione.

- Come e' stato implementato questo divieto?

- Cosa e' stato contestato? :
  - "**Esportatori sono incerti** riguardo a come applicare la regolamentazione" (US TBT , G/TBT/M/14, par 35).

In che misura l'incertezza puo' caratterizzare la natura protettiva delle TBTs?

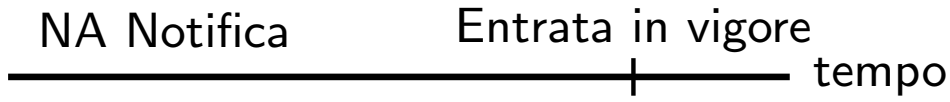
- Considero regolamentazioni tecniche appena introdotte
- Studio l'effetto differenziato di quelle misure implementate in maniera non trasparente sul comportamento di imprese esportatrici.

Letteratura esistente

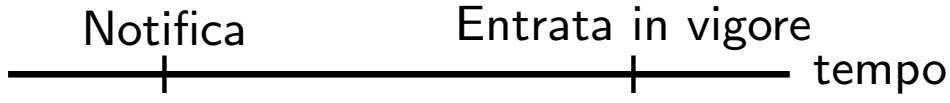
1. Gli effetti della **trasparenza** sul commercio internazionale
   - Lejárraga and Shepherd (2013); Ing et al. (2018).
2. Gli effetti dell'**incertezza delle politiche commerciali**
   - Handley and Limao (2015); Coelli (2018)
3. Gli effetti delle **TBTs** sulle attivita' delle imprese
   - Herghelegiu (2018); Fontagné and Orefice (2018)

Definizione di TBT non trasparente

1. **Sorpresa**



2. **Annunciata**



Costruzione di una nuova banca dati

- **Perche' ?**
  - le banche dati esistenti (per esempio TRAINS) non riportano la storia completa delle TBT e mancano di identificatori
- **Come?**
  - 405 TBTs contenute nel database delle regolamentazioni contestate alla OMC (1995-2011)
  - web scraping dal sito OMC per scaricare documenti rilevanti su queste reglamentazioni
  - Analisi testuale di 2 tipi di dati:
    1. notifica
    2. il contenuto del reclamo

[More]

Frequenze dei diversi tipi di TBTs

- Idenitificate le date d'introduzione per 75% of TBTs
  - 37% sono TBT Sorpresa
  - 63% sono TBT Annunciate

[More]

- Associato questa banca dati con un panel di esportatori francesi nel settore manufatturiero 1995-2007
  - La quota di mercato delle line di prodotto e paesi di destinazioni interessate da nuove TBTs e' in media l'8%

[More]

Startegia Empirica 1

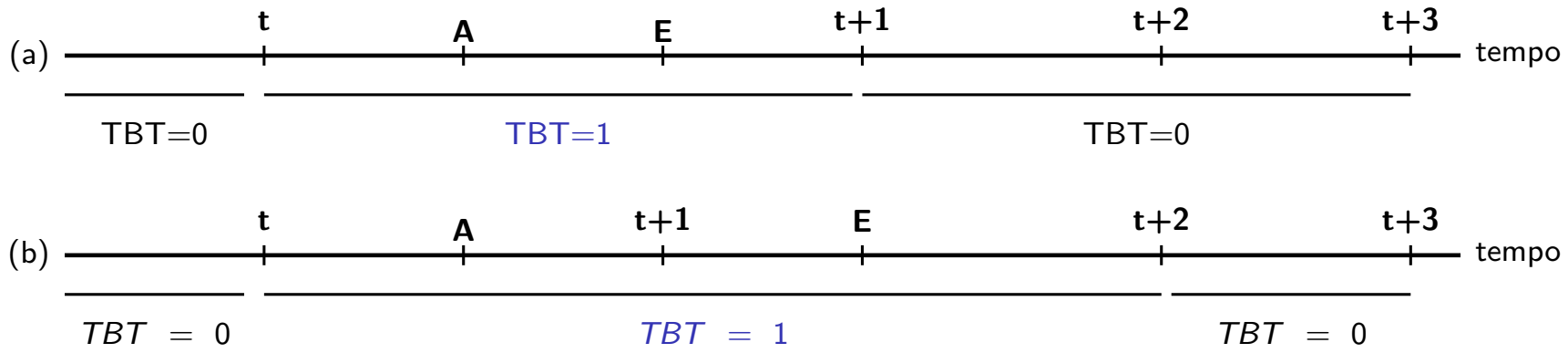
Un semplice modello:

$$y_{ipdt} = \alpha + \delta_0 \mathrm{TBT}_{pdt} + \epsilon_{ipdt} \tag{1}$$

dove y_{ipdt} e' una misura di **performance della impresa** i nel prodotto p, nel paese di destinazione d, al tempo t, e

$$\mathrm{TBT}_{pdt} = 1[\text{if } t \geq t(A_{pd}) \;\&\; t \leq t(E_{pd})], \tag{2}$$

dove A_{pd} e' la data di Adozione, mentre E_{pd} quella di entrata in vigore e $t(A_{pd})$ e $t(E_{pd})$ i rispettivi semestri.



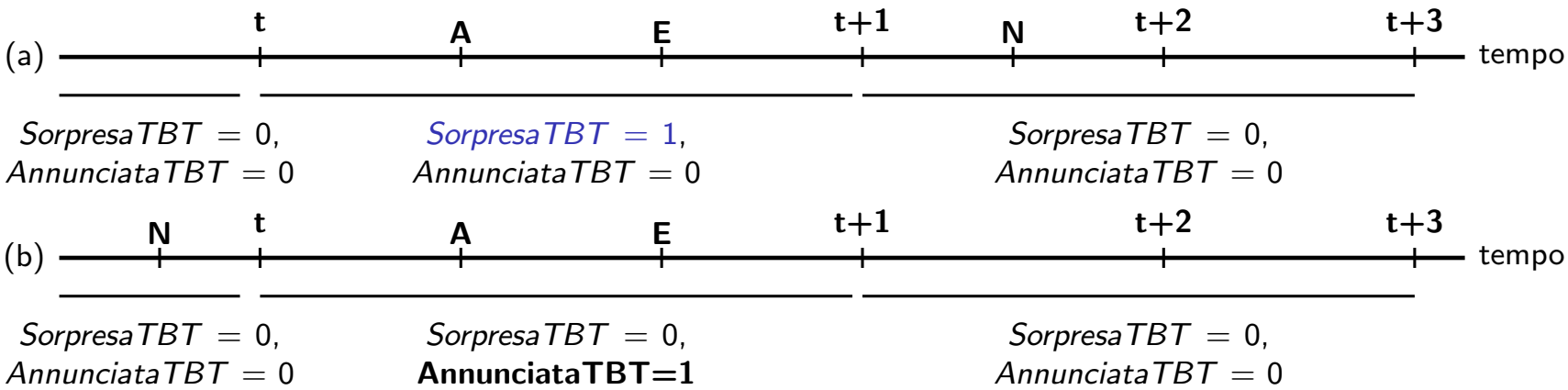
Strategia empirica 2

Introduciamo la data della Notifica N_{pd}, che puo' essere *NA*.

$$y_{ipdt} = \alpha + \beta_0 \text{SorpresaTBT}_{pdt} + \gamma_0 \textbf{AnnunciataTBT}_{pdt} + \epsilon_{ipdt} \quad (3)$$

where:

1. $\text{SorpresaTBT}_{pdt} = 1[\text{if } (N_{p,d} = NA | N_{p,d} > E_{p,d}) \ \& \ \text{TBT}_{pdt} = 1]$,
2. $\textbf{AnnunciataTBT}_{pdt} = 1[\text{if } N_{p,d} \leq E_{p,d} \ \& \ \text{TBT}_{pdt} = 1]$.



Identificazione degli effetti

$$y_{ipdt} = \beta_0 \text{SorpresaTBT}_{pdt} + \gamma_0 \text{AnnunciataTBT}_{pdt} + \\ + \delta asinh(\text{tariff}_{pdt}) + \mu_{HS2,d,t} + \mu_i + \epsilon_{ipdt} \quad (4)$$

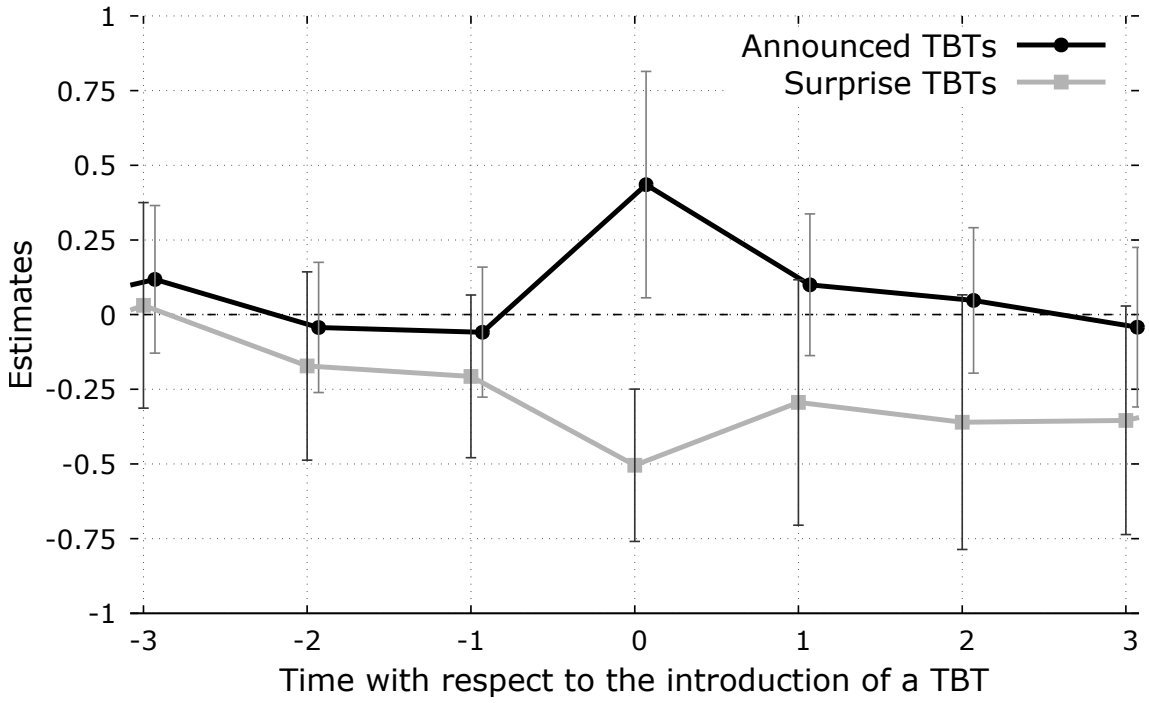
[Ipotesi d'identificazione]

1. controllo per la tariffa (Moore and Zanardi, 2011; Beverelli et al., 2014; Orefice, 2017; Herghelegiu, 2018)

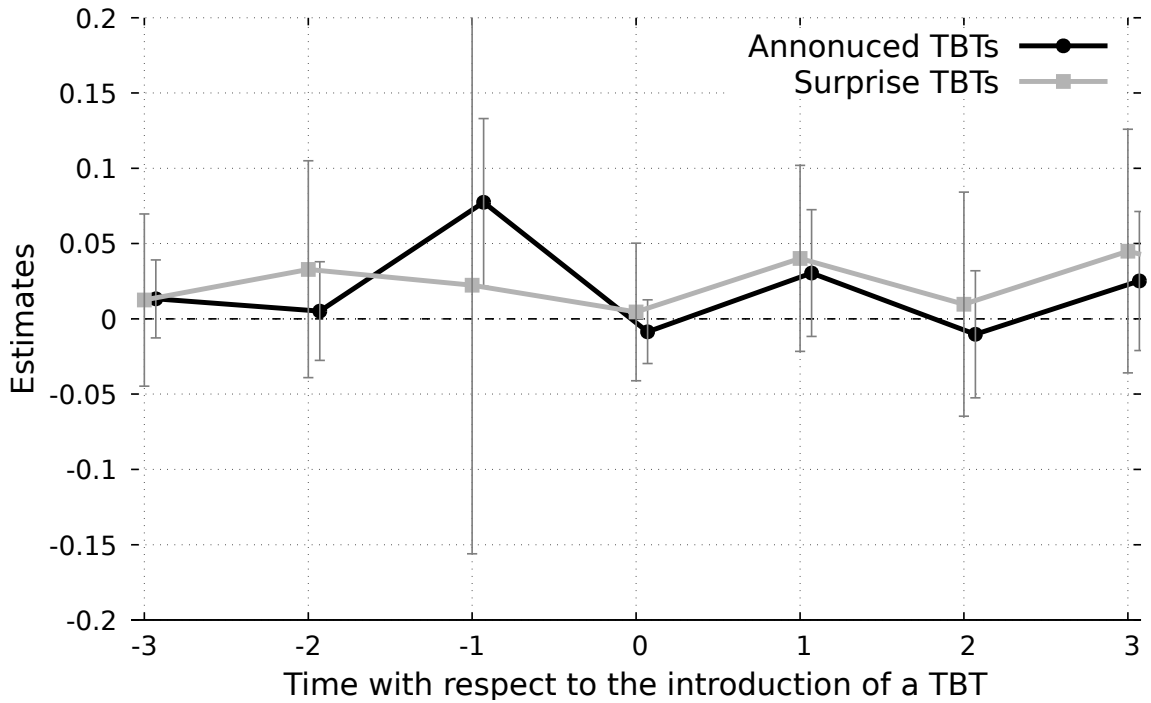
2. comparare le performance per **la stessa impresa** (μ_i) di linee di prodotto vendute in **condizioni di mercato similari** ($\mu_{HS2,d,t}$), che si distinguono per essere o meno toccate da una TBT

[Evidenza di causalità inversa]

Valore dell'Export



Probabilita' d'uscita



Quantificazione

TBT Annunciate sono associate a:

- $\uparrow \sim 26\%$ del **valore medio di export** [Risultati]
- $\uparrow \sim 5\%$ della probabilita' di uscita [Risultati]

TBT Sorpresa sono associate a:

- $\downarrow \sim 24\%$ del **valore medio di export** [Risultati]
- In media, l'effetto di una TBT Sorpresa equivale ad un incremento della tariffa da 16% a 44.5%
- $\sim 40\%$ tariffa nello scenario di guerra tariffaria in Costinot and Rodríguez-Clare (2014) [Risultati]

Test di robustezza

- Event by Event Study [More]
- stimatore PPML [More]
- Diversi gruppi controfuattuali [More]
- Underidentification [More]
- Differenze nella lunghezza del trattamento [More]
- Solo TBTs su HS4s [More]

Interpretazione dei risultati

- La TBT richiede un investimento
- l'investimento e' almeno in parte irreversibile
- l'azienda puo' rimandare l'investimento

La mancanza di trasparenza $\Longrightarrow \uparrow$ l'incertezza dell'investimento
$\Longrightarrow \uparrow$ il costo opportunita' di investire (Dixit and Pindyck, 1994)

Interpretazione dei risultati

La mancanza di trasparenza $\Longrightarrow \uparrow$ l'incertezza dell'investimento $\Longrightarrow \uparrow$ il costo opportunita' di investire (Dixit and Pindyck, 1994)

Si tratta di uno stop temporaneo?

DEPENDENT VARIABLE	#(Shipments)	Export per Shipment
	(1)	(2)
SorpresaTBT	$-\mathbf{0.201}^{b}$	-0.195
	(0.083)	(0.145)
Obs.	4,214,856	4,214,856
Adj. R2	0.26	0.26
Firm FE	Yes	Yes
HS2-Country-Time FE	Yes	Yes

Risultati complementari

1. Studio della variabilita' dell'effetto a seconda delle caratteristiche d'impresa [Risultati]
    - Indipendentemente dalla taglia, tutte le imprese subiscono uno stop
    - l'effetto e' temporaneo per le grandi, mentre le piccole e medie imprese escono dal mercato.

2. Test sulla persistenza della incertezza
    - Gli effetti si estinguono piu' velocemente (in media, da 2 a 1 semestre), nel caso la regolamentazione venga ufficializzata [Risultati]

Riepilogo

Mancanza di trasparenza determina:

1. una riduzione del **25%** nel valore medio d'esportazione
2. effetto aggregato equivalente ad un regime tariffario di **guerra commerciale**
3. **effetti eterogenei** rispetto alle caratteristiche d'impresa
4. un **stop temporaneo** per le grandi + uscita d'imprese piccole e medie

Conclusione

In che misura l'incertezza caratterizza la natura protettiva delle TBTs?

I paesi possono aumentare l'incertezza delle imprese straniere di servire il proprio mercato implementando regolamentazione tecnica in modo non trasparente.

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https://ioire.github.io

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Herghelegiu, C. (2018): "The political economy of non-tariff measures," *The World Economy*, 41, 262–286.

Ing, L. Y., O. Cadot, and J. Walz (2018): "Transparency in non-tariff measures: An international comparison," *The World Economy*, 41, 884–912.

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Orefice, G. (2017): "Non-Tariff Measures, Specific Trade Concerns and Tariff Reduction," *The World Economy*, 40, 1807–1835.

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WTO Database of STC - Notified entry

STC Notif Type Symbol	First date raised	Dates subsequently raised	Members maintaining	Member(s) concerned	Issues	Description of content	First date raised minutes	Minutes description	Product mentioned in the minutes and/or notification	HS Code (Rev. 2)
G/TBT/N/ARG/101	11/7/2003	3/23/2004	Argentina	European Union	further information, clarification, transparency	Maximum limits for sulphate content	G/TBT/M/31	45. [...] The representative of the European Communities requested Argentina to provide answers to the comments and noted that all the texts concerned had been adopted before their notification.	Wine	2204

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WORLD TRADE ORGANIZATION

NOTIFICATION -> DATE

G/TBT/N/ARG/101
23 May 2003
(03-2765)

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Committee on Technical Barriers to Trade Original: Spanish

NOTIFICATION

The following notification is being circulated in accordance with Article 10.6.

1.	**Member to Agreement notifying:** ARGENTINA **If applicable, name of local government involved (Articles 3.2 and 7.2):**
2.	**Agency responsible:** National Institute of Vitiviniculture **Name and address (including telephone and fax numbers and E-mail and Web site addresses, if available) of agency or authority designated to handle comments regarding the notification shall be indicated if different from above:** *Idem* National Enquiry Point
3.	**Notified under Article 2.9.2 [** X **], 2.10.1 [ ], 5.6.2 [ ], 5.7.1 [ ], other:**
4.	**Products covered (HS or CCCN where applicable, otherwise national tariff heading. ICS numbers may be provided in addition, where applicable):** Wine
5.	**Title, number of pages and language(s) of the notified document:** Wine – Sulphate Content (2 pages, in Spanish)
6.	**Description of content:** Establishes the maximum limits for sulphate content, expressed as potassium sulphate, both in wine that is in circulation and in wineries.
7.	**Objective and rationale, including the nature of urgent problems where applicable:** The need to establish, as an exporting country, the appropriate limits for these products through essential production and conservation techniques, as laid down by the International Organization of Vine and Wine (OIV).
8.	**Relevant documents:** INV Resolution No. 14/2003
9.	**Proposed date of adoption:** 30 April 2003 (Official Journal) <-ADOPTION DATE **Proposed date of entry into force:** 8 May 2003 <- ENFORCEMENT DATE
10.	**Final date for comments:** -
11.	**Texts available from: National enquiry point [**X**], or address, telephone and fax numbers and E-mail and Web site addresses, if available, of other body:** Punto Focal de la República Argentina Dirección Nacional de Comercio Interior (DNCI) Avda. J. A. Roca 651, Piso 4°, Sector 22 (1322) Buenos Aires Fax: 54 11 4349 4072 Tel.: 54 11 4349 4067 E-mail: focalotc@mecon.gov.ar Web site: http://www.puntofocal.gov.ar

WTO Database of STC - Unnotified entry

STC Notif Type Symbol	NOTIF_NO	First date raised	Dates subsequently raised	Members maintaining	Member(s) concerned	Issues	Description of content	First date raised minutes	Minutes description	Product mentioned in the minutes and/or notification
		6/25/2009	11/5/2009	China	European Union, United States, Japan	further information, clarification, transparency	Mandatory internet filter software used to prevent harmful information	G/TBT/M/48, paras. 36-42	(ix) China – Green Dam Youth Escort internet filtering software 36. The representative of the European Communities drew the Committee's attention on Circular 2009/226, issued by the Chinese Ministry of Industry and Information Technology (MIIT) on 22 May 2009. The EC representative explained that, according to this measure, all computers sold in China, whether imported or domestically manufactured, would need to be equipped with the so-called Green Dam Youth Escort internet filtering software as of 1 July 2009.	Computers

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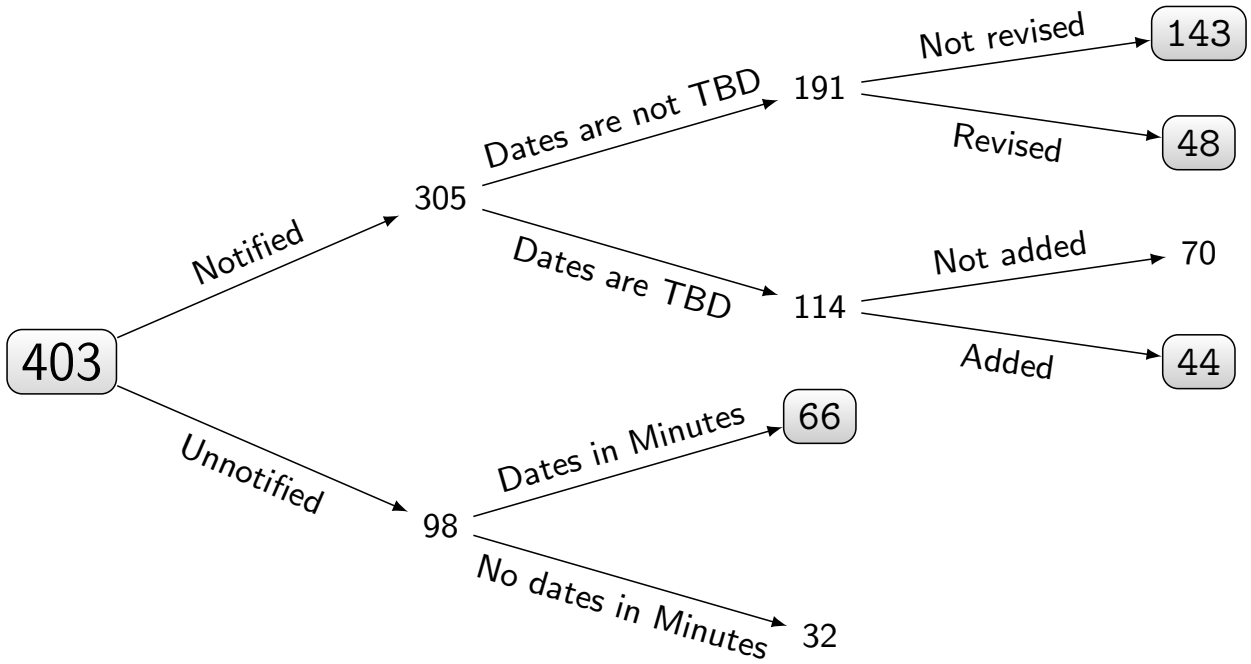
Database on tempolines

I identify the tempoline of introduction for 301 (**75**%) of the TBTs.



Notes: Frequency of TBTs by the source from which their tempoline information is retrieved. The edges of the tree represent attributes that identify whether a certain source of information can be used.

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Sorpresa Measures by countries and products

Table: Top 5 countries and products by Sorpresa TBTs

Country	#(Sorpresa TBTs)	Share (%)	Sector (HS2)	#(Sorpresa TBTs)	Share (%)
EU	17	26	Beverages & Spirits (22)	29	40
Korea	10	48	Meat (02)	18	50
China	10	27	Edible Preparations (21)	17	35
India	7	70	Fish (03)	15	47
USA	7	50	Electrical Machinery (85)	13	33

Notes: The share of Sorpresa is the ratio between the number of contested TBTs introduced by a country (within an HS2 catgory) as Sorpresa measures over the total number of contested TBTs introduced by the same country. Risultati are shown for the first ten countries in terms of Sorpresa share and only for those countries with at least 3 contested TBTs.

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Summary statistics for the STC database

Table: Summary statistics for STC database

	Mean	Median	Min	Max
#(TBT) by Country	4	5.2	1	27
#(HS4 categories) by TBT	32	3	1	314
#(semesters) in the Introduction Period by TBT	1.8	1	1	6

Notes: Each STC can cover on or more TBTs. The last two rows of the table gives figures at the TBT level.

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Estimating Sample

Estimating Sample	SEMESTRAL AVERAGE	
	Sample	Touched by TBT
#(HS4, country)	35964	1122
#(exporters)	17131	2580
Total Export (bln)	32.6	2.44

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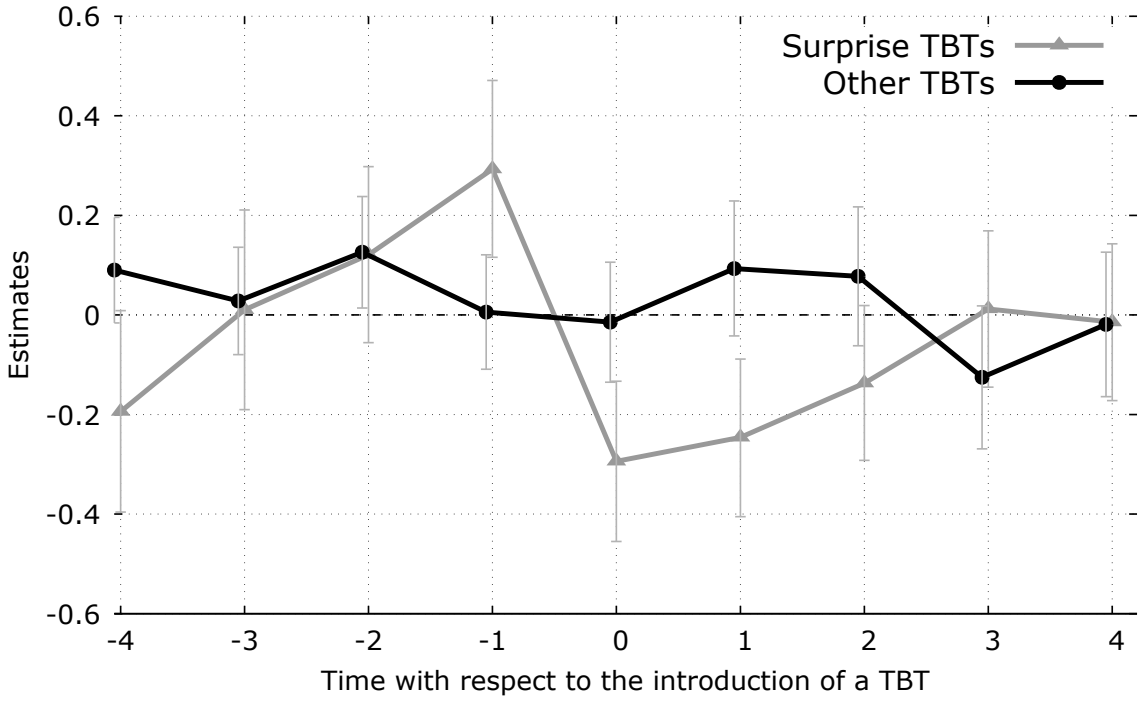
Concerns with Reverse Causality



Notes: time is a semester. The image plots the estimated coefficients, and CI 95% , of a model where we regress the (log) value of French export in a (product, destination country, tempo) market over semestral dummies around the introduction of the TBT. The model includes (product,destination country) fixed effects and therefore exploits the tempo variability within markets TBTs.

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Identification Assumptions

Define with p' a product that belongs to the same HS2 as p and with $Y_{ipdt}(0)$ the potential export without any regulation.

1. Strong Exogeneity: For all $(ipdt)$, $E(Y_{ipdt}(0) - Y_{ip'dt-1}(0)|\ TBT_{pd}) = E(Y_{ipdt}(0) - Y_{ip'dt-1}(0))$
2. Parallel Trends: For $t \geq 2$, $E(Y_{ipdt}(0) - Y_{ip'dt-1}(0))$ does not vary across firms.

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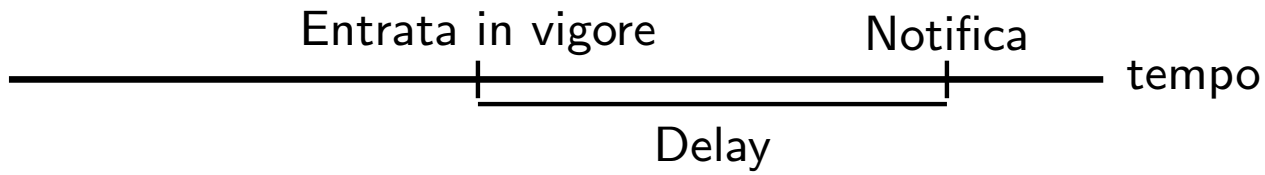
Persistence of Uncertainty

Of the Sorpresa TBTs, there are two types:

a. **Unnotified** (22%)

b. **Late Notified** (16%)



Of the Late Notified:

	Min	Mean	Median	Max
Delay (months)	0	5	3	19

Results - Static Model

DEPENDENT VARIABLE	Export		Exit_{t-1}	
TBT	0.12		0.045^{b}	
	(0.10)		(0.017)	
SurpriseTBT		-0.27^{a}		0.00
		(0.13)		(0.02)
AnnouncedTBT		0.23^{b}		0.055^{a}
		(0.11)		(0.01)
asinh(tariff)	-0.05^{a}	-0.05^{a}	0.00	0.00
	(0.036)	(0.036)	(0.00)	(0.00)
Obs.	4,214,856	4,214,856	2,522,245	2,522,245
R2	0.26	0.26	0.11	0.11
Firm FE	Yes	Yes	Yes	Yes
HS2-Country-Time FE	Yes	Yes	Yes	Yes

Notes: Export is in log, so the marginal effect of a dummy reads $100(e^{\beta}-1)\%$, with β being the coefficient on the dummy. Standard errors in parenthesis are clustered at (p,country,time). The observations in cols 3 and 4 are larger than in 1 and 2 since who export might be an entry and exit or an incumbent, exit is defined only over the last two. $^{c} < 0.1$, $^{b} < 0.05$, $^{a} < 0.01$.

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Results - Static Model

DEPENDENT VARIABLE	$Export_t$		$Exit_{t-1}$	
TBT	**0.12**		**0.045**^{b}	
	(0.10)		(0.017)	
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Firm FE	Yes	Yes	Yes	Yes
HS2-Country-time FE	Yes	Yes	Yes	Yes

The introduction of a **TBT** over which EU has raised a concern is associated to:

- **no significant** adjustment in the **average export value**;
- an **increase** in the probability of **exit by 4.5%**

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Results - Static Model

DEPENDENT VARIABLE	$Export_t$		$Exit_{t-1}$	
TBT	0.12		0.045^b	
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SurpriseTBT		**-0.27**^{a}		**0.00**
		(0.13)		(0.02)
AnnouncedTBT		0.23^b		0.055^a
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R2	0.26	0.26	0.11	0.11
Firm FE	Yes	Yes	Yes	Yes
HS2-Country-time FE	Yes	Yes	Yes	Yes

Surprise TBTs are associated to a:

- substantial **fall**, of around **24%**, in the **average export value**,
- **no significant** adjustment in the probability of **exit**

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Results - Static Model

DEPENDENT VARIABLE	$Export_t$		$Exit_{t-1}$	
TBT	0.12		0.045^b	
	(0.10)		(0.017)	
SurpriseTBT		-0.27^a		0.00
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		(0.11)		(0.01)
asinh(tariff)	-0.05^a	-0.05^a	0.00	0.00
	(0.036)	(0.036)	(0.00)	(0.00)
Obs.	4,214,856	4,214,856	2,522,245	2,522,245
R2	0.26	0.26	0.11	0.11
Firm FE	Yes	Yes	Yes	Yes
HS2-Country-time FE	Yes	Yes	Yes	Yes

Announced TBTs are associated to a:

- substantial **rise**, of around **26%**, in the **average export value**;
- an **increase** in the probability of **exit by 5.5%**

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Persistence of Uncertainty

	(1) Export	(2) Export
$Sorpresa TBT_{pdt,k=0}$	-0.269^{c}	-0.268^{c}
	(0.14)	(0.14)
$Sorpresa TBT^{UN}_{pdt,k=1}$	-0.310^{a}	**-0.320**^{a}
	(0.119)	(0.135)
$Sorpresa TBT^{LN}_{pdt,k=1}$	0.0936	**0.0951**
	(0.193)	(0.194)
$Sorpresa TBT^{UN}_{pdt,k=2}$		-0.186
		(0.173)
$Sorpresa TBT^{LN}_{pdt,k=2}$		0.0192
		(0.177)
asinh(tariff)	-0.0520^{a}	-0.0514^{a}
	(0.00204)	(0.00206)
N	3965137	3819196
adj. R^2	0.261	0.262
Firm FE	Yes	Yes
HS2-Country-tempo FE	Yes	Yes

Notes: K are the number of semesters after the introduction of a TBT. The superscript UN and LN are used to distinguish the two types of Sorpresa TBT, Unnotified and Late Notified ones. Sample follows methodology of Schmidheiny and Siegloch (2019). Export is in log. SE are clustered at (HS4,country,tempo). $^{c} < 0.1$, $^{b} < 0.05$, $^{a} < 0.01$.

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Table: Testing equality of coefficient between unnotified and late notified at the enforcement tempo

	Export
$SorpresaTBT^{LN}_{HS4,d,t-1,k=1}$	-0.279^{a}
	(0.0617)
$SorpresaTBT^{UN}_{HS4,d,t-1,k=1}$	-0.263^{c}
	(0.127)
asinh(tariff)	-0.0527^{a}
	(0.00225)
Obs.	4,214,856
adj. R^2	0.261
Firm FE	Yes
HS2-Country-tempo FE	Yes

Notes: P-value under the equality of the coefficients for $SorpresaTBT^{LN}_{s-1,k=1}$ and $SorpresaTBT^{UN}_{s-1,k=1}$ is 0.8983. K represents the leads, with $k = 1$ being one period ahead. Since the variables of interest are lagged $(s-1)$, they estimates the effect of a SorpresaTBT in the period of enforcement, distinguishing between those TBTs that will be notified by the next semester, denoted with subscript LN and those that will not, denoted with subscript UN . Significance levels: $^{c} < 0.1$, $^{b} < 0.05$, $^{a} < 0.01$.

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Manufacturing + Service sectors

Table: Effects of Annunciata vs Sorpresa measures - Population of French exporters

DEPENDENT VARIABLE	$Export_t$		$Exit_t$		$Exit_{t-1}$	
	(1)	(2)	(3)	(4)	(5)	(6)
TBT	0.08		0.02		0.05^b	
	(0.09)		(0.02)		(0.02)	
SorpresaTBT		-0.24^a		0.02		-0.01
		(0.09)		(0.01)		(0.02)
AnnunciataTBT		0.13		-0.00		0.06^b
		(0.08)		(0.01)		(0.03)
asinh(tariff)	-0.05^a	-0.05^a	0.00^a	0.00^a	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Obs.	8,167,539	8,167,539	4,560,835	4,560,835	4,378,804	4,378,804
Adj. R2	0.32	0.32	0.28	0.28	0.28	0.28
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
HS2-Country-tempo FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Export is in log, so the marginal effect of a dummy reads $100(e^{\beta}-1)\%$, with β being the coefficient on the dummy. Standard errors in parenthesis are clustered at (HS4,country,tempo). The observations in cols 3 and 4 are larger than in 1 and 2 since who exits does not export in the period. Significance levels: $^c < 0.1$, $^b < 0.05$, $^a < 0.01$.

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Heterogeneity across firms

DEPENDENT VARIABLE	$Export_t$		$Exit_t$	
	(1)	(2)	(3)	(4)
$Size_{MED,t}$	0.195^a	0.196^a	-0.072^a	-0.072^a
	(0.006)	(0.006)	(0.003)	(0.003)
$Size_{BIG,t}$	0.378^a	0.378^a	-0.122^a	-0.122^a
	(0.008)	(0.008)	(0.003)	(0.003)
SorpresaTBT$Size_{SMALL}$		$\mathbf{-0.339}^a$		$\mathbf{0.125}^b$
		(0.151)		(0.072)
SorpresaTBT$Size_{MED}$		$\mathbf{-0.429}^a$		$\mathbf{0.132}^a$
		(0.094)		(0.036)
SorpresaTBT$Size_{BIG}$		$\mathbf{-0.192}^b$		**0.004**
		(0.097)		(0.021)
asinh(tariff)	-0.05^a	-0.053^a	0.001^a	0.001^a
	(0.002)	(0.002)	(0.0005)	(0.001)
Obs.	4,214,856	4,214,856	2,522,245	2,522,245
Adj. R2	0.26	0.26	0.11	0.11
Firm FE	Yes	Yes	Yes	Yes
HS2-Country-tempo FE	Yes	Yes	Yes	Yes

Notes: Export is in log. $^c < 0.1$, $^b < 0.05$, $^a < 0.01$.

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Role of Market Experience

DEPENDENT VARIABLE	Export	
HighExp	0.72^a	0.72^a
	(0.003)	(0.003)
MedExp	0.28^a	0.28^a
	(0.002)	(0.002)
SorpresaTBT*HighExp*		-0.13
		(0.15)
SorpresaTBT*MedExp*		**-0.20**^{c}
		(0.12)
SorpresaTBT*LowExp*		**-0.32**^{a}
		(0.10)
log(dom_sales)	0.21^a	0.21^a
	(0.003)	(0.03)
asinh(tariff)	-0.05^a	-0.05^a
	(0.002)	(0.002)
N	4214856	4208253
R^2	0.271	0.271
Firm FE	Yes	Yes
HS2-Country-tempo FE	Yes	Yes

Notes: *LowExp* is dropped as reference class. Export is in log, so the marginal effect of a dummy reads $100(e^{\beta} - 1)\%$, with β being the coefficient on the dummy. Standard errors in parenthesis are clustered at (HS4,country,tempo). Significance levels: $^c < 0.1$, $^b < 0.05$, $^a < 0.01$.

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Only TBTs on HS4

Table: Effects of Annunciata vs Sorpresa measures - Excluding Regulations on HS6

DEPENDENT VARIABLE	Export_t	Exit_t	Exit_{t-1}
	(1)	(2)	(3)
SorpresaTBT	-0.25^a	0.049^a	-0.01
	(0.10)	(0.02)	(0.02)
AnnunciataTBT	0.27^b	-0.00	0.10^a
	(0.14)	(0.01)	(0.04)
asinh(tariff)	-0.05^a	0.00	0.00
	(0.00)	(0.00)	(0.00)
Obs.			
Adj. R2	0.29	0.30	0.18
Firm FE	Yes	Yes	Yes
HS2-Country-tempo FE	Yes	Yes	Yes

Notes: Export is in log, so the marginal effect of a dummy reads $100(e^{\beta}-1)\%$, with β being the coefficient on the dummy. Standard errors in parenthesis are clustered at (HS4,country,tempo). The observations in cols 3 and 4 are larger than in 1 and 2 since who exits does not export in the period. Significance levels: $^c < 0.1$, $^b < 0.05$, $^a < 0.01$.

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Varying sample per length of the introduction period

Table: Export and exit, exclusion of TBTs by period length

	(1) Export	(2) $Exit_{t-1}$	(3) Export	(4) $Exit_{t-1}$	(5) Export	(6) $Exit_{t-1}$
SorpresaTBT	-0.268^{b}	0.00503	-0.289^{b}	0.00503	-0.288^{b}	0.00503
	(0.131)	(0.0617)	(0.135)	(0.0617)	(0.135)	(0.0617)
AnnunciataTBT	0.230^{b}	0.0551^{a}	0.198^{c}	0.0548^{a}	0.196^{c}	0.0543^{a}
	(0.112)	(0.0198)	(0.113)	(0.0201)	(0.113)	(0.0201)
asinh(tariff)	-0.0527^{a}	0.00142^{a}	-0.0526^{a}	0.00143^{a}	-0.0529^{a}	0.00143^{a}
	(0.00201)	(0.0005)	(0.00201)	(0.0005)	(0.00201)	(0.0005)
N	4213289	2424024	4213199	2423967	4208622	2420964
adj. R^2	0.261	0.114	0.261	0.114	0.261	0.114
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
HS2-Country-tempo FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: L represents the lags, while K the leads, before and after the introduction of a TBT, where the subscript *Antic* and *Surp* are used to distinguish the two types of TBT. Cols (1) and (2) use a sample of TBT which excludes measures that extend for more than 3, (3) and (4) more than 2, (5) and (6) more than one semester. Export is in log. Standard errors in parenthesis are clustered at (HS4,country,tempo). The observations in cols 3 and 4 are larger than in 1 and 2 since exit is defined for firms that have exported at least two subsequent periods. levels: $^{c} < 0.1$, $^{b} < 0.05$, $^{a} < 0.01$.

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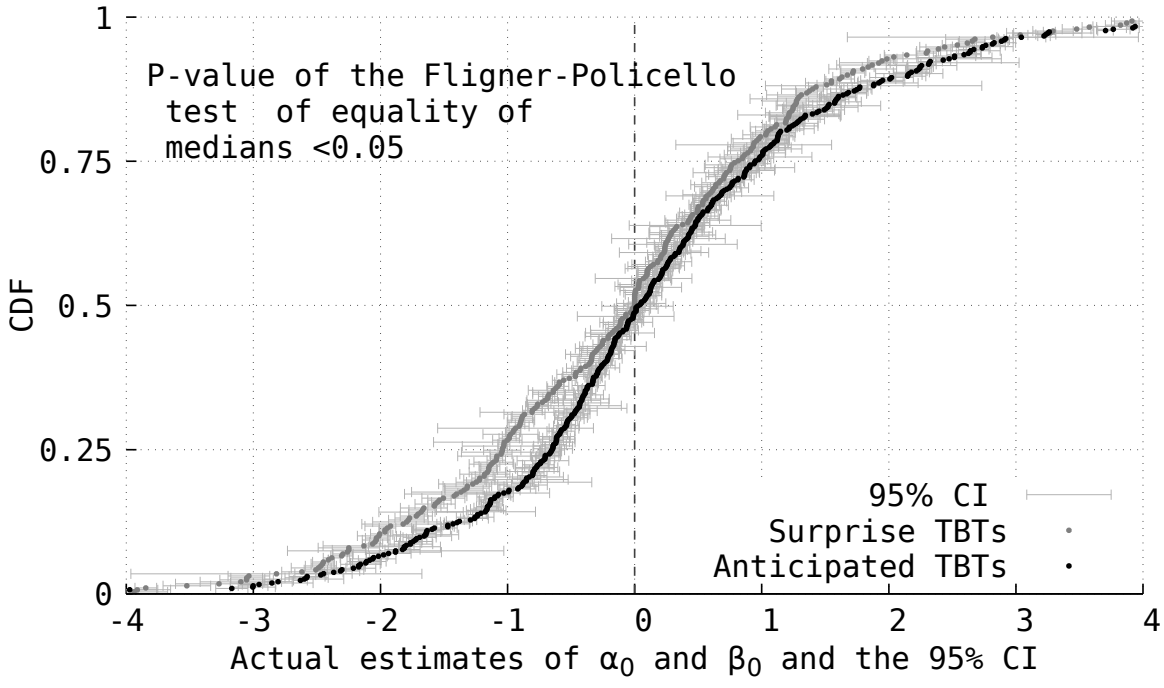
Event by event

Similar method in Cengiz et al. (2019)

Figure: EXPORT, at the introduction of a TBT



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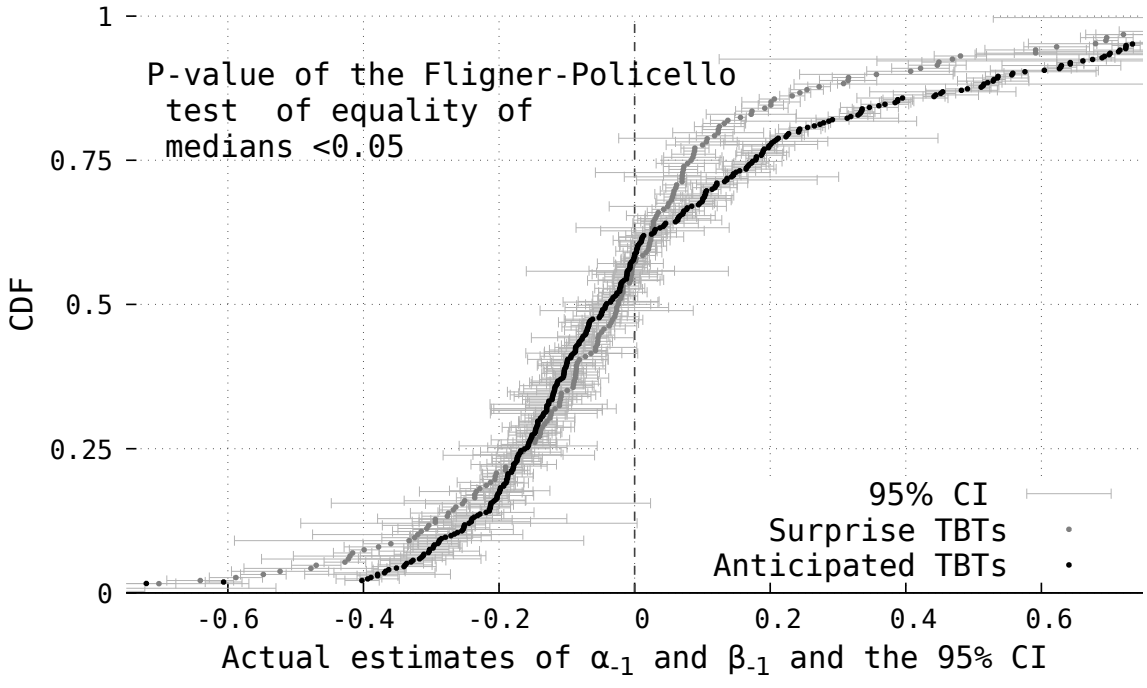
Event by event

Similar method in Cengiz et al. (2019)

Figure: EXIT, one lag before the introduction of a TBT



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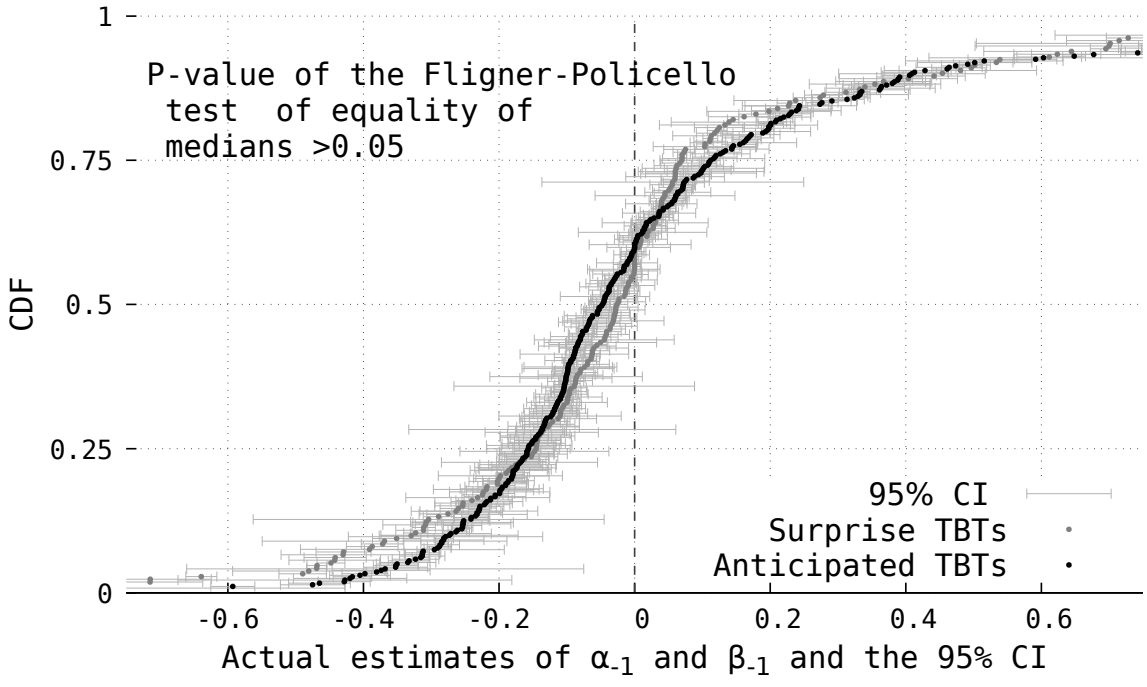
Event by event

Similar method in Cengiz et al. (2019)

Figure: EXIT, at the introduction of a TBT



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Underidentification

Table: Export, exclusion of TBTs by the coverage share of the fixed effect

	(1) Export	(2) Export	(3) Export	(4) Export
SorpresaTBT	-0.273^{b}	-0.256^{c}	-0.268^{c}	-0.256^{c}
	(0.137)	(0.139)	(0.140)	(0.147)
AnnunciataTBT	0.241^{b}	0.246^{b}	0.267^{b}	0.290^{b}
	(0.113)	(0.114)	(0.116)	(0.123)
asinh(tariff)	-0.053^{a}	-0.053^{a}	-0.053^{a}	-0.053^{a}
	(0.002)	(0.002)	(0.002)	(0.002)
N	4212139	4211987	4211893	4211524
adj. R^2	0.261	0.261	0.261	0.261

Notes: Cols represents estimation of the static specification over a sample of TBTs that cover no more than 90% (1), 80% (2), 70% (3) and 60% (4) observations within the $HS2, d, t$ category. Export is in log. Standard errors in parenthesis are clustered at (HS4,country,tempo). Significance level: $^{c} < 0.1$, $^{b} < 0.05$, $^{a} < 0.01$.

Underidentification

Table: Exit, exclusion of TBTs by the coverage share of the fixed effect

	(1) $Exit_{s-1}$	(2) $Exit_{s-1}$	(3) $Exit_{s-1}$	(4) $Exit_{s-1}$
SorpresaTBT	0.003	0.002	0.005	0.003
	(0.061)	(0.062)	(0.063)	(0.065)
AnnunciataTBT	0.055^a	0.056^a	0.055^a	0.058^a
	(0.0200)	(0.0202)	(0.0204)	(0.0213)
asinh(tariff)	0.00141^a	0.00141^a	0.00141^a	0.00141^a
	(0.0005)	(0.0005)	(0.0005)	(0.0005)
N	2,423,222	2,423,120	2,423,059	2,422,039
adj. R^2	0.114	0.114	0.114	0.114

Notes: Cols represents estimation of the static specification over a sample of TBTs that cover no more than 90% (1), 80% (2), 70% (3) and 60% (4) observations within the $HS2, d, t$ category. Export is in log. Standard errors in parenthesis are clustered at (HS4,country,tempo). Significance level: $^c < 0.1$, $^b < 0.05$, $^a < 0.01$.

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Tariff equivalent

$$E[Y|\tau, SorpresaTBT = 1] = E[Y|\tau + \Delta\tau, SorpresaTBT = 0] \quad (5)$$

- in the average market with a Sorpresa TBT, this is going from $\tau = 16\%$ to $\tau = 44.5\%$ for 1-2 semesters
- $\approx 40\%$, the uniform tariff of the trade war regime in Costinot and Rodríguez-Clare (2014)

[Details]

Tariff Equivalent

We define Y_{ipdt} to include trade zeros, defined as

$$\mathrm{Y}_{ipdt} = \begin{cases} = y_{ipdt} \\ = 0 \text{ if } y_{ipdt} = NA \text{ and exit=1.} \end{cases} \tag{6}$$

$$ln(Y_{ipdt}) = \alpha + \beta \mathrm{SorpresaTBT}_{pdt} + \delta ln(\tau_{pdt}) + \epsilon_{ipdt} \tag{7}$$

Since $\Delta Y\% = (1 - e^{\beta})100$ and $\Delta Y\% = \delta \Delta \tau\%$ we have that:

$$\Delta \tau\% = \frac{(1 - e^{\beta})100}{\delta} \tag{8}$$

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Tariff Equivalent - Estimation

$$\Delta\hat{\tau}\% = \frac{(1 - e^{\hat{\beta}})100}{\hat{\delta}} = 183\% \tag{9}$$

Which evaluated at mean $\tau^M = 16\%$ in market with a Sorpresa TBT gives $\tau^M + \Delta\hat{\tau}\%(\tau^M) = 44.8\%$.

Estimator	PPML
Dependent variable	Y_{ipdt}
SorpresaTBT	-0.31[a]
	(0.15)
asinh(tariff)	-0.16[a]
	(0.02)
Obs.	4,017,721
Firm FE	Yes
HS2-Country-tempo FE	Yes

Notes: The estimation is performed using the R package alpaca, which fits GLM's with High-Dimensional k-Way Fixed Effects using the algorithm in Stammann (2018).

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PPML Estimation

We define Y_{ipdt} to include trade zeros, defined as

$$\mathrm{Y}_{ipdt} = \begin{cases} = y_{ipdt} \\ = 0 \text{ if } y_{ipdt} = NA \text{ and exit=1.} \end{cases} \tag{10}$$

Dependent variable	Y≥0 (1)	Y≥0 (2)
SorpresaTBT	-0.21^{a}	-0.31^{b}
	(0.07)	(0.15)
AnnunciataTBT	0.87^{b}	0.83^{a}
	(0.37)	(0.30)
asinh(tariff)	-0.16^{a}	-0.16^{a}
	(0.02)	(0.02)
Obs.	4,094,703	4,094,703
Firm FE	Yes	Yes
HS2-Country-tempo FE	Yes	Yes

Notes: Cols (1) includes the case when only one period is concerned, cols (2) instead consider the case when both periods . levels: $^{c} < 0.1$, $^{b} < 0.05$, $^{a} < 0.01$.

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Different counterfactual groups

Table: Export, alternative set of fixed effects

	(1) Export	(2) Export	(3) Export	(4) Export
SorpresaTBT	-0.267^b	-0.299^a	-0.178^a	-0.20^a
	(0.137)	(0.142)	(0.0687)	(0.0944)
AnnunciataTBT	0.230^b	0.216	0.188^a	0.26^b
	(0.111)	(0.131)	(0.0713)	(0.1252)
asinh(tariff)	-0.0527^a	-0.108^a	-0.0179^a	-0.055
	(0.00201)	(0.00232)	(0.00176)	(0.0027)
N	4214856	4215092	4249924	4209901
adj. R^2	0.261	0.094	0.221	0.44
Firm FE	Yes	No	Yes	No
Firm-Country FE	No	No	No	Yes
HS2-Country-tempo	Yes	Yes	No	Yes
Country-tempo FE	No	No	Yes	No

Notes: Export is in log. Standard errors in parenthesis are clustered at (HS4,country,tempo). The observations in cols 3 and 4 are larger than in 1 and 2 since exit is defined for firms that have exported at least two subsequent periods. levels: $^c < 0.1$, $^b < 0.05$, $^a < 0.01$.

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Different length of the TBT

Table: Export and exit, exclusion of TBTs by period length

	(1) Export	(2) $Exit_{s-1}$	(3) Export	(4) $Exit_{s-1}$	(5) Export	(6) $Exit_{s-1}$
SorpresaTBT	-0.268^{b}	0.00503	-0.289^{b}	0.00503	-0.288^{b}	0.00503
	(0.131)	(0.0617)	(0.135)	(0.0617)	(0.135)	(0.0617)
AnnunciataTBT	**0.230**^{b}	**0.0551**^{a}	**0.198**^{c}	**0.0548**^{a}	**0.196**^{c}	**0.0543**^{a}
	(0.112)	(0.0198)	(0.113)	(0.0201)	(0.113)	(0.0201)
asinh(tariff)	-0.0527^{a}	0.00142^{a}	-0.0526^{a}	0.00143^{a}	-0.0529^{a}	0.00143^{a}
	(0.00201)	(0.0005)	(0.00201)	(0.0005)	(0.00201)	(0.0005)
N	4213289	2424024	4213199	2423967	4208622	2420964
adj. R^2	0.261	0.114	0.261	0.114	0.261	0.114
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
HS2-Country-tempo FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Cols (1) and (2) use a sample of TBT which excludes measures that extend for more than 3, (3) and (4) more than 2, (5) and (6) more than one. Export is in log. Standard errors in parenthesis are clustered at (HS4,country,tempo). The observations in cols 3 and 4 are larger than in 1 and 2 since exit is defined for firms that have exported at least two subsequent periods. levels: $^{c} < 0.1$, $^{b} < 0.05$, $^{a} < 0.01$.

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