

Comparative Advantage and the Uneven Effects of Non-Tariff Measures

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Outline

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Introduction

- An important trend in trade policy over the last decades is the remarkable reduction of tariff barriers worldwide and the growing relevance of regulatory barriers...
- This process seems to be correlated with the explosion of PTAs and the increasing fragmentation of production, creating pressure for new regulatory arrangements not always compatible with WTO rules...
- Despite the fact that notifications of TBT/SPS measures are expected to be grounded in pre-existing international standards and scientific evidence, their widespread dissemination among WTO members raised concerns of a new wave of protectionism...

Introduction

- At the same time, the official trade debate in Latin America, as much as in most developing economies, is still concentrated in the "old WTO" governance: tariffs, quotas and subsidies. The eventual costs of regulatory barriers such as TBT and SPS measures is generally ignored by local trade authorities..
- The available literature on the impacts of TBT/SPS on trade flows is generally scarce and with mixed results: impacts can be either positive or negative, providing no general guidance for its policy implications...
- Using a comprehensive multisectoral dataset, this work provide evidence that comparative advantage plays a role on how pre-existing TBT/SPS measures may affect export performance from a given country...
- Policy implications are at least twofold:
 - TBT/SPS measures may reinforce pre-existing trade patterns around the world;
 - Trade negotiations should concentrate efforts on sectors where countries do not have comparative advantages...

Related Literature

- Most of the empirical studies on the effects of NTMs on bilateral trade flows are based on standard OLS gravity estimations and are generally sector specific...
- Regardless of the real objectives for the imposition of non-tariff measures such as TBT and SPS by importing countries, several studies have pointed out their "predominantly" negative effects on trade flows, using rather mild OLS specifications (Leamer, 1990; Otsuki et al, 2001; Moenius, 2004; Fontagné et al, 2005; Disdier et al., 2008;
- According to the results of Moenius, 2004; Fontagné et al, 2005 and Disdier et al, 2008, just to mention a few, pre-existing TBT/SPS measures can be either trade reducing or trade promoting. No microeconomic guidance is provided for their results...

Related Literature

- A recent debate on the possible existence of misspecifications in standard gravity estimations raised serious concerns over the credibility of several previous studies using gravity models:
 - Most previous studies do not control for multilateral resistance. Anderson and Wincoop, 2003, advocates that a given bilateral trade flow is also sensitive to changes in relative prices with third countries (see also Oliveiro and Yotov, 2012);
 - Most previous studies ignore the existence of “zero trade flows”. Helpman, Melitz and Rubinstein, 2008, advocates working with the two-stage Heckman selection model in order to control for the possible correlation between the intensive and extensive margins of trade; (see also Disdier and Marette (2010); Crivelli and Groeschl (2016));
 - Most previous studies ignore the possible existence of heteroskedasticity when working with log-linear transformations. Santos-Silva and Tenreyro, 2006, 2015, advocates working with the Poisson model. Moreover, the authors points out to additional difficulties when working with the Heckman Selection model: 1. Its is hard to find a convincing instrument for the first-stage equation (probit); 2. The Panel version of the model presents additional difficulties, especially related to dynamic considerations (See Yotov et al, 2016);

Database and Empirical Strategy

- We estimate the impacts of TBT/SPS measures on import flows of two different country groups:
 - Latin American importers: Brazil, Mexico, Argentina, Colombia and Chile.
 - Developed countries importers: USA, EU_28, Japan, Canada and Australia.
- Bilateral trade data is at the 4 digit HS classification level and there are 4 years of information, from 2006 to 2012, with two-year intervals;
- The first data set (Latin American) has 2,253,677 observations whereas the second data set (Developed countries) has 2,133,978 observations, including zero trade flows;
- Trade Flows, GDP and Import Tariffs are sourced from World Bank whereas TBT/SPS measures are sourced from WTO, CWS and Inmetro.

Table 1. Incidence of Non-tariff Measures by year

	developed countries				Importer: Latin America			
	Only TBT	Only SPS	SPS and TBT	No measures	Only TBT	Only SPS	SPS and TBT	SPS and TBT
2006	32.86	9.16	12.75	61.12	25.17	7.54	6.57	6.57
2012	39.74	8.75	13.82	47.34	36.19	8.65	7.82	7.82
2007	38.47	10.74	14.09	44.05	37.64	8.45	9.9	9.9
2012	36.96	9.94	16.12	39.95	38.85	10	11.2	11.2

Imports
 Importers are Argentina, Brazil, Chile, Colombia, and Mexico.
 Importers are Australia, Canada, European Union, Japan and the United States.

1. Latin American countries were clearly less active in 2006, with (61.12%) of their imports not affected by NTMs in comparison to (45.23%) for developed importers;
2. In 2012, both country groups seem to have converged to a similar pattern of activism;
3. For both groups in 2012, over 50% of their imports are affected by TBT measures whereas over 20% are affected by SPS measures;
4. The percentage of imports flows affected by both SPS/TBT measures is higher for developed countries (16.12% against 11.2%), suggesting (perhaps) a more restrictive regulatory system;

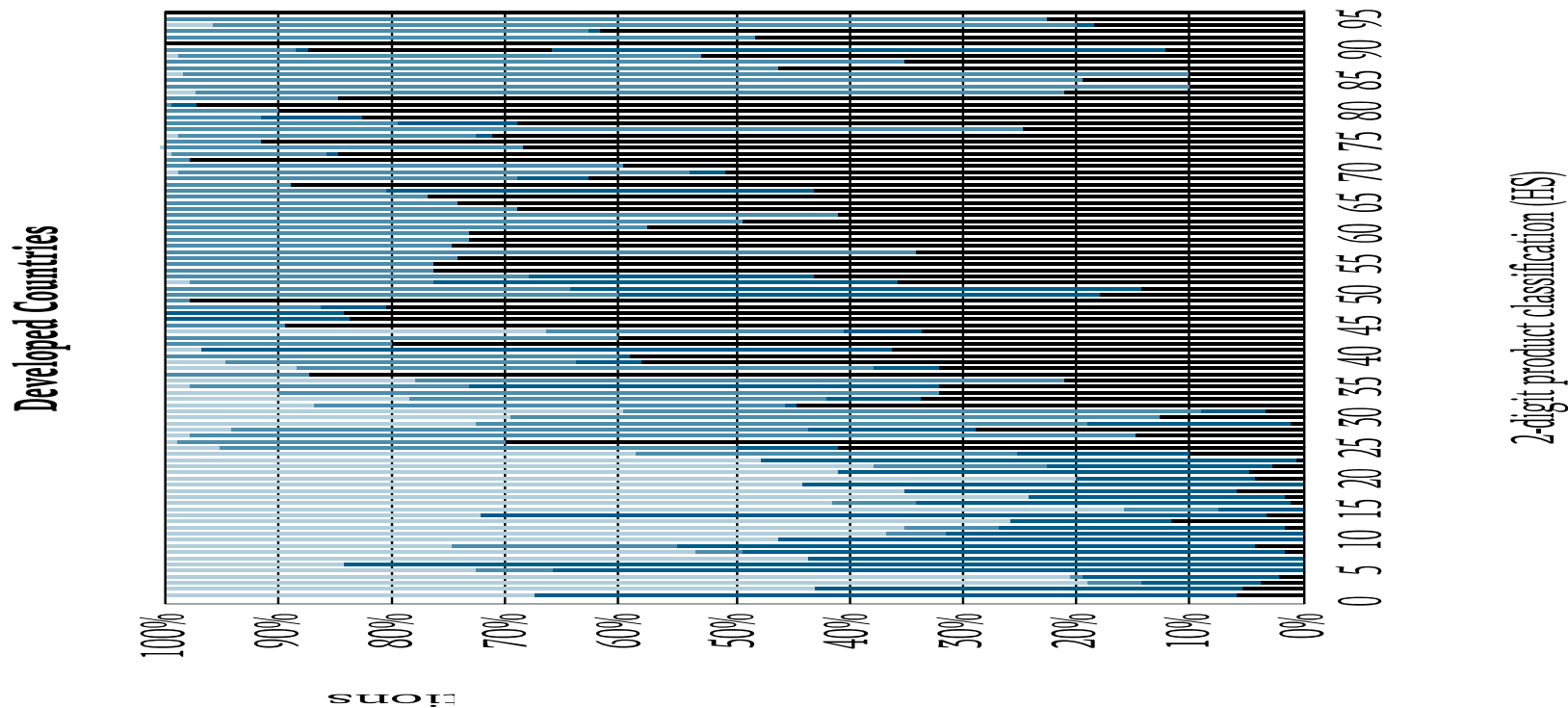
Table 2. Incidence of Non-tariff Measures by sector

Group	Sector	SPS	TBT	Both
Developed countries	Industry	48.21%	4.16%	4.28%
	Agriculture	13.47%	28.89%	44.28%
Latin America	Industry	54.99%	4.60%	1.81%
	Agriculture	35.58%	26.49%	73.07%

SPS: Argentina, Brazil, Chile, Colombia and Mexico. Developed: Canada, European Union, Japan and the United States. Sectors: Agriculture and 28-36 (HS02) as Industry.

- Over the whole sample for both groups, the agricultural sector is by far the one with the highest incidence of NTMs, where SPS measures tend to predominate (78,8% of the observations for developed and 73% for Latin America country group);
- The agricultural sector is also the one with the highest overlapping of SPS and TBT measures: more than 45% of its observations are affected by both measures at the same time;
- The industrial sector is the less restrictive for both groups: over 50% of its observations are not affected by any measures. As expected, TBT “only” measures tend to predominate;
- As a whole, in both sectors the incidence of measures tend to be lower for Latin America importers;

Figure 1. Incidence of Non-tariff Measures by HS02



1. Industrial sectors in developed countries (28-96) are the ones with lowest incidence of NTM measures, exception made for “chemicals and machinery” (28-40) and “electronics and vehicles” (84-89) where TBT measures tend to predominate;
2. Agribusiness sectors (41-70) are mostly affected by TBT measures (only)...
3. Agricultural sectors (1-27) are highly affected by either “SPS only” measures or both TBT/SPS measures.

Figure 2. Incidence of Non-tariff Measures by HS02

1. Industrial sectors in LatAm countries (28-96) are the ones with lowest incidence of NTM measures, exception made for “chemicals and machinery” (28-40) and “electronics and vehicles” (84-89) where TBT measures tend to predominate;
2. Agribusiness sectors (41-70) are mostly affected by TBT measures (only)...
3. Agricultural sectors (1-27) are highly affected by either “SPS only” measures or both TBT/SPS measures.

Possible Microeconomic channels for NTMs... (Melitz, 2003)

- In a world of i countries indexed by $i=1,2,\dots$ under monopolistic competition and a CES demand function, country i 's demand for good j , $x_i(j)$ is given by:

$$x_i(j) = \frac{B_i p_i(j)^{-\sigma}}{P_i^{-\sigma}} \frac{1}{\sigma} \frac{1}{a_i(j)}$$

- Price index in country i is given by (B_i is consumption basket in country i):

$$P_i = \left(\sum_j B_i p_i(j)^{-\sigma} \right)^{-1/\sigma}$$

- Under monopolistic competition, the profit maximizing price decision by firms leads to:

$$p_i(j) = \frac{\sigma}{\sigma-1} \frac{1}{a_i(j)}$$

“a” is the firm specific productivity drawn from a distribution $G(a)$

Possible Microeconomic channels for NTMs...

- The profit related to the export sales of good j from a firm in country i to country m is given by:



- The extensive margin decision (whether or not a firm decide to export) is given by the condition:

Firms with productivity $a > a_{im}^$ will choose to export. Firms with $a < a_{im}^*$ only sell domestically...*



Possible Microeconomic channels for NTMs...

- The productivity threshold that must be met for a firm to export is thus given by:

- **Supply side effects:**

- The higher the fixed costs f_{mi} , the higher the necessary productivity to export;
 - *Ceteris paribus, the remaining exporters will sell more, given that fixed costs do not affect exporting prices and the residual demand for each firm will be higher;*
- The higher the marginal costs c_{ij} , the higher the necessary productivity to export:
 - *Ceteris paribus, it is not clear whether or not remaining exporters will sell more since, despite the fact that residual demand will be higher, prices will be also adjusted in order to reflect higher marginal costs;*
- **Demand side effect:** Conformity with NTMs suggests more quality, safety and any other features desired by consumers. This effect may increase differentiation among suppliers, leading to an increase in market power;

Gravity Benchmark model...

- We estimate a Panel using the PPML estimator:

$$\log(m_{mxjt}) = \beta NTM_{mjt} + tm_{mjt} + \xi_{mx} + a_{mt} + \gamma_{xt} + \delta_{jt} + \varepsilon_{mxjt}$$

- Where:

- m_{mxjt} corresponds to bilateral imports of product j that country m imports from country x at year t ;
- tm_{mjt} is the import tariff applied by country m over imports of product j ;
- NTM_{mjt} is a dummy variable that equals 1 if m applies an NTM on product j at year t ;
- ξ_{mx} denote country-pair fixed effect;
- a_{mt} importer time-varying fixed effects;
- γ_{xt} exporter time-varying fixed effects;
- δ_{jt} product-time fixed effects;

“Multilateral resistance”
(Anderson and Wincoop (AER,
2003))

Multilateral Resistance

- “Multilateral resistance” is a general equilibrium effect that controls for changes in relative prices between either exporter or importer countries in the gravity equation and the rest of the world...
- In our sample, this effect seemed not to play any significant role in coefficient estimations and then its controls were replaced by standard fixed effects...(year fixed effects, importer/exporter fixed effects and product fixed effects)
- With the elimination of “multilateral resistance” fixed effects, we had to re-introduce standard gravity controls back to the gravity equation (i.e. Country level GDPs);

With (1) and Without (2) multilateral resistance

Variable	Importer: developed countries		Importer: Latin American countries	
	(1)	(2)	(3)	(4)
TBT × Developed	0.189*** (0.0419)	0.176*** (0.0437)	0.352*** (0.0438)	0.354*** (0.0467)
TBT × LatAm	-0.261*** (0.0509)	-0.267*** (0.0524)	-0.526*** (0.0616)	-0.500*** (0.0644)
TBT × Developing	-0.120*** (0.0317)	-0.139*** (0.0335)	-0.242*** (0.0506)	-0.246*** (0.0535)
TBT × LDC	-0.248*** (0.0852)	-0.243*** (0.0872)	-1.679*** (0.213)	-1.734*** (0.218)
SPS × Developed	-0.629*** (0.0585)	-0.610*** (0.0608)	-0.494*** (0.0612)	-0.486*** (0.0659)
SPS × LatAm	1.213*** (0.0693)	1.234*** (0.0713)	0.824*** (0.0843)	0.841*** (0.0871)
SPS × Developing	-0.239*** (0.0476)	-0.222*** (0.0504)	-0.405*** (0.0689)	-0.433*** (0.0729)
SPS × LDC	1.034*** (0.103)	1.048*** (0.104)	1.242*** (0.245)	1.172*** (0.248)
Tariff	-0.00207 (0.00171)	-0.00264 (0.00172)	-0.0221*** (0.00218)	-0.0250*** (0.00253)
Log GDP importer	0.874*** (0.0362)		1.072*** (0.0474)	
Log GDP exporter	0.0401 (0.0257)		0.114*** (0.0398)	
Multilateral resistance	No	Yes	No	Yes
Observations	577182	577177	360189	360155
Adj. R2	0.513	0.515	0.406	0.408

Table 3. OLS Gravity estimations ...

“The comparative advantage narrative starts here...”

Variable	Importer: developed countries	Importer: Latin American countries
NTM	-0.074*** (0.025)	-0.17*** (0.06)
TBT	-0.152*** (0.024)	-0.067*** (0.016)
SPS	-0.0549 (0.039)	-0.17*** (0.041)
NTM × Developed	-0.0589 (0.045)	0.07*** (0.045)

Variable	Importer: developed countries (1)	Importer: developed countries (2)	Importer: developed countries (3)	Importer: developed countries (4)	Importer: Latin American countries (5)	Importer: Latin American countries (6)	Importer: Latin American countries (7)	Importer: Latin American countries (8)
NTM × LatAm			0.215*** (0.0516)			-0.339*** (0.0600)		
NTM × Developing			-0.214*** (0.0328)			-0.324*** (0.0495)		
NTM × LDC			0.135* (0.0814)			-1.433*** (0.219)		
TBT × Developed				0.189*** (0.0419)			0.332*** (0.0438)	
TBT × LatAm				-0.261*** (0.0509)			-0.526*** (0.0616)	
TBT × Developing				-0.120*** (0.0317)			-0.242*** (0.0506)	
TBT × LDC				-0.248*** (0.0852)			-1.679*** (0.213)	
SPS × Developed				-0.629*** (0.0585)			-0.494*** (0.0612)	
SPS × LatAm				1.213*** (0.0693)			0.824*** (0.0843)	
SPS × Developing				-0.239*** (0.0476)			-0.405*** (0.0689)	
SPS × LDC				1.034*** (0.103)			1.242*** (0.245)	
Tariff	-0.00190 (0.00166)	-0.00190 (0.00166)	-0.00191 (0.00166)	-0.00207 (0.00171)	-0.0221*** (0.00228)	-0.0219*** (0.00229)	-0.0231*** (0.00222)	-0.0221*** (0.00218)
Log GDP importer	0.893*** (0.0360)	0.893*** (0.0360)	0.899*** (0.0363)	0.874*** (0.0362)	1.088*** (0.0465)	1.085*** (0.0464)	1.090*** (0.0470)	1.072*** (0.0474)
Log GDP exporter	0.0370 (0.0255)	0.0374 (0.0254)	0.0368 (0.0258)	0.0401 (0.0257)	0.0463 (0.0381)	0.0466 (0.0380)	0.150*** (0.0395)	0.114*** (0.0398)
Observations	577182	577182	577182	577182	360189	360189	360189	360189
Adj. R2	0.508	0.508	0.508	0.513	0.400	0.400	0.402	0.406

Table 4. Poisson Results...

Variable	Importer: developed countries	Importer: Latin American countries	
	(1) (2) (3) (4) (5) (6) (7) (8)		
NTM	-0.0155 (0.0745)	-0.0301 (0.0536)	
TBT	-0.00941 (0.0697)	0.00721 (0.0540)	
SPS	-0.0829 (0.143)	-0.173 (0.112)	
NTM × Developed		0.0106 (0.107)	-0.0944 (0.0773)
NTM × LatAm		-0.203 (0.195)	-0.147 (0.132)
NTM × Developing		0.0432 (0.131)	0.261* (0.139)
NTM × LDC		-1.107*** (0.417)	-1.016*** (0.356)
TBT × Developed		-0.00246 (0.100)	-0.0285 (0.0770)
TBT × LatAm		-0.346* (0.185)	-0.214* (0.129)
TBT × Developing		0.118 (0.127)	0.314** (0.142)
TBT × LDC		-1.031** (0.409)	-0.855** (0.376)

Variable	Importer: developed countries	Importer: Latin American countries					
	(1) (2) (3) (4) (5) (6) (7) (8)						
SPS × Developed		0.222 (0.174)					
SPS × LatAm		0.275 (0.225)	0.279* (0.158)				
SPS × Developing		-0.574*** (0.164)	-0.981*** (0.223)				
SPS × LDC		-0.874** (0.371)	-1.998** (0.681)				
Tariff	-0.0172 (0.0140)	-0.0171 (0.0140)	-0.0152 (0.0139)	-0.0416*** (0.00734)	-0.0412*** (0.00729)	-0.0410*** (0.00738)	
Log GDP importer	0.670*** (0.0953)	0.672** (0.0952)	0.660*** (0.0957)	0.660*** (0.0962)	0.546*** (0.129)	0.540*** (0.129)	0.563*** (0.128)
Log GDP exporter	0.254*** (0.0527)	0.254*** (0.0527)	0.249*** (0.0551)	0.243*** (0.0559)	0.0885 (0.0836)	0.0893 (0.0831)	0.0504 (0.0812)
Obs.	2133978	2133978	2133978	2133978	2253677	2253677	2253677

1. When the impact is not statistically significantly different from zero, it may also be a sign of comparative advantage...
2. LDC countries are clearly harmed by NTMs measures...

Table A2. Excluding Zero Trade Flows

Variable	Importer: developed countries		Importer: Latin American countries	
	Full sample	Excluding zero trade flows	Full sample	Excluding zero trade flows
TBT × Industrial	-0.00246 (0.100)	-0.105 (0.107)	-0.0285 (0.0770)	0.0175 (0.0744)
TBT × LatAm	-0.346* (0.185)	-0.312 (0.327)	-0.214* (0.129)	-0.208** (0.104)
TBT × Developing	0.118 (0.127)	0.117 (0.144)	0.314** (0.142)	0.318* (0.184)
TBT × LDC	-1.031** (0.409)	-0.589 (0.363)	-0.855** (0.376)	-0.890 (0.665)
SPS × Industrial	0.222 (0.174)	0.157 (0.184)	-0.106 (0.130)	-0.167 (0.171)
SPS × LatAm	0.275 (0.225)	0.278 (0.391)	0.279* (0.158)	0.164 (0.271)
SPS × Developing	-0.574*** (0.164)	-0.499*** (0.148)	-0.981*** (0.223)	-0.697*** (0.228)
SPS × LDC	-0.874** (0.371)	0.201 (0.452)	-1.998*** (0.681)	-0.632 (0.628)
Tariff	-0.0152 (0.0139)	-0.0185 (0.0146)	-0.0410*** (0.00738)	-0.0329*** (0.00950)
Log GDP importer	0.660*** (0.0962)	0.621*** (0.109)	0.348*** (0.127)	0.361*** (0.138)
Log GDP exporter	0.243*** (0.0559)	0.262*** (0.0690)	0.0808 (0.0825)	0.142* (0.0843)
Observations	2133978	577182	2253677	360189
Observations	577182	577177	360189	360155
Adj. R2	0.513	0.515	0.406	0.408

With no explicit comparative advantages in our sample, NTMs can be specially harmful to LDC firms at the extensive margin of trade...

LDCs exports are negatively affected by NTMs only when zero trade flows are taken into consideration...

Table 5. Poisson Results – Sector level

Variable	Importer: developed countries	Importer: Latin American countries
	(1)	(2)
TBT × Industry	0.0963 (0.0721)	-0.00773 (0.0585)
TBT × Agric.	-0.301** (0.133)	0.0775 (0.150)
SPS × Industry	-0.0953 (0.166)	-0.147 (0.114)
SPS × Agric.	0.0217 (0.191)	-0.610* (0.340)
TBT × Developed × Industry		0.135 (0.127)
TBT × LatAm × Industry		-0.234 (0.261)
TBT × Developing × Industry		0.184 (0.141)
TBT × LDC × Industry		-1.264** (0.557)
TBT × Developed × Agric.		-0.459** (0.210)
TBT × LatAm × Agric.		-0.369** (0.181)
TBT × Developing × Agric.		-0.0693 (0.192)
TBT × LDC × Agric.		-0.374 (0.532)

Variable	Importer: developed countries	Importer: Latin American countries
	(1)	(2)
SPS × Developed × Industry		0.405** (0.198)
SPS × LatAm × Industry		-0.863*** (0.295)
SPS × Developing × Industry		-0.551*** (0.215)
SPS × LDC × Industry		-1.482** (0.622)
SPS × Developed × Agric.		0.164 (0.257)
SPS × LatAm × Agric.		0.718** (0.320)
SPS × Developing × Agric.		-0.566** (0.227)
SPS × LDC × Agric.		-0.929** (0.406)
Tariff	-0.0187 (0.0142)	-0.0161 (0.0144)
Log GDP importer	0.655*** (0.0919)	0.358*** (0.0947)
Log GDP exporter	0.254*** (0.0531)	0.241*** (0.0539)
Observations	2133978	2133978

Table 6. Is it really comparative advantage?

Variable	Importer: developed countries		Importer: Latin American countries	
	(1)	(2)	(3)	(4)
TBT × Developed × Industry	0.135 (0.127)	-0.138** (0.0552)	-0.0745 (0.0798)	-0.0279 (0.0629)
TBT × LatAm × Industry	-0.234 (0.261)	-0.0257 (0.105)	-0.381** (0.172)	0.0174 (0.101)
TBT × Developing × Industry	0.184 (0.141)	0.0460 (0.0361)	0.437*** (0.135)	0.0940 (0.105)
TBT × LDC × Industry	-1.264** (0.557)	0.0565 (0.0678)	-3.882*** (0.664)	0.130 (0.374)
TBT × Developed × Agric.	-0.459** (0.210)	-0.0699 (0.105)	0.129 (0.179)	0.251** (0.124)
TBT × LatAm × Agric.	-0.369** (0.181)	-0.131 (0.108)	0.204 (0.251)	0.199 (0.184)
TBT × Developing × Agric.	-0.0693 (0.192)	-0.0216 (0.130)	-0.835** (0.415)	-0.150 (0.403)
TBT × LDC × Agric.	-0.374 (0.332)	-0.609*** (0.0875)	1.008* (0.597)	-1.408*** (0.149)
SPS × Developed × Industry	0.405** (0.198)	-0.150 (0.108)	0.0209 (0.129)	-0.127 (0.0956)
SPS × LatAm × Industry	-0.863*** (0.295)	0.0286 (0.133)	-0.119 (0.188)	-0.0408 (0.120)
SPS × Developing × Industry	-0.551*** (0.213)	-0.0226 (0.0628)	-0.551** (0.264)	0.118 (0.153)
SPS × LDC × Industry	-1.482** (0.622)	-0.344 (0.411)	-1.725*** (0.678)	0.789*** (0.265)
SPS × Developed × Agric.	0.164 (0.257)	0.437** (0.200)	-0.599* (0.353)	0.0796 (0.141)
SPS × LatAm × Agric.	0.718** (0.320)	-0.239 (0.162)	-0.0457 (0.400)	-0.482 (0.319)
SPS × Developing × Agric.	-0.566** (0.227)	-0.161 (0.156)	-1.504*** (0.422)	-0.656** (0.320)
SPS × LDC × Agric.	-0.929** (0.406)	0.0712 (0.154)	-2.672*** (0.642)	-6.134*** (1.397)
Tariff	-0.0161 (0.0144)	-0.0115** (0.00559)	-0.0435*** (0.00753)	-0.0340*** (0.00494)

Variable	Importer: developed countries		Importer: Latin American countries	
	(1)	(2)	(3)	(4)
Log GDP importer	0.57*** (0.0947)	0.55*** (0.0908)	0.502*** (0.0729)	0.527*** (0.119)
Log GDP exporter	0.41*** (0.059)	0.276*** (0.046)	0.041 (0.083)	0.095** (0.039)
Exporter-Product-Firm effect	No	Yes	No	Yes
Observations	223570	121493	223577	77000

1. Adding exporter-product fixed effects (columns 2 and 4) as controls for comparative advantages...
2. In most of the results, controlling for comparative advantages either keep the NTM effect insignificant or changes it from significant (positive or negative) to insignificant...

Final Remarks

1. This paper provides some preliminary evidence for the correlation between comparative advantages and the uneven effects of NTMs;
2. We also provided some economic rational for their effects based on the Melitz model;
3. Future work will focus on improving the robustness of our results. Instead of controlling for exporter-product fixed effects, we will try to add other comparative advantages proxies such as:
 1. Country-factor proportions;
 2. Revealed comparative advantages indexes;