# On Non-Tariff Measures and Changes in Trade Routes: From North-North to South-South Trade?

## Fabio G. Santeramo

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# Facts - Last decade trends

Increase in global trade of AG products (cfr. Fontagne et al.,CEPII 2013). Large increase in trade flows in the Northern area (EU and US) and large increase in trade flows among major Southern countries (few exceptions: Brazil and China vs Russian Federation and South Africa).

Increase in S-S trade and decrease in N-S and S-N (exceptions for imports of US and EU from selected BRIC countries).

## Hypotheses

Koo et al. (AEPP, 2006), Lambert and McKoy (JAE, 2009), and Sun and Reed (AJAE, 2010): PTAs favor intra-bloc trade creation (TC), and trade diversion (TD) toward developing countries.

Disdier et al. (WBER, 2015) S-N trade expansion due to economic integration, and restrictive standards to fulfill bilateral agreements.

# What's left? (or deserve attention)

## Evidence

TD (N-S and S-N) and TC effects (S-S) + national policies pushing consumers preferences toward nationally produced goods (in the North), to the detriment of imported goods (from the South).

How trade will be (re-)shaped ? A new era of (de)globalization?

## The steps...
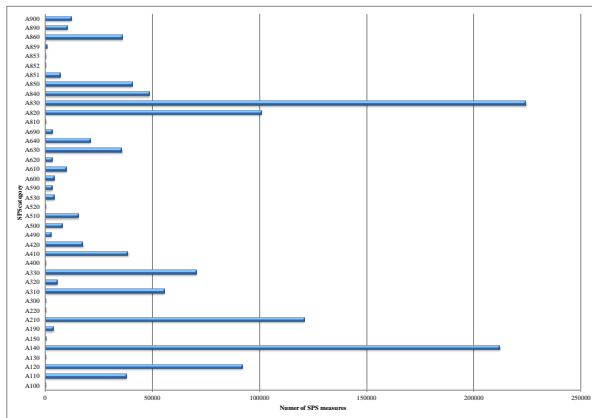
Review of the existing literature
Dataset on bilateral trade flows, SPS and controls
Assessment of the impact of NTMs and SPSs (TC and TD)

## SPS DATA

Figure 1. Global number of SPS by categories in 2016.



Source: elaboration on UNCTAD (2017), TRAINS NTMs: The Global Database on Non-Tariff Measures.

Note: SPS categories are coded according to the UNCTAD classification. They are as follows: A100 = Prohibitions/restriction of imports for SPS reasons; A200 = Tolerance limits for residues and restricted use of substances; A300 = Labeling, Marking and Packaging requirements; A400 = Hygienic Requirements; A500 = Treatments for elimination of plant and animal pests and disease-causing organisms in the final product (e.g. Post-harvest treatment); A600 = Other Requirements on Production or Post-Production Processes; A800 = Conformity Assessment related to SPS; A900 = SPS Measures, not elsewhere specified (n.e.s.). In particular, the most used SPS are: **A140** = Special authorization requirement for SPS reasons; **A830** = Certification requirement; **A210** = Tolerance limits for residues of or contamination by certain (non-microbiological) substances.
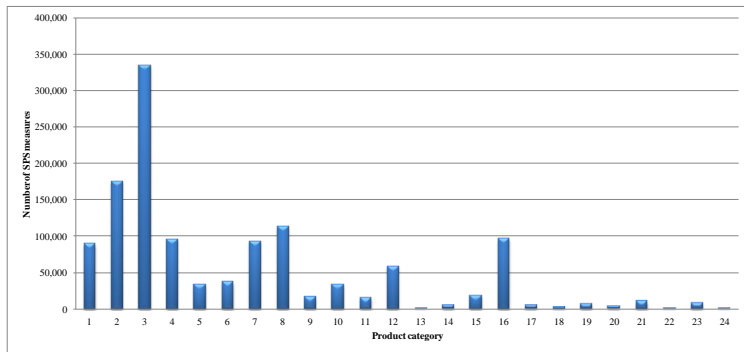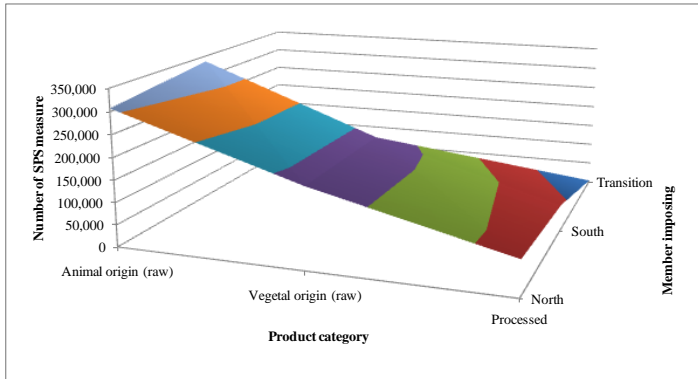
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Figure 2. Global number of SPS by products in 2016.



Source: elaboration on UNCTAD (2017), TRAINS NTMs: The Global Database on Non-Tariff Measures.

Note: Product categories are coded according to the Harmonized System (HS) 2-Digit Chapter Headings. They are as follows: 01 = Live animals; **02** = Meat and edible meat; **03** = Fish and crustaceans, mollusks and other aquatic invertebrates; 04 = Dairy produce; birds' egg; natural honey; edible products of animal origin, not elsewhere specified or included; 05 = Products of animal origin, not elsewhere specified or included; 06 = Live trees and other plants; bulbs, roots; cut flowers and ornamental foliage; **07** = Edible vegetables and certain roots and tubers; **08** = Edible fruit and nuts; peel of citrus fruit or melons; 09 = Coffee, tea, mate and spices; 10 = Cereals; 11 = Products of the milling industry; malt, starches, inulin, wheat gluten; **12** = Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit, industrial or medicinal plants; straw and fodder; 13 = Lac; gums, resins and other vegetable saps and extracts; 14 = Vegetable planting material; vegetable products not elsewhere specifies or included; 15 = Animal or vegetable fats and oils and their cleavage products; prepared animal fats; animal or vegetable waxes; **16** = Preparation of meat, fish or crustaceans, mollusks or other aquatic invertebrates; 17 = Sugars and sugar confectionery; 18 = Cocoa and cocoa preparations; 19 = Preparations of cereals, flour, starch or milk; pastrycooks' products; 20 = Preparations of vegetables, fruits, nuts or other parts of plants; 21 = Miscellaneous edible preparations; 22 = Beverages, spirits and vinegar; 23 = Residues and wastes of food industries; prepared animal fodder; 24 = Tobacco and manufactured tobacco substitutes.

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Figure 3. Global number of SPS by product category and areas of member imposing in 2016.

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Figure 4. . Global number of SPS by categories and products in 2016.

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## SPS DATA

## Literature Review on NTMs

<u>Literature review</u>

Table 1. Classification of published researches by countries area in percentage.

| Country imposing measure / Importer | Country affected by measure / Exporter | Percentage of published researches |
|---|---|---|
| North | North | 5% |
| North | South | 40% |
| South | North | 0% |
| South | South | 0% |
| Not specified | Not specified | 55% |
| | | 100% |

Note: In general, the literature on the influence of NTMs on trade analyzes the effect of measures imposed by developed countries. Although existing, researches that investigate the effects of NTMs imposed by developing countries are limited (e.g. Narayan and Nguyen (2016)[1] for South-North; Ferro et al. (2015)[2], Narayan and Nguyen (2016) for South-South).

[1]Narayan, S., and Nguyen, T.T. (2016). Does the trade gravity model depend on trading partners? Some evidence from Vietnam and her 54 trading partners. *International Review of Economics & Finance*, *41*, 220-237.
[2]Ferro, E., Otsuki, T., and Wilson, J.S. (2015). The effect of product standards on agricultural exports. *Food Policy*, *50*, 68-79.

Table 1. Descriptive statistics of ETE.

| ETE | Min | Max | Median | Mean | Std. Dev. | C.I.[*] | Obs.[**] |
|---|---|---|---|---|---|---|---|
| Total | -38.540 | 54.140 | -0.048 | -0.305 | 3.039 | [-3.334; 2.734] | 100% |
| Positive | 0.000 | 54.140 | 0.280 | 1.031 | 2.966 | [-1.935; 3.997] | 44% |
| Negative | -0.001 | -38.540 | -0.456 | -1.37 | 2.653 | [-4.023; 1.283] | 56% |
| Significant | -38.540 | 18.105 | -0.160 | -0.598 | 3.151 | [-3.749; 2.553] | 61% |
| Significant positive | 0.000 | 18.105 | 0.580 | 1.263 | 2.296 | [-1.033; 3.559] | 24% |
| Significant negative | -38.540 | -0.004 | -0.734 | -1.789 | 3.047 | [-4.836; 1.258] | 37% |
| Not significant | -12.920 | 54.140 | 0.004 | 0.155 | 2.795 | [-2.640; 2.950] | 39% |

Notes: ETE stands for 'estimated trade effect of NTMs'. In the sample, only two observations are equal to zero.

[*] Confidence interval (C.I.) ranges between mean minus standard deviation (minimum) and mean plus standard deviation (maximum).

[**] Percentages computed on the total number of observations (1,364).

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Figure 5. ETE arranged by direction.
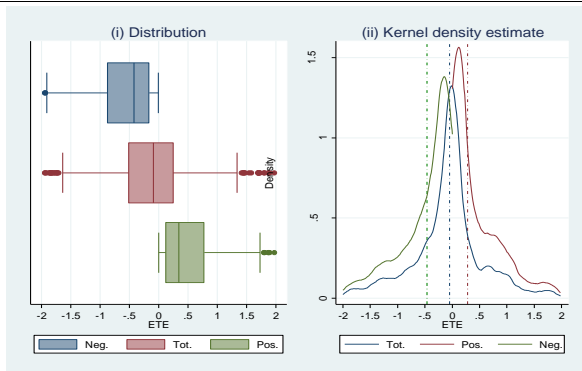


Notes: ETE stands for 'estimated trade effect of NTMs'. In panel (i) distribution of ETE is on statistically significant observations within $10^{th}$ and $95^{th}$ percentiles. Horizontal lines within boxes are median values (Me) (i.e. $Me_{Neg.}$ = -0.42, $Me_{Tot.}$ = -0.16, $Me_{Pos.}$ = 0.34). In panel (ii) the estimated density for ETE is computed removing observations which exceed $10^{th}$ and $95^{th}$ percentiles. Dashed lines are median values (Me) computed on total observations (i.e. $Me_{Tot.}$ = -0.05, $Me_{Pos.}$ = 0.28, $Me_{Neg.}$ = -0.46).

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Figure 6. Trend of published researches on trade effects of NTMs and notified NTMs over time.
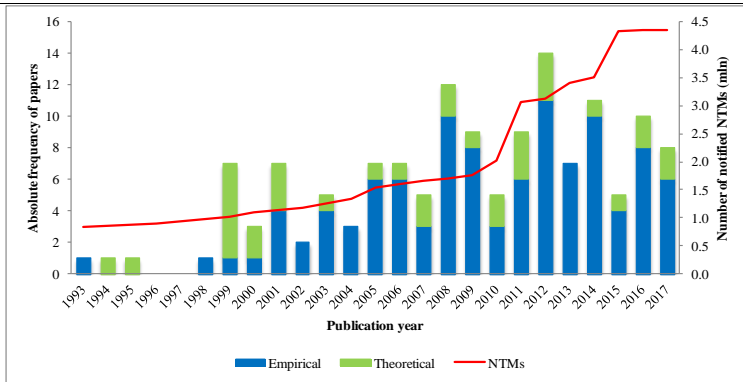
Source: elaboration on UNCTAD (2017), TRAINS NTMs: The Global Database on Non-Tariff Measures.

Note: The number of notified NTMs refers to the total of agri-food sector, without distinguishing among types of NTMs.

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## Literature Review

From 155 studies on trade and NTMs , to a sample of 62 papers (47 published in peer-reviewed journals, 15 from grey literature), for a total of 1,364 observations (ETEs).

ETEs function of publication bias, trade routes, NTM traits and methodological assumptions,

A meta-analysis-type approach. Four specifications: absolute value of ETE; ETEs in level; positive ETEs; negative ETEs.

Figure 7. ETEs arranged by trade routes.
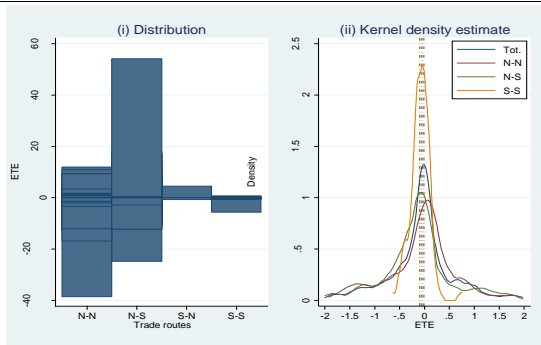


Notes: ETE stands for 'estimated trade effect of NTMs'. Trade routes are as follows: N-N stands for 'North-North', N-S stands for 'North-South', S-N stands for 'South-North', S-S stands for 'South-South', where the formers are countries imposing NTMs (reporters) and the latters are countries affected by NTMs (partners). Reporters and partners are classified into North (Developed Economies) and South (Developing Economies and Economies in transition), according to the country classification proposed by the United Nations (2017). In panel (ii), the estimated density for ETE is computed removing observations which exceed 10th and 95th percentiles. Dashed lines are median values (Me) computed on total observations (i.e. Me$_{Tot.}$ = -0.05, Me$_{N-N}$ = -0.01, Me$_{N-S}$ = -0.10, Me$_{S-S}$ = -0.09). Kernel density estimate for S-S is omitted because there are only two observations for ETEs.

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Figure 8. ETEs arranged by types of measure.
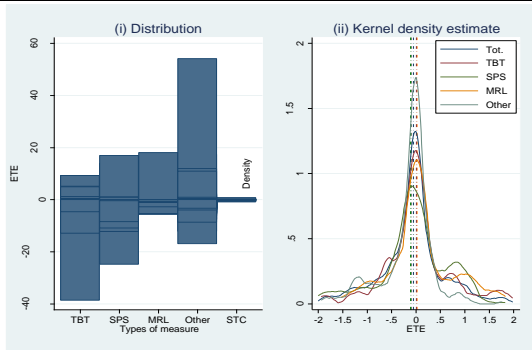


Notes: ETE stands for 'estimated trade effect of NTMs'. Types of measure are as follows: TBT stands for 'Technical Barrier to Trade', SPS stands for 'Sanitary and Phytosanitary Standard', MRL stands for 'Maximum Residue Level', STC stands for 'Specific Trade Concern', 'Other' includes measures not involved in other categories (e.g. quality and quantity control measures, Hazard Analysis and Critical Control Points (HACCP), private standards, voluntary standards, etc.). In panel (ii), the estimated density for ETEs is computed removing observations which exceed $10^{th}$ and $95^{th}$ percentiles. Dashed lines are median values (Me) computed on total observations (i.e. $Me_{Tot.} = -0.05$, $Me_{TBT} = 0.01$, $Me_{SPS} = -0.11$, $Me_{MRL} = 0.02$, $Me_{Other} = -0.09$). Kernel density estimate for STC is omitted because there are only 24 observations for ETEs.

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Figure 9. Kernel density estimate of ETEs by time trend.
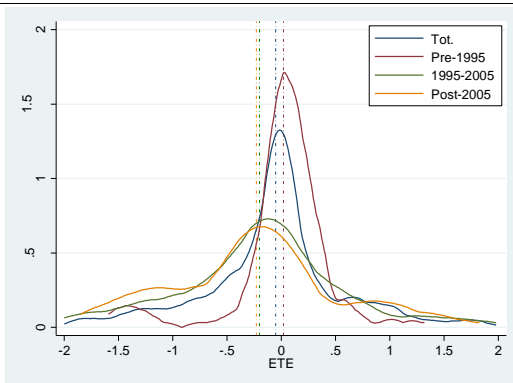


Notes: ETE stands for 'estimated trade effect of NTMs'. The analysed timeframe are classified in pre-1995, from 1995 to 2005, post-2005. The estimated density for ETEs is computed removing observations which exceed $10^{th}$ and $95^{th}$ percentiles. Dashed lines are median values (Me) computed on total observations (i.e. $Me_{Tot.} = -0.05$, $Me_{Pre-1995} = 0.02$, $Me_{1995-2005} = -0.20$, $Me_{Post-2005} = -0.23$).

Table 4. Regression results.

| Covariates[§] | Model I: $|\hat{\beta}_i|$ | Model II: $\hat{\beta}_i$ | Model III: $\hat{\beta}_i>0$ | Model IV: $\hat{\beta}_i<0$ |
|---|---|---|---|---|
| | Dependent variable | | | |
| $\gamma_1$: Standard error | 0.058 *** | 0.055 *** | 0.055 *** | -0.581 *** |
| | (0.006) | (0.007) | (0.007) | (0.068) |
| $\gamma_2$: Sample size[*] | -3.661 *** | 3.811 *** | -0.715 | 0.590 *** |
| | (1.271) | (1.432) | (0.261) | (1.371) |
| $\gamma_3$: Q1 | -3.970 *** | -2.748 *** | -4.670 *** | 1.083 |
| | (0.570) | (0.641) | (0.828) | (0.828) |
| $\gamma_4$: Q2 | -2.637 *** | -2.721 *** | -3.471 *** | -0.325 |
| | (0.591) | (0.665) | (0.883) | (0.865) |
| $\gamma_5$: WP | -2.295 *** | -2.202 *** | -1.208 | 0.364 |
| | (0.615) | (0.691) | (1.053) | (0.810) |
| $\gamma_6$: CP | -1.247 ** | -3.405 *** | -3.012 *** | -0.848 |
| | (0.622) | (0.699) | (1.085) | (0.826) |
| $\delta_1$: N-N | 1.035 *** | -0.743 ** | 0.870 | -1.160 *** |
| | (0.303) | (0.341) | (0.777) | (0.251) |
| $\delta_2$: N-S | 0.581 ** | 0.260 | 0.641 | -0.414 |
| | (0.260) | (0.292) | (0.512) | (0.298) |
| $\delta_3$: S-N | 0.226 | 1.911 | 0.744 | 4.601 *** |
| | (1.630) | (1.833) | (2.928) | (1.542) |
| $\delta_4$: S-S | 0.531 | 0.854 | -0.086 | -0.272 |
| | (0.614) | (0.690) | (1.372) | (0.515) |
| $\zeta_1$: MRL | -0.030 | -0.842 * | -2.931 *** | -0.650 * |
| | (0.447) | (0.503) | (1.016) | (0.370) |
| $\zeta_2$: SPS | 0.670 | -1.287 ** | -2.500 ** | -1.021 ** |
| | (0.489) | (0.549) | (1.124) | (0.410) |
| $\zeta_3$: TBT | 0.610 | -1.419 ** | -2.192 * | -0.737 |
| | (0.548) | (0.617) | (1.236) | (0.471) |
| $\zeta_4$: Other | 1.081 *** | -1.072 ** | -1.727 * | -1.279 *** |
| | (0.380) | (0.428) | (0.891) | (0.334) |
| $\zeta_5$: STC | 0.763 | -1.084 | -1.933 | -0.261 |
| | (0.671) | (0.754) | (1.391) | (0.595) |

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Table 4. (Continued).

| Covariates[§] | Model I: $|\hat{\beta}_i|$ | Model II: $\hat{\beta}_i$ | Model III: $\hat{\beta}_i>0$ | Model IV: $\hat{\beta}_i<0$ |
|---|---|---|---|---|
| | Dependent variable | | | |
| $\theta_1$: AVE | 0.933 * | -1.152 * | 1.220 | -1.380 *** |
| | (0.528) | (0.594) | (1.132) | (0.461) |
| $\theta_2$: Count variable | -0.368 | 0.354 | -1.126 | -0.141 |
| | (0.407) | (0.458) | (0.874) | (0.391) |
| $\theta_3$: Dummy variable | -0.051 | -0.347 | -0.166 | -0.382 |
| | (0.418) | (0.470) | (0.914) | (0.402) |
| $\theta_4$: Index | -0.471 | -0.159 | -0.637 | -0.181 |
| | (0.411) | (0.462) | (0.874) | (0.386) |
| $\theta_5$: Bilateral NTM | -0.566 * | 1.144 *** | 0.032 | 0.961 *** |
| | (0.337) | (0.379) | (0.641) | (0.342) |
| $\theta_6$: Tariff protection | 1.387 *** | -0.333 | 1.154 ** | -0.767 *** |
| | (0.257) | (0.289) | (0.484) | (0.264) |
| $\theta_7$: Zero trade flows | 0.578 ** | -0.438 | 1.540 *** | -0.215 |
| | (0.286) | (0.321) | (0.576) | (0.323) |
| $\theta_8$: Dependent variable: imports | -0.339 | -0.032 | -1.548 *** | -0.056 |
| | (0.286) | (0.321) | (0.595) | (0.259) |
| $\theta_9$: HS-2 digit | 1.155 | 0.669 | -0.227 | 0.528 |
| | (0.883) | (0.993) | (1.886) | (0.711) |
| $\theta_{10}$: HS-4 digit | 0.288 | 0.610 | -0.373 | 0.783 |
| | (0.868) | (0.976) | (1.852) | (0.680) |
| $\theta_{11}$: HS-6 digit | 0.535 | 0.768 | 0.935 | 0.907 |
| | (0.865) | (0.973) | (1.751) | (0.637) |
| $\theta_{12}$: HS-8 digit[**] | -0.470 | 0.674 | | |
| | (1.582) | (1.779) | | |
| $\theta_{13}$: Pre-1995 | -0.266 | -0.638 | -0.273 | 0.189 |
| | (0.433) | (0.487) | (0.800) | (0.452) |
| $\theta_{14}$: 1995-2005 | 0.343 | -0.175 | -0.342 | -0.873 *** |
| | (0.271) | (0.304) | (0.537) | (0.257) |
| $\theta_{15}$: Post-2005 | 1.145 *** | 0.117 | 1.801 *** | -0.744 *** |
| | (0.278) | (0.313) | (0.530) | (0.273) |
| $\alpha$: Constant | 2.027 ** | 2.282 ** | 5.774 ** | -0.246 |
| | (1.023) | (1.150) | (2.515) | (1.018) |
| Observations[***] | 942 | 942 | 428 | 513 |
| R-squared | 0.276 | 0.201 | 0.321 | 0.445 |

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Notes: Standard errors are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

[*] The estimated coefficients for sample size are of the order of magnitude of $10^{-07}$.

[**] Omitted because of collinearity: we have only 15 positive observations, of which only two observations are statistically significant.

[***] In the regression we lost 422 observation with respect to the starting sample (total observations = 1,364), because we have missing values for variables 'standard error' (350) and 'sample size' (113). In particular, 41 observations are missing simultaneously in the two variables.

[§] Acronyms are as follows: working paper (WP), conference proceeding (CP), North-North (N-N), North-South (N-S), South-North (S-N), South-South (S-S), Maximum Residue Level (MRL), Sanitary and Phytosanitary Standard (SPS), Technical Barrier to Trade (TBT), Specific Trade Concern (STC), *ad valorem equivalent* (AVE), Non-Tariff Measure (NTM), Harmonized System (HS).

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Figure 10. Net magnitude of ETEs as function of the prestige of publication outlet.



| | Q1 | Q2 | WP | CP |
|---|---|---|---|---|
| Net ETE | -1.943 | -0.610 | -0.268 | 0.780 |
| Coeff. | -3.970 | -2.637 | -2.295 | -1.247 |

**Prestige of publication outlet**
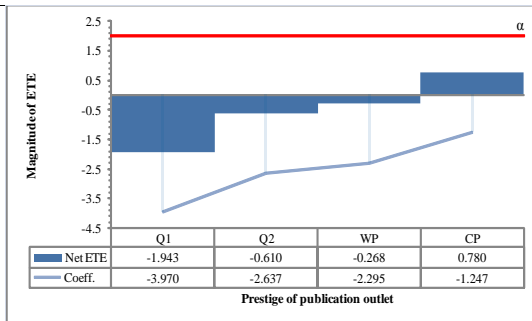
Notes: Net ETEs are obtained by summing the estimated coefficients for Q1, Q2, WP, CP to the constant $\alpha$ (2.027). Publication outlet refers to peer-reviewed journals (Q1, Q2) and gray literature; quartiles follow the classification of Scimago Journal & Country Rank (SJR) at the date of publication and the subject area 'Economics and Econometrics'; gray literature refers to working papers (WP) and conference proceedings (CP).

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Figure 11. Net ETEs as function of trade routes.



| | N-N | N-S | S-N | S-S |
|---|---|---|---|---|
| ∎ |βi| | 3.062 | 2.608 | 2.027 | 2.027 |
| ∎ βi | 1.539 | 2.282 | 2.282 | 2.282 |
| ∎ βi>0 | 5.774 | 5.774 | 5.774 | 5.774 |
| ∎ βi<0 | -1.160 | 0.000 | 4.601 | 0.000 |
| | | **Trade routes** | | |
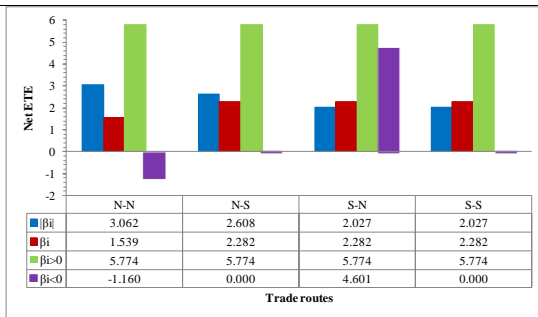
Notes: Net ETEs are obtained by summing statistically significant estimated coefficients for N-N, N-S, S-N, S-S to statistically significant constant $\alpha$, respectively of models I (2.027), II (2.282), III (5.774), and IV (0.000). Acronyms are as follows: N-N stands for 'North-North', N-S stands for 'North-South', S-N stands for 'South-North', S-S stands for 'South-South', where the former is the country imposing measures, the latter is country affected by measures.

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Figure 12. Positive net ETEs as function of the types of measure.



| | MRL | SPS | TBT | Other |
|---|---|---|---|---|
| Net ETE | 2.843 | 3.274 | 3.582 | 4.047 |
| Coeff. | -2.931 | -2.500 | -2.192 | -1.727 |

**Types of measure**
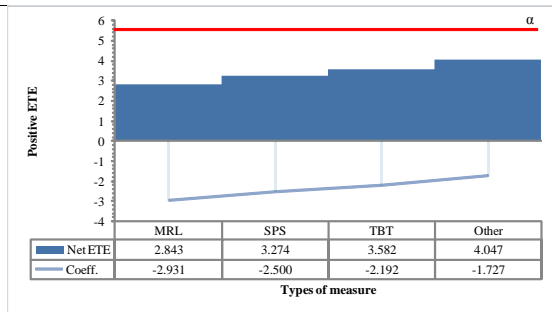
Notes: Positive net ETEs are obtained by summing the estimated coefficients for MRL, SPS, TBT, Other to the constant $\alpha$ (5.774). Acronyms are as follows: MRL stands for 'Maximum Residue Level'; SPS stands for 'Sanitary and Phytosanitary Standard'; TBT stands for 'Technical Barrier to Trade'; 'Other' includes several categories of NTMs (e.g. quality and quantity control measures, private standards, voluntary standards, etc.).

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Table 5. Summary of findings on ETEs.

| Covariates | Dependent variable | | | |
|---|---|---|---|---|
| | Model I: $|\hat{\beta}_t|$ | Model II: $\hat{\beta}_t$ | Model III: $\hat{\beta}_t>0$ | Model IV: $\hat{\beta}_t<0$ |
| Publication prestige | − | − | − | n.s. |
| Trade routes | + | − | n.s. | −/+ |
| Type of NTM | + | − | − | − |
| NTM: intensive margin | + | − | n.s. | − |
| Bilateral NTM | − | + | n.s. | + |
| Tariffs protection | + | n.s. | + | − |
| Trade: extensive margin | + | n.s. | + | n.s. |
| Dependent variable: imports | n.s. | n.s. | − | n.s. |
| Product aggregation | n.s. | n.s. | n.s. | n.s. |
| Time trend | + | n.s. | + | − |

Note: + and − represent, respectively, positive and negative effects on ETS; n.s. stands for 'not significant'.

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## Literature Review: takeaways

Several variables explain heterogeneity in ETEs: some intensify ETEs (e.g. the variables tariffs protection and those related to time trends), others drive ETEs in a precise direction (positive vs. negative).

Bilateral NTMs less discriminatory than multilateral NTMs (Crivelli and Groschl, 2016), and increase the positive ETEs of NTMs. Using imports as dep. var., and specific types of NTMs: negative ETS.

ETEs tend to be trade-routes dependent: Negative ETEs for N-N trade; larger ETEs are found for N-S trade, while the ETEs tend to be positive for S-N trade.

(Again) North tend to re-shape. (Plus) South enhance trade.

SPS DATA

Literature Review on NTMs

Material and Methods

*Data*

Table 3. Variables description.

| VARIABLE | DESCRIPTION | NOTE | SOURCE |
|---|---|---|---|
| Year | 1991-2016 | | |
| Reporter | 10 origin country/member imposing measure. | ARG; BOL; BRA; CAN; CHN; IDN; NZL; PER; RUS; USA. Classified in North and South countries. | World Economic Situation and Prospects (WESP) |
| Partner | 23 destination country/member affected by measure. | ARG; AUS; BOL; BRA; CAN; CHN; COG; DEU; EGY; ESP; FRA; GBR; IDN; IND; ITA; LBY; MAR; NZL; PER; RUS; TUN; USA; ZAF. Classified in North and South countries. | WESP |
| Product | 8 product category (HS-2 digit). | 02; 03; 04; 07; 08; 10; 12; 16. | UNCOMETRADE/ UNCTAD TRAINS NTMs |
| Trade | Bilateral trade flows (imports and exports). | US$ | UNCOMETRADE |
| Contiguity | Reporter and partner are contiguous. | dummy | CEPII |
| Common official language | Reporter and partner share a common official or primary language. | dummy | CEPII |
| Distance | Weighted distance (pop-w, km) between reporter and partner. | km | CEPII |
| Reporter GDP | GDP of the origin country. | current US$ | CEPII |
| Partner GDP | GDP of the destination country. | current US$ | CEPII |
| WTO membership | Reporter and partner are both GATT/WTO members | dummy | CEPII |
| NTM | Numbers of measures imposed | From A100 to A900 | UNCTAD TRAINS NTMs |

Table 4. Countries list.

| ISO-3 digit | Reporter/Partner | Country area |
|---|---|---|
| ARG | Argentina | South |
| AUS | Australia | North |
| BOL | Plurinational State of Bolivia | South |
| BRA | Brazil | South |
| CAN | Canada | North |
| CHN | China | North |
| COG | Congo | South |
| DEU | Germany | North |
| EGY | Egypt | South |
| ESP | Spain | North |
| FRA | France | North |
| GBR | United Kingdom | North |
| IDN | Indonesia | South |
| IND | India | South |
| ITA | Italy | North |
| LBY | Libya | South |
| MAR | Morocco | South |
| NZL | New Zealand | North |
| PER | Peru | South |
| RUS | Russian Federation | North |
| TUN | Tunisia | South |
| USA | United States | North |
| ZAF | South Africa | South |

Table 5. Product categories

| HS-2 digit | Product category |
|---|---|
| 02 | Meat and edible meat |
| 03 | Fish and crustaceans, mollusks and other aquatic invertebrates |
| 04 | Dairy produce; birds' egg; natural honey; edible products of animal origin, not elsewhere specified or included |
| 07 | Vegetables and certain roots and tubers, edible |
| 08 | Fruit and nuts, edible; peel of citrus fruit or melons |
| 10 | Cereals |
| 12 | Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit, industrial or medicinal plants; straw and fodder |
| 16 | Meat, fish or crustaceans, mollusks or other aquatic invertebrates; preparation thereof |

## SPS DATA

## Literature Review

## Material and Methods

Extensive Margins - Prob of Trade

Intensive Margins - Prob of Increasing Trade

Trade Creation - Prob of Trading w/ new Partners

Trade Diversion - Prob of Trading w/ different Partners

*Variables definition*

Extensive Margins
(Trade existence)

$Trade_t > 0$

Intensive Margins
(Trade increase)

$Trade_t > Trade_{t-1}$

Trade creation
(New Partners)

$Trade_{t-1} = 0 \wedge Trade_{t-1} \neq 0$

Trade diversion
(Different Partners)

$(Trade_{ij,t-1} \neq 0 \wedge Trade_{ij,t} = 0) \wedge (Trade_{iz,t-1} = 0 \wedge Trade_{iz,t} \neq 0)$

Note: *Trade* (at time *t* or *t-1*) is the bilateral trade flows existing between reporter *i* and partner *j*, referred to product *k*.

Horizontal vs. transversal trade

$$Z_{ij,t}^k = \alpha_0 + \alpha_1 + \alpha_2 + \beta_1 SPS_{ij,t-1}^k + \beta_2 SPS_{NN-SS,t-1}^k + \gamma_1(GDP_{i,t} - GDP_{j,t}) + \gamma_2\Delta(GDP_{i,t}) + \gamma_3\Delta(GDP_{j,t}) + \delta Dist_{ij,t} + \zeta Cont_{ij,t} + \eta + COL_{ij,t} + \theta WTO_{ij} + \varepsilon \qquad (1)$$

Horizontal trade:

$$Z_{ij,t}^k = \alpha_0 + \alpha_1 + \alpha_2 + \beta_1 SPS_{ij,t-1}^k + \beta_2 SPS_{N-N,t-1}^k + \beta_3 SPS_{S-S,t-1}^k + \gamma_1(GDP_{i,t} - GDP_{j,t}) + \gamma_2\Delta(GDP_{i,t}) + \gamma_3\Delta(GDP_{j,t}) + \delta Dist_{ij,t} + \zeta Cont_{ij,t} + \eta + COL_{ij,t} + \theta WTO_{ij} + \varepsilon \qquad (2)$$

Transversal trade:

$$Z_{ij,t}^k = \alpha_0 + \alpha_1 + \alpha_2 + \beta_1 SPS_{ij,t-1}^k + \beta_2 SPS_{N-s,t-1}^k + \beta_3 SPS_{S-N,t-1}^k + \gamma_1(GDP_{i,t} - GDP_{j,t}) + \gamma_2\Delta(GDP_{i,t}) + \gamma_3\Delta(GDP_{j,t}) + \delta Dist_{ij,t} + \zeta Cont_{ij,t} + \eta + COL_{ij,t} + \theta WTO_{ij} + \varepsilon \qquad (3)$$

North vs. South imposing

$$Z_{ij,t}^k = \alpha_0 + \alpha_1 + \alpha_2 + \beta_1 SPS_{ij,t-1}^k + \beta_2 SPS_{NN-NS,t-1}^k + \gamma_1(GDP_{i,t} - GDP_{j,t}) + \gamma_2\Delta(GDP_{i,t}) + \gamma_3\Delta(GDP_{j,t}) + \delta Dist_{ij,t} + \zeta Cont_{ij,t} + \eta + COL_{ij,t} + \theta WTO_{ij} + \varepsilon \qquad (4)$$

where:

$Z_{ij,t}^k$ alternatively represent trade existence, trade increase, trade decrease, trade creation, trade destruction, and trade diversion.

$SPS_{ij,t-1}^k$ are the number of measure.

$SPS_{NN-SS,t-1}^k$ are the number of measure existing between countries similarly developed.

$SPS_{N-N,t-1}^k$ are the number of measure that the North imposes to the North.

$SPS_{S-S,t-1}^k$ are the number of measure that the South imposes to the South.

$SPS_{S-N,t-1}^k$ are the number of measure that the South imposes to the North.

$SPS_{N-s,t-1}^k$ are the number of measure that the North imposes to the South.

$SPS_{NN-NS,t-1}^k$ are the number of measure imposed by the North.

$(GDP_{i,t} - GDP_{j,t})$ is the difference in logarithm of the GDPs of reporter and partner.

$\Delta(GDP_{i,t}), \Delta(GDP_{j,t})$ are the growth rates of reporter and partner in logarithm.

$Dist_{ij,t}$ is the distance in logarithm between reporter and partner.

$Cont_{ij,t}$ is an index of contiguity between reporter and partner.

$COL_{ij,t}$ is an index indicating that reporter and partner share a common official language.

$WTO_{ij}$ is an index indicating that both reporter and partner are WTO members.

$\alpha_0, \alpha_1, \alpha_2$ are the constant, the year fixed effects, and the country-pair fixed effects.

$\beta_2, \beta_3 \beta_3, \gamma_1, \gamma_2, \gamma_3, \delta, \zeta, \eta, \theta$ are parameters.

$\varepsilon$ is the error term.

$i$ is the countries imposing the measure.

$j$ is the country affected by the measure.

$z$ is a third country not directly involved in the dynamics of the measure.

$k$ is the product category.

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## SPS DATA

## Literature Review

## Material and Methods

Extensive Margins - Prob of Trade

Intensive Margins - Prob of Increasing Trade

Trade Creation - Prob of Trading w/ new Partners

Trade Diversion - Prob of Trading w/ different Partners

## Preliminary Results

Table 6. Estimated probability of different trade scenarios.

| VARIABLES | Trade existence | | Trade increase | | Trade creation | | Trade diversion | |
|---|---|---|---|---|---|---|---|---|
| | N-N & S-S | N-S & S-N | N-N & S-S | N-S & S-N | N-N & S-S | N-S & S-N | N-N & S-S | N-S & S-N |
| Year f.e. | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country-pair f.e. | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| $SPS_{t-1}$ | 0.0311*** | 0.0296*** | 0.00540*** | 0.00710*** | -0.0304*** | -0.0307*** | -0.0301*** | -0.0280*** |
| | (0.00186) | (0.00205) | (0.00104) | (0.00117) | (0.00191) | (0.00216) | (0.00186) | (0.00204) |
| N-N $SPS_{t-1}$ | -0.00544** | | 0.000721 | | 0.00423 | | 0.00610** | |
| | (0.00274) | | (0.00157) | | (0.00284) | | (0.00272) | |
| S-S $SPS_{t-1}$ | 0.459*** | | 0.202*** | | -0.508*** | | -0.495*** | |
| | (0.0234) | | (0.0168) | | (0.0243) | | (0.0242) | |
| N-S $SPS_{t-1}$ | | -0.00158 | | -0.0185 | | 0.00358 | | 0.000968 |
| | | (0.00276) | | (0.00157) | | (0.00286) | | (0.00274) |
| S-N $SPS_{t-1}$ | | 0.531*** | | 0.0294* | | -0.526*** | | -0.528*** |
| | | (0.0267) | | (0.0154) | | (0.0268) | | (0.0267) |
| $GDP_i$-$GDP_j$ | 0.0285* | 0.0185 | -0.0152 | -0.0161 | -0.0251 | -0.0155 | 0.00194 | 0.0117 |
| | (0.0148) | (0.0148) | (0.00981) | (0.00982) | (0.0159) | (0.0159) | (0.0149) | (0.0149) |
| $\Delta GDP_i$ | -20.03*** | -19.42*** | -4.396*** | -4.317*** | 26.56*** | 25.87*** | 23.85*** | 23.29*** |
| | (1.495) | (1.495) | (1.382) | (1.382) | (1.622) | (1.621) | (1.544) | (1.544) |
| $\Delta GDP_j$ | -3.492*** | -3.611*** | 9.026*** | 8.995*** | 3.771*** | 3.904*** | 3.197*** | 3.323*** |
| | (0.671) | (0.671) | (0.560) | (0.560) | (0.726) | (0.725) | (0.674) | (0.673) |
| $Distance_{ij}$ | 28.71*** | 27.36*** | -2.655** | -2.834** | -30.31*** | -28.94*** | -25.10*** | -23.77*** |
| | (1.848) | (1.850) | (1.315) | (1.315) | (1.974) | (1.975) | (1.857) | (1.859) |
| Contiguity | 55.57*** | 52.92*** | -4.656* | -5.008* | -58.69*** | -56.02*** | -48.53*** | -45.92*** |
| | (3.599) | (3.602) | (2.558) | (2.560) | (3.844) | (3.847) | (3.616) | (3.619) |
| Common official language | -14.14*** | -13.46*** | 1.375** | 1.465** | 14.94*** | 14.26*** | 12.35*** | 11.68*** |
| | (0.918) | (0.919) | (0.653) | (0.653) | (0.980) | (0.980) | (0.922) | (0.923) |
| WTO members | 0.155*** | 0.159*** | -0.116*** | -0.117*** | -0.0804*** | -0.0838*** | -0.150*** | -0.153*** |
| | (0.0292) | (0.0292) | (0.0182) | (0.0182) | (0.0300) | (0.0300) | (0.0293) | (0.0293) |
| Constant | -260.7*** | -248.4*** | 23.64** | 25.28** | 275.1*** | 262.7*** | 227.8*** | 215.7*** |
| | (16.84) | (16.85) | (11.98) | (11.98) | (17.98) | (18.00) | (16.92) | (16.93) |
| Observations | 248,666 | 248,666 | 321,426 | 321,426 | 239,311 | 239,311 | 248,896 | 248,896 |

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Note: $GDP_i$-$GDP_j$ is computed as the difference between the logarithms of GDPs of countries $i$ and $j$; $Distance_{ij}$ is the logarithms of the distance between countries $i$ and $j$.

Table 7. Estimated probability of different trade scenarios.

| VARIABLE | | Trade existence | Trade increase | Trade creation | Trade diversion | Eq. |
|---|---|---|---|---|---|---|
| Horizontal vs. transversal trade | $SPS_{t-1}$ | 0.0311*** | 0.00540*** | -0.0304*** | -0.0301*** | (1) |
| | | (0.00186) | (0.00104) | (0.00191) | (0.00186) | |
| | N-N & S-S $SPS_{t-1}$ | -0.00154 | 0.00171 | -0.000331 | 0.00211 | |
| | | (0.00277) | (0.00157) | (0.00288) | (0.00276) | |
| Horizontal trade | $SPS_{t-1}$ | 0.0311*** | 0.00540*** | -0.0304*** | -0.0301*** | (2) |
| | | (0.00186) | (0.00104) | (0.00191) | (0.00186) | |
| | N-N $SPS_{t-1}$ | -0.00544** | 0.000721 | 0.00423 | 0.00610** | |
| | | (0.00274) | (0.00157) | (0.00284) | (0.00272) | |
| | S-S $SPS_{t-1}$ | 0.459*** | 0.202*** | -0.508*** | -0.495*** | |
| | | (0.0234) | (0.0168) | (0.0243) | (0.0242) | |
| Transversal trade | $SPS_{t-1}$ | 0.0296*** | 0.00710*** | -0.0307*** | -0.0280*** | (3) |
| | | (0.00205) | (0.00117) | (0.00216) | (0.00204) | |
| | N-S $SPS_{t-1}$ | -0.00158 | -0.00185 | 0.00358 | 0.000968 | |
| | | (0.00276) | (0.00157) | (0.00286) | (0.00274) | |
| | S-N $SPS_{t-1}$ | 0.531*** | 0.0294* | -0.526*** | -0.528*** | |
| | | (0.0267) | (0.0154) | (0.0268) | (0.0267) | |
| North vs. South imposing | $SPS_{t-1}$ | 0.521*** | 0.115*** | -0.547*** | -0.539*** | (4) |
| | | (0.0175) | (0.0113) | (0.0180) | (0.0179) | |
| | N-N & N-S $SPS_{t-1}$ | -0.494*** | -0.109*** | 0.521*** | 0.513*** | |
| | | (0.0176) | (0.0113) | (0.0180) | (0.0179) | |

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

## Let's settle preliminary findings

Few studies on N-N, S-N, S-S. **Need for global assessment** of SPS and Trade.

**Re-shaping effect?**: SPSs do not facilitate changes in trade routes, but strength existing ones.

**But**: if North imposes, less TE and TI, more TC and TD. **North tend to re-shape**

## SPS DATA

## Literature Review on NTMs

## Material and Methods

Extensive Margins - Prob of Trade
Intensive Margins - Prob of Increasing Trade
Trade Creation - Prob of Trading w/ new Partners
Trade Diversion - Prob of Trading w/ different Partners

## Preliminary Results

## Preliminary Results

## Causality?

Table 8. Descriptive statistics for trade and SPS by countries area.

| | | Trade (mln US$) | | | | SPS | | |
|---|---|---|---|---|---|---|---|---|
| | | μ | Min | Max | Δ | μ | Min | Max |
| Global | | 65.30 | 0 | 3,220 | -0.006 | 1.72 | 1 | 84 |
| Similar development | N-N & S-S | 99.10 | 0 | 3,220 | 0.005 | 1.78 | 1 | 84 |
| Different development | N-S & S-N | 34.40 | 0 | 2,880 | -0.015 | 1.67 | 1 | 84 |
| Horizontal | N-N | 136.00 | 0 | 3,220 | 0.010 | 2.07 | 1 | 84 |
| | S-S | 18.50 | 0 | 2,830 | -0.006 | 1.14 | 1 | 6 |
| Transversal | N-S | 22.70 | 0 | 2,880 | -0.042 | 1.97 | 1 | 84 |
| | S-N | 55.00 | 0 | 1,590 | 0.045 | 1.14 | 1 | 7 |
| North imposing | N-N & N-S | 78.90 | 0 | 3,220 | -0.017 | 2.02 | 1 | 84 |
| South imposing | S-S & S-N | 38.80 | 0 | 2,830 | 0.021 | 1.14 | 1 | 7 |

Note: μ is the average values; Δ is the average growth rate.

## SPS DATA

## Literature Review

## Material and Methods

## Preliminary Results

## Causality? **And next...**

Economic assessment

Disentangling effects at SPSs / Sector level

Or ?

Table 12. Estimated probability of different trade scenarios: detail on types of SPS by trade routes.

| VARIABLES | Horizontal vs. transversal trade (N-N & S-S) | | | | North vs. South imposing (N-N & N-S) | | | |
|---|---|---|---|---|---|---|---|---|
| | Trade existence | Trade increase | Trade creation | Trade diversion | Trade existence | Trade increase | Trade creation | Trade diversion |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country-pair fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| $SPS_{k-1}$ | 0.031 *** | 0.005 *** | -0.031 *** | -0.030 *** | 0.520 *** | 0.115 *** | -0.546 *** | -0.538 *** |
| | (0.002) | (0.001) | (0.002) | (0.002) | (0.018) | (0.011) | (0.018) | (0.018) |
| $SPS_{k-1}$ (trade routes specific) | 0.204 *** | 0.072 *** | -0.196 *** | -0.201 *** | -0.295 *** | -0.053 *** | 0.330 *** | 0.318 *** |
| | (0.006) | (0.004) | (0.007) | (0.006) | (0.018) | (0.012) | (0.019) | (0.018) |
| $A120_{k-1}^{a}$ (trade routes specific) | -0.221 *** | -0.074 *** | 0.212 *** | 0.218 *** | -0.212 *** | -0.059 *** | 0.203 *** | 0.208 *** |
| | (0.006) | (0.004) | (0.006) | (0.006) | (0.004) | (0.003) | (0.005) | (0.004) |
| $A140_{k-1}^{b}$ (trade routes specific) | -0.171 *** | -0.079 *** | 0.149 *** | 0.169 *** | -0.133 *** | -0.040 *** | 0.125 *** | 0.129 *** |
| | (0.008) | (0.006) | (0.008) | (0.008) | (0.006) | (0.004) | (0.005) | (0.006) |
| $A210_{k-1}^{c}$ (trade routes specific) | -0.447 *** | -0.172 *** | 0.440 *** | 0.439 *** | | | | |
| | (0.021) | (0.017) | (0.021) | (0.021) | | | | |
| $A310_{k-1}^{d}$ (trade routes specific) | 0.306 *** | 0.145 *** | -0.328 *** | -0.343 *** | -0.144 *** | -0.074 *** | 0.150 *** | 0.081 *** |
| | (0.021) | (0.016) | (0.022) | (0.022) | (0.024) | (0.021) | (0.025) | (0.024) |
| $A820_{k-1}^{e}$ (trade routes specific) | 0.727 *** | 0.284 *** | -0.752 *** | -0.753 *** | 0.875 *** | 0.539 *** | -0.879 *** | -0.879 *** |
| | (0.029) | (0.018) | (0.029) | (0.029) | (0.032) | (0.025) | (0.032) | (0.032) |
| $A830_{k-1}^{f}$ (trade routes specific) | -0.082 *** | -0.032 *** | 0.077 *** | 0.080 *** | -0.014 *** | -0.011 *** | 0.007 | 0.012 ** |
| | (0.006) | (0.004) | (0.006) | (0.006) | (0.005) | (0.003) | (0.005) | (0.005) |
| $GDP_i$-$GDP_j$ | 0.014 | -0.031 *** | -0.007 | 0.019 | 0.006 | -0.039 *** | -0.003 | 0.027 * |
| | (0.015) | (0.010) | (0.016) | (0.015) | (0.015) | (0.010) | (0.016) | (0.015) |
| $\Delta GDP_i$ | -0.723 *** | -0.178 *** | 0.893 *** | 0.821 *** | -0.624 *** | -0.126 ** | 0.795 *** | 0.721 *** |
| | (0.057) | (0.053) | (0.060) | (0.058) | (0.058) | (0.053) | (0.061) | (0.058) |
| $\Delta GDP_j$ | -0.163 *** | 0.250 *** | 0.173 *** | 0.158 *** | -0.183 *** | 0.239 *** | 0.194 *** | 0.179 *** |
| | (0.024) | (0.020) | (0.025) | (0.024) | (0.024) | (0.020) | (0.025) | (0.024) |
| $Distance_{ij}$ | 20.370 *** | -6.979 *** | -21.710 *** | -16.600 *** | 25.130 *** | -6.189 *** | -26.800 *** | -21.250 *** |
| | (1.848) | (1.318) | (1.970) | (1.857) | (1.841) | (1.965) | (1.305) | (1.850) |
| Contiguity | 39.080 *** | -13.170 *** | -41.710 *** | -31.730 *** | 48.500 *** | -11.560 *** | -51.760 *** | -40.950 *** |
| | (3.598) | (2.565) | (3.837) | (3.616) | (3.585) | (2.540) | (3.826) | (3.602) |
| Common official language | -9.883 *** | 3.562 *** | 10.560 *** | 8.015 *** | -12.350 *** | 3.125 *** | 13.190 *** | 10.430 *** |
| | (0.918) | (0.655) | (0.978) | (0.923) | (0.914) | (0.648) | (0.975) | (0.918) |
| WTO members | 0.116 *** | -0.133 *** | -0.042 | -0.109 *** | 0.130 *** | -0.137 *** | -0.056 * | -0.123 *** |
| | (0.030) | (0.018) | (0.030) | (0.030) | (0.030) | (0.018) | (0.030) | (0.030) |
| Constant | -185.000 *** | 62.940 *** | 197.100 *** | 150.700 *** | -228.300 *** | 55.760 *** | 243.400 *** | 193.000 *** |
| | (16.830) | (12.000) | (17.950) | (16.910) | (16.770) | (11.890) | (17.900) | (16.850) |
| Observations | 248,666 | 321,426 | 239,311 | 248,896 | 248,666 | 321,426 | 239,311 | 248,896 |

Standard errors are in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%.

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Table 13. Details on types of SPS.

| Code | Name | Description | Example |
|---|---|---|---|
| A120 | Geographic restrictions on eligibility | Prohibition of imports of specified products from specific countries or regions due to lack of evidence of sufficient safety conditions to avoid sanitary and phytosanitary hazards. The restriction is imposed automatically until the country proves employment of satisfactory sanitary and phytosanitary measures to provide a certain level of protection against hazards that is considered acceptable. Eligible countries are put on a "positive list". Imports from other countries are prohibited. The list may include authorized production establishments within the eligible country | Imports of dairy products from countries that have not proven satisfactory sanitary conditions are prohibited. |
| A140 | Special authorization requirement for SPS reasons | A requirement that importers should receive authorization, permits or approval from a relevant government agency of the destination country for SPS reasons: In order to obtain the authorization, importers may need to comply with other related regulations and conformity assessments. | An import authorization from the Ministry of Health is required. |
| A210 | Tolerance limits for residues of or contamination by certain (non-microbiological) substances | A measure that establishes a maximum residue limit (MRL) or tolerance limit of substances such as fertilisers, pesticides, and certain chemicals and metals in food and feed, which are used during their production process but are not their intended ingredients. It includes a permissible maximum level (ML) for non-microbiological contaminants. | (a) MRL is established for insecticides, pesticides, heavy metals and veterinary drug residues; (b) POPs and chemicals generated during processing; (c) residues of dithianon in apples and hop. |
| A310 | Labeling requirements | Measures defining the information directly related to food safety, which should be provided to the consumer: Labelling is any written, electronic or graphic communication on the consumer packaging or on a separate but associated label. | (a) Labels that must specify the storage conditions such as "5 degree C maximum"; (b) potentially dangerous ingredients such as allergens, e.g. "contains honey not suitable for children under one year of age". |
| A820 | Testing requirement | A requirement for products to be tested against a given regulation, such as MRL: This measure includes the cases where there is sampling requirement. | A test on a sample of orange imports is required to check against the maximum residue level of pesticides. |
| A830 | Certification requirement | Certification of conformity with a given regulation that is required by the importing country but may be issued in the exporting or the importing country. | Certificate of conformity for materials in contact with food (containers, papers, plastics, etc.) is required. |

Source: UNCTAD - United Nations Conference on Trade and Development (2012). International Classification of Non-Tariff measures, February 2012 version (UNCTAD/DITC/TAB/2012/2). New York, Geneva: United Nations.

Table 14. Estimated probability of different trade scenarios: detail on time trend by trade routes.

| VARIABLES | Horizontal vs. transversal trade (N-N & S-S) | | | | North vs. South imposing (N-N & N-S) | | | |
|---|---|---|---|---|---|---|---|---|
| | Trade existence | Trade increase | Trade creation | Trade diversion | Trade existence | Trade increase | Trade creation | Trade diversion |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country-pair fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| $SPS_{t-1}$ | 0.031 *** | 0.005 *** | -0.030 *** | -0.030 *** | 0.521 *** | 0.115 *** | -0.547 *** | -0.539 *** |
| | (0.002) | (0.001) | (0.002) | (0.002) | (0.018) | (0.011) | (0.018) | (0.018) |
| $SPS_{t-1}$ (trade routes specific) | 0.006 ** | 0.003 | -0.008 ** | -0.008 ** | -0.495 *** | -0.107 *** | 0.520 *** | 0.513 *** |
| | (0.003) | (0.003) | (0.003) | (0.003) | (0.018) | (0.011) | (0.018) | (0.018) |
| $SPS_{t-1}$ pre-2005 (trade routes specific) | -0.026 *** | -0.003 | 0.030 *** | 0.032 *** | 0.004 | -0.006 *** | 0.001 | 0.004 |
| | (0.004) | (0.002) | (0.004) | (0.004) | (0.003) | (0.002) | (0.004) | (0.003) |
| $GDP_i$-$GDP_j$ | 0.012 | -0.030 *** | -0.007 | 0.022 | 0.010 | -0.029 *** | -0.008 | 0.020 |
| | (0.015) | (0.010) | (0.016) | (0.015) | (0.015) | (0.010) | (0.016) | (0.015) |
| $\Delta GDP_i$ | -0.798 *** | -0.202 *** | 0.966 *** | 0.901 *** | -0.804 *** | -0.206 *** | 0.962 *** | 0.905 *** |
| | (0.057) | (0.053) | (0.060) | (0.058) | (0.057) | (0.053) | (0.060) | (0.058) |
| $\Delta GDP_j$ | -0.162 *** | 0.247 *** | 0.183 *** | 0.158 *** | -0.173 *** | 0.247 *** | 0.189 *** | 0.168 *** |
| | (0.023) | (0.020) | (0.024) | (0.024) | (0.024) | (0.020) | (0.024) | (0.024) |
| $Distance_{ij}$ | 26.760 *** | -4.518 *** | -28.160 *** | -22.760 *** | 26.590 *** | -4.415 *** | -28.300 *** | -22.990 *** |
| | (1.837) | (1.306) | (1.959) | (1.846) | (1.830) | (1.304) | (1.952) | (1.839) |
| Contiguity | 51.740 *** | -8.290 *** | -54.500 *** | -43.960 *** | 51.420 *** | -8.086 *** | -54.760 *** | -44.410 *** |
| | (3.577) | (2.541) | (3.816) | (3.596) | (3.564) | (2.538) | (3.801) | (3.581) |
| Common official language | -13.160 *** | 2.302 *** | 13.870 *** | 11.180 *** | -13.080 *** | 2.248 *** | 13.940 *** | 11.300 *** |
| | (0.912) | (0.649) | (0.972) | (0.917) | (0.909) | (0.648) | (0.969) | (0.913) |
| WTO members | 0.145 *** | -0.125 *** | -0.068 ** | -0.138 *** | 0.147 *** | -0.125 *** | -0.071 ** | -0.142 *** |
| | (0.029) | (0.018) | (0.030) | (0.029) | (0.029) | (0.018) | (0.030) | (0.029) |
| Constant | -242.900 *** | 40.610 *** | 255.600 *** | 206.500 *** | -241.400 *** | 39.670 *** | 256.800 *** | 208.600 *** |
| | (16.740) | (11.890) | (17.850) | (16.820) | (16.670) | (11.880) | (17.780) | (16.760) |
| Observations | 248,666 | 321,426 | 239,311 | 248,896 | 248,666 | 321,426 | 239,311 | 248,896 |

Standard errors are in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%.

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Table 15. Estimated probability of different trade scenarios: detail on product categories by trade routes.

| VARIABLES | Horizontal vs. transversal trade (N-N & S-S) | | | | North vs. South imposing (N-N & N-S) | | | |
|---|---|---|---|---|---|---|---|---|
| | Trade existence | Trade increase | Trade creation | Trade diversion | Trade existence | Trade increase | Trade creation | Trade diversion |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country-pair fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| $SPS_{t-1}$ | 0.031 *** | 0.005 *** | -0.031 *** | -0.030 *** | 0.521 *** | 0.115 *** | -0.547 *** | -0.539 *** |
| | (0.002) | (0.001) | (0.002) | (0.002) | (0.018) | (0.011) | (0.018) | (0.018) |
| $SPS_{t-1}$ (trade routes specific) | -0.026 *** | 0.139 *** | 0.024 *** | 0.026 *** | -0.511 *** | 0.016 | 0.537 *** | 0.529 *** |
| | (0.002) | (0.005) | (0.003) | (0.002) | (0.018) | (0.012) | (0.018) | (0.018) |
| $SPS_{t-1}$ animal origin[a] (trade routes specific) | 0.255 *** | -0.070 *** | -0.248 *** | -0.252 *** | 0.288 *** | -0.060 *** | -0.284 *** | -0.286 *** |
| | (0.004) | (0.005) | (0.004) | (0.004) | (0.003) | (0.004) | (0.004) | (0.003) |
| $SPS_{t-1}$ vegetal origin[b] (trade routes specific) | - | -0.146 *** | - | - | - | -0.131 *** | - | - |
| | | (0.005) | | | | (0.004) | | |
| $GDP_i$-$GDP_j$ | 0.023 | -0.024 ** | -0.015 | 0.010 | -0.010 | -0.032 *** | 0.021 | 0.044 *** |
| | (0.015) | (0.010) | (0.016) | (0.015) | (0.015) | (0.010) | (0.016) | (0.015) |
| $\Delta GDP_i$ | -0.723 *** | -0.193 *** | 0.909 *** | 0.828 *** | -0.639 *** | -0.192 *** | 0.832 *** | 0.742 *** |
| | (0.058) | (0.053) | (0.061) | (0.059) | (0.059) | (0.053) | (0.062) | (0.060) |
| $\Delta GDP_j$ | -0.217 *** | 0.247 *** | 0.234 *** | 0.212 *** | -0.234 *** | 0.236 *** | 0.251 *** | 0.230 *** |
| | (0.024) | (0.020) | (0.025) | (0.024) | (0.024) | (0.020) | (0.025) | (0.024) |
| $Distance_{ij}$ | 18.660 *** | -7.324 *** | -20.040 *** | -14.800 *** | 23.180 *** | -6.439 *** | -24.310 *** | -19.090 *** |
| | (1.857) | (1.309) | (1.982) | (1.866) | (1.893) | (1.306) | (2.025) | (1.902) |
| Contiguity | 35.720 *** | -13.830 *** | -38.420 *** | -28.190 *** | 44.660 *** | -12.030 *** | -46.870 *** | -36.700 *** |
| | (3.616) | (2.547) | (3.860) | (3.634) | (3.685) | (2.541) | (3.943) | (3.704) |
| Common official language | -8.984 *** | 3.752 *** | 9.683 *** | 7.069 *** | -11.370 *** | 3.245 *** | 11.940 *** | 9.339 *** |
| | (0.923) | (0.650) | (0.984) | (0.927) | (0.940) | (0.648) | (1.005) | (0.945) |
| WTO members | 0.144 *** | -0.131 *** | -0.069 ** | -0.138 *** | 0.129 *** | -0.141 *** | -0.056 * | -0.123 *** |
| | (0.030) | (0.018) | (0.031) | (0.030) | (0.030) | (0.018) | (0.031) | (0.030) |
| Constant | -169.600 *** | 66.020 *** | 182.100 *** | 134.400 *** | -210.700 *** | 58.000 *** | 220.800 *** | 173.400 *** |
| | (16.910) | (11.920) | (18.050) | (17.000) | (17.240) | (11.890) | (18.450) | (17.330) |
| Observations | 237,473 | 321,426 | 228,397 | 237,703 | 236,119 | 321,426 | 227,357 | 236,349 |

Standard errors are in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%.
[a] Category 'animal origin' includes: 02 = Meat and edible meat; 03 = Fish and crustaceans, mollusks and other aquatic invertebrates; 04 = Dairy produce; birds' egg; natural honey; edible products of animal origin, not elsewhere specified or included.
[b] Category 'vegetal origin' includes: 07 = Edible vegetables and certain roots and tubers; 08 = Edible fruit and nuts; peel of citrus fruit or melons; 10 = Cereals.

## Let's settle (not so preliminary) findings

1. **Re-shaping effect?**: SPSs do not facilitate changes in trade routes, but strength existing ones. **But**: if North imposes, less TE and TI, more TC and TD. **North tend to re-shape**

2. The story is confirmed for **food safety related SPSs** (A120, A140, A210) and certification requirements (not much for labeling requirements and testing requirement)

3. Stronger effects of SPSs in the **post-2005 period**.

4. Most results hold for **processed foods**, not vegetable/animal raw products.

## Let's settle (not so preliminary) thoughts

A. Deglobalization? Not (so much) creating, nor (so much) diverting, but increasing trade in general.
A. Changing-routes effects? Yes, to some extent

B. How? SPSs are not favouring transversal trade.

C. So, from N-N to S-S? Not quite, in general, but... SPSs stimulate S-S trade

## SPS DATA

## Literature Review

## Material and Methods

## Preliminary Results

## Causality? **And next...**

Economic assessment : TBD

Disentangling effects at SPSs / Sector level: **DONE**

Or ?

**Thanks**

Comments are VERY welcome:
no barriers, no frictions please!

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