New Data and Analysis on Non-tariff Measures in Agri-food Trade[†]

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Abstract:

We outline new data on non-tariff measures (NTMs) in agricultural trade collected as part of the NTM-Impact project. The data cover product and process standards, conformity assessment measures, and country requirements for the EU and 10 other countries. We create a Heterogeneity Index of Trade (HIT) regulations to aggregate data on different measures, and estimate the impact of regulatory heterogeneity on trade using a gravity framework. Our results suggest that differences in standards reduce trade in beef and pig meat, but have little impact on trade in other agri-food products.

Keywords:

Non-tariff measures (NTMs), import requirements, agri-food trade, gravity estimation, regulatory heterogeneity index

1. Introduction

The continual decline of tariffs as a result of multilateral trade negotiations and multiple regional agreements has increased the relative importance of non-tariff measures (NTMs) in agri-food trade. Import conditions for food products defined by public and private standards continue to differ between countries despite international coordination and the development of multilateral regulations and common conformity assessments by international institutions. Typically, standards prescribe requirements for product characteristics, production processes and/or conformity assessment and are used to address information problems, market failure externalities, or societal concerns. In the context of agri-food trade, they aim to ensure food safety, animal and plant health, but also extend to other quality and technical aspects of food products. Mandatory and voluntary requirements for imports are formulated by both governments and the private sector.

Due to their relevance in international trade and in the food chain, public and private food standards have attracted much attention, but impact analysis is difficult (see, for example, Beghin et al., 2011; Maertens and Swinnen, 2009; Jongwanich, 2009; Schlueter et al., 2009; Disdier et al., 2008). Key challenges in quantitative analyses relate to the accounting, measurement and comparability of standards because of their often complex definitions and diverse impacts. In particular, little work has focused on the measurement and comparison of stringency of non-numerical standards across countries. A possible way forward is the comparison of regulatory heterogeneity across countries using an index framework that combines numerical and non-numerical data. Such an approach has been applied by Kox and Lejour (2005) and Kox and Nordas (2007) to analyse the trade impacts of differences in services legislation across countries, and by Vigani et al. (2009) to evaluate the impact of difference in regulations for genetically modified organisms across countries.

We contribute to the understanding of the impact of NTMs on trade using a new database. The data was collected as part of an European Commission co-financed collaborative research project titled "Assessment of the impacts of non-tariff measures on the competitiveness of the EU and selected trade partners", hereof referred to as the "NTM-Impact" project. The NTM-Impact database contains information on sanitary, phytosanitary and conformity measures in the EU and 10 other nations (Argentina, Australia, Brazil, Canada, China, Japan, New Zealand, Russia, and the US). Products covered in the database include beef, pig meat, cheese, barley, maize, rape, and some fruits and vegetables. Following Rau et al. (2010), the data can be used to formulate the heterogeneity index of trade (HIT) regulation. The HIT combines numerical, ordered and binary data to measures differences in NTM requirements between trading partners. The HIT can be disaggregates into sub-indexes so as to focus on certain standards or measures. In this paper, we include HIT sub-indexes for maximum residue levels (MRLs) for veterinary drugs and pesticides in gravity models to examine the trade impact of differences in regulations across countries.

This paper has four further sections. Section 2 describes the NTM-Impact database. The heterogeneity index is outlined in Section 3. Section 4 details our gravity specification and discusses the results. Section 5 concludes.

2. New NTM data

Our heterogeneity index of NTMs draws on new data collected as part of the NTM-Impact project. The project aims to assess the impacts of standards and regulations in the EU and its major trading partners on trade in agri-food products. The NTM database is the first database to systematically provide qualitative and quantitative information on an extensive array of import requirements concerning food safety for many countries and products. The data was collected through a concerted effort with international partners using a common framework, so as to make the different information content of import requirements comparable across countries.[1] Import requirement categories covered in the data include product, process and presentation requirements; conformity assessment requirements; and country-level requirements concerning food safety, and animal and plant health. Measures examined within each category are presented in Table 1.

<Table 1 about here>

Standards and regulations included in the database include those that have or are likely to cause disagreement according the European Commission, the World Trade Organisation and the economics literature on standards and regulations. The countries covered in the database include the EU (treated as a single entity) and its major trading partners, namely Argentina, Australia, Brazil, Canada, China, Japan, New Zealand, Russia, and the US.[2] The database targets HS 4-digit commodities by collecting data on representative HS 6-digit commodity within each category. HS 4-digit commodities for which data is collected include beef (0201), pig meat (0203), cheese (0604), potatoes (0701), tomatoes (0702), fresh vegetables (0709), other vegetables (0710), frozen apples and pears (0808), barley (1003), maize (1005), and rape and colza seed (1205). These products provide a broad representation of the most commonly traded (in value terms) products between the EU and the 10 partner countries selected. The time dimension is limited to a single period. Hence, the data should be interpreted as a snap-shot of NTMs for the period 2009-2010.

Table 2 displays specific elements of standards and regulations, and relevant product categories in the database. For the analysis, we constructed heterogeneity indexes on standards and regulations for residues of (i) pesticides, and (ii) veterinary drugs. Standards

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[1] We acknowledge the considerable effort in data collection by NTM-Impact international partners – University of Sao Paulo (Brazil), Instituto Nacional de Tecnologia Agricola (Argentina), Virginia Tech University (USA), Université de Laval (Canada), University of Otago (New Zealand), Research and Information System for Developing Countries (India), Institute for Agricultural Market Studies (Russia), Centre for Chinese Agricultural Policy (China), University of Sydney (Australia), Osaka University (Japan) and Keio University (Japan).

[2] In most cases standards and measures in on country apply to imports from all sources, but some export-specific measures exist for animal and plant health legislation.

and regulations on pesticides and veterinary drugs residues are set in each country to protect consumers from adverse health risks, and are implemented via bans, sampling requirements, and maximum limits , most commonly MRLs.

<Table 2 about here>

Codex Alimentarius Commission provides MRLs for selected pesticides and veterinary drugs as international standards, and WTO member states are required to align their standards with the Codex standards wherever available. However, a country is allowed to deviate from Codex MRLs when deviation is justified by providing scientific proof of potential risks. Thus, MRLs may be different across countries. In the NTM-Impact database, 610 individual pesticides and 205 individual veterinary drugs are considered in the respective indexes for pesticides and veterinary drugs.

3. The heterogeneity index

This section provides an overview of the HIT described by Rau et al. (2010). The HIT facilitates comparison of different agri-food requirements, ranging from product and process standards to firm-level conformity assessment measures and country requirements, across countries. Given the vast array of measures and differences in how they are described, aggregating and comparing measures across countries is challenging. Import requirements may be expressed as binary, ordered or quantitative data. Table 3 presents examples of the different types of information available for NTMs.

<Table 3 about here>

The HIT facilitates aggregation of diverse regulations involving different kinds of information. Specifically, the HIT between importing country j and exporting country k is calculated as a Gower (Gower, 1971) index of (dis)similarity and is expressed as:

$$\mathrm{HIT_{jk}} = \frac{\sum_{i=1}^{n} w_{ijk} DS_{ijk}^{HIT}}{\sum_{i=1}^{n} w_{ijk}} \quad (1)$$

where i denotes an import requirement, w_{ijk} is the weight placed on requirement i, and DS_{ijk}^{HIT} is a dissimilarity measure, which is defined as:

$$DS_{ijk}^{HIT} = \frac{| x_{ij} - x_{ik} |}{\max(x_i) - \min(x_i)} \quad (2)$$

where x_i is the observation on requirement i (which may be binary, ordered or quantitative information), and $\max(x_i)$ and $\min(x_i)$ are, respectively, the maximum and minimum value for requirement i across all countries considered. Intuitively, the dissimilarity measure scales the difference for requirement i between the exporting and the importing countries by the difference between the maximum and minimum of requirement i over all countries examined.

The HIT is calculated on a bilateral basis by comparing trading standards and regulations for each trading pair. The index depends on the benchmark for comparison, which is always the exporting country. As a result, the direction of trade matters and index values between trading pairs are not necessarily symmetric (i.e., the index value for A's imports from B does not necessarily equal the index value for B's imports from A).

HIT values range between zero and one. An index value of zero indicates that there is no difference in requirements between importing and exporting countries, and a value of one indicates maximum dissimilarity in regulations. The HIT provides information about (dis)similarity of regulations across countries and does not measure the costs that exporters could incur when selling their products on foreign markets. Heterogeneity in regulations across countries may increase or decrease trade. On one hand, less stringent regulations in one nation relative to regulations in potentially export markets may increase trade costs or prohibit trade. On the other hand, strict regulations in an exporting nation may make it easier for that nation to export to countries with less strict regulations. The impact of heterogeneity in standards is therefore an empirical question, which we address in the next section.

Although the HIT can be potentially calculated for all regulatory categories (see overview in Section 2), at the time of writing, indexes are only available for veterinary drugs and pesticides. As noted above, the index for veterinary drugs is based on MRLs for 207 drugs, and the pesticides' index considers 610 MRLs for pesticides. In aggregating MRLs for different substances, each MRL was assigned an equal weight in both indexes. Unequal weights were not considered as assigning different weights requires expert knowledge about specific characteristic of the substances and production methods.

4. Gravity analysis

To assess the impact of cross-country differences in standards on trade, we include heterogeneity indexes for veterinary drugs and pesticides in gravity models. Building on the gravity trade literature (see, for example, Anderson and van Wincoop, 2003; Jayasinghe et al., 2010; Sun et al., 2010; Tamini et al., 2010), we consider the following log-linear gravity equation:

$$\ln x_{ij} = \alpha_0 + \alpha_i + \alpha_j + \boldsymbol{\delta D}_{ij} + \varepsilon_{ij} \quad (3)$$

where x_{ij} is the 2009 value in U.S. dollars of sales from exporting country i to importing country j, α_i and α_j are exporter and importer fixed effects, respectively, and $\boldsymbol{D}_{ij}$ is a matrix of observable trade cost determinants.

The trade cost matrix includes the heterogeneity indexes, a distance variable, applied import tariffs and dummy variables that denote whether the exporting or importing country is landlocked, whether the exporting and importing countries have ratified a Free Trade Agreement (FTA), share a common language or have colonial relationships. Table 4 presents a more detailed description of the independent variables used in equation (3). Trade data are sourced from the United Nation's Commodity Trade Statistics Database, and tariff data are taken from the Trade Analysis and Information System developed by the United Nations Conference on Trade. Development, and distance, landlocked, common language, and colonial relationship variables are sourced from the Centre D'Etudes Prospectives et D'Informations Internationales.

<Table 4 about here>

The dataset is a cross-section of 37 countries – the 27 EU member states, Argentina, Australia, Brazil, Canada, China, Japan, New Zealand, Russia, and the US. Trade data for 6 different agri-food products were collected. The products are defined by HS codes at the 6-digit level: beef (020110, 020120, 020130, 020210, 020220, and 020230), pig meat (020311, 020312, 020319, 020321, 020322, and 020329), cheese (040610, 040620, 040630, 040640 and 040690), fruits (080810 and 080820), vegetables (070110, 070190, 070200, 070930, and 070960), and cereals-grains (100300, 100510, 100590, 120510, and 12590). A separate gravity equation is estimated for each product.

The gravity analyses consider bilateral trade between all 37 countries (including bilateral pairs with zero trade). The exceptions are bilateral pairs with missing heterogeneity index data. These observations are excluded from the dataset. Two well-known problems associated with estimating the gravity equation are the inclusion of multilateral trade resistance factors (Anderson and van Wincoop, 2003) and the treatment of zero trade flows (Silva and Tenreyro, 2006). We included country-fixed effects in the gravity equation (3) to control for multilateral resistance terms. The empirical trade literature has yet to settle the debate on the efficiency of different estimators that account for zero trade flows. The log-linearity prevents us from applying directly an OLS estimator. Silva and Tenreyro (2006) propose estimating gravity equations in levels (i.e. before the equation is log-linearized) using a Poisson Pseudo-Maximum Likelihood (PPML) estimator. The PPML estimator is shown to be more efficient than a Non-linear Least Square (NLS) estimator in the presence of heteroskedasticity. However, Martin and Pham (2008) and Burger et al. (2009) showed that the efficiency of the PPML approach is sensitive to the proportion of zeros in trade flows. We report results for an OLS estimator using $\ln(x_{ij} + 1)$ as the dependent variable, and for a PPML estimator.

Table 5a presents the OLS and PPML estimation results of equation (3) for beef, pig meat and cheese, while Table 3b focuses on the results for vegetables, fruits and cereals-grains. Because the PPML estimation is likely to yield a more efficient estimator than the OLS, our discussion focuses on results using the PPML estimator, unless otherwise noted. When relevant, the differences between the two estimators will be highlighted. The number of observations is reported at the bottom of Tables 5a and 5b along with a goodness-of-fit measure. The R^2 statistics is not particularly high, but this is expected in a cross-section setting. The number of observations differs across products and estimators for a number of reasons. First, each product category is comprised of a different number of HS6 commodities. Second, the heterogeneity index for veterinary drug regulations are not available for imports into Australia, Canada and Japan, yet veterinary drug regulations are potentially significant non-tariff barriers for beef, pig meat, and cheese. Similarly, maximum residue limits for pesticide drugs were not available for some importing countries. Finally, preliminary runs indicated that convergence for the PPML estimator was difficult to obtain likely because of the large number of dummy variables (Silva and Tenreyro, 2010). A modified estimation routine which drops the observations that are believed to cause the convergence issues was implemented.[3] Hence, some PPML samples are smaller than the corresponding OLS samples.

< Tables 5a and 5b about here>

We first review the results related to the heterogeneity indexes. Recall that a value of zero for an index indicates that regulations are the same in both the exporting and importing countries, while a value of one indicates that regulations are very dissimilar. It is difficult to assign a priori beliefs for the coefficients of the indexes. It can be expected that highly dissimilar

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[3] Stata code for our chosen PPML estimation is available at: http://privatewww.essex.ac.uk/~jmcss/LGW.html.

regulations will make it more costly for a country to export to a given market because of the additional costs of complying and dealing with many different regulations. However, firms that produce in a country for which regulations are very strict (such as when maximum residue limits are very low) could find it not too costly to meet other country's regulations and thus a highly dissimilar index could actually induce more trade, *ceteris paribus*. Using the same logic, a firm that faces very loose standards in its home country could find similar, yet slightly stricter, standards to represent a significant barrier to overcome for exporting. The coefficient of a heterogeneity index reflects the average impact of similarities in the different standards.

The heterogeneity index for veterinary drug regulations – which is only relevant for beef, pig meat and cheese – is positive for one of the three equations. The coefficients of the PPML and OLS estimators for beef are both negative, suggesting that heterogeneity raises the cost of trading beef products. In the case of pig meat and cheese, the index has no statistically significant impact. The point estimates are negative for the pig meat equation, but positive for cheese. Heterogeneity in veterinary drug regulations only seems to play a significant role on beef trade flows. The heterogeneity index for pesticide regulations has a statistically significant negative impact on beef and pig meat. As for veterinary drugs, heterogeneity increases trading costs. The PPML coefficient is positive in the cheese, vegetable and cereals-grains equations, yet it is not statistically significant. The OLS estimation however reveals a statistically significant positive coefficient for cheese and vegetables. While the evidence is not clear-cut, it seems that heterogeneity in pesticide regulations actually increases the volume of cheese and vegetable trade. The PPML and OLS coefficients of the heterogeneity index in the fruit trade equation are not statistically significant.

The distance coefficients in the two estimations are negative and statistically significant (see Tables 5a and 5b). While it distance is expected to have a greater impact on trade flows of products that are highly perishable (such as vegetables and fruits), the evidence is mixed. The estimation results reveal that contiguous countries are more likely to trade with each other and that landlocked countries trade less with others, all other things equal. Colonial ties are rarely revealed statistically significant by the PPML estimator. In the case of OLS, all point estimates are negative, and four coefficients are statistically significant at the 1 percent level. The EU, Mercosur and Australia/New Zealand FTA dummy variables all have a positive impact on beef, pig meat and vegetable trade.[4] In other instances, the coefficient of these three dummy variables is positive, but not statistically significant. In the four instances for which the PPML estimation yields a negative coefficient, the coefficient estimates are not statistically significant. A similar estimation outcome can be observed for the NAFTA dummy variable; although there is a case (cereals-grains PPML estimate) for which the estimated coefficient is positive, but not statistically significant. The coefficients of applied tariffs are the only subset of coefficients for which the estimation results are truly puzzling. In five of the six gravity equations estimated with PPML, the coefficient of applied tariffs is positive and significant at the 1 percent level. The OLS estimation generates similar results. This could be because, in general, agricultural tariffs are highest for products in which a nation has a comparative disadvantage and is therefore is more likely to import.

5. Concluding remarks

We outlined new data on non-tariff measures (NTMs) in agricultural trade collected as part of the NTM-Impact project. The data cover product and process standards, conformity assessment measures, and country requirements for the EU and 10 other countries. The database includes qualitative and quantitative information on an extensive array of import

[4] We are unable to estimate the impact of the Australia-New Zealand CER agreement for cheese, as bilateral observations on there was missing HIT data for cheese trade between the two countries. Consequently, bilateral trade between in New Zealand and Australia was excluded from the dataset.

requirements for 11 HS 4-digit agri-food commodities. We aggregated different measures using an index able to include diverse regulations involving different kinds of information. Indexes for residues of veterinary drugs and pesticides were included in gravity equations to estimate the impact of differences in standards and regulations across countries on agri-food trade. We found that heterogeneity in pesticide regulations reduces trade in beef and pig meat, and differences in legislation for veterinary drugs reduces trade in beef. A possible reason for this finding is that higher standards abroad than at home increase trade costs. For other products, with the exceptions of cereals and grains, we did not find a statistically significant relationship between differences in regulations and trade. For cereals and grains, our results suggest that heterogeneity in pesticide regulations increase trade. A possible reason for this finding is that countries with more stringent standards are easily able to export to countries with less stringent standards. These finding warrant further investigation.

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Table 1. Categories and measures of import requirements covered in the new NTM database.

Categories	**Measures**
Product requirements/food safety limits	Maximum residue limits (MRLs) for additives, contaminants, microbial criteria and veterinary drugs
Process requirements	Hygiene Quarantine Treatments Traceability
Presentation requirements	Labelling Publicity/marketing
Conformity assessment requirements	Approved third countries Approved businesses Certification Border inspection Laboratories, sampling and analysis
Country-level requirements	Pre-export checks on equivalence Equivalence agreement on control system Monitoring hazards Animal health control Plant health control

Source: Rau et al. (2010).

Table 2. Standards and regulations for pesticides and veterinary drugs limits.

	Standards or regulations	**Relevant product categories**
Pesticides	Banned compounds	Meat & dairy
	Lower maximum limit or threshold	Fruit & vegetables
	Higher maximum limit	Cereals
	Sampling	
	Failures	
	Default limit	
	Lot size	
Veterinary drugs	Banned compounds	Meat & dairy
	Maximum residue limit, lower limit or threshold	
	Higher maximum limit	
	Sampling	
	Failures	
	Default limit	
	Lot size	

Source: Shutes et al. (2011).

Table 3: Different information type for NTMs.

	Binary	**Ordered**	**Quantitative**
Type of measure	Rule based calculation	Rank based qualitative or quantitative information	Numerical elements
Example	EU regulates (1) and Australia does not regulate (0)	EU imposes the tightest labeling requirements (5). The labeling requirement set by the US is average (3) and Mexico has the most lenient requirement (1).	Maximum residue levels of a specific substance for a specific product

Source: Rau et al. (2010). Amended.

Table 4: Definition of independent variables of the gravity equation.

Abbreviation	Description
dist	Population-weighted average of distance between major cities in the two countries of interest, harmonic mean
idx_vet	Heterogeneity index for veterinary drugs data
idx_pest	Heterogeneity index for pesticide data
clang	Equal to one if the two nations share a common official language
contig	Equal to one if the two nations are contiguous
colony	Equal to one if the two nations have ever had a colonial link
elocked	Equal to one if the exporter is landlocked
mlocked	Equal to one if the import is landlocked
tariff	Simple average of the effectively applied tariff
fta_nafta	Equal to one if the two nations are members of the NAFTA
fta_merc	Equal to one if the two nations are members of Mercosur
fta_anz	Equal to one if the two nations are members of the Australia-New Zealand Closer Economic Relations (CER) agreement

Table 5a: Estimation results of the gravity equation for the beef, pig meat and cheese sectors.

	Beef		Pig meat		Cheese	
Variables	OLS	PPML	OLS	PPML	OLS	PPML
dist	-0.920***	-0.741***	-1.071***	-1.034***	-1.293***	-1.075***
	(0.079)	(0.214)	(0.080)	(0.220)	(0.097)	(0.273)
idx_vet	-1.442*	-8.203**	-0.680	-3.219	2.313	2.808
	(0.770)	(3.803)	(0.710)	(7.281)	(2.327)	(3.704)
idx_pest	-0.0202	-4.635**	-0.161	-6.593***	2.899***	5.952
	(1.110)	(2.159)	(1.208)	(2.555)	(0.763)	(4.520)
clang	0.468***	1.040***	0.260**	0.313	0.484***	0.611*
	(0.138)	(0.321)	(0.126)	(0.356)	(0.173)	(0.336)
contig	1.888***	0.408	1.585***	0.887***	1.552***	0.257
	(0.176)	(0.287)	(0.176)	(0.294)	(0.187)	(0.340)
colony	-0.491***	0.377	-0.530***	-0.318	-0.115	0.563*
	(0.175)	(0.350)	(0.176)	(0.337)	(0.211)	(0.315)
elocked	-0.454	-3.687	-1.064***	-8.523***	0.977***	2.084**
	(0.344)	(3.116)	(0.174)	(0.922)	(0.226)	(1.041)
mlocked	-1.506***	-6.333***	-0.790***	-6.090***	-1.761***	-3.824***
	(0.246)	(0.663)	(0.218)	(1.159)	(0.229)	(1.028)
tariff	2.079***	0.726***	3.166***	1.451***	0.312***	0.746***
	(0.219)	(0.191)	(0.663)	(0.408)	(0.0535)	(0.181)
fta_eu	-0.257	2.099*	-0.0562	2.110	1.236	2.070
	(0.435)	(1.237)	(0.382)	(2.298)	(0.793)	(1.322)
fta_nafta	3.158**	5.082**	3.079**	-0.662	-1.720	-0.719
	(1.410)	(2.497)	(1.295)	(1.136)	(1.773)	(1.414)
fta_merc	-4.414***	0.842	-4.043***	5.665**	-2.786*	5.028***
	(0.572)	(1.171)	(0.453)	(2.393)	(1.506)	(1.509)
fta_anz	0.0219	5.217***	-1.065	2.495*		
	(1.037)	(1.348)	(0.971)	(1.472)		
Constant	8.055***	6.269**	10.07***	15.42***	9.085***	4.468
	(0.968)	(3.059)	(0.873)	(3.262)	(1.171)	(3.004)
Observations	7,776	7,350	7,560	7,560	5,400	5,400
R-squared	0.433	0.246	0.491	0.291	0.576	0.249

Note: The symbols *** denote a *p*-value lower than 0.01, ** denote a *p*-value lower than 0.05, and * denotes a *p*-value lower 0.1.

Table 5b: Estimation results of the gravity equation for the vegetable, fruit and cereals-grains sectors.

	Vegetables		Fruit		Cereals-grains	
Variables	OLS	PPML	OLS	PPML	OLS	PPML
dist	-0.857***	-0.318	-1.120***	-1.013***	-1.177***	-1.139***
	(0.071)	(0.260)	(0.135)	(0.288)	(0.090)	(0.395)
idx_pest	0.0455	0.271	1.109	-0.0534	1.534**	0.751
	(0.756)	(2.852)	(1.867)	(1.577)	(0.627)	(7.700)
clang	0.333***	0.508	0.959***	0.286	0.0460	-0.364
	(0.111)	(0.404)	(0.233)	(0.389)	(0.136)	(0.360)
contig	2.021***	0.873**	1.403***	0.0362	2.411***	0.671
	(0.167)	(0.425)	(0.258)	(0.484)	(0.193)	(0.426)
Colony	-0.711***	-0.136	-0.757***	-0.138	-0.307	0.361
	(0.166)	(0.415)	(0.293)	(0.497)	(0.198)	(0.341)
elocked	-1.864***	-1.760*	-2.757***	-3.673***	-2.820***	-6.505***
	(0.208)	(0.927)	(0.393)	(0.821)	(0.238)	(1.348)
mlocked	-0.866***	-8.530***	-1.976***	-2.412***	-1.246***	7.840
	(0.260)	(1.808)	(0.371)	(0.561)	(0.189)	(12.30)
tariff	0.0997***	1.509*	-0.0549	-0.227	0.129	4.348
	(0.0335)	(0.906)	(0.116)	(0.183)	(0.174)	(2.938)
fta_eu	0.194	7.794***	-0.169	-0.622	0.0689	3.499***
	(0.217)	(2.402)	(0.609)	(0.648)	(0.285)	(1.214)
fta_nafta	5.765***	4.927***	2.954**	1.998**	3.553***	12.77
	(0.568)	(1.048)	(1.326)	(0.827)	(0.544)	(12.31)
fta_merc	-0.946	5.652**	-0.604	0.944	-0.896	-2.803
	(0.949)	(2.384)	(1.382)	(1.149)	(1.548)	(12.63)
fta_anz	0.694	11.77***	-2.928	0.117	-1.261	1.270
	(1.287)	(1.540)	(2.075)	(4.249)	(0.988)	(2.181)
Constant	8.649***	0.922	12.91***	10.16***	11.51***	-0.164
	(0.685)	(2.982)	(1.477)	(2.826)	(0.955)	(12.71)
Observations	6,480	6,480	2,592	2,592	6,408	6,408
R-squared	0.544	0.425	0.587	0.425	0.407	0.544

Note: The symbols *** denote a *p*-value lower than 0.01, ** denote a *p*-value lower than 0.05, and * denotes a *p*-value lower 0.1.