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The Effect of Non-Tariff Measures on Supply Chains in the Asia-Pacific Region

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Abstract

This paper explores the impact of non-tariff measures (NTMs) on supply chains in the Asia-Pacific region, with a focus on exports to major ASEAN countries. Generally defined, NTMs are policy measures, other than tariffs, which may have an impact on international trade. The database of NTMs that we use was compiled as part of a multi-agency project led by UNCTAD. This database contains detailed and comprehensive data on NTMs obtained from teams of researchers working systematically through all laws, rules and regulations which may affect merchandise trade. These measures are then set within a common classification framework and assigned to tariff lines within the World Customs Organization's Harmonized System.

We first use the detailed NTM database to obtain econometric estimates of the effect of different types of NTMs on imports into major ASEAN countries, using a gravity model framework. We then use these econometric estimates in a global computable general equilibrium model to examine the impact of eliminating the types of NTMs that are found to have significant negative effects on trade. We use a newly available Global Supply Chain Model, based on the well-known Global Trade Analysis Project (GTAP model). By utilizing this model, we can capture separately the effects of removing the NTMs identified as particularly problematic, on products sold for intermediate production and those sold to final consumers. This enables quantification and in-depth analysis of the impact of NTMs on supply chains.

JEL: F13, F14, F17, F68

Keywords: Non-tariff measures; Supply chains; ASEAN; RCEP; Gravity model; CGE modelling; International trade;

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Introduction

Generally defined, NTMs are policy measures, other than tariffs, which may have an impact on international trade in goods and services (see Beghin, Maertens, & Swinnen, 2015 for a useful survey of NTM research). The issue of NTMs on "supply" or "global value" chains is attracting increased attention by researchers. The effects of NTMs and other trade costs can be compounded in a supply chain where semi-finished goods cross international borders multiple times: "the effect of a marginal increase in trade costs everywhere in the supply chain is much larger than would be the case if there were a single international transaction" (Ferrantino, 2012). The issue of NTMs in global value chains is further discussed in Cadestin, Gourdon, & Kowalski (2016) and Kowalski, Lopez Gonzalez, Ragoussis, & Ugarte (2015).

While there are now many examples of studies which incorporate econometric estimates of the effect of NTMs into CGE models, there remains significant scope to refine the methodologies (see Walmsley & Minor, 2015, for a survey). Our approach uses a detailed NTM database to obtain econometric estimates of the effect of different types of NTMs on imports into six major ASEAN countries, using a gravity model framework. We then use these econometric estimates to identify the types of NTMs that are found to have significant negative effects on either imports of products sold for intermediate production and/or those sold to final consumers in these ASEAN countries. Finally, we simulate the removal of these NTMs using the ImpactECON Global Supply Chain Model (IESC), based on the well-known Global Trade Analysis Project (GTAP) model.

We focus on ASEAN because updated NTM data has recently been collected and publicly released for these countries, whereas data for many other Asian economies, including Japan, Korea, China and India, is still being finalized. These ASEAN countries are also likely to have a broadly similar regulatory environment, in other words, we are not

combining a disparate group of high and low income countries from different regions. Moreover, major ASEAN economies are well linked into regional and global supply chains.

The UNCTAD NTM database

The database of NTMs used in our paper has been compiled in a multi-agency project led by UNCTAD.[1] This database, which has recently been relaunched with expanded and updated country coverage, contains detailed and comprehensive data on NTMs obtained from teams of researchers working systematically through all laws, rules and regulations which may affect merchandise trade.[2] These measures are then set within a common classification framework as well as assigned to tariff lines within the World Customs Organization's Harmonized System. Cadot & Gourdon (2016), Cadot, Asprilla, Gourdon, Knebel, & Peters (2015) and Vanzetti, Peters, & Knebel (2014) provide relevant examples of applications of this database.

The classification developed by UNCTAD and the Multi-Agency Support Team (MAST) which underpins the NTM database has 16 chapters (UNCTAD 2013 and UNCTAD 2014), as presented in table 1. Within each chapter, there is a hierarchy of classification, for instance the grouping A5 *Treatment for elimination of plant and animal pests and disease-causing organisms in the final product e.g. post-harvest treatment* includes the subgroupings: A51 *Cold/heat treatment*, A52 *Irradiation*, A53 *Fumigation* and A59 *Treatment for elimination of plant and animal pests and disease-causing organisms in the final product, n.e.s.* (UNCTAD, 2013).

(Table 1 about here)

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[1] http://unctad.org/en/Pages/DITC/Trade-Analysis/Non-Tariff-Measures.aspx
[2] Two authors of the current paper were responsible for contributing the New Zealand data to this database.

Estimation methodology and data

Our research examines the effect of NTMs on imports in six major ASEAN markets (Singapore, Malaysia, Indonesia, Thailand, Viet Nam and the Philippines). We use a gravity model framework which is commonly used for this type of application. (See, in particular, Beghin, Disdier, & Marette, 2015, Carrère & De Melo, 2011 and the widely cited paper Kee, Nicita, & Olarreaga, 2009.) There are two main types of gravity estimators applied.

The first type of estimator adapts a Heckman selection approach, where a first step estimator (typically probit) estimates the effect of the independent variables on trade occurring (the "selection" equation) and the second stage estimates the effect of the independent variables on the value of trade if it occurs (the "outcome equation"); in practice both the selection and outcome equation are estimated simultaneously. (See Crivelli & Gröschl, 2012 for an example). Helpman, Melitz and Rubinstein (2008) adapt the Heckman selection approach, where the estimation of the "outcome equation" controls for firm heterogeneity. This estimator is referred to as the HMR estimator.[3] We begin by applying the conventional Heckman approach, but will expand to also include the HMR. As we explain later, the Heckman and HMR approaches have the advantage of allowing us to model the effect of NTMs in preventing products being traded.

The second set of estimator adapts count data frameworks, with the most commonly used being a poission psudeo maximum likelihood estimator (ppml), although the negative binomal regressor and zero inflated negative binomial estimators are also used particularly with disaggregated data where the incidence of zero trade is much greater. (See Kee and Nicita, 2016, as an example). There are, however, some practical challenges with negative binomal regressors, including that the estimates are not scale invariant (see Shepherd, 2013). We consider the ppml estimator in the first instance, but find estimation intractable with some

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[3] See WTO (2012) for a discussion and Ferro, Otsuki, & Wilson (2015) for an application.

specifications and consider also that the ability of the Heckman and HMR approaches in allowing us to model the effect of NTMs in preventing products being traded make it a superior approach for our application.

The UNCTAD NTM data are cross-sectional, capturing all NTMs in force in our ASEAN countries of interest in 2015. Our econometric framework is therefore also cross-sectional. We investigate the effect of NTMs using data on imports at the HS 6 digit level in 2015. While the UNCTAD data are collected at the more detailed tariff line level, the harmonized system is only consistent at up to the HS 6 digit level, with countries able to adopt their own codes at the more detailed level. We therefore work with data at the HS 6 digit level for consistency across countries Moreover, the widely used UN COMTRADE database, which we use as the source of import data is only available at the 6 digit level.[4]

We examine imports across a pool of 119 exporting countries. This corresponds to the almost all individual countries included in version 9 of the GTAP database (Aguiar, Narayanan, & McDougall, 2016). We, however, exclude the US territory of Puerto Rico as gravity data variables are not available and we also exclude Taiwan, which is not widely internationally recognized as a country and therefore is not included in the UN COMTRADE database.

With 6 importing countries, 118 possible partners, and 5,203 HS level 6 "products" in the 2012 version of the HS system that we use, our gravity database includes almost 3.7 million observations although most these involve zero trade.[5]

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[4] https://comtrade.un.org/
[5] We exclude HS subheadings 27.05.00 and 27.16.00 as these are typically classified as services. A subsequent version of this paper will include statistics on the instances of zero trade.

Our NTMs are incorporated through dummy variables for each different type of NTM which is equal to unity if the importing country applies this NTM on imports from at least one exporting country.[6]

The gravity model framework requires data on consumption and production in both the importing and exporting country. As we are using cross-sectional data, we are able to make use of sectoral data from the GTAP database with data on 43 sectors for 2011 (Narayanan et al., 2015).[7] When estimating the impact of NTMs on consumption goods we use the data on private consumption (VPA in the GTAP database); and we use firm purchases (VFA) when estimating the impact on imported intermediates. We multiply each by the ratio of 2015 nominal GDP to 2011 nominal GDP from the World Bank World Development Indicators to generate sectoral data by country that takes account of both the growth of the economy and changes in exchange rate. The theoretical underpinnings of the gravity model are based on using nominal GDP, which is reflected in our approach. While it would be preferable to have sectoral data for the same year as our trade and GDP data, these data are generally not available annually and we note that the use of sectoral data represents an improvement on most analysis which tends to use just aggregate GDP (see Shepherd, 2013).

Tariff data is obtained from the WTO and World Bank, depending on availability.[8] Data for Viet Nam, Singapore, Indonesia and the Philippines for 2015 is obtained from the WTO. Data for Malaysia and Thailand is not available directly from the WTO, so we use data from the World Bank WITS database, which has data for Thailand (for 2015) and Malaysia (for 2014). With data from both databases, we incorporate preferential rates, where applicable,

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[6] A subsequent version will allow for bilateral variation among NTMs, but this is rare. The vast majority of NTMs in the UNCTAD database are applied to all countries.

[7] This corresponds to the goods sectors in the GTAP version database. While raw milk is included as a sector, it is not exported, so is excluded from our gravity estimation.

[8] http://tariffdata.wto.org and http://wits.worldbank.org/

and include a separate dummy variable where a specific tariff applies. As the gravity model works with logs, tariffs are incorporated as 1 + the ad volorum tariff rate.

Other gravity data variables typically included as controls: distance, contiguity, common official language, common legal system and the existence of a regional trade agreement (RTA) are obtained from the widely used CEPII database.[9] As data on the existence of a RTA are only available until 2006, we update this by adding new agreements that enter into force from 2006 to 1 January 2015 and which are notified to the WTO.[10]

We control for importer, exporter and sectoral fixed effects; the sectors are discussed later. Moreover, as some HS subheadings contain a lot of product potentially traded and others contain fewer, we include the natural log of the value of world imports in each HS subheading.[11] This is an alternative to similar papers that use product level fixed effects (see Crivelli and Gröschl, 2012 and Kee and Nicita, 2016). We prefer to control for world imports because it avoids the issues of multicollinearity that we encountered with product fixed effects, given that the NTMs which the ASEAN countries apply on any given product are correlated. Moreover, the use of the world imports as an independent variable is possible in our paper as we only look at a small number of importing countries, whereas the above mentioned papers, which look at a larger set of countries, are not able to avoid endogeneity through excluding imports from the countries of focus.

We estimate separately the effects of NTMs on two broad sectoral aggregations: Food and Agriculture, and Non Agriculture Products. These are based on aggregations of the GTAP sectors as set out in the annex.

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[9] http://www.cepii.fr/cepii/en/bdd_modele/bdd.asp.
[10] http://rtais.wto.org/UI/PublicMaintainRTAHome.aspx.
[11] In order to avoid issues of endogenity we exclude imports from our six major ASEAN markets.

For each of our broad sector aggregations, we estimate separately the effects of NTMs on imports of consumer goods and intermediate/capital goods. We distinguish between these two categories of products through a conversion table between HS2012 subheadings and the Broad Economic Classification (BEC) available from the UN Statistical Division.[12] Under the BEC framework, products are classified as either intermediate, consumer or investment (capital goods) or not classified. This is consistent with the approach taken in compiling the IESC database detailed in Walmsley and Minor (2016), although they supplement the concordance with additional information from the GTAP database.

Estimation Results

We have undertaken preliminary estimation results with the Heckman estimator for consumer goods and intermediate/investment goods in both the agriculture and food and non-agriculture product groupings. These are summarized in tables 2 and 3, where table 3 shows only the NTM coefficients that are incorporated into the IESC model.

(Table 2 about here)

(Table 3 about here)

Incorporating estimates as shocks to the IESC Model

We then use these estimates to calculate the estimated increase in imports in each sector when the identified types of NTM are removed. As we find that many types of NTM actually facilitate trade in ASEAN, under our approach the identified NTMs could either be eliminated or replaced with other types of NTM that do not have the same negative effects on trade.[13]

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[12] https://unstats.un.org/unsd/trade/conversions/HS%20Correlation%20and%20Conversion%20tables.htm

[13] The NTMs that facilitate trade have stastically significant positive estimates. These are not shown in this version of the paper.

We use the newly available IESC model (Walmsley & Minor, 2016), a modified version of the GTAP model which we use along with the IESC and GTAP version 9 databases (Aguiar, Narayanan & McDougall, 2016) to implement these shocks.

We conduct our analysis for six sectoral aggregations; two from the Food and Agriculture grouping and four from the Non Agriculture grouping – see the Annex. These reflect the sectoral aggregations that will be used in simulations with the IESC model.

Under the BEC and GTAP sector concordances used, each product is allocated to only one sector and then to either consumption or intermediate goods. We therefore have separate, non-overlapping, sets of products in each sector divided again by whether they are consumption or intermediate inputs.

We only consider NTMs that have a statistically significant negative effect on the level of imports at the 95% level (i.e. from the "outcome" equation in the Heckman framework) and where the effect on the probability of trade is also negative even if not statistically significant (from the "selection" equation in the Heckman framework). In some instances, however, it may not be appropriate to remove a NTM from a product as the NTM – despite being found to negatively affect trade – might be the only feasible way to address a legitimate public policy concern. To reflect this, we do not simulate the removal of a NTM from a product when all six major ASEAN countries apply this NTM to that product.

As each of the identified NTMs only apply to some products within a sector, we need to weight the shock by the proportion of imports, from each exporting region, that are covered by each NTM. These are then aggregated to obtain the effect of the removal of all problematic NTMs on a particular product. This is summarized in equation 1 below, where:

$$\Delta M_j = \frac{\sum_j (\sum_i -\beta_i . D_{ij}) \cdot M_j}{\sum_j M_j} \quad (1)$$

Where: M_j is imports of product j; β_i is the coefficient for NTM i that has been found to have a statistically significant effect on trade (as discussed above); and D_{ij} is a dummy variable equal to one if the importing country applies NTM i on product j and – as discussed above – not all major ASEAN countries apply this NTM (see discussion above). These are calculated separately for each of the 15 exporting regions that we incorporate in the IESC model – see annex - and for each of the 6 major ASEAN importing countries; we omit the subscripts for importers and exporters for clarity.

In our exploratory modelling, we implement import increases through the widely used import-augmenting technological change mechanism. Walmsley and Minor (2015) provide a useful survey of the mechanisms to incorporate NTM enhancements and considerations to be kept in mind. As explained in Walmsley and Minor (2015) an import-augmenting technological shock has two main effects: (1) it reduces the importers price causing a substitution towards that good and an increase in quantity demanded and (2) it reduces the amount of that needs to be imported to satisfy a given demand. As a result of the second effect, firms in the importing country require less imported intermediates for a given production level and households and governments can satisfy an initial demand with less imports (from the perspective of the exporter); this increases GDP in the importing countries. These effects mean that the principal benefits accrue to the importing countries affected. This is borne out in our exploratory results: the six ASEAN countries that liberalise NTMs account for the vast majority of GDP and welfare improvements.

The import-augmenting technological change mechanism is likely to be best suited to model the benefits of NTM liberalization where importing firms bear the burden of meeting NTM requirements, for instance where they must relabel products or incur the cost (and time delay) of inspection or testing. Further versions of this paper will consider different channels, particularly for the NTMs that affect production requirements affecting the cost structure of the

exporting firm. The advantage of the econometric approach developed in this paper is that we obtain the estimates of the effects on trade of the different types and can therefore incorporate these NTMs through different channels.

In our exploratory modelling, we simulate a 10% reduction in the burden of NTMs using the import-augmenting technological change mechanism. This can be interpreted as any combination of the following: removing some requirements i.e. removing some regulations; applying existing to rules to fewer products; or applying these in a less onerous way e.g. inspecting a smaller proportion of total shipments.[14]

We implement these shocks for each exporting region through first calibrating the necessary import-augmenting technological change required to achieve each of the required changes in consumption/firm use i.e. those that correspond to 10% of the change in imports suggested by the econometric results for full elimination of all "problematic" NTMs.[15] The shocks are then implemented simultaneously to enable general equilibrium interactions between sectors and regions.

As the modelling is only intended to be illustrative at present, we do not report full results in this version of the paper. However, key features from our results are as follows.

- We see considerable variation in the changes in each region's exports to the six major ASEAN countries. While imports from all regions are stimulated through the

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[14] While the UNCTAD database does not summarize information on the stringency of requirements or other procedural details, a liberalization scenario can assume that less burdensome application some types of existing NTMs will reduce the trade effects of these NTMs.

[15] In the IESC framework, estimated increases in imports of consumption goods are *qpms* shocks whereas estimated increases in imports of intermediate inputs are *qfms* shocks. In our exploratory simulations, the calibration is done by exogenising exports to all six ASEAN countries by one exporting region at a time to determine the necessary technological change variables. Alternative approaches are to separately exogenise exports by an exporting region to each of the six ASEAN countries individually. This could be further disaggregated by exogenising exports in only one sector. The appropriate approach will depend on views about the extent to which trade diversion should be controlled for in the calibration. We have yet to consider how to model changes to government purchases (*qgms*).

reduction in ASEAN NTMs, the extent of this varies and we also capture the general equilibrium interactions. As a result, some countries export less of particular products to ASEAN countries. This shows the benefit of bringing our gravity modelling results into a CGE framework.

- Only China sees a (modest) expansion of its plant product sector. This can be considered a manifestation of a consequence of the import augmenting technological shock: the amount that ASEAN needs to import to satisfy a given demand is reduced (the iceberg effect). It is notable that the plant products sector was particularly affected by NTMs. The six ASEAN countries of focus typically see a modest contraction of the animal product sector as a result of increased imports, whereas most other regions expand this sector. The impact on output in other sectors in different regions varies. In the case of China and the United States, all sectors expand apart from other manufactures and plant products respectively. All New Zealand sectors, other than animal products, contract slightly reflecting substitution towards this sector with its increased exports.

- With an import-augmenting technological change, the main gains in terms of GDP and welfare are to the six ASEAN countries that we assume are reducing the NTMs they apply. Results are mixed for other countries with New Zealand, India and China benefiting from ASEAN NTM reform whereas Australia, Japan, Korea and the United States see a reduction in GDP and welfare. Negative effects on third countries can be explained by increased efficiency of ASEAN competitors who use imported intermediates more efficiently. While the import-augmenting technological change is expected to benefit disproportionately importing countries, our results are an important reminder of the consequences of the channel selected to model NTM reform, particularly it is non-reciprocal and ASEAN's trading

partners do not reduce their NTMs. Our results also serve as a reminder of the economic benefits of improved access to imports, including imported intermediates.

As noted earlier, future versions of this paper will consider different channels, particularly for the NTMs that affect production requirements affecting the cost structure of the exporting firm.

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Tables

Table 1: Classification of non-tariff measures

Technical measures	A	**Sanitary and Phyto-sanitary Measures**
	B	Technical Barriers To Trade
	C	Pre-Shipment Inspection And Other Formalities
Non-technical measures	D	Contingent Trade-Protective Measures
	E	Non-Automatic Licensing, Quotas, Prohibitions And Quantity-Control Measures Other Than For SPS Or TBT Reasons
	F	Price-Control Measures, Including Additional Taxes And Charges
	G	Finance Measures
	H	Measures Affecting Competition
	I	Trade-Related Investment Measures
	J	Distribution Restrictions
	K	Restrictions On Post-Sales Services
	L	Subsidies (Excluding Export Subsidies Under P7)
	M	Government Procurement Restrictions
	N	Intellectual Property
	O	Rules Of Origin
Exports	P	Export-Related Measures

Source: UNCTAD, 2013.

Table 2: Econometric Estimates (control variables)

VARIABLES	Food and Agriculture - Consumption		Food and Agriculture - Intermediates		Non-Agriculture - Consumption		Non-Agriculture - Intermediates	
	Outcome	Selection	Outcome	Selection	Outcome	Selection	Outcome	Selection
Common language		0.159***		0.148***		0.144***		0.0951**
		(0.0426)		(0.0404)		(0.0486)		(0.0374)
Preferential tariff	-0.0809**	-0.0123	-0.101**	-0.0339***	-0.0274	-0.00892	-0.114***	0.0463***
	(0.0350)	(0.00758)	(0.0428)	(0.00734)	(0.0265)	(0.00760)	(0.0170)	(0.00619)
Specific tariff	-0.123	0.0579	0.666**	0.289***	0.152	-0.188***	0.0895	0.0289
	(0.190)	(0.0462)	(0.274)	(0.0509)	(0.245)	(0.0723)	(0.191)	(0.0572)
Consumption/use	0.00688	-0.0415***	0.213***	-0.0147	0.0928***	0.00586	0.447***	0.132***
	(0.0542)	(0.0142)	(0.0422)	(0.00990)	(0.0243)	(0.00733)	(0.0388)	(0.0108)
Production	0.870***	0.245***	0.627***	0.154***	0.766***	0.293***	0.788***	0.232***
	(0.0575)	(0.0138)	(0.0522)	(0.0123)	(0.0509)	(0.0143)	(0.0295)	(0.00822)
World Imports	0.914***	0.308***	0.833***	0.212***	0.787***	0.300***	0.862***	0.322***
	(0.0216)	(0.00481)	(0.0352)	(0.00402)	(0.0163)	(0.00311)	(0.0140)	(0.00236)
Distance	-0.513	-0.194**	-0.655	-0.288***	-0.576**	-0.186*	-0.410**	-0.266***
	(0.325)	(0.0897)	(0.436)	(0.0770)	(0.238)	(0.112)	(0.176)	(0.0767)
Contiguity	0.372	0.213**	0.364	0.172***	-0.125	0.137	0.272*	0.184***
	(0.303)	(0.0998)	(0.311)	(0.0633)	(0.182)	(0.107)	(0.149)	(0.0664)
Com. legal system	0.189*	0.0763**	0.189**	0.0569***	0.0316	0.0560**	0.00927	0.00446
	(0.103)	(0.0299)	(0.0867)	(0.0209)	(0.0932)	(0.0280)	(0.0658)	(0.0246)
RTA	0.132	0.0135	0.192	0.0196	-0.0349	0.00431	0.104	0.000483
	(0.194)	(0.0500)	(0.180)	(0.0475)	(0.157)	(0.0501)	(0.167)	(0.0565)

Table 3: Statistically Significant Negative NTM Coefficients (on outcome equation)

NTM	Description	Food and Agriculture - Consumption	Food and Agriculture - Intermediates	Non-Agriculture - Consumption	Non-Agriculture - Intermediates
a140	Authorization requirements	0.587	0	1.364	0
a150	Importer registration requirements	0.455	0	0	0
a490	Hygienic requirements	0	0	0	3.8
a510	Cold/heat treatment	0.201	0	0	0
a520	Irradiation requirements	0	0	0	1.315
a530	Fumigation requirements	0	2.028	0	0
a620	Animal raising/catching requirements	0	3.23	0	0
a630	Food and feed processing requirements	0	0	0	1.561
a690	Other production requirements	2.715	0	0	0
a840	Inspection requirements	0	0	0	0.799
a851	Traceability (origin)	1.963	0	0	0
a859	Other traceability requirements	3.153	0	0	0
a860	Quarantine requirements	0.468	0	0	0
a890	Other conformity requirements	1.159	1.552	0	0
b110	Prohibitions	0	0.981	0	0
b150	Importer registration requirements	0.887	0	0.293	0
b330	Labelling requirements	0.387	1.034	0	0
b490	Production requirements	1.331	0	0	0
b700	Performance standards	0	0	0	0.423
b820	Testing requirements	0.639	0	0	0
b840	Inspection requirements	0	0	0	0.16
b900	Other TBT requirements	0	0	0	0.806
c900	Customs formalities	2.022	0	0	0
d120	Anti-dumping duties	0	0	1.308	0

See UNCTAD (2013) for a full description of each of these codes.

Annex: Regions

Singapore

Thailand

Malaysia

Viet Nam

Philippines

Indonesia

Other ASEAN

New Zealand

Australia

Japan

Korea

China

India

United States

ROW

Annex: GTAP Sectors and Aggregations

GTAP Sector	Broad Aggregation	Specific Aggregation
PDR - Paddy rice	Agriculture and food	Plant products
WHT - Wheat	Agriculture and food	Plant products
GRO - Cereal grains n.e.c.	Agriculture and food	Plant products
V_F - Vegetables, fruit, nuts	Agriculture and food	Plant products
OSD - Oil seeds	Agriculture and food	Plant products
C_B - Sugar cane, sugar beet	Agriculture and food	Plant products
PFB - Plant-based fibers	Non Agriculture	Textiles, apparels, leather etc
OCR - Crops n.e.c.	Agriculture and food	Plant products
CTL - Bovine cattle, sheep and goats, horses	Agriculture and food	Animal products
OAP - Animal products n.e.c.	Agriculture and food	Animal products
RMK - Raw milk	Agriculture and food	Animal products
WOL - Wool, silk-worm cocoons	Non Agriculture	Textiles, apparels, leather etc
FRS - Forestry	Non Agriculture	Wood products
FSH - Fishing	Agriculture and food	Animal products
COA - Coal	Non Agriculture	Other manufactures
OIL - Oil	Non Agriculture	Other manufactures
GAS - Gas	Non Agriculture	Other manufactures
OMN - Minerals n.e.c.	Non Agriculture	Other manufactures
CMT - Bovine meat prods	Agriculture and food	Animal products
OMT - Meat products n.e.c.	Agriculture and food	Animal products
VOL - Vegetable oils and fats	Agriculture and food	Plant products
MIL - Dairy products	Agriculture and food	Animal products
PCR - Processed rice	Agriculture and food	Plant products
SGR - Sugar	Agriculture and food	Plant products
OFD - Food products n.e.c.	Agriculture and food	Plant products
B_T - Beverages and tobacco products	Agriculture and food	Plant products
TEX - Textiles	Non Agriculture	Textiles, apparels, leather etc
WAP - Wearing apparel	Non Agriculture	Textiles, apparels, leather etc
LEA - Leather products	Non Agriculture	Textiles, apparels, leather etc
LUM - Wood products	Non Agriculture	Wood products
PPP - Paper products, publishing	Non Agriculture	Wood products
P_C - Petroleum, coal products	Non Agriculture	Other manufactures
CRP - Chemical, rubber, plastic products	Non Agriculture	Other manufactures
NMM - Mineral products n.e.c.	Non Agriculture	Other manufactures
I_S - Ferrous metals	Non Agriculture	Other manufactures
NFM - Metals n.e.c.	Non Agriculture	Other manufactures
FMP - Metal products	Non Agriculture	Other manufactures
MVH - Motor vehicles and parts	Non Agriculture	Machinery and Equipment
OTN - Transport equipment n.e.c.	Non Agriculture	Machinery and Equipment
ELE - Electronic equipment	Non Agriculture	Machinery and Equipment
OME - Machinery and equipment n.e.c.	Non Agriculture	Machinery and Equipment
OMF - Manufactures n.e.c.	Non Agriculture	Other manufactures
ELY - Electricity	Non Agriculture	Other manufactures
GDT - Gas manufacture, distribution	Non Agriculture	Other manufactures

Other   Services   Services