Estimating the Impact of Non-Tariff Measures on Trade: New Evidence from 40 developing countries

Dr.Masoud Ali Khalid[1], Assist Prof Dr.Narmen M. Ghafor[2]
Assist Prof Dr. Mohammad MahmoodFaqe Hussein[3]

1 Corresponding Author: Department of Banking and Financial Science, Cihan University/ Sulaimani.

2 Department of Economics, University of Sulaimani.

3 Department of Statistics and Informatics, University of Sulaimani.

Abstract

Non-tariff measures (NTMs) such as food safety standards are used to achieve the non-trade objective of protecting consumers' safety and health. Nevertheless, they can also be used as a trade protection tool to drive a price wedge between foreign and domestic producers. This study investigates the impact of NTMs on trade in the developing countries over the period of 1999 to 2014 with a specific focus on Plastic, Vehicle, Animal, and Vegetable commodities. We formalize what protectionism is by comparing standards to the internationally scientific referenced benchmarks regulated jointly by both the Food and Agricultural Organization and the World Health Organization. Our results show that the animal and vehicle commodityare less dependent on imports and is overprotected by more stringent standards relative to the international benchmarks. Conversely, we find that the other variables are not under-protected relative to the international standards. These results largely support the hypothesis that heavily import dependent sectors are less protected.

Keywords: Trade Protectionism, Non-tariff measure, Food Safety Standards, Developing countries.

1 INTRODUCTION

Trade protectionism includes the deliberate use of government regulations to restrict the importation of foreign goods and services, which have become a common feature of international trade. Prior to the General Agreement on Tariffs and Trade (GATT) and its subsequent revisions, extensions, and rounds, the use of excessively high tariffs on manufactured products has promoted protectionism. However, as a result of the World Trade Organization, this kind of protectionism has lost ground following a decline in the use of tariffs and the consequent increase in the use of non-tariff measures (NTMs) by many countries as barriers to trade. NTMs take several different types, from conventional barriers such as quotas and subsidies to more complicated and dynamic ones, including voluntary sanitary and phytosanitary measures, compulsory technical regulations and minimum entry price controls. In addition, Protectionist intent is generally not apparent in NTMs, as it is sometimes the case with tariffs, because they are sometimes less explicit than tariffs and are often related to non-trade policies such as consumer protection. Moreover, protectionist motive is therefore harder to detect,such as non-trade priorities have the legitimate concern for the welfare of the citizenry, in which case the government is obligated to protect the health of citizens and the

environment by ensuring that the NTMs that guarantee a certain health and safety issue are implemented.

Furthermore, these NTMs may also be used as a possible barrier to protect domestic producers and push out foreign producers through the use of strict trade protectionism as a mechanism to channel a divide between domestic and foreign producers(Baldwin, 1970, 2000).This is the case for many food items where the governments tries to achieve a non-trade goal of improving the health and safety of customers, but at the same time sets much higher requirements for food safety than would be expected by international benchmarks. Nonetheless, the prevalence and continued use of such food safety regulations as protectionist weapons has been found to hinder the growth of exports in many countries on global markets (Otsuki et al., 2001; Shepherd and Wilson, 2013). This could therefore jeopardize the continent's progress, as deep trade integration is widely seen as the most promising way to achieve economic growth (Nicita and Rollo, 2015).

The protectionist usage of NTMs and their consequences for countries exporting and importing is still not well understood. Studies investigating whether the use of NTMs has protectionist intent are rare; this can be due in large part to the challenge of differentiating their non-trade policy objectives from their trade policy objectives and the lack of a widely agreed benchmark for doing so (Xiong and Beghin, 2014). Our study therefore contributes to the literature by ascertaining the protectionist intent of NTMs with a specific focus on sanitary and phytosanitarymeasure (MTM)and technical barrier to trade (TBT). We argue that standards are a strong case study because they are implemented mainly out of a genuine concern for the health and safety purpose(the non-trade objective). However, they can also be used as a protectionist instrument by importing countries which set excessively restrictive standards to achieve a certain level of protectionism (the trade objective). This provides a basis for assessing whether or not the criteria chosen are still safe. Furthermore, out of all NTMs, our interest in standards arises from the facts that, a substantial proportion of traded food products are subject to standards controlled by many importing countries and hence provide a significant NTM to review.

Although the World Trade Organization (WTO) agreements on Sanitary and Phytosanitary Measures (SPS) and Technical Barriers to Trade (TBT) encourage the use of international standards, and the Agreements also acknowledge which countries that use domestic standards provided they have scientific justification. This provision has been widely used to the benefit of many established standard-setting countries to the extent that some standards have created a number of disputes, due to the allegation that they are being used as disguised protectionism. For example, there have been a considerable number of disputes amongst several OECD countries and, these have been brought to the WTO after its dispute settlement procedure was developed in 1995 (Dee and Ferrantino, 2005).

Given that countries have a free hand to make standards that differ from the global norm, one that pronounces domestic standards that surpass the international socially optimal benchmark with a non-trade objective as being excessively strict, suboptimal, perhaps protectionist in nature, and thus further trade distorting (Fisher and Serra, 2000; Grandal and Shy, 2001; Marette and Beghin, 2010). Likewise, local standards that are smaller than the international socially acceptable benchmark can be claimed to be less trade distorting or even trade enhancing, but still suboptimal and non-protectionist. On the other hand, empirical studies of trade consequences of these ‘suboptimal standards' are uncommon due to the difficulty of separating standards with legitimate intent from those with protectionist intent (Li and Beghin, 2014).

Moreover, SPS and TBT measures are put in place to ensure that imports meet food safety, animal or plant health, and importing countries technical regulations, these requirements may affect trade through the addition of increased compliance, inspection, and operating costs. Exporters have declared that some SPS / TBT measures have requirements that are disproportionate to actual levels of risk and hamper trade excessively, often acting as disguised trade barriers. However, it can be difficult to determine the impacts of types of measures. Unlike tariffs, NTMs are neither transparent nor easily measured, resulting in many challenges in terms of data, methodology and concept.

Thus this study fills this gap by evaluating the impact of NTMs on trade in 40 developing countries. We investigate the protectionist intent of developing countries food safety standards using a sample of food imports from several developing countries with a specific focus on Plastic, Vehicle, Animal, and Vegetable commodities and it applies a more advanced panel data system.

The rest of this paper is organized as follows: Section 2 briefly reviews the related literature. In section 3, we describe the data and methodology. Section 4 discusses the results and the final section concludes.

2. LITERATURE REVIEW

The literature on standards and foreign trade flows focuses primarily on exploring the impact on trade flows of minimum quality requirements and reliability requirements (Grandal and Shy, 2001; Otsuki et al., 2001; Disdier et al, 2008; Ferro et al., 2015; Fontagne´et al., 2015; etc). However; recent studies have explored how standards can be used as a method of regulatory protectionism. Although the literature on the protectionist use of food safety standards is scarce, in comparison to the very small empirical literature, some theoretical works are available. On the theoretical hand, early studies in this field have eligible protectionism when welfare maximizing national expectations is higher than those of the social planner, and vice versa for anti-protectionism. They showed that domestic policy makers set a number of criteria to optimize both producer and consumer welfare along with the welfare of certain interest groups. Such domestic requirements are then compared to an internationally appropriate universal standard that would have been introduced by a social planner aiming only to optimize social welfare and foreign profits (Fisher and Serra, 2000; Marette and Beghin, 2010).

The primary conclusion of the theoretical literature study is that standards are used as instruments of veiled protectionism in order to shield domestic producers from competition (Anderson et al., 2004; Fischer and Serra, 2000; Sturm, 2006; Sheldon, 2013). Nevertheless, some other researchers comprehensive theoretical history has pointed out that norms are not always protectionist and can often be anti-protectionist (Maertens and Swinnen, 2007; Marette and Beghin, 2010; Swinnen and Vandemoortele, 2011; Tian, 2003). However, the empirical confirmation of these theoretical predictions is uncommon, a gap which this study is trying to fill. The divergent existence of these theoretical statements suggests the need for standards to be empirically evaluated by product before eventually classifying them as protectionist instruments – an indication that empirical research is of paramount importance.

Furthermore, the tremendous pace at which NTMs spread as instruments of trade policy is reflected in the rapidly increasing analysis of their economic impact. Van Tongeren et al. (2009), Beghin et al. (2012) and Ghodsi (2015a),for example a partial equilibrium system was applied to evaluate the effect of NTMs on trade, but computable general equilibrium models were also used recently for this purpose.e.g. by Francois et al. (2012). In order to assess the impact of NTMs on international trade, often a gravity estimation approach is followed, by Essaji (2008), Disdier et al. (2010), Yousefi and Liu (2013) and Ghodsi (2015b). A way to directly compare the effects of NTMs on trade with the impact of tariffs on trade is to compute the ad valorem equivalents (AVEs) of NTMs, which was done by Kee et al. (2009), Bratt (2014), Beghin et al. (2014) as well as Cadot and Gourdon (2015). Ferrantino (2006) offers a thorough overview of the often used methods for quantifying the impact of NTMs on trade flows and prices by NTM sort.

One method to calculate AVEs is to evaluate the price wedge resulting from the implementation of NTMs, applied by Dean et al. (2009), Rickard and Lei (2011) and Nimenya et al. (2012). The amount of information required for this research limits most papers to evaluating very few items for a limited set of countries – mostly agricultural ones. The study by Dean et al. (2009) and Cadot and Gourdon (2015) are rare exceptions. Another disadvantage of this approach is that there is no observe ability of domestic prices in the absence of NTMs. Therefore, domestic prices affected by NTMs frequently compete directly with foreign prices, thereby neglecting the potential effect of product

quality differences. In addition, NTMs occur at various stages along the supply chain, which necessitates a comparison of different prices across the production and distribution chain (e.g. Cost, Insurance and Freight (CIF), Delivered Duty Paid (DDP)) for a single product, and in the case of prohibitive NTMs, there is simply no quality measurable.

The other branch of literature has been triggered by a contribution of Kee et al. (2009), who infer the AVEs of NTMs indirectly in a two-step approach. They use a gravity model to assess the impact of NTMs on import values. The results are then converted to AVEs using elasticity's in import demand which are calculated in advance. They note that, when weighted by import prices, the average AVE of all goods affected by NTMs is 45 % and 32 %. In addition, they note a great variety of AVEs across products and countries, with the highest AVEs found in Africa for agricultural products and low-income countries.

Importantly, Kee et al (2009) restricted their AVEs to be positive, i.e. through using parameter constraints, all NTMs were required to have only tariff-like and quota-limiting effects on imports. Nevertheless, NTMs may also help to promote trade, provided market imperfections. Beghin et al. (2014) therefore, re-estimate the gravity approach proposed by Kee et al. (2009) for standard like NTMs for the years 2001 to 2003, making positive and negative NTM, AVE values. Technical regulations impacted 12 % of all goods at the 6-digit HS stage in their study. Among these, 39 % had negative AVEs – i.e. an impact that encouraged imports. Bratt (2014)concludes, NTMs typically hinder rather than encourage trade with a median AVE of 15.7%. 46.1 %of all measured AVEs, however, have a positive impact on trade. Differentiation between exporters and importers at different rates of income, as well as between food and manufacturing, he finds that the impacts of NTMs are primarily driven by the impressive NTM countries, where NTMs are the highest for low-income countries in both sectors. In addition, Bratt (2014)illustrates those NTMs that target the food sector are more restrictive on imports than NTMs in the industrial sector.

Compared with the price wedge approach, the key benefit of the gravity approach is that the former relies on trade data, which is more plentiful at the disaggregated commodity level than price data. Moreover, it can be used for specific panel research, i.e. for a wide range of countries and goods, with various NTMs changing over time. Yet the indirect approach also has disadvantages. This strategy, like the price gap process, does not differentiate the output of domestic products from international products, affecting the effect of NTMs. Additionally; AVE measurements are based on the elasticity's of import demand, which are estimates themselves.

In acknowledgement of the advantages and disadvantages of both methods, we also seek to fill the gaps in the latter branch of literature caused by Kee et al (2009).Previous calculations of AVEs of NTMs (Kee et al., 2009; Bratt, 2014; and Beghin et al., 2014) Cross sectional data were performed due to a lack of knowledge on NTMs. Having a rich NTM database gathered from WTO I-TIP, we expand their approach to a data review panel. Furthermore, and perhaps most critically, earlier estimates did not differentiate types of NTMs whose various attributes would have different trade consequences. We differentiate major categories of NTMs, which will provide deeper insights into the consequences of using specific NTMs. Additionally; the existence of NTMs was captured by employing dummy variables. Our analysis, however, is based on the intensity of use of NTM types by counting the number of imposed NTMs.

3. METHODOLOGY AND DATA COLLECTION

3.1 Methodology

Gravity methods are widely used to determine trading volumes. It is generally accepted that bilateral trade volumes (or values) are determined by economic reach of the trading countries and multilateral resistance, including trade policies, bilateral geographical distance, common borders, language , membership of free trade areas, etc. (Anderson and van Wincoop, 2003).

Therefore, we are going to use the following gravity approach to determine NTM's effect on trade in 40 developing countries.

$$\ln(\mathrm{EXP}_{ijt}) = a_i + a_j + a_t + \beta \ln NTM_{ijt}\ (Industry + Agriculture\ prpduct) + \gamma_1\, lnpop_{it} + \gamma_2\, Dist + \gamma_2\, Ln\ Lan + u_{ijt} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

In equation (1), the dependent variable is *EXPijt*, which is the export of several developed countries for 40 developing countries in year *t*. We provide a set of independent variables such as: popjtis the total population; and distijis the geographical distance between the two countries; langij is an ordinary variable, representing the existence of common official language; industij represents the industry product such as Plastics and Vehicle products and Agriclulij shows the agriculture product such as animals and vegetables.

In addition, the two-stage method is seized by the two regression equations (2) and (3) specified below:

Stage 1: Model of sample selection for trade probability is shown below:

$$\ln(\mathrm{EXP}_{ijt}) = a_i + a_j + a_t + \beta \ln NTM_{ijt} + \gamma_1\, GravityControls_{ijt} + u_{ijt} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Stage 2: The trade flow equation [non-linear least squares estimation]

$$\ln(\mathrm{EXP}_{ijt}) = a_i + a_j + a_t + \beta \ln NTM_{ijt} + \gamma_1\, GravityControls_{ijt} + u_{ijt} + \theta\eta_{ijt}\,\eta Z\varepsilon + \ln\{trade[\delta Z_{ijt} + \eta_{ijt}] - 1\} + \varepsilon_{ijt} \quad \ldots\ldots\ldots\ldots\ldots (3)$$

Where γ_1 is a vector flow coefficients, η_{ijt} =φ (Z_{ijt})/ Φ (Z_{ijt}) is the inverse Mills ratio and Z_{ijt} = Φ (P_{ijt}), in which P_{ijt} are the evaluations from the regression model in stage 1.

The first stage, equation (2), is the sample selection model, whereby dependent variable is the presence of country i's trade country j in year t, and the independent variables are the same as those in regression equation (1), which involve of the NTM notification variable and the independent variables in any gravity approach, All indicated by vector Gravity model. The second stage, equation (3), is the trade flow equation, whereby the dependent variable is the log value of developed countries exports.

This allows us to determine the NTM effect of positive trade flows on the sample of country pairs.

Helpman et al. (2008) illustrate that a transformation of equation (3) that will give consistent estimates is:

$$\ln(\mathrm{EXP}_{ijt}) = a_i + a_j + a_t + \beta \ln NTM_{ijt} + \gamma_1\, GravityControls_{ijt} + u_{ijt} + \theta\eta_{ijt} + Z_{ijt1} + Z_{ijt2} + Z_{ijt3} + \varepsilon_{ijt} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

Where the polynomial in $Z_{ijt1} = Z_{ijt2} + \eta_{ijt}$ is an approximation of an arbitrary and increasing function of the latent variableZ_{ijt}.

Regarding NTMs, coefficients in the panel OLS regression shows an important impact on verdict to trade of such variables. As such, NTMs serve as a major trade obstacle for the products concerned. In addition, variations between these variables show up in the regression portion of the estimation method.

3.2 Data collection

Table 1Variable descriptions and sources.

Variable	Description	Sources
EXP	Export	World Development Indicators (WDI) 2019.
Dist	Distance between capital of each countries	the CEPII database (the Centre d'EtudesProspectives et d'InformationsInternationales in France database)2019
Plas	Plastics	UNCTAD-Trade Analysis Information System (TRAINS) 2019.
Veh	Vehicle	UNCTAD-Trade Analysis Information System (TRAINS) 2019.
Anim	Animals	UNCTAD-Trade Analysis Information System (TRAINS) 2019.
Vege	Vegetables	UNCTAD-Trade Analysis Information System (TRAINS) 2019.
		World Development Indicators (WDI) 2019.
POP	Total Population	An ordinary variable as we put two vale (0 and 1)
Lan	Language	

4. Results and Discussions

Table 2 presents the OLS estimation results which show that 3 variables are statistically significant however two of them are negative such as Distance, Population, while Vehicle is positive. Meaning that these variables are not playing an important role in international trade in developing countries, and it does not lead to stimulate economic growth in the developing countries. Furthermore, the remaining variables of our estimations are in significant such as Animal, Vegetable and Plastic. Meaning that, the sample of our data indicate that, as some countries do not trade with each other, in some years, it means that NTM is less important than tariff in the developing countries.

Furthermore, the developing countries standards on different kinds of commodities do not hinder theextensive margins of it, means that the standards are not restrictive in that they prevent imports of themat the extensive level. This implies that many of the imports at this line oftrade often considered the standard requirements for market access beforehand and ensured adequatecompliance prior to entering the market.

In addition, we also used language as a binary variable in our sample countries, we put 1 if all developing countries use the same language and zero otherwise, and this variable is not an important tools in international trade between developing and foreign countries regarding in NTMs.

Table 2Pooled OLS Regression: Dependent variable (Developed Countries Export).

Variable	*Coefficient*	Standard Error	*T ratio*
Constant	118.2566	9.81723	0.000*
Ln POP	-.0003694	.0000662	0.000
LDist	-1.170841	.2699968	0.000*
Ln Lnag	1.248581	8.857855	0.888
LAnim	.0001277	.0000867	0.557
LVege	.0001277	.0002166	0.557
LPlas	-2.45e-06	8.95e-06	0.785
LVeh	.0100635	.0049378	0.043*
Hausman Random effect (POP)	.0000437		
N	191		
Countries	12		

Min obs	15
Max obs	16
Av obs	15.9
R-sq within	0.947
R-sq between	0.953
R-sq overall	0.972

* denote significance at 1% level. Values in parentheses are Heteroscedasticity consistent *t*-statistics and values in brackets are *p*-values.

In addition, table 3 presents the results of the selected agricultural and industry commodities as we have mentioned previously in table 2, by using the fixed and random effect model and we estimate 7 different variables namely population, distance and language as a binary variable, animals, vegetables, plastic and vehicles. Results reveal that population has an enormous impact on international trade among 40 developing countries with the foreign countries, meaning that when the population increase it push the government policy to rethink about those commodities which is necessary for their people. For this reason population variable in our estimation is positive and statistically significant. Moreover, another variables such as Animal and vehicle are another commodity which could be it's a good idea the developing countries should not depend to import them because some of the developing countries may produce animals and vehicles, for first one maybe it's related to the climate and environment, and some of the diverse animals can live in their country. For the second commodities might be related to the labor skills which also some of the developing countries mayafford labor intensive and variousindustries to produce a good enough amount of them for their people. For these circumstances they have not to import them. Furthermore, the other variables are not important indicators in our sample countries. The reason for this maybe is that they have a local capacity to produce them. Finally, the distance variables play a negative and statistically significant role in the panel estimation. It means that wherever the country's partner is far or close to the developing countries may not important for them because standard and quality are the most common policy, which developing countries require from exporter countries to do so.

Table 3Fixed Effects Results: Dependent variable (Developed Countries Export).

Variable	*Coefficient*	Standard Error	*T ratio*
Constant	72.75947	8.128021	0.000*
Ln POP	.0033292	.0005487	0.000*
LDist	.2548974	.9450172	0.788
Ln Lnag	5.147283	5.070253	0.314
LAnim	.0718586	.0228891	0.002*
LVege	.0000897	.000125	0.476
LPlas	-9.30e-07	5.16e-06	0.857
LVeh	.0203965	.0035429	0.000*
Hausman Random effect (POP)	.0000437		
N	191		
Countries	12		
Min obs	15		
Max obs	16		
Av obs	15.9		
R-sq within	0.947		
R-sq between	0.953		
R-sq overall	0.972		

* Denote significance at 1% level. Values in parentheses are Heteroscedasticity consistent *t*-statistics and values in brackets are *p*-values.

Finally the estimation in table 4 recommends that the economic indicator of the trade partners would not contribute significantly to enhancement imports of plastic. However, the developing countries standards have a negative and significant effect on vehicle, so for any additional standard requirement imports decrease by about 0.2 % of exports. This indicates the results of Chevassus-Lozza et al. (2008) and Van Tongeren et al.(2010). Moreover, Distance variable does not significantly inhibit the plastic commodity. Furthermore, the results show that higher priceshave a significant impact on import at this trade margin. This illustrates that high regulatory costs often lead to higher prices that in turn have a negative impact on import. In addition only Vehicle, animal and populationare positive and statistically significant, meaning that importing any kind of these variables into the developing countries do not lead and effect on trade and economic seriously.

The estimates suggest that vehicle standards have a substantial and specific correlation with imports from industrial countries, so that potential. Even with standard requirements, exporters are not discouraged. An assessment of the developing countries directives on Vehicle and Animal standards indicate that there has been a relative long term stability in the directives, which provides exporters the export flexibility at the trade margin. Income in exporting countries greatly encourages exports of these commodities. This might be a result of the demands of government and organic production in this sector, which developing countries are trying to fulfill.

Table 4Random Effects Results: Dependent variable (Developed Countries Export).

Variable	*Coefficient*	Standard Error	*T ratio*
Constant	118.2566	9.81723	0.000*
Ln POP	3.09e-06	1.10e-06	0.005*
Ln Lnag	1.248581	.0503601	0.888
LAnim	.0768933	.0250567	0.002*
LVege	.0001277	.0002166	0.555
LPlas	-2.45e-06	8.95e-06	0.784
LVeh	.0214016	.003841	0.000*
LDist	-.2053197	.0503601	0.000*
Hausman Random effect (POP)	.0000437		
N	191		
Countries	12		
Min obs	15		
Max obs	16		
Av obs	15.9		
R-sq within	0.947		
R-sq between	0.953		
R-sq overall	0.972		

* Denote significance at 1% level. Values in parentheses are Heteroscedasticity consistent *t*-statistics and values in brackets are *p*-values.

5. Conclusion

In this paper we have examined different types of non-tariff measures (NTMs) at the Harmonized System 6-digit commodity level for 40 importing developing countries over the period 1999-2014. In addition, we have gathered data from the WTO I-TIP database on NTM notifications. Through

distinguishing the impact of NTMs on many different forms of NTMs, we contribute to the current literature, with particular attention given to technical barriers to trade (TBT), and sanitary and phytosanitary measures (SPS). Furthermore, working with this unique dataset allows for a strength measure to determine the trade effects of NTMs. Moreover, considering the potential of NTMs for reducing information asymmetries, the effects of NTMs on importsare not limited to being negative in our study.

Instead, we find some agricultural products among those that experienced import boosts from SPS measures and TBTs While we find developing countries move up with foreign countries to implement NTMs.

In addition, we cannot confirm findings from previous studies at the product level which suggested that NTMs have a negative impact on agricultural products in particular. Alternatively, among those that encountered import boosts from SPS initiatives and TBTs we consider some agricultural products.

In brief our results show that the animal and vehicle commodity are less dependent on imports, and is overprotected by more stringent standards relative to the international benchmarks. Conversely, we find that the other variables are not under-protected relative to the international standards.

References

Anderson, J. E., & Van Wincoop, E. (2003). Gravity with gravitas: A solution to the border puzzle. American economic review, 93(1), 170-192.

Anderson, K., Damania, R., and Jackson, L. (2004).Trade, standards, and the political economy of genetically modified food (No. 3395).World Bank Policy Research Working Paper.

Baldwin, R. (2000). Regulatory protectionism, developing nations and a two-tier world trading system.(S. Collins and D. Rodrik, Eds.)Brookings Trade Forum. Washington, DC: Brookings Institution.

Beghin, J., A.-C.Disdier, S. Marette, and F. van Tongeren, F. (2012). Welfare costs and benefits of non-tariff measures in trade: a conceptual framework and application. World Trade Review, 11(03), 356-375.

Beghin, J., A.-C.Disdier, S. Marette (2014).“Trade Restrictiveness Indices in Presence of externalities: An Application to Non-tariff Measures”, CESifo Working Paper No. 4968, September 2014.

Bratt, M. (2014). “Estimating the bilateral impact of non-tariff measures (NTMs)”, Working Paper WPS 14-01-1, Université de Genève.

Cadot, O. and J. Gourdon, 2015."NTMs, Preferential Trade Agreements, and Prices: New evidence," Working Papers 2015-01, CEPII research center.

Dean, J.M., J. Signoret, R.M. Feinberg, R.D. Ludema, and M.J. Ferrantino (2009). “Estimating the Price Effects of Non-Tariff Barriers”, The B.E. Journal of Economic Analysis & Policy, 9 (1), Art. 12.

Disdier, A. C., B. Fekadu, C. Murillo, and S.A. Wong, (2010).Trade effects of SPS and TBT measures on tropical and diversification products.

Dee, P. S., and Ferrantino, M. J. (2005).Quantitative methods for assessing the effects of non-tariff measures and trade facilitation (Vol. 54). APEC Secretariat

Disdier, A.-C., Fontagné, L., and Mimouni, M. (2008). The impact of regulations on agricultural trade: Evidence from the SPS and TBT agreements. American Journal of Agricultural Economics, 90(2), 336-350.

Emlinger, C., Jacquet, F., &Lozza, E. C. (2008). Tariffs and other trade costs: assessing obstacles to Mediterranean countries' access to EU-15 fruit and vegetable markets. European Review of Agricultural Economics, 35(4), 409-438.

Essaji, A. (2008). Technical regulations and specialization in international trade. Journal of International Economics, 76(2), 166-176.

Ferrantino, M. (2006).“Quantifying the Trade and Economic Effects of Non-Tariff Measures”, OECD Trade Policy Papers, No. 28, OECD Publishing.http://dx.doi.org/10.1787/837654407568

Ferro, E., Otsuki, T., and Wilson, J. S. (2015).The effect of product standards on agricultural exports. Food Policy, 50, 68-79.

Fischer, R., and Serra, P. (2000).Standards and protection. Journal of International Economics, 52(2), 377-400.

Fontagné, L., Orefice, G., Piermartini, R., and Rocha, N. (2015). Product standards and margins of trade: Firm-level evidence. Journal of International Economics, 97(1), 29-44.

Ghodsi, M., S. Jokubauskaite, and R. Stehrer, (2015b) “Non-Tariff Measures and the quality of imported products”, mimeo.

Ghodsi, M., (2015a)."Distinguishing Between Genuine and Non-Genuine reasons for imposing TBTs; A Proposal Based on Cost Benefit Analysis", wiiw Working Paper, No. 117, Vienna, July 2015.

Gandal, N., and Shy, O. (2001).Standardization policy and international trade. Journal of International Economics, 53(2), 363-383.

Helpman, E., Melitz, M., & Rubinstein, Y. (2008). Estimating trade flows: Trading partners and trading volumes. The quarterly journal of economics, 123(2), 441-487

Kee, H.L, A. Nicita, and M. Olarreaga (2009). “Estimating Trade Restrictiveness Indices”, The Economic Journal, 119: 172-199.

Li, Y., and Beghin, J. C. (2014). Protectionism indices for non-tariff measures: An application to maximum residue levels. Food Policy, 45, 57-68.

Maertens, M., and Swinnen, J. (2007).Standards as barriers and catalysts for trade, growth, and poverty reduction. Journal of International Agricultural Trade and Development, 4(1), 47-61.

Marette, S., and Beghin, J. (2010). Are standards always protectionist? Review of International Economics, 18(1), 179-192.

Nicita, A., and Rollo, V. (2015).Market access conditions and sub-Saharan Africa’s exports diversification. World Development, 68, 254-263.

Nimenya, N., P.-F.Ndimira and B. H. de Frahan (2012). “Tariff equivalents of nontariff measures: the case of European horticultural and fish imports from African countries”, Agricultural Economics, 43: 635-653.

Otsuki, T., Wilson, J. S., and Sewadeh, M. (2001).Saving two in a billion: quantifying the trade effect of European food safety standards on African exports. Food Policy, 26(5), 495-514.

Rickard B.J., and L. Lei (2011). “How important are tariffs and nontariff barriers in international markets for fresh fruit?”, Agricultural Economics, 42: 19-31.

Sheldon, I. M. (2013). North-South trade and standards: What can general equilibrium analysis tell us? World Trade Review 11(3), 376-89.

Sturm, D. M. (2006).Product standards, trade disputes, and protectionism. Canadian Journal of Economics, 39(2), 564-581.

Shepherd, B., and Wilson, N. L. W. (2013). Product standards and developing country agricultural exports: The case of the European Union. Food Policy, 42, 1-10

Swinnen, J. F. M., and Vandemoortele, T. (2011).Trade and the political economy of food standards. Journal of Agricultural Economics, 62(2), 259-280.

Tian, H. (2003).Eco-labelling scheme, environmental protection, and protectionism. Canadian Journal of Economics/Revue Canadienned`Economique, 36(3), 608-633.

Van Tongeren, F., Beghin, J., and Marette, S. (2009). A Cost-Benefit Framework for the Assessment of Non-Tariff Measures in Agro-Food Trade.

Van Tongeren, F., Disdier, A. C., Ilicic-Komorowska, J., Marette, S., & Von Lampe, M. (2010). Case Studies of Costs and Benefits of Non-Tariff Measures.

Xiong, B., and Beghin, J. (2014).Disentangling demand-enhancing and trade-cost effects of maximum residue regulations. Economic Inquiry, 52(3), 1190-1203.

Appendix

List of the countries in our estimation

Countries Group	Members
Importers (Developing countries)	Algeria, Argentina, Armenia, Azerbaijan, Bahrain, Bangladesh, Belarus, Bolivia, Brazil, Brunei, Cambodia, Chad, Chile, China, Colombia, Congo, Egypt, Fiji, Georgia, Ghana, Haiti, India, Indonesia, Iran, Jamaica, Jordan, Kazakhstan, Kenya, Kuwait, Kyrgyz, Lebanon, Mexico, Morocco, Oman, Qatar, Saudi Arabia, Nigeria, Pakistan, Paraguay, Peru.
Exporters developed countries)	USA, Japan, Australia, South Korea