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RESEARCH in PROGRESS

Assessing the impacts of eliminating Non-Tariff Barriers in the framework of the African Continental Free Trade Area on Cameroons economy

by

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CONTENT

I. CONTEXT AND RESEARCH ISSUES

With the failure of import-led industrialization policies since independence, African countries have embraced regional integration as an essential determinant of their development goals. The African Continental Free Trade Area Agreement (AfCFTA) is the latest and biggest regional integration initiative. Its effective implementation will create a single African market of over a billion consumers with a total Gross Domestic Product (GDP) of over $3 trillion. This will make Africa the largest free trade area in the world (Songwe, 2019). The AfCFTA's objective is to enhance the level of intra-African trade from current levels of about 10-13 % to 25 % or more within the next decade[2] and thereby assist Africa to use trade more effectively as an engine of growth and sustainable development.

The AfCFTA market thus offers development opportunities to country like Cameroon which, in order to materialize its economic emergence "2035 vision" supported by an Industrialization Master Plan (IMP), has adopted a national strategy for the implementation of the AfCFTA in 2020, a few months after ratifying the AfCFTA Agreement in October 2019. Cameroon's Industrialization Master Plan has two main objectives: increasing its exports to Africa and diversifying its economy.

Although tariff elimination is an important end goal for deeper intra-African trade[3], some of the greatest benefits would lie in eliminating NTBs[4] (Viljoen, 2018 ; Parshotam, 2018; Abrego, Amado, Gursoy, Nicholls & Perez-Saiz, 2019; Balistreri, Tarr & Yonezawa, 2015). Today's AfCFTA real challenge is the increasing number of NTBs in Africa which exist in various forms. This fact is called "the current scenario: Trade within Africa" as opposed to "the earlier scenario: African trade to EU or US" (Plessis, 2016). De Melo & Tsikata (2015) argue that these were largely ignored across African RECs until recently. Thus, if the AfCFTA is successful in addressing these barriers, significant progress can be made to increase intra-Africa trade (Viljoen, 2018).

A general categorization of potential NTBs within AfCFTA is include in the agreement[5]. A mechanism to identify, notify, resolve, monitor and eliminate NTBs within the AfCFTA will be put in place[6]. Following a complaint[7] by an interested Party[8] on measures that restrict trade, if the parties[9] mutually agree on the complaint as being an NTB, the responding Party shall develop an elimination plan[10]. By the end,

[2] The Economic Commission for Africa (ECA) estimates that the elimination of import tariffs through the AfCFTA could increase intra-African trade by 52.3 per cent.

[3] See Mevel & Karingi (2013); Sandrey & Jensen (2015); UNCTAD (2015a); UNCTAD (2015b); and Tanyi (2015) for tariffs reduction analysis in the AfCFTA

[4] The implementation of the AfCFTA will consist of trade liberalization in various domains: Trade in Goods, trade in services, Rules and procedures on the settlement of disputes, competition policy, Investment, Intellectual property rights and e-commerce. In the domain of trade in goods, countries will proceed of substantial removal of tariffs and elimination of Non-Tariff Barriers (NTBs).

[5] Appendix 1 of the Annex 5 (Non-Tariff Barriers) of the Protocol on Trade in Goods of the agreement establishing the AfCFTA lists six categories of NTBs:

a. government participation in trade and restrictive practices tolerated by Governments;
b. customs and administrative entry procedures;
c. technical Barriers to Trade;
d. sanitary and Phytosanitary Measures;
e. specific limitations; and
f. charges on imports.

[6] Article 12 of the Annex 55 (Non-Tariff Barriers) of the Protocol on Trade in Goods of the agreement establishing the AfCFTA. The mechanism is available at https://tradebarriers.africa/about

[7] can lodge a complaint or a trade problem on the basis of the principle of request (of the country undergoing the NTB) - response (of the country imposing the NTB) or Recourse to a facilitator to resolve complaints in the event that the request-response principle does not succeed.

The final step is the case where the parties still cannot reach an agreement. In this case, the complaining State party may resort to the dispute settlement stage.

[8] "Interested Party" means a Party that is directly affected by the Non-Tariff Barriers (hereinafter referred to as NTBs) under discussion;

[9] The responding State Party the requesting State Party

[10] As provided for under Article 13 of the Annex 5 (Non-Tariff Barriers) of the Protocol on Trade in Goods of the agreement establishing the AfCFTA

following the list of complaints received, each state party will prepare a Time Bound Elimination Matrix[11], based on the agreed categorization of NTBs and their level of impact on intra-African trade.

Cameroon's imports are not the subject of significant NTBs. Data from ITIP of the WTO shows that Cameroon notified only TBT measures on 12 November 2007 and 12 August 2009 that apply to all WTO members. However, its exports face bilateral measures (SPS) initiated by European Union (on 16 may 2018) and by Ecuador (on 11march 2013, 24 April 2013, and 24 February 2015) and multilateral measures[12] (EXS; QRS; SFG; SPS; SSG; STE; TBT; TRQ) applied by 146 WTO members including 34 African countries[13] from 1995 to 2019. In addition, even NTBs in markets where Cameroon does not trade could have a disincentive effect for its exports. Therefore, the AfCFTA will have important trade, economic and development issues and challenges for Cameroon.

NTBs elimination will involve, as for many countries, more challenges and threats for Cameroon. These relates to the difficulties in determining the extent of which NTBs elimination will impacts its economy through the two main objectives of Cameroon's IMP toward its economic emergence "2035 vision", that are increasing its exports to Africa and diversifying its economy.

One of the major challenges is the elimination of non-technical measures such as quotas or price controls on national producers and consumers[14]. As instruments of industrial policy, these traditional trade policies still present in many developing countries, aim to protect and develop domestic industries by restricting imports (UNCTAD, 2017). Thus, those policies generate income and growth of productive sectors crucial for infant industries in developing countries like Cameroon that are struggling to promote industrialization. At the same time, while promoting national industries by reducing unfair competition, non-technical measures entail higher prices for the entire population[15]. Thus, the elimination of non-technical measures may hurt domestic infant industries but improve consumer welfare.

Another challenge stems from the dual opposite effect of technical measures (SPS and TBT)[16] on trade. Technical measures applied by Cameroon's trade partners may have a dual effect on promoting and reducing Cameroon's trade. SPS and TBT imposed in Cameroon's trade partners may foster Cameroon's exported products that meet the requirements on that foreign markets by, in the presence of information asymmetries, providing further information on the good and safe quality of Cameroon's products, to consumers in those partner countries. At the same time, those SPS and TBT measures also may have a deterring effect on Cameroon's exports because complying with requirements imposed by SPS and TBT is costly and involves technical efforts and cumbersome procedures for Cameroon's exporting firms. Thus, the elimination of SPS and TBT measures by Cameroon's trade partners could also have these dual effects on Cameroon's exports. The same dual effect for Cameroon's imports may happen if Cameroon eliminates its SPS and TBT measures.

Whether they damage trade or not, SPS and TBT measures have the initial role of protecting health, safety and environment. As such, in order to facilitate trade by the elimination of unnecessary and unjustifiable NTBs, Annex 6(Technical Barriers to Trade) and Annex 7(Sanitary and Phytosanitary measures) of the Protocol on Trade in Goods of the agreement establishing the AfCFTA encourage harmonization of SPS and TBT measures amongst AfCFTA state parties rather than eliminate them, by the use of international standards. However, due to the complexity of these measures, it is extremely difficult to foresee the impact of regulatory convergence on different countries. Indeed, for instance, Cameroon doesn't apply SPS and TBT measures at the same level/products as its trade partners. So, an harmonization across the continent will impact some countries positively and others negatively because while other countries will be lowering their protection others will increase it.

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[11] "Time Bound Elimination Matrix" means the Non-Tariff Barriers elimination plan for the removal of identified NTBs that is based on the NTBs level of impact on intra-regional trade.

[12] applied to all WTO members

[13] Benin ; Botswana ;Burkina Faso ;Burundi ;Cabo Verde ;Central African Republic ;Congo ;Cote d'Ivoire ;Egypt ;Eswatini ;Gabon ;Gambia ;Ghana ;Guinea ;Kenya ;Liberia ;Madagascar ;Malawi ;Mali ;Mauritius ;Morocco ; Mozambique ;Namibia ;Nigeria ;Rwanda ;Senegal ;Seychelles ;SouthAfrica ;Tanzania ;Togo ;Tunisia ;Uganda ;Zambia ;Zimbabwe.

[14] Non-technical measures comprise a wide array of policies listed in the AfCFTA categorization of potential NTBs to be eliminated.

[15] Not only for consumers but also companies that imports intermediate goods used as inputs

[16] SPS and TBT stand for Sanitary and Phytosanitary and Technical Barriers to Trade respectively

II. RESEARCH QUESTIONS

What are the impacts of AfCFTA 's NTB elimination and SPS/TBT harmonization on Cameroon's economy? Specifically, how and to what extent will imports and exports, consumption, production and welfare of households, firms and the government be affected?

III. LITERATURE REVIEW

Numerous studies have been carried out to analyze the impact of trade agreements. In this literature review, we are interested in studies of trade agreements in Africa analyzing the impact of NTMs using a Computable General Equilibrium Model (CGEM). We discuss in detail the methods of incorporating NTMs into the different models used in these studies, the sources and types of NTM measurements, and the results obtained.

The models that are generally used for the analysis of the effects of RTAs are econometric gravity models, also called ex post models, and simulation models, including PEMs and CGEMs, also called ex ante models.

Gravity models use historical data to estimate the impact of past trade policies. These models have been used extensively to analyze the impact of free trade agreements on the bilateral trade of member countries in Africa (see Carrère, 2004; Longo & Sekkat, 2004; Coulibaly, 2004; Musila, 2005; Coulibaly, 2009; Afesorgbor, 2013,2017 ; Ngepah & Udeagha, 2018; Osabuohien, Efobi, Odebiyi, Fayomi & Salami, 2019; Tegebu & Seid, 2019).

As the AfCFTA is just only entry into force, ex ante models are more appropriate for our analysis. They assess the effects of a change in trade policy such as non-tariff policy on a set of economic variables of interest such as trade, production, consumption, welfare, etc.

Despite the simplicity of PEMs and their lower requirement in terms of data (e.g. Milner, Morrissey & McKay, 2005; Karingi, Lang, Oulmane, Perez, Jallab & Hammouda, 2005; Karingi, Perez, Oulmane, Lang & Jallab, 2006; Pasara & Dunga, 2019; ECA & TradeMark East Africa, 2020), CGEMs are widely used because of the way they attempt to capture the complex interactions between sectors (Mold & Mukwaya, 2016) and within the different agents of an economy (Mevel & Karingi, 2012). CGEMs use economic data to evaluate how an economy or region might react to changes in policy or to external shocks[17].

Much work has been done thanks to CGEMs for African RTAs and AfCFTA. These studies are distinguished not only by the types of CGEM, the assumptions of the models, but also the evaluated trade policies. Tariff policies have been widely analyzed (see Hallaert, 2007; Dimaranan & Mevel, 2008; Mashayekhi, Peters & Vanzetti, 2012; Minor& Mureverwi, 2013; Mold & Mukwaya, 2016; Saygili, Peters & Knebel, 2018; ECA, 2018; ECA & TradeMark East Africa, 2020), but just a few deal with the barriers resulting from non-tariff policies(see Mevel & Karingi, 2012; 2013; Sandrey & Jensen, 2015; Chauvin, Ramos & Porto, 2017; Vanzetti, Peters & Knebel, 2017; AfDB, 2019; Abrego, Amado, Gursoy, Nicholls & Perez-Saiz, 2019; Zhu, 2020; Maliszewska & Ruta, 2020).

TABLE 1: SUMMARY OF STUDIES OF THE IMPACTS OF NTMS IN RTAS IN AFRICA AND AFCFTA AND COMPARISON WITH THE CURRENT STUDY

Studies	CGE Models	CGE types	NTB types	Sources of NTBs	NTB incorporation Methods	NTB reforms

[17] For more details on the advantages and disadvantages of each of these two types of ex ante simulation models see Piermartini & The (2005). Demystifying Modelling Methods for Trade Policy. DISCUSSION PAPER NO 10

Mevel & Karingi (2012)	MIRAGE	a dynamic multi-country and multi-sector	The trade facilitation measures	Minor & Tsigas (2008)	iceberg costs	Trade Facilitation twice more efficient
Mevel & Karingi (2013)	MIRAGE	a dynamic multi-country and multi-sector	The trade facilitation measures	Minor & Tsigas (2008)	iceberg costs	Trade Facilitation twice more efficient
Vanzetti, Peters & Knebel (2017)	standard GTAP model	a static, multiregional, multisector	ad valorem equivalents of the NTMs	Cadot, Asprilla, Gourdon, Knebel & Peters (2015)	Iceberg cost(*ams)*	regulatory cooperation on technical measures (SPS and TBT)
					tariff equivalent of NTBs	non-tariff barriers, such as quotas and price controls, are fully eliminated
Sandrey& Jensen (2015)	standard GTAP model,	a comparative static general equilibrium model	ad valorem equivalents of NTBs for both agricultural and manufacturing goods	Kee, Nicita& Olarreaga (2009)	tariff equivalent of NTBs	50% of the AVE of NTBs
					iceberg costs(*ams)*	25% of the remaining AVE of NTBs
Depetris Chauvin, Ramos & Porto(2017)	The MIRAGE-e CGE (First stage)	a recursive-dynamic, multi-region and multi-sector	ad valorem equivalents of NTBs	Kee, Nicita& Olarreaga (2009)	iceberg costs	fifty percent (50%) reduction in NTMs
			transaction costs associated with time (delays in customs)	Minor & Tsigas (2008)	iceberg cost	thirty percent (30%) reduction
Abrego, Amado, Gursoy, Nicholls& Perez-Saiz (2019)	Costinot & Rodriguez-Clare (2014)	static, multi-country, multi-sector	Ad valorem equivalents of NTBs (all trade costs excluding tariff)	Economic and Social Commission for Asia and the Pacific (ESCAP) and World Bank database for 2016	tariff equivalent of NTBs	35 percent reduction in NTBs(baseline) 25 percent reduction in NTBs (sensitive analysis) 45 percent reduction in NTBs (sensitive analysis)
Zhu (2020)	standard GTAP model	Multi-regions and multi-sectors	ad valorem equivalents of NTBs (SPS+TBT)	Cadot, Asprilla, Gourdon, Knebel & Peters (2015)	iceberg cost(*ams)*	fully eliminated
Maliszewska & Ruta (2020)	Envisage Model	global recursive dynamic model	NTBs in goods	Kee, Nicita& Olarreaga (2009)	Iceberg cost	50 percent reduction on a most favored nation (MFN) of NTBs within AfCFTA—with a cap of 50 percentage points and 20 percent with non-AfCFTA markets;.
			NTBs in 11 services	Jafari & Tarr (2015)	Iceberg cost	50 percent reduction on a most favored nation (MFN) of NTBs within AfCFTA—with a cap of 50 percentage points and 20 percent with non-AfCFTA markets;.
			Trade facilitation measures (time in customs) in line with the WTO TFA	Melo, Sorgho & Wagner (in progress)	Iceberg cost	Barriers in trade facilitation are halved, although capped at 10 percentage points
This study	PEP model	Static, single country, multisector	Ad valorem equivalents of 12 NTBs	New AVEs Database estimated by the author	Tariff equivalent of NTBs	Full elimination of NTBs that affect imports and generate revenue
					Tariff equivalent of NTBs	Full elimination of NTBs that affect exports and generate revenue
					Iceberg cost	Regulatory cooperation on technical measures (SPS and TBT)
					Export cost	Full elimination of NTBs that affect Producers/exporters

Source: Author

It appears that there are very few studies devoted to analyzing the impact of NTMs in RTAs in Africa. Their low number can be explained not only by the absence of official data available on NTMs but also by the persistent difficulties in quantifying the trade effects of NTMs. The observation that emerges from Table 1 is that two databases are the most used to extract the AVEs of NTBs falling under NTMs: Kee, Nicita & Olarreaga (2009) and Cadot, Asprilla, Gourdon, Knebel & Peters (2015). The other databases concern the AVEs of trade facilitation measures (Minor & Tsigas, 2008; Melo, Sorgho & Wagner, in progress), AVEs of aggregated NTBs including NTMs (ESCAP-World Bank Trade Cost Database[18]).

Unfortunately, Kee, Nicita, & Olarreaga, 2009 and Cadot et al., (2015) by their low level of disaggregation do not allow to answer specific research questions. Cadot et al., (2015) provide AVEs for only 3 groups of NTMs: SPS, TBT, and Other NTMs (that combine Inspection, Price Controls, and Quantity Controls). In addition, these AVEs data exist only at the region level including Africa; therefore, does not make it possible to distinguish the value of AVEs by country and trade partner. Thus, David, ralph, & Knebel (2018) assume the NTMs estimated for Africa are applicable to each African country. Finally, AVEs are available in Cadot et al., (2015) at the sector level, not at the HS 6 digits-level.

Although estimated for products at HS 6 digits level, Kee, Nicita, & Olarreaga (2009) suffer from the same aggregation limit as Cadot et al., (2015). Its current version includes data of AVEs for only 2 groups of NTMs: core NTBs (Price control measures, Quantity restrictions, Monopolistic measures, Technical regulations) and domestic support, and for 93 countries including 23 African.

Apart from Kee, Nicita & Olarreaga (2009) and Cadot et al. (2015), other databases exist but which to our knowledge are not yet used for impact studies of NTMs in the context of RTAs and AfCFTA. Beghin, Disdier & Marette (2015), Ghodsi, Gruebler & Stehrer (2016a), Niu, Liu, Gunessee& Milner (2018) and Niu, Milner, Gunessee & Liu (2020) compute importer-specific AVEs per HS 6 digits-product level. Bratt (2017) and Kee & Nicita (2016) compute AVEs of NTMs that vary bilaterally per HS 6 digits-product level. But they also have shortcomings that we are trying to correct in this study through the following main points:

First, a new database of AVEs of NTMs is produced in this study. This new database of AVEs is different from all those mentioned above insofar as for the estimation of the coefficients (impact of NTMs on trade) necessary for the calculation of AVEs, all the theoretical foundations (notably domestic trade and panel dimension) of a structural gravity model recommended in the literature are taken into account (see section VI. 2.i).

Second, AVEs in this new database vary bilaterally (by country pair) at the HS 6 digits-product level and exist for 12 types of NTMs imposing by 148 WTO members including the EU. More importantly, AVEs for each of these types are further split by measures affecting exports, measures affecting imports and measures affecting both.

Third, the new database includes more importing countries including African countries, which is crucial for a comprehensive analysis of the impact of AfCFTA.

Beyond the new database, this study is also different from the others found in the literature (Table 1), in the sense that the impact of NTMs using the CGE model considers the heterogeneity of NTMs through the application of all methods of incorporating NTMs into a CGE model according to the nature of the NTMs that we are analyzing (see Webb, Strutt, Gibson & Walmsley (2020)).

IV. OBJECTIVES

The global objective of this study is to assess the impacts of NTBs elimination and SPS and TBT harmonization on Cameroon's economy. As a mean of facilitating policy-makers decisions, the specific objectives are evaluating the impacts of NTBs elimination and SPS and TBT harmonization on:

- national production by product/industry;
- national supply to domestic consumption;

[18] https://www.unescap.org/resources/escap-world-bank-trade-cost-database

- national supply to foreign markets(exports);
- national demand of foreign markets production(imports);
- economic agents (households, firms and government) welfare.

V. JUSTIFICATION ET MOTIVATIONS

As the AfCFTA is still negotiated, Cameroon and its trading partners will eliminate NTB and harmonize SPS and TBT measures. It is therefore crucial for Cameroon to clarifying ex ante the impacts of putting these AfCFTA's measures in place so that to grasp the full benefits and reduce as much as possible its costs implications for the whole economy. It will therefore be a question of helping political decision-makers to adopt the best options that will provide the most welfare to all economic agents.

What motivates this study is the global efforts made in recent years in terms of both data collection and quantification of NTMs.

VI. METHODOLOGY

To answer to the research questions, this study adopts a three-steps methodology. The first step (1) is to determine the variable "regulatory distance" that measures the extent of convergence/divergence cooperation of technical measures (SPS and TBT); in the second step (2) it is calculated the AVEs for NTBs and "regulatory distance" for SPS and TBT, and third step (3), these AVEs data are shocked in the CGE model implemented in GAMS.

1. MEASURING THE DISTANCE IN REGULATORY STRUCTURES FOR SPS AND TBT

The following method of summarizing and evaluating the structural patterns of NTMs across countries was first introduced by Cadot et al. (2015) and recently developed in Knebel & Peters (2018) which yields a measure of regulatory distance[19] between any two countries at the HS 6 digits product level.

Formally, the distance in regulatory structures can be expressed and aggregated as follows: The specific type (*l*) of NTM applied by an importing country *(i)* to a specific product (*k*) coming from an exporting country (*j*) in a given year (*t*) is defined as a dummy variable[20]:

$$n^{l}_{ijkt} = \begin{cases} 1, \text{ if country } i \text{ applies NTM type } l \text{ to product } k \text{ from origin } j \text{ in year } t \\ 0, \text{ if no such NTM is applied} \end{cases}$$

The regulatory distance (RD) between two countries *i* and *j* for the same type of NTM, product and year is therefore:

$$RD^{l}_{ijkt} = |n^{l}_{ijkt} - n^{l}_{jikt}|, \text{ for } i \neq j$$

If both countries apply the same measure, the regulatory distance is *0*; if not, the equation yields 1. To analyze regulatory patterns, it has to be aggregated across measures and products. The overall regulatory distance between countries *i* and *j*, across all products and types of measure in a given year, is thus:

$$RD_{ijt} = \frac{1}{LK} \sum_{l}^{L} \sum_{k}^{K} RD^{l}_{ijkt}$$

[19] This method is called distance in regulatory structures, or simply regulatory distance (UNCTAD, 2017).

[20] It is feasible that an importer applies several different regulations that are classified under the same NTM code (for example, two different certificates – a health certificate and a veterinary certificate). In such cases, still only a '1' is counted for this importer-product-NTM combination.

where *L* is the number of different types of NTM aggregated, and *K* the number of different products over which the average is built. Instead of aggregating across all types of measure and products, in this paper only technical measures (SPS and TBT) are the focus.

2. AVEs FOR NTBs AND REGULATORY DISTANCE

A broad review of the indicators used to quantify NTMs shows that the most common approach used to gauge the restrictiveness of NTMs are the frequency index and coverage ratio (Bowen, Hollander & Viaene, 2016). However, they lack a sound theoretical grounding (Kee, Nicita & Olarreaga, 2009). Thus, few authors provide a precise definition of what they mean by trade restrictiveness.

Kee, Nicita & Olarreaga (2009) in a famous paper computed AVEs for NTMs that are "clearly defined indicators of trade restrictiveness and well-grounded in trade theory". There have been massive efforts by the academic community to improve or apply the same method to a more critical set of countries (see Beghin, Disdier & Marette, 2015; Ghodsi, Gruebler & Stehrer 2016a; Niu, Liu, Gunessee& Milner,2018; Niu, Milner, Gunessee & Liu, 2020; Kee & Nicita, 2016; and Bratt, 2017).

This paper will endeavor to estimate the AVEs for NTMs that are well grounded in trade theory. There are two broad approaches to estimate the trade costs associated with NTMs in terms of AVEs: price-based and quantity-based approaches.

The price-based approach does this directly by using detailed price data to estimate the impact of NTMs on price gaps, that is, between import prices affected by NTMs and an NTM-free world price (e.g. Bradford, 2005; Saini, 2012). The quantity-based approach, by contrast, is more indirect and makes use of trade data to estimate the impact of NTMs on trade. The coefficient of the NTM variable is then used to estimate an AVE. Although simple in its application, the price-based approach is a method that requires considerable amounts of data (Bratt, 2017). The case of this paper involves price data for more than 5000 products analyzed and by country pair. Data on domestic prices at the tariff line level only exist for a few products and a few countries (Kee, Nicita & Olarreaga, 2009). Thus, because the concern in this study is on how the effects of NTMs vary across a range of sectors at disaggregated level (HS 6-digit level) and country pairs—something that requires highly detailed data—it follows that the quantity-based approach is the more suitable method. Data on imported quantities and import demand elasticities exists at the tariff line level necessary for the quantity-based approach are both available and easily accessible for a large number of countries (Kee, Nicita& Olarreaga, 2008; Ghodsi, rübler& Stehrer, 2016).

This quantity-based approach might be applied to either bilateral or multilateral trade flows. In the multilateral trade flows perspective, Kee, Nicita & Olarreaga, 2009; Beghin, Disdier & Marette, 2015; Ghodsi, Gruebler & Stehrer, 2016a; Niu, Liu, Gunessee & Milner, 2018; and Niu, Milner, Gunessee & Liu, 2020) estimate the importer-specific impact of NTMs at the six-digit level of the harmonized system (HS 6-digit level) and compute AVEs per importing country and product.

Recognizing that the impact of NTMs on imports can be ambiguous as well as asymmetric, Bratt (2017) estimates AVEs based on the gravity model that allow the impact of NTMs to vary bilaterally. Other study that did the same is Kee & Nicita (2016).

Kee & Nicita (2016) estimated AVEs at HS 6-digit level of nearly 5000 products, for a total of 34 importing countries with 96 exporting countries in 2011. The sample is largely determined by the availability of NTM data in TRAINS. They focused primarily on the SPS/TBT measures and include the other type of NTM as a control variable in their regressions.

Bratt (2017) used the same dataset of NTMs (UNCTAD's TRAINS) of 81 countries. A total of 5,111 tariff lines are included. The tariff for a given observation is from any year between 2000 and 2004, with the latest year available being preferred. They conducted a cross section analysis with the data set includes NTMs introduced up to and including 2003. All types of NTM are included in the data set, with the two most frequent categories being technical measures (66.3%) and quantity controls (25.6%).

This study follows Bratt (2017) and Kee & Nicita (2016) that compute AVEs of NTMs thanks to the quantity-based approach allowing NTMs to vary bilaterally. Unlike these latest studies, this research exploits the panel dimension (panel gravity model) of non-tariff trade policies and heterogeneity of NTMs whose diverse attributes by motives would bring various trade consequences (Grubler, Ghodsi &

Stehrer, 2015). As argued by Niu, Liu, Gunessee & Milner (2018) a limitation of Kee, Nicita & Olarreaga (2009) is that the paper provides trade protection estimates for a single year, 2002. The analysis cannot comment on the evolution of protection from NTMs and the overall protection over time. Niu, Liu, Gunessee & Milner (2018) filled this gap but by adopting the methodology of Kee, Nicita & Olarreaga (2009) and applying it at discrete points over time (cross-section analysis for many years). They estimated country-product AVEs of NTMs[21] and domestic support for 5009 product lines for 97 countries at 3-year intervals over the period 1997–2015, specifically for 1997, 2000, 2003, 2006, 2009, 2012 and 2015. In that way, they were able to answer the questions: For instance, with the gradual tariff reduction, what happened to NTM protection levels up to and since 2002? How has overall trade protection levels changed over time and how has NTMs changed relative to tariffs? How have these changes varied across countries and country groupings, and across products and product groupings?

To our knowledge only Grubler, Ghodsi & Stehrer (2015) took into account these two dimensions of non-tariff measures (Panel dimension and heterogeneity effect of NTMs). But our study uses very updated and more disaggregated data. Indeed, Grubler, Ghodsi & Stehrer (2015) considers a balanced panel[22] of bilateral trade flows of 149 importers (mainly WTO members) and all their trading partners at a 6-digit product level for the period 2002 to 2011 for only four different groups of NTMs (ADP, SPS, TBT, QNTM)[23]. Our study goes very deeply, not only does it cover the wider and recent period 2000-2016 (17 years), it analyzes twelve groups of NTMs (ADP, CVD, EXS, QRS, SFG, SPS, SSG, STE, TBT, TRQ, SPS-STC, TBT-STC) notified by 148 WTO members (NTM-imposing economies) including the EU. Moreover, in our study, we split each NTMs group into three types: Webb, M., Strutt, A., Gibson, J., & Walmsley, T. (2020) show that within the same NTM type, we can find (1) measures that only impact exporters, (2) measures that only impact importers, and (3) measures that impact both (See Annex 1).

Unlike some of the recent papers (Kee, Nicita & Olarreaga, 2009; Kee & Nicita, 2016; Bratt, 2017; Niu, Liu, C., Gunessee & Milner, 2018; Niu, Milner, Gunessee & Liu, 2020) in the field, this report does not use dummy variables marking the presence of NTMs as the basic explanatory variable. Instead, it uses the number of NTMs of a certain type imposed by the importing country on each product. The reason for using the count of NTMs is that the cumulative burden of different measures is considered the most burdensome for trade (Cadot, Gourdon & Van Tongeren, 2018)[24]. As such, this paper follows the same approach with Grubler, Ghodsi & Stehrer (2015), Ghodsi, Gruebler & Stehrer (2016a), Ghodsi, Grübler, Reiter & Stehrer (2017), Cadot, Gourdon & Van Tongeren (2018), and Dolabella (2020).

Finally, as it will be demonstrated in the following section, this report takes into account the recommended theoretical foundations (e.g. domestic trade) of a structural gravity model discussed in Yotov, Piermartini, Monteiro & Larch (2016). To our knowledge, this has not yet been the case with studies estimating AVEs using a bilateral (Kee, Nicita& Olarreaga, 2009; Beghin, Disdier& Marette, 2015; Ghodsi, Gruebler & Stehrer, 2016a; Niu, Liu, Gunessee & Milner, 2018; and Niu, Milner, Gunessee & Liu, 2020) or multilateral (Bratt, 2017; Kee & Nicita, 2016) approach.

In the next paragraphs, it will be presented how AVEs for NTMs and regulatory distance are computed in this paper following the two-steps quantity-based approach:

[21] The measures considered as core NTMs are: Price control measures (TRAINS M3 code F1-F3), Quantity Restrictions (TRAINS M3 code A1, B1, E1-E3, G33), Monopolistic measures (TRAINS M3 code H) and technical measures (TRAINS M3 code A, B, C).
[22] Given the large number of zero trade flows, they make use of the Heckman two-stage estimation procedure to address the possible selection bias
[23] anti-dumping (ADP), (2) sanitary and phytosanitary measures (SPS), (3) technical barriers to trade (TBT) and other quantitative measures (QNTM) encompassing safeguards (SG), special safeguards (SSG), countervailing duties (CV) and quantitative restrictions (QR).
[24] For instance, Cass Sunstein, Administrator of the U.S. Office for Information and Regulatory Affairs from 2009 to 2012, noted that "[a] special problem, and one that makes the project of simplification all the more imperative, is that agencies currently impose high cumulative burdens on the private sector. Requirements may be sensible taken individually, but taken as a whole, they might be redundant, inconsistent, overlapping, and immensely frustrating, even crazy-making (to use the technical term). In fact the problem of cumulative burdens may have been the most common complaint that I heard during my time in government." (Sunstein, 2015).

Step 1: Structural Gravity Model and Data

The following lines describe the structural gravity model and the data sources for estimating the bilateral impact of NTBs and regulatory distance on imports.

Structural gravity model specification

This study estimates a sectoral structural gravity model using panel data. Theoretical and empirical foundations motivate the choice of this methodology. These foundations are taken from Yotov, Piermartini, Monteiro & Larch (2016).

Why a sectoral model? Many trade policies are negotiated and applied at the sectoral level, such as tariffs. While it is in principle possible to aggregate trade policy and still use the aggregate gravity model, such aggregation practices should be avoided and, whenever possible, gravity should be estimated at the level of aggregation which is the target of the specific policy. Furthermore, even for policies that are negotiated at the aggregate level (e.g. some RTAs), it may be desirable to also obtain sectoral effects because the effects of these non-discriminatory policies may actually be quite heterogeneous across sectors.

Why a panel data model? First, using panel data leads to improved estimation efficiency. Second, the panel dimension enables to apply the pair-fixed-effects methods to address the issue of endogeneity of trade policy variables (Baier & Bergstrand, 2007). Third, the use of panel data allows for a flexible and comprehensive treatment and estimation of the effects of time-invariant bilateral trade costs with pair fixed effects. A new paper by Egger, Larch & Yotov (2020) point to a series of advantages of using consecutive-year data recognizing dynamic-adjustment effects. Their analysis reveals that, relative to time-interval data, the proposed approach avoids downward-biased effect estimates due to the distribution of trade-policy events during an event window as well as due to anticipation (pre-interval) and delayed (post-interval) effects, and it improves the efficiency of effect estimates due to the use of more data. Their findings challenge the common practice of estimating gravity equations with time-interval data in order to capture dynamic-adjustment effects to trade-policy changes. Indeed, Olivero, & Yotov (2012) build a dynamic gravity model and experiment with alternative interval specifications and find that gravity estimates obtained with 3-, 4-, and 5-year lags deliver similar results with respect to the estimates of the standard gravity variables. Then, the good practice would be to start with consecutive years and experiment with intervals as robustness.

The theoretically-consistent sectoral structural gravity model (equation 1)[25] of the following aggregate Gravity system derived from the Armington-CES (demande side) model[26] is estimated[27].

$X_{ij,t} = (E_{j,t}Y_{i,t}/Y_t)\,(t_{ij,t}/\Pi_{i,t}P_{j,t})^{1-\sigma}$ ..... (Structural Gravity Equation) (1);

$P_{j,t}^{1-\sigma} = \Sigma_i (t_{ij,t}/\Pi_{i,t})^{1-\sigma}(Y_{i,t}/Y_t)$ ..... (Inward Resistance Equation)(2);

$(\Pi_{i,t})^{1-\sigma} = \Sigma_j (t_{ij,t}/P_{j,t})^{1-\sigma}(E_{j,t}/Y_t)$ ..... (Outward Resistance Equation)(3);

$E_{j,t} = Y_{j,t} = Q_{j,t}P_{j,t}$ ..... (Expenditure/Income Equation)(4);

$P_{j,t} = [(Y_{i,t}/Y_t)^{(1/(1-\sigma))}] / \beta_{j,t}\Pi_{j,t}$ ..... (Market Clearance Equation)(5).

Where:

$X_{ij,t}$ equals exports value from country i to country j (i=j for internal trade); I*ntra-national* trade data has to be constructed consistently as the difference between *gross* production value data and total exports. $E_{j,t}$ stands for expenditure of country j that equals to total endowments value ($Q_{j,t}P_{j,t}$) in the country j, where $Q_{j,t}$ stands for the quantity of endowments and $P_{j,t}$ the composite price for the endowments. Y_t stands for the world production; $\Pi_{i,t}$ stands for stands for average trade cost that producers in country i face while trading internationally; It takes also into account domestic trade costs; $P_{j,t}$ stands for composite price index that consumers in country j pay for imported and domestic goods; β_j stands for CES share

[25] $X^k_{ij} = (E^k_j Y^k_i / Y^k)\,(t^k_{ij}/\Pi^k_i P^k_j)^{1-\sigma_k}$

[26] the structural gravity model presented below is derived from the demand side. However, the same gravity system can be derived from the supply side (See Eaton & Kortum (2002)).

[27] For brevity's sake, the sectoral dimension k is omitted in the structural gravity model. Alternatively, the gravity model can be estimated with data pooled across sectors, in which case the proper treatment of the multilateral resistance requires exporter-product-time and importer-product-time fixed effects, and the effects of trade policy should be allowed to vary by sector.

parameter. σ (σ > 1) is the elasticity of substitution among different varieties, i.e. goods from different countries. $t_{ij,t}$ stands for total bilateral trade costs.

From the Sectoral Structural Gravity equation 1 of the system above, one can derive the following econometric model:

$$\ln X_{ij,t} = \ln E_{j,t} + \ln Y_{i,t} - \ln Y_t + (1-\sigma)\ln t_{ij,t} + (\sigma-1)\ln \Pi_{i,t} + (\sigma-1)\ln P_{j,t} \quad (6)$$

The equation 6 can be estimated thanks to OLS but it suffers from not taking into account observations where trade flows values are zero. A clear drawback of the OLS approach, however, is that it cannot take into account the information contained in the zero trade flows, because these observations are simply dropped from the estimation sample when the value of trade is transformed into a logarithmic form. The problem with the zeroes becomes more pronounced the more disaggregated the trade data are.

An easy and convenient solution to the presence of zero trade flows is to estimate the gravity model in multiplicative form instead of logarithmic form. The multiplicative form, advocated by Santos Silva & Tenreyro (2006), consists in applying the Poisson Pseudo Maximum Likelihood (PPML) estimator to estimate the gravity model[28]. The use of the PPML estimator is justified on various grounds. First, the PPML estimator, applied to the gravity model expressed in a multiplicative form, has the advantage also to handle the heteroscedasticity issue, which often plagues trade data (Silva & Tenreyro, 2006). The problem is important because, as pointed out by Silva & Tenreyro (2006), in the presence of heteroscedasticity, the estimates of the effects of trade costs and trade policy are not only biased but also inconsistent. Second, the additive property of the PPML estimator ensures that the gravity fixed effects are identical to their corresponding structural terms (Arvis & Shepherd, 2013; Fally, 2015)[29].

Thus, Yotov, Piermartini, Monteiro & Larch (2016) recommend a theoretically-consistent estimating structural gravity model with the following specification (7):

$$X_{ij,t} = \exp[\pi_{i,t} + \chi_{j,t} + \mu_{ij} + \eta_1 BTITC_{ij} + \eta_2 BTP_{ij,t} + \eta_3 NES_{i,t} * INTL_{ij} + \eta_4 NIP_{j,t} * INTL_{ij}] * \varepsilon_{ij,t} \quad (7)$$

Where:
$X_{ij,t}$ denotes nominal trade flows, which include international and intra-national trade, at non-consecutive year t. The inclusion of *intra-national* trade data in structural gravity estimations is desirable for several reasons. First, it ensures consistency with gravity theory, where consumers choose among and consume domestic as well as foreign varieties. Second, it leads to the theoretically consistent identification of the effects of bilateral trade policies (Dai, Yotov & Zylkin, 2014). Third, it also enables to identify and estimate the effects of non-discriminatory trade policies (Heid, Larch & Yotov, 2015)[30].

$\pi_{i,t}$ denotes the set of time-varying source-country dummies, which control for the outward multilateral resistances ($\Pi_{i,t}$), countries' output shares($Y_{i,t}/Y_t$) and, potentially any other observable and unobservable exporter-specific factors that may influence bilateral trade; $\chi_{j,t}$ encompasses the set of time-varying destination-country dummy variables that account for the inward multilateral resistances ($P_{j,t}$), total expenditure ($E_{j,t}$), and any other observable and unobservable importer-specific characteristics that may influence trade. The use of *exporter-time* ($\pi_{i,t}$) and *importer-time*($\chi_{j,t}$) fixed effects enables to control for the unobservable multilateral resistances, and potentially for any other observable and unobservable *characteristics* that vary over time for each exporter and importer, respectively (Anderson & Van Wincoop, 2003).

μ_{ij} denotes the set of country-pair fixed effects, which serve two main purposes: First, the pair fixed effects are the most flexible and comprehensive measure of time-invariant bilateral trade costs because

[28] Monte Carlo simulations show that the PPML estimator performs very well even when the proportion of zeroes is large.
[29] The PPML estimator can also be used to calculate theory-consistent general equilibrium effects of trade policies (Anderson, Larch & Yotov (2015); Larch & Yotov (2016)).
[30] Fourth, it resolves the "distance puzzle" in trade, by measuring the effects of distance on international trade relative to the effects of distance on internal trade (Yotov (2012)). Finally, it enables to capture the effects of globalization on international trade and to correct for biases in the estimation of the impact of RTAs on trade (Bergstrand, Larch & Yotov (2015)).

they will absorb all time-invariant gravity covariates in vector $BTITC_{ij}$ from equation (7) (e.g. bilateral distance) (Egger & Nigai, 2015; Agnosteva, Anderson & Yotov, 2014). However, the pair fixed effects will not prevent the estimation of the effects of bilateral trade policy such as Non-Tariff Measures ($NTM_{ij,t}$) in the vector $BTP_{ij,t}$, since trade policies are time-varying by definition. In addition, the pair fixed effects will also account for any unobservable time invariant trade cost components. Egger & Nigai (2015) and Agnosteva, Anderson & Yotov (2014) show that the pair-fixed effects are a better measure of bilateral trade costs than the standard set of gravity variables. Second, the pair fixed effects will absorb most of the linkages between the endogenous trade policy variables and the remainder error term $\varepsilon_{ij,t}$ in order to control for potential endogeneity of the former (Baier & Bergstrand, 2007). In principle, it is possible that the error term in gravity equations may carry some systematic information about trade costs. However, due to the rich fixed effects structure in equation (7), researchers should be more confident to treat and interpret $\varepsilon_{ij,t}$ as a true measurement error.

The term $BTITC_{ij}$ represents the vector of any time-invarying bilateral determinants of trade flows. The variables ln$DISTANCE_{ij}$, $LANGUAGE_{ij}$, $COLONY_{ij}$, $CONTIGUITY_{ij}$, represent a series of observable variables which have become standard covariates in empirical gravity specifications. ln$DISTANCE_{ij}$ is the logarithm of bilateral distance between trading partners *i* and *j*, $CONTIGUITY_{ij}$ is an indicator variable that captures the presence of contiguous borders between countries *i* and *j*. $LANGUAGE_{ij}$ and $COLONY_{ij}$ are dummy variables that take the value of one for common official language and for the presence of colonial ties, respectively.

$BTP_{ij,t}$ is the vector of bilateral trade policies. In principle, it may include any time-varying covariates, however, we choose $RTA_{ij,t}$, $TARIFF_{ij,t}$ that are standard covariates in empirical gravity specifications. To these, we add NTMs ($NTM_{ij,t}$) and $RD_{ij,t}$. $RTA_{ij,t}$ is a dummy variable that accounts for the presence of a RTA between trading partners *i* and *j* at time *t* by taking the value of one, and zero otherwise. The term $TARIFF_{ij,t}$ accounts for bilateral tariffs and is defined as $TARIFF_{ij,t} = \ln(1+tariff_{ij,t})$, where $tariff_{ij,t}$ is the tariff that country *j* imposes on imports from country *i* at time *t*. $NTM_{ij,t}$ is our variable of interest that accounts for bilateral Non-tariff Measures imposed by country j(imposing country) on products exported by country i(affected country). $NTM_{ij,t}$ is a count variable of the number of measures applied by country j on country i for the NTM type[31]. In order to take into account the heterogeneity of NTMs we split each NTM chapter into three types: measures that only impact exporters ($EXNTM_{ij,t}$), measures that only impact importers ($IMNTM_{ij,t}$), and measures that impact both ($BONTM_{ij,t}$). Previous studies do not take this aspect into account; while from the Annex 1, Webb, M., Strutt, A., Gibson, J., & Walmsley, T. (2020) show that for the same chapter such as the SPS we find for example the measure "Importer registration requirements" (a150) which impacts importers, the measure "Residue tolerance limits" (a210) which impacts the production process and therefore only exporters, and the “Systems approach” measure (a130) which can simultaneously affect importers and exporters. $RD_{ij,t}$ is the regulatory distance variable.

$NES_{i,t}\times INTL_{ij}$ corresponds to the product between $NES_{i,t}$ and $INTL_{ij}$. The term $NES_{i,t}$ denotes the vector of Non-discriminatory Export Support (NES) policies, such as export subsidies, while $INTL_{ij}$ is a dummy variable taking a value of one for international trade between countries i and j, and zero otherwise. Importantly, the interaction between the country-specific *NES* variables and the bilateral dummy for international trade flows results in a new bilateral term, i.e. $NES_{i,t}\times INTL_{ij}$, which will enable to identify the effects of any non-discriminatory export support policies, even in the presence of exporter-time fixed effects as required by gravity theory (Heid, B., Larch, M., & Yotov, Y., 2015). Similarly, the covariate $NIP_{j,t}\times INTL_{ij}$ is constructed as the product between the term $NIP_{j,t}$, which denotes the vector of any NTM that is Non-discriminatory Import Protection (NIP) policies, and the dummy for bilateral international trade $INTL_{ij}$. Given its bilateral nature, the expression $NIP_{j,t}\times INTL_{ij}$ can be used to identify the effects of any non-discriminatory import protection policies. But, in the case of our study, we do not need these variables $NES_{i,t}\times INTL_{ij}$ et $NIP_{j,t}\times INTL_{ij}$. In fact, for any non-discriminatory NTMs (multilateral NTMs), the trading partner of “All WTO members” is disaggregated by each WTO member. Furthermore, no other non-discriminatory control variable is needed given the intrusion of fixed effects that will take them into account.

[31] The I-TIP database provides the date of withdrawal for ADP and CVD measures and end dates for some QRs, SGs and SSGs. For other types of NTMs this information is not available. For our analysis, we assume that they have not been withdrawn since (Ghodsi, Gruebler & Stehrer (2016a); Ghodsi, Grübler, Reiter & Stehrer (2017)).

Finally, the total bilateral trade costs vector $t_{ij,t}$= ($RTA_{ij,t}$, ln$DISTANCE_{ij}$, $LANGUAGE_{ij}$, $COLONY_{ij}$, $CONTIGUITY_{ij}$, $TARIFF_{ij,t}$, $RD_{ij,t}$, $EXNTM_{ij,t}$, $IMNTM_{ij,t}$, $BONTM_{ij,t}$) and the gravity model specification to estimate is represented by the following equation 8:

$$X_{ij,t}=\exp[\pi_{i,t}+\chi_{j,t}+\mu_{ij}+\alpha_1 RTA_{ij,t}+\alpha_2 \ln DISTANCE_{ij}+\alpha_3 LANGUAGE_{ij}+\alpha_4 COLONY_{ij}+\alpha_5 CONTIGUITY_{ij}+\alpha_6 TARIFF_{ij,t}+\alpha_7 RD_{ij,t}+\sum_{n=} \alpha_{8n} EXNTM^{n}_{ij,t}+\sum_{n=} \alpha_{9n} IMNTM^{n}_{ij,t}+\sum_{n=} \alpha_{10n} BONTM^{n}_{ij,t}]*\varepsilon_{ij} \quad (8)$$

Where:

n = {ADP, CVD, EXS, QRS, SFG, SPS, SSG, STE, TBT, TRQ, SPS_STC, TBT_STC}[32].
α_7(-), α_{8n} (-/+), α_{9n} (-), and α_{10n} (-/+) are the estimated coefficients of interest and their expected signs.

Data for estimating Structural Gravity Model

We carry out estimates of the Panel structural gravity model over the period 2000-2016. This period is imposed by the availability of data, in particular that of trade data for the variable $X_{ij,t}$ (i = j for internal trade).

Indeed, the trade data of this study are extracted from the recently realized database "The International Trade and Production Database for Estimation (ITPD-E)"[33] by Borchert, Larch, Shikher & Yotov (2020). In our knowledge, none paper has not used yet this very huge database in a structural gravity model for AVEs estimation purpose. The ITPD-E is constructed using reported administrative data and intentionally does not include information estimated by statistical techniques. This feature and the unprecedented coverage of industries and countries with consistent international and domestic trade data renders the ITPD-E well suited for estimation of economic models, e.g., the gravity model of trade (Borchert, Larch, Shikher & Yotov, 2020). The ITPD-E contains consistent data on bilateral international trade and domestic trade, calculated using production data, for a large number of countries (243 countries), industries (the broad sectors of agriculture, mining and energy, manufacturing, and services), and years (from 2000 to 2016).

Domestic trade makes ITPD-E ensures consistency with gravity theory (see Yotov, Piermartini, Monteiro & Larch (2016)). The inclusion of intra-national trade data for the estimation of AVEs of NTMs used in the analysis of NTMs in the CGE model, therefore constitutes an originality. Insofar as to our knowledge the existing databases of AVEs for NTBs do not take this important theoretical aspect into account in their estimate.

However, it should be noted that in the ITPD-E database, trade data are not classified according to the HS codification (6 digits), but rather according to the ITPD-E codification (by industrial sector) comprising 170 industries grouped into five major sectors (Agriculture, Manufacturing, Mining, Energy, and Services). The ITPD-E database is accompanied by tables of concordances between the ITPD-E and FCL codifications (for Agriculture), and ISIC rev3 / rev4 (for Manufacturing, Mining, Energy).

Regarding the data source of NTMs, the variable of interest of our study, there are several multi-country datasets covering different NTM types on bilateral basis at 6 digits HS levels[34]. Almost all of them have emerged with the global economic and financial crisis, during which a revival of beggar-thy-neighbor policies with downward trade spirals was feared (Grübler & Reiter, 2020). This is the case for the TRAINS-UNCTAD (2010-2019, 92 economies) (UNCTAD, 2017; updated), Global Trade Alerts (GTA) (2009-2019, 185 economies) databases (Evenett & Fritz (2018)) and the WTO I-TIP (1995-2019) database of NTM notifications to the WTO [35] . Other group of NTMs databases include specific databases for certain types of NTMs (e.g., the World bank Temporary Trade Barriers (Bown, 2016)),

[32] ADP (antidumping), CVD (countervailing duties), EXS (export subsidies), QRS (quantitative restrictions), SFG(Safeguard), SPS (sanitary and phytosanitary), SSG (special Safeguards), STE (state-trading enterprises), TBT (technical barriers to trade), TRQ (tariff-rate quotas), SPS_STC (specific trade concerns against SPS), TBT_STC (specific trade concerns against TBT) are NTM chapters in our chosen NTMs database "wiiw NTB database" (See section 4.i of this report).

[33] https://www.usitc.gov/data/gravity/itpde_guide/

[34] Annex 1 describes a list of raw databases for NTMs identified in the literature. Two groups of databases could be distinguished: general databases and specific databases.

[35] accessible via the Integrated Trade Intelligence Portal (I-TIP). WTO I-TIP database online: https://www.wto.org/english/res_e/statis_e/itip_e.htm

or for certain countries (e.g. the United States International Trade Commission NTMs database), or for certain types of countries and NTMs (e.g. the OECD export restrictions database, the OECD Consumer Product and Producer Support in Agricultural Products Database, and the European Commission Market Access Database).

The ideal for our research would be to choose a multi-country (with as many African countries as possible) dataset which covers different NTM type and the greatest number of countries over several years including the most recent. In the literature, the TRAINS-UNCTAD database is widely used for analyzing the impacts of NTMs on trade (see Beghin, Disdier & Marette, 2015; Niu, Liu, Gunessee & Milner, 2018; Niu, Milner, Gunessee & Liu, 2020; Kee & Nicita, 2016; Bratt, 2017; Cadot, Gourdon & Van Tongeren, 2018; Webb, Strutt, Gibson & Walmsley, 2020). But, to do this, all these studies estimate gravity models with cross-sectional data. This is due to the fact that there is limited time variation in the NTM data in the TRAINS UNCTAD Database, so each sub-data set (one for every tariff line) is a cross-section (Bratt, M., 2017). For instance, for Cameroon the data was collected only in 2015. Unlike UNCTAD' TRAINS database, GTA is updated continuously since 1 November 2008, hence it provides a good source of year-on-year changes in commercial interest-motivated NTMs, but not the overall stock of measures in each country. The main drawback of GTA for our study is that GTA contains information on state acts whose dominant motive is commercial and, as such, measures that cover other policy objectives, such as human and animal health or environmental, are excluded. Consequently, in general, UNCTAD database suggests that about 90% of measures are technical (SPS and TBT), whereas in GTA they are few.

Like the other database, the shortcoming of WTO I-TIP is that it is – in its publicly accessible form – not suitable for econometric analysis, i.e. it does not follow a panel structure, where NTMs are distinctly assigned to products according to a product classification such as the Harmonised System (HS) (Grübler & Reiter, 2020). Fortunately, upon an extensive data work conducted at the Vienna Institute for International Economic Studies (wiiw[36]), Ghodsi, Grübler, Reiter & Stehrer (2017) imputed into the WTO I-TIP database missing product codes at the HS 6-digit level [37] and complementary information from the Temporary Trade Barriers Database (TTBD)[38] has been added to build a new database-the wiiw NTM database- useable for detailed econometric panel data analysis (Grübler & Reiter, 2020). Since then, the wiiw NTM database has been updated[39] and the current version contains information on more than 60,000 notifications of ten forms of NTMs (ADP, CVD, EXS, QRS, SFG, SPS, SSG, STE, TBT, TRQ) and two types of specific trade concerns (SPS-STC, TBT-STC)[40] notified by 148 WTO members (NTM-imposing economies) including the EU over 5,000 products for the period 1995-2019[41]. Dolabella (2020) used the first version of wiiw NTM database to estimate bilateral volume effects of imposing technical barriers to trade (TBT) and sanitary and phytosanitary (SPS) measures on international trade, for more than 5,000 products at the 6-digit level of the Harmonized System using a panel for 2001-2015 with NTM data notified by more than 150 member countries of the World Trade Organization (WTO). Ghodsi, Gruebler & Stehrer (2016a) used the same first version to examine the relevance of non-tariff measures (NTMs) at the 6-digit level of the HS over the period 2002-2011 by estimating multilateral ad valorem equivalents of NTMs for about 100 WTO member countries. Thanks to its panel structure and comprehensiveness (many countries and different type of NTMs) over a long period of time (from 1995 till 2019), the updated wiiw NTM database (Grübler & Reiter, 2020)[42] is chosen for this study as the source of NTMs data for estimating bilateral ad valorem equivalents of NTMs.

[36] German acronym for: Wiener Institut für Internationale Wirtschaftsvergleiche (wiiw).
[37] See Appendix 1 / HS code matching procedure of Ghodsi, M., Grübler, J., Reiter, O., & Stehrer, R. (2017)
[38] The database compiled by Bown (2007), which initially contained only antidumping measures, later also included other non-tariff trade barriers. The TTBD is published by the World Bank with updates until 2016 (Bown, C.P., 2016). Available at: https://datacatalog.worldbank.org/dataset/temporary-trade-barriers-database-including-global-antidumpingdatabase
[39] The first version of these data was produced as part of the project PRONTO (Productivity, Non-tariff Measures and Openness) under the EU's Seventh Framework Programme under grant agreement No. 13504.
[40] corresponding to six categories of the UNCTAD NTM classification. UNCTAD (2019) distinguishes 16 types of NTMs, of which 15 are targeting imports. https://unctad.org/en/pages/PublicationWebflyer.aspx?publicationid=2516
[41] Although we have information on some NTMs that were initiated
before the establishment of the WTO in 1995, earlier data are very incomplete.
[42] https://wiiw.ac.at/wiiw-ntm-data-ds-2.html

The AVE for tariff ($Tariff_{ij,t}$) for each product–country combination is gathered from the ITC's MacMap database. This database has a unique approach to measuring the tariff levels faced by individual country exports in that it accounts for bilateral, regional and preferential tariff systems (Allen, M., 2005).

Most of the bilateral gravity variables ($DISTANCE_{ij}$, $LANGUAGE_{ij}$, $COLONY_{ij}$, $CONTIGUITY_{ij}$) data is from the CEPII website. The one exception is the RTA ($RTA_{ij,t}$) data, which is from the database "Content of Deep Trade Agreements" of the World Bank.

Step 2: Computing bilateral AVEs of NTMs and Regulatory Distance

This step consists of transforming the estimated bilateral impact on imports into bilateral AVEs. To do so, let it first be noted that there is no derivative of X_{ij} with respect to NTM_{ij} since they are dummy variables. Hence, a change in X_{ij} in response to a change in each of these variables is represented by a difference quotient. This point is made in Beghin, Disdier & Marette (2015) in developing a formula for calculating AVEs.

Let it also be noted that (i) a change in X^k_{ij} with respect to the domestic price of the importer for good k, $price^k_j$ is the elasticity of import demand, ω^k_j and (ii) the difference quotient of $price^k_j$ and NTM^k_{ij} is the bilateral AVE, $AVE\_ntm^k_{ij}$, being sought. These considerations result in the expression:

$$\Delta X^k_{ij} / \Delta NTM^k_{ij} = (\Delta X^k_{ij} / \Delta price^k_j) / (\Delta price^k_j / (\Delta NTM^k_{ij}) = \omega^k_j AVE\_ntm^k_{ij}$$

Rearranging and noting that $\Delta X^k_{ij} / \Delta NTM^k_{ij} = \exp(\alpha_{mn})-1$ yields the AVEs for NTMs:

$$AVE\_ntm^k_{ij} = (\exp(\alpha_{mn})-1) / \omega^k_j \quad (9)$$

α_{mn} are estimated coefficients from equation 8 above; n corresponds to the number of NTM's chapter (n=1;2; 3; …;12). m corresponds to the type of NTM as explained above. (m=8;9;10).

The same transformation is done to obtain the AVEs for regulatory distance variable:

$$AVE\_rd^k_{ij} = (\exp(\alpha_7)-1) / \omega^k_j \quad (10)$$

α_7 are estimated coefficient from equation 8 above; ω^k_j the import demand elasticities are taken from Ghodsi, Grübler & Stehrer (2016). They produced importer-specific demand elasticities for 167 countries for the more recent period 1996-2014 (HS revision 1996) for 5124 products. The well-known and used[43] import demand elasticities database is Kee, Nicita & Olarreaga (2008) that estimated more than 300,000 import demand elasticities across 117 countries for about 4,900 products at the 6-digit level of the HS (HS revision 1988) for the period 1988-2001 using the UNCTAD's previous system of classifying NTMs, dubbed the Trade Control Measures (TCMCS).

3. AVEs IN THE CGE MODEL

Once the AVEs of every type of NTBs and regulatory distance are estimated, the next step is to assess the potential impact of their removal(shock) on consumption, production, trade (exports and imports) and welfare. The following lines first describe the CGE model used, the closure and the sources of data. Second, methods of incorporating AVEs of NTMs into the CGE model and finally the different trade policies scenarios are presented.

CGE model, closure and Data

CGE model

A single and static country CGE model, the standard model PEP-1-t (Decaluwé, B., Lemelin, A., Robichaud, V., & Maisonnave, H., 2013)), is implemented in GAMS.

[43]Their estimates are frequently used in various policy analysis (e.g. Kee, Nicita & Olarreaga, 2009; Bratt, 2014; Peterson & Thies, 2014; Beghin, Disdier & Marette, 2015)

Model closure

The standard GTAP (Hertel, 1997) closure is used in the simulations, but allowing for capital mobility and fixed wages of unskilled labour in Africa (i.e., to reflect the high levels of un- and under-employment that characterize regional labour markets) (ECA & TradeMark East Africa (2020)).

Data for the CGE model

The CGE model is calibrated on the last available Social Accounting Matrix (SAM) of Cameroon of 2014 (or 2020 currently built with the support of ECA if available yet) is used.

The core data of the SAM are supplemented with additional information. When it comes to analyzing trade policies, it is extremely important to get bilateral trade barriers at a much-disaggregated level as in trade negotiations tariff reductions are generally made at the Harmonized System at 6-digit (HS6) level of the product lines.

For this reason, **tariff data** are from the MAcMap-HS6 database. It provides exhaustive information on market access at the bilateral level, namely for more than 220 exporter countries and 169 importer countries, and for as much as 5113 products. Most notably, it includes all preferential schemes currently active, as well as offering a more intuitive aggregation methodology that lends itself to a useful description of tariff barriers to worldwide trade at a specific point in time.

The **NTBs data** are from our new AVEs of NTMs database that is built on the bilateral basis at the HS 6 digits product level for over 5,000 products and 148 countries (WTO members) including the EU and containing 12 forms of NTMs (ADP, CVD, EXS, QRS, SFG, SPS, SSG, STE, TBT, TRQ, SPS-STC, TBT-STC).

Since we use a single country multi sector model for Cameroon and two aggregated partners namely the Africa and the ROW, the countries present in our databases (MAcMap-HS6 database and New AVEs for NTBs database) are aggregated into Africa and ROW by averaging bilateral tariff rates and AVEs of NTBs and by product groups in the SAM.

Methods of incorporating AVEs of NTMs into the CGE model

While the nature of NTMs is nuanced and complex (UNCTAD lists over 100 categories), CGE models have employed a limited set of approaches to incorporate NTMs into their model theory (Walmsley & Minor (2016)).

There are several methods in the literature for incorporating NTMs into GCE Models. The most recent (*the export cost method*) consists in capturing the impacts of NTBs directly on exporters (Walmsley & Strutt (2019)). According to this approach, BNTs reduce the volume of exports needed to meet a given level of import demand (Webb, Strutt, Gibson & Walmsley (2020). It is appropriate for the liberalization of NTBs which directly affect the cost of exporting.

The *export cost method* is the counterpart of another method, the *import-augmenting technological (or iceberg) change*, widely used in the past but which is suitable for cases where the obligation to meet the requirements of NTBs falls on the importer[44]. The iceberg method was first introduced by Samuelson (1954) in a simple two-by-two theoretical exposition, whereby "value melts away" during transit, causing the quantity arriving in the importing market to be lower the quantity of goods that left the dock in the exporting country.

Other methods include incorporating NTBs as import tariffs or export taxes[45]. These two other methods, on the other hand, involve the collection of taxes.

[44] An alternative approach is the "willingness to pay" method that models the reduction in customs delays from the demand side as an increase in a consumer's willingness to pay for faster delivery (Walmsley and Minor, forthcoming).

[45] (see Fugazza & Maur, 2008; for discussion and Arita, Beckman & Mitchell, 2017; Kawasaki, 2017; and Andriamananjara, Ferrantino & Tsigas, 2003; for three illustrative examples of how this separation is made in practice)

Faced with multiple varieties of NTBs (even though aggregated), as argued by Fugazza & Maur (2008), a major issue is then to choose the appropriate policy shock to assess their impact. Walmsley & Strutt (2019) find that the choice of mechanism can have important consequences for estimates of the impact of changes in NTB, with mechanisms that raise productivity (*the export cost method* and *Iceberg method)* leading to larger changes in real GDP than those (*Tariffs* and *Export taxes*) that treat NTMs as associated with economic rents that can be modelled using trade taxes.

The following section shows for each method how the shock on NTB affects endogenous variables of the equations of our CGE model. The rest of the equations of the different blocks of our model are presented in appendix 2.

First, let us examine the mechanism by which demand for imports is modelled in trade models in general. Demand for imports ($Q_{i,j}$) is modelled using the familiar Armington CES demand function, obtained from maximizing utility $U_j=[\Sigma_{i=} (Q_{i,j})^{-\rho}]^{-1/\rho}$ subject to a budget constraint $X_j=[\Sigma_{i=} P_{i,j}*Q_{i,j}]$. This gives:
$Q_{k,i,j}= Q_{k,j}*(P_{k,i,j}/ P_{k,j})^{-\sigma_k}$
Where:

i is the source country (where there are n countries, i=1...n);
j is the importing country (j: 1…n)
k represents the commodity (where there are m commodities, k=1...m)
$P_{k,i,j}$ is the price of the good from country i;
$P_{k,j}$ is the composite price of imports in country j;
σ_k is the elasticity of substitution between goods from different countries r;
$Q_{k,i,j}$ is the demand for goods k from country i by country j; and
$Q_{k,j}$ is the demand for imported goods k by country j.

Iceberg Method

The iceberg method assumes that the quantity value ($Q_{k,i,j}/\tau_i$) arriving in the importing country (s) "melts away" during transit in contrast to that ($Q_{i,j}$) which left the dock in the exporting country (i). τ_i the iceberg cost variable. Hence the utility function becomes:

$U_j= [\Sigma_{i=} (Q_{i,j}/\tau_i)^{\rho}]^{-1/\rho}$ and budget constraint: $X_j=[\Sigma_{i=} P_{i,j}*\tau_i *(Q_{i,j}/\tau_i)]$, since the price has risen to $P_{i,j}*\tau_i$ and the quantity is now ($Q_{i,j}/\tau_i$); thereby ensuring that the same amount X_j is paid to the exporter for these goods.

Demand for imports is therefore given by:

$Q_{k,i,j}/\tau_i = Q_{k,j}*[(P_{k,i,j}* \tau_i) / P_{k,j}]^{-\sigma_k}$
Where:

$P_{k,j}$ is the composite price of imports in country j, inclusive of iceberg costs.

Lowering NTM (reducing τ_r) has two effects on trade within the Armington structure (Hertel, Walmsley & Itakura, 2001):

- Expansion effect: τ_i reduces the amount that needs to be imported to satisfy a given level of demand.
- Substitution effect: τ_i reduces the importer's price causing substitution towards that good and an increase in quantity demanded.

Tariff equivalent and export taxes Methods

NTMs are also often modelled as tariff equivalents via import or export taxes[46]. Import and export taxes are modelled as a wedge between the world and market prices in the importing (j) and exporting countries (i). Demand for imports with import taxes is therefore given by:

$Q_{k,i,j} = Q_{k,j}*[(P_{k,i,j}* (1+tariff_{k,i,j}) / P_{k,j}]^{-\sigma_k}$

[46] TARIFFi,j represents 1 plus the tariff rate (tariffi,j).

Where: $P_{k,j}$ is the composite price of imports in country j, inclusive of import taxes.

Note the difference between this and the iceberg cost is that tariffs do not reduce the quantity and hence the second effect, noted by Hertel, Walmsley & Itakura (2001) is not present. Moreover, revenue from these trade taxes accrues to the regional household of the importing or exporting country depending on whether the import or export tax is used, respectively. These 'tax' variables often serve a dual purpose to reflect the existence of economic rents that accrue to either the exporter or importer; perhaps due to imperfect competition. The choice of whether to use export or import taxes therefore depends on whether these rents are believed to accrue to the importing or exporting region.

Export cost Method

This method recognizes that many NTMs raise the costs of production of the exporting firm. For example, restricted use of substances or production process requirements.

Trade policies scenarios

This study simulates three types of scenarios: Scenario 1 dealt for tariff elimination only, the scenario 2 is full elimination of NTBs and regulatory cooperation for SPS and TBT, and the scenario 3 simulate the previous both scenarios.

TABLE 2 : SCENARIOS

	Tariff	NTBs	SPS and TBT
Scenario 1	tariff elimination for 97% of tariff lines by Cameroon and developing countries partners in Africa, and XXX for LDCs	X	X
Scenario 2	X	full elimination of NTBs	regulatory cooperation for SPS and TBT
Scenario 3	tariff elimination for 97% of tariff lines by Cameroon and developing countries partners in Africa, and XXX for LDCs	full elimination of NTBs	regulatory cooperation for SPS and TBT

Source: Author

VII. EXPECTED RESULTS

The expected results of this study can be broken down into three main points:

1. THE EFFECTS OF THE ELIMINATION OF BNTS UNDER THE AFCFTA ON:

a. Cameroon's exports and imports;
b. Cameroon's household consumption;
c. Cameroon's firm production;
d. welfare of the various economic agents in Cameroon.

2. THE EFFECTS OF HARMONIZATION OF SPS AND TBT UNDER THE AFCFTA ON:

a. Cameroon's exports and imports;
b. Cameroon's household consumption;
c. Cameroon's firm production;
d. welfare of the various economic agents in Cameroon.

3. ECONOMIC POLICY RECOMMENDATIONS

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IX. ANNEX

ANNEX 1: DIVISION OF NTM OBLIGATIONS

NTM	Description	Exporter weight (proportion of cost directed at exporter)	Importer weight (proportion of cost directed at importer)	Explanation
Sanitary and Phytosanitary Measures				
a100	General prohibitions/ restrictions	0	1	Since these do not impose any costs on exporters who are able to export.
a110	Temporary geographic prohibitions	0	1	Since these do not impose any costs on exporters who are able to export.
a120	Geographical restrictions on eligibility	0	1	Since these do not impose any costs on exporters who are able to export.
a130	Systems approach	0.5	0.5	Since involves a combination of measures, which may affect importers or exports
a140	Authorisation requirements (for importers)	0	1	Since the importer has to be authorised
a150	Importer registration requirements	0	1	Since the importer has to register
a190	Prohibitions/restrictions nes	0	1	Since these do not impose any costs on exporters who are able to export.
a210	Residue tolerance limits	1	0	Since affect production
a220	Restricted use of substances	1	0	Since affect production
a310	Labelling requirements	0.75	0.25	As labelling can be done by either the importer or the manufacturer, but is more likely to be done by the manufacturer
a320	Marking requirements	1	0	Since would be done prior to shipment, that is by exporter
a330	Packaging requirements	0.75	0.25	As packaging can be done by either the importer or the manufacturer, but is more likely to be done by the manufacturer
a410	Hygienic requirements: microbiological requirements	0.5	0.5	Since cover the process until final sale, therefore affecting both importers and exporters
a420	Hygienic requirements	0.5	0.5	Since cover the process until

	during production (until final consumption)			final sale, therefore affecting both importers and exporters
a490	Hygienic requirements	0.5	0.5	Since cover the process until final sale, therefore affecting both importers and exporters
a500	General treatment requirements	0.5	0.5	Since this treatment can be done by either the exporter or the importer
a510	Cold/heat treatment	0.5	0.5	Since this treatment can be done by either
a520	Irradiation requirements	0.5	0.5	Since this treatment can be done by either the exporter or the importer
a530	Fumigation requirements	0.5	0.5	Since this treatment can be done by either
a590	Treatment requirements nes	0.5	0.5	Since this treatment can be done by either the exporter or the importer
a610	Plant-growth processes	1	0	Since affect production processes
a620	Animal raising/catching requirements	1	0	Since affect production processes
a630	Food and feed processing requirements	1	0	Since affect production processes
a640	Storage and transport requirements	0.5	0.5	Since cover the process until final sale, therefore affecting both importers and exporters
a690	Other production requirements	1	0	Since affect production processes
a810	Product registration requirements	0.5	0.5	As the cost may be borne by either the importer or the exporter
a820	Testing requirements	0.5	0.5	As the cost may be borne by either the importer or the exporter
a830	Certification requirements	0.5	0.5	As the cost may be borne by either the importer or the exporter
a840	Inspection requirements	0.5	0.5	As the cost may be borne by either the importer or the exporter
a850	General traceability requirements	0.5	0.5	Both importer and exporters need to keep records
a851	Traceability (origin)	0.5	0.5	Both importer and exporters need to keep records
a852	Traceability (processing history)	0.5	0.5	Both importer and exporters need to keep records
a853	Traceability (distribution and location after delivery)	0	1	Borne by final seller, that is importer
a859	Other traceability requirements	0.5	0.5	Both importer and exporters need to keep records
a860	Quarantine	0.5	0.5	As the cost may be borne by

	requirements			either the importer or the exporter
a890	Other conformity requirements	0.5	0.5	As the cost may be borne by either the importer or the exporter
a900	SPS measures nes	0.5	0.5	As there is no information to identify whether the cost would be borne by the exporter or the importer
Technical Barriers to Trade				
b110	Prohibitions	0	1	Since these do not impose any costs on exporters who are able to export.
b140	Autorisation requirements (for importers)	0	1	Since the importer has to be authorised
b150	Importer registration requirements	0	1	Since the importer has to register
b190	Prohibitions/restrictions nes	0	1	Since these do not impose any costs on exporters who are able to export.
b200	Tolerance limits nes	1	0	Since affect production processes
b210	Residue tolerance limits	1	0	Since affect production processes
b220	Restricted use of substances	1	0	Since affect production processes
b310	Labelling requirements	0.75	0.25	As labelling can be done by either the importer or the manufacturer, but is more likely to be done by the manufacturer.
b320	Marking requirements	1	0	Since would be done prior to shipment, that is by exporter
b330	Packaging requirements	0.75	0.25	As packaging can be done by either the importer or the manufacturer, but is more likely to be done by the manufacturer.
b400	General production or postproduction requirements	0.5	0.5	As there is no information to identify whether the cost would be borne by the exporter or the importer
b410	Production process requirements	1	0	Since affect production processes
b420	Storage and transport requirements	0.5	0.5	Since cover the process until final sale, therefore affecting both importers and exporters
b490	Production requirements	1	0	Since affect production processes
b600	Product identity requirement	1	0	As goes to the product itself, that is how manufactured
b700	Performance standards	1	0	Since affect production processes
b810	Product registration requirements	0.5	0.5	As the cost may be borne by either the importer or the exporter

b820	Testing requirements	0.5	0.5	As the cost may be borne by either the importer or the exporter
b830	Certification requirements	0.5	0.5	As the cost may be borne by either the importer or the exporter
b840	Inspection requirements	0.5	0.5	As the cost may be borne by either the importer or the exporter
b850	General traceability requirements	0.5	0.5	Both importer and exporters need to keep records
b851	Traceability (origin)	0.5	0.5	Both importer and exporters need to keep records
b852	Traceability (processing history)	0.5	0.5	Both importer and exporters need to keep records
b853	Traceability (distribution and location after delivery)	0	1	Borne by final seller, that is importer
b859	Other traceability requirements	0.5	0.5	Both importer and exporters need to keep records
b890	Conformity assessments nes	0.5	0.5	As the cost may be borne by either the importer or the exporter
b900	Other TBT requirements	0.5	0.5	As there is no information to identify whether the cost would be borne by the exporter or the importer
c100	Pre-shipment inspection	1	0	Since it is before shipment
c300	Direct consignment requirements	0.5	0.5	As the cost may be borne by either the importer or the exporter
c400	Import monitoring requirements	0	1	As the cost is more likely to be borne by the importer.
c900	Customs formalities	0	1	As the cost is more likely to be borne by the importer.

Source : Webb, M., Strutt, A., Gibson, J., & Walmsley, T. (2020)

ANNEX 2: DESCRIPTION OF RAW DATABASES FOR NTMS AS FOR 29/03/2019

Database	Year coverage	Number of countries	Product aggregation level	Number of NTM	Flow
UNCTAD Integrated Trade Intelligence Portal (I-TIP) http://i-tip.unctad.org/	Year of Data Collection 2012-2017	85 reporters 250 partners	5381 products at 6 digits (HS)	The chapters from A to P (except K)	Inward
WTO Integrated Trade Intelligence Portal (I-TIP) https://i-tip.wto.org					
Global Trade Alerts (GTA) https://www.globaltradealert.org/data_extraction	Implementation date	185 impleme	5205 products at 6	The chapters A, B, CAP, D, E, F, FDI, G, I,	Inward, outwa

	2008-2021	nting countries 234 affected juridictions	digits (HS)	L, M, MIG, N, P, TARIFF, X	rd, outward subsidy
Specific Trade Concerns (STCs) Technical Barriers to Trade Information Management System http://tbtims.wto.org/en/SpecificTradeConcerns/Search Sanitary and Phytosanitary Information Management System http://spsims.wto.org/en/PredefinedReports/ListOfSpecificTradeConcerns?Submit=DownloadAsExcel	1995-1998 (TBT)			Technical Barriers to Trade Sanitary and Phytosanitary	
The World Bank (WB) Temporary Trade Barriers https://datacatalog.worldbank.org/dataset/temporary-trade-barriers-database-including-global-antidumping-database	1980 - 2015	42		All contingent trade measures: • Global Antidumping Database (GAD) - 1980s-2015 • Global Countervailing Duties Database (GCVD) - 1980s-2015 • China-Specific Safeguards Database (CSGD) - 2002-2015 • Global Safeguards Database (GSGD) - 1995-2015 • WTO Disputes Database (DSUD) - 1995-2015	
The OECD export restrictions database export restrictions on Industrial Raw Materials(ERIRM) https://qdd.oecd.org/subject.aspx?Subject=ExportRestrictions_IndustrialRawMaterials export restrictions on Primary Agriculture Products (ERPAP) https://qdd.oecd.org/subject.aspx?Subject=ExportRestrictions_PrimaryAgriculture	2009-2014 for ERIRM 1996-2012 for ERPAP	44 for ERIRM	6-digit level of HS2007	• restrictions on Industrial Raw Materials • restrictions on Primary Agriculture Products	•
The OECD consumer and producer support in agricultural products database https://stats.oecd.org/viewhtml.aspx?QueryId=84839&vh=0000&vf=0&l&il=&lang=en					
European Commission Market Access Database http://madb.europa.eu/madb/indexPubli.htm					
United States International Trade					

Commission NTMs database https://dataweb.usitc.gov/					
regional agencies, including **United Nations regional commissions.**					
The ITC business surveys http://ntmsurvey.intracen.org/ntm-survey-data					
online complaints portals https://www.tradebarriers.org					

Source: Compiled by the author