

(Preliminary draft)

THE UNSEEN IMPACT OF NON-TARIFF MEASURES:

Insights from a new database



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Abstract

Non-tariff measures (NTMs) affect our daily lives: Packaging requirements and limits on the use of pesticides ensure safe food; restrictions on toxins in toys protect our children; and emission standards for cars have an impact on climate change.

Built upon a new dataset, covering 109 countries and 90 per cent of world trade, this UNCTAD-World Bank report sheds more light upon the prevalence and impact of non-tariff measures. Nearly 80 per cent of all traded goods are affected by non-tariff measures. The prevalence of NTMs in developed countries is significantly higher than in developing and least developed countries.

Although most of NTMs serve legitimate policy objectives, they often raise costs which can create hurdles to trade and economic development. In most sectors, the restrictiveness of NTMs by far exceeds current tariffs. Particularly in agricultural sectors, developing country exporters face NTMs equivalent to tariffs higher than 20 per cent. In particular, complex sanitary, phytosanitary and technical requirements create challenges of compliance.

Acknowledgements

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Several partners and donors contributed to the database development. The global data collection is a joint effort coordinated by UNCTAD with the African Development Bank, Economic Research Institute for ASEAN and East Asia, International Trade Centre, Latin American Integration Association (ALADI), National Graduate Institute for Policy Studies (GRIPS), World Bank and World Trade Organisation. Donors are the European Commission, Canada, Japan, Russian Federation, and the United States. The UNCTAD – World Bank project "Top 25 Markets" was financially supported by Japan and the Consortium on Non-Tariff Measures coordinated by GRIPS. The financial contribution is gratefully acknowledged.

The calculated indicators of the disaggregated ad valorem equivalents will be made publicly available for use by researchers and policymakers at i-tip.unctad.org and wits.worldbank.org.

1. Introduction

Non-tariff measures inhabit the grey zone where trade policy meets national regulation. They are generally defined as policy measures other than ordinary customs tariffs that can potentially have an economic effect on international trade. While tariffs are relatively transparent and have been regularly compiled into public databases, non-tariff measures are not always easy to identify and have only been sporadically collected for relatively few countries. With new data, this report sheds new light on the usage and impact of NTMs.

Most traded goods are affected by non-tariff measures. The majority of NTMs are regulatory measures while traditional trade measures such as quotas and non-automatic licensing are now less common. Since most regulations apply equally to domestic products, NTMs affect most of the products that we encounter in our daily lives: packaging requirements and limits on the use of pesticides ensure safe food; restrictions on toxins in toys protect our children; mandatory voltage standards for household plugs enable regional mobility; and emission standards for cars limit climate change.

While tariffs are clear in their intent, the role of NTMs is less straightforward. On the one hand, many regulatory NTMs are indispensable for sustainable development. They aim to protect human, animal or plant health as well as the environment. These objectives are at the core of social and environmental sustainability policies and the measures are legitimate tools in countries' efforts to achieve the Sustainable Development Goals. On the other hand, NTMs can also raise costs and create hurdles for trade and economic development. Private sector surveys indicate that technical regulations as well as related processes pose a significant challenge for trade.

This report confirms firms' perception and shows that NTMs today have a bigger influence on trade than tariffs. The availability of information is a key challenge that also magnifies other challenges, such as the national streamlining of NTMs and regulatory cooperation at the regional and multilateral level to reduce any adverse effects of NTMs. Until recently, systematic information about NTMs for a significant number of countries and a significant share of world trade was unavailable.

To that end, UNCTAD and the World Bank launched the "Top 25 Markets"-project in 2014 to collect NTM data for countries that represent a significant share of world trade. In particular, NTM data now covers large importers that serve as main destination markets for developing countries. This information allows us to support exporters in developing country and to assess the development implications of NTMs. Other regional and international organisations also contributed to the data collection.¹ As of December 2017, the data covers 109 countries and 90 per cent of world trade. It has been made publicly available, both at the World Integrated Trade Solution (WITS at wits.worldbank.org) and at UNCTAD's Trade Analysis Information System (TRAINS at i-tip.unctad.org).

The report is structured as follows. Section 2 of this report describes the methodology that governs the data collection of the NTM database. The conversion of textual information from laws and regulations into a systematic database was achieved with the International Classification of NTMs developed by the Multi Agency Support Team (MAST). The classification is a comprehensive list of all possible NTMs disaggregated into 178 detailed measure codes. For the NTM database, almost 15 000 regulations were analysed in depth and registered with the corresponding NTM codes, affected products and countries, the date of entry, and additional descriptive information. A standardized collection approach ensures a high level of comparability.

Section 3 presents some stylized facts on NTMs usage. Developed countries regulate in general more products and a higher share of imports than least-developed and developing countries. Agricultural products are more often regulated than manufactures and natural resources. Agricultural products are also more intensively regulated, i.e. many distinct measures are applied to agri-food imports while there are fewer measures are applied to manufactured products. The use of export-related measures is also widespread. Almost 40 per cent of all exports are subject to at least one export measure. The indicators are made available at a disaggregated country and product level.

¹ For more information, see partners and donors at unctad.org/ntm.

Section 4 measures the impact of NTMs on trade by estimating their ad valorem equivalents (AVEs). In order to make NTMs and tariff comparable, AVEs express the impact of NTMs in terms of a tariff with the same effect. We show that in almost all sectors NTMs are more important than tariffs. This is particularly the case for agricultural products, but also for wood products, machinery and other manufactures. Technical measures (SPS and TBT) matter more in high-income countries than in middle income countries. They also constitute a relatively high trade barrier in low-income countries despite the fact that the number of measures is relatively lower. This could indicate a less efficient implementation of the technical regulations in the low-income countries. In general, traditional trade policy measures such as quotas and price measures constitute a higher barrier to trade in low-income countries than in middle and high-income countries.

Most NTMs are applied in a de jure non-discriminatory manner equally to domestic and all foreign producers. Yet, they have different effects on different countries and exporters. Low-income countries face on average higher AVEs on their exports than high-income countries. The reasons include costs of compliance, which are often higher for lower income countries as well as the composition of their export baskets which tend to consist of more agricultural and apparel products. This finding has important development implications. The AVEs will be made available at a disaggregated product and country pair level for further analysis.

This report and the underlying databases provide a rich source of information for policymakers, trade negotiators and the private sector. It shows that if policymakers care about sustainable development, they need to care about NTMs. The publicly available data and indicators allow tailor-made analysis that can underpin regulatory cooperation and NTMs streamlining to the benefit of social, environmental and economic development.

2. Identifying non-tariff measures

2.1. Definition and classification of non-tariff measures

Recognizing the proliferation and increasing importance of NTMs, UNCTAD has actively worked on the topic since the 1980s. Given the scarcity of available information, UNCTAD began to identify and classify NTMs in 1994. In 2006, UNCTAD established the Group of Eminent Persons on Non-Tariff Barriers (GNTB) and a Multi-Agency Support Team (MAST).² Their main purpose was to develop a definition and classification to facilitate the collection, quantification and understanding of NTMs.

NTMs were defined as *policy measures, other than ordinary customs tariffs, that can potentially have an economic effect on international trade in goods, changing quantities traded, or prices or both* (UNCTAD, 2009). This concept of NTMs is distinctly neutral. There is no a-priori judgement regarding the impact on trade or welfare, nor the legality of a measure. As this broad definition comprises a wide array of policies, the subsequent step of the MAST was the development of a common language on NTMs: an internationally agreed and recognized classification. The classification is the foundation for data collection and, ultimately, more transparency and a better understanding of NTMs.

The MAST classification of NTMs, version 2013, (UNCTAD, 2015) has 16 chapters of different measure categories (table 1, left). Chapters A to O refer to import-related NTMs, whereas chapter P covers measures that countries impose on their own exports. Another essential distinction is made between technical measures (chapters A, B and C) and non-technical measures (chapters D to O).

Technical measures comprise SPS and TBT measures and related pre-shipment requirements. These measures are imposed for objectives that are not primarily trade-related: for example, human, plant and

² Besides UNCTAD, these include the Food and Agricultural Organization (FAO), the International Monetary Fund (IMF), the International Trade Centre (ITC), the Organization for Economic Cooperation and Development (OECD), the United Nations Industrial Development Organization (UNIDO), the World Bank and World Trade Organization (WTO).

animal health, and the protection of the environment. Even if equally applied to domestic producers, they nevertheless regulate international trade and are thus considered NTMs.

Non-technical measures cover a wide array of policies, including traditional trade policies such as quotas and non-automatic licences (chapter E), price controls and para-tariff measures (chapter F) and contingent trade protective (chapter D) measures such as anti-dumping duties. The full list is presented in table 1.

Each chapter is further broken down into more detailed measures types (example of SPS measures, table 1, right). The tree structure allows for a fine-grained classification of measures. For example, the SPS chapter (A) consists of 34 NTM codes at the finest level of detail. In total, the MAST classification has 178 disaggregated codes.

Table 1: MAST classification of non-tariff measures

Import-related measures	Technical measures	A	Sanitary and phytosanitary (SPS) measures	<p>Tree structure, for example:</p> <p>A Sanitary and phytosanitary (SPS) measures</p> <p> A1 Prohibitions/restrictions of imports for SPS reasons</p> <p> A11 Temporary geographic prohibition (...)</p> <p> A2 Tolerance limits for residues and restricted use of substances (...)</p> <p> A3 Labelling, marking, packaging requirements (...)</p> <p> A4 Hygienic requirements (...)</p> <p> A5 Treatment for the elimination of pests and diseases</p> <p> A51 Cold/heat treatment</p> <p> A52 Irradiation (...)</p> <p> A6 Requirements on production/post-production processes (...)</p> <p> A8 Conformity assessment</p> <p> A81 Product registration</p> <p> A82 Testing requirement</p> <p> A83 Certification requirement</p> <p> A84 Inspection requirement</p> <p> A85 Traceability requirement</p> <p> A851 Origin of materials and parts</p> <p> A852 Processing history (...)</p> <p> A86 Quarantine requirement</p> <p> A89 Other conformity assessments</p>
		B	Technical barriers to trade (TBT)	
		C	Pre-shipment inspections and other formalities	
	Non-technical measures	D	Contingent trade-protective measures	
		E	Non-automatic licensing, quotas, prohibitions and quantity-control measures	
		F	Price-control measures, including additional taxes and charges	
		G	Finance measures	
		H	Measures affecting competition	
		I	Trade-related investment measures	
		J	Distribution restrictions	
		K	Restrictions on post-sales services	
		L	Subsidies (excluding export subsidies)	
		M	Government procurement restrictions	
		N	Intellectual property	
	O	Rules of origin		
Export-related measures	P	Export-related measures		

Source: Authors' illustration based on UNCTAD (2015)

Even with 178 distinct types of measure, data analysis involves a significant generalization of the complexity and differences between NTMs, particularly SPS measures and TBT. For product-specific trade negotiations and export decisions, an in-depth review of full-text regulatory documents is necessary. The NTM database also provides direct access to the complete regulations. Still, the classification of measures and affected products provides useful entry point for a wider assessment of the prevalence and impact of NTMs for a comparative perspective across countries and sectors, and for narrowing down of priorities.

2.2. Data collection process

On the basis of the MAST classification, UNCTAD leads an international effort, in close collaboration with the World Bank and other partners, to collect comprehensive data on NTMs. Country coverage and data quality are rapidly increasing, particularly after further improving the data collection approach in 2012 and expanding collaboration with many regional and national partners.

Data on official NTMs are collected by extensively reading and analysing national legislative documents, such as laws, decrees or directives. As mentioned before, this material includes behind-the-border technical regulations that apply to domestic as well as foreign products. The same data collection and classification methodology is used in all countries.

The first step is to establish a national team that will work with UNCTAD staff to collect the data. The team may comprise government officials, think tanks and independent experts. The team is trained through UNCTAD's online course on NTM data collection and in face-to-face workshops. The training courses build national capacity on NTM classification, product classification and on a consistent and comparable data collection approach described in the UNCTAD Guidelines to Collect Data on Official NTMs.³

The actual data collection process starts with the identification of sources of regulatory information in each country. All relevant documents are then obtained from these sources. Much effort is devoted to ensure that the data is comprehensive and covers all NTMs applied on imports/exports. Each document and regulation is registered with extensive bibliographical information to ensure that information can be traced back to its source.

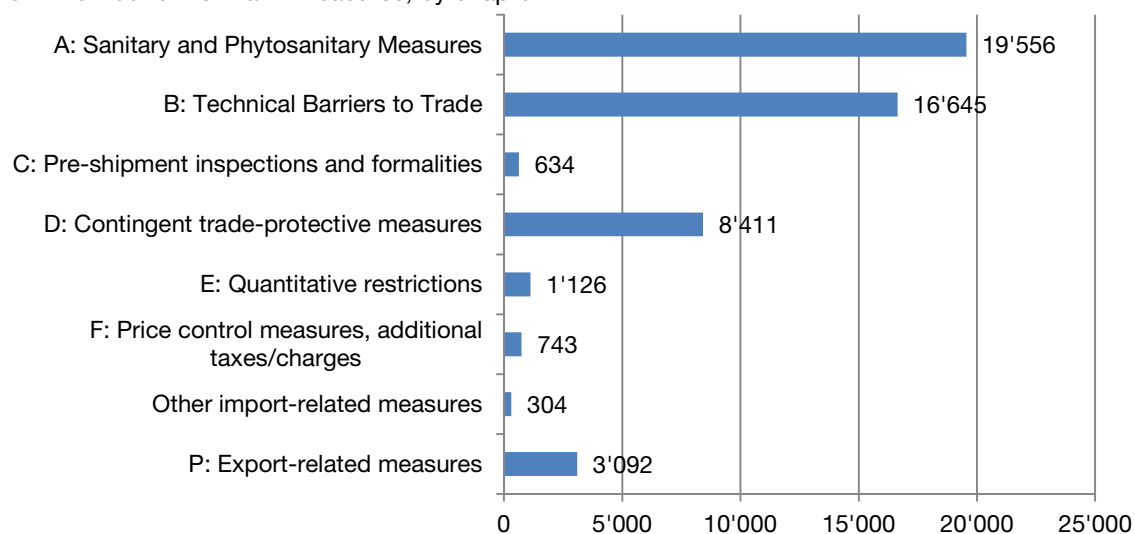
Once a relevant regulation is identified and registered, each specific provision is classified into one of the 178 NTM codes -- along with detailed measure descriptions and further descriptive information. One regulation can contain several different measures, for example, a required maximum residual limit of pesticides as well as a respective inspection requirement. For each measure, the affected countries and products are also classified in detail.⁴ To ensure consistency, UNCTAD carries out extensive quality control during and at the end of the data collection process.

Globally, data collectors have reviewed hundreds of thousands of pages of regulatory documents. The database now contains 14 561 different regulations that comprise 50 511 distinct measures. Figure 1 shows that SPS measures and TBT are, by far, the most common measures.

³ For more information, see http://unctad.org/en/PublicationsLibrary/ditctab2014d4_en.pdf

⁴ Product classification is done at the national tariff line level or at 6-digits of the Harmonized System, which distinguishes about 5,200 different products.

Figure 1: Number of non-tariff measures, by chapter

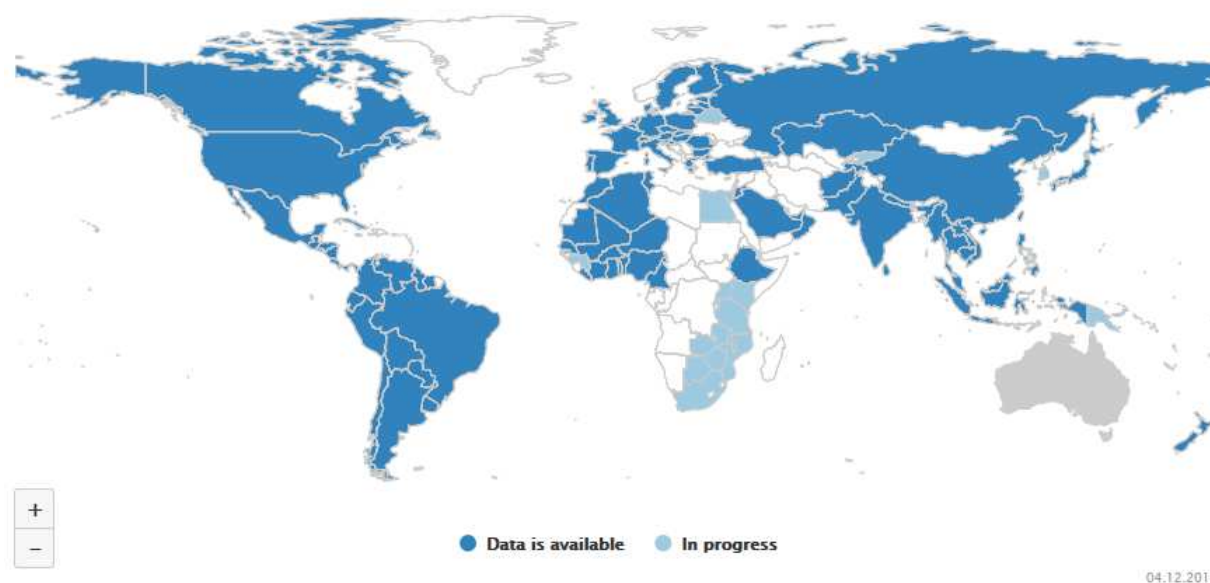


Source: Authors' illustration based on TRAINS

2.3. Data availability and dissemination

As of December 2017, UNCTAD's NTM data comprises 109 countries, covering 90 per cent of global trade. The map below illustrates the current country coverage as well as ongoing data collection efforts.

Figure 2: Country coverage of NTM data



Source: Authors' illustration based on TRAINS.

UNCTAD's NTM data is made available through the following two portals:

- Trade Analysis Information System (TRAINS) at i-tip.unctad.org:

TRAINS provides data on NTMs at the HS 6-digit product classification. Users can search the database by country, type of NTM, affected product and partner country. It also contains information on the regulatory source and descriptions of the measures. Moreover, researchers interested in NTMs can download a STATA dataset with additional variables.

- World Integrated Trade Solution (WITS) at wits.worldbank.org:

WITS integrates TRAINS with other trade-related databases, such as UN COMTRADE, WTO Integrated Data Base (IDB) and WTO Consolidated Tariff Schedules (CTS). As a result, WITS offers an interface that provides access to databases covering imports, exports and protection data — tariff and non-tariff measures — over time.

3. Stylized facts of NTM usage

This section summarizes the usage of NTMs by countries and for specific products. The indicators discussed in this section draw from an inventory of the new TRAINS database and describe the use and prevalence of NTMs. They count, for example, how many and what type of products are affected by a NTM. The two most basic indicators are the Frequency Index and the Coverage Ratio. These are now standard measurements of NTM incidence used in the preliminary exploration of data (UNCTAD, 2013, WTO 2012). Two additional indicators measure the prevalence of NTMs.

- The Frequency Index accounts for the simple presence or absence of a NTM. It captures the percentage of imported products affected by one or more NTM.⁵ Considering the HS6-digit level of product disaggregation, there are around 5'200 products to count.
- The Coverage Ratio captures the share of trade subject to NTMs. It is similar to the Frequency Index but weights by import values, rather than a simple average of product lines. Specifically, the numerator is the sum of the trade value of products that are affected by a NTM. It is then divided by the total value of imports.
- The Prevalence Score counts how many NTM apply to a given product.⁶ Computed at the HS6 digit product level, it is aggregated as a simple average for a country or a group of products.
- The Regulatory Intensity adjusts the Prevalence Score for differences in regulatory intensity and trade importance across products. This normalization adjusts for the fact that some products are more traded and regulated than others, for example medicines. Computed as an average for a country, the Regulatory Intensity is normalized by the average number of measures for each product around the world and then weighted by its importance in world trade.

Using these indicators for 109 countries from the new TRAINS database, Figures 3-7 reveal four stylized facts. First, developed countries use NTMs more than developing countries, and especially for key products in their import basket (extensive margin). At the same time, developed countries use on average more measures on each product (intensive margin). Second, NTMs are most widespread in the agro-food sector, both at the intensive and extensive margin, and across all regions. Third, Technical Barriers to Trade are the most frequent form of NTMs, affecting 35 per cent of product lines and about 65 per cent of world trade, followed by export measures and sanitary and phytosanitary measures. Fourth, developed countries drive the high global usage of TBT and export measures, while the use of SPS measures is more uniformly distributed.

3.1. NTM usage by development status

Figure 3 shows the incidence and prevalence of NTMs across development status. Panels A and B illustrate import measures while panels c and d refer to export measures. On the import side, three findings stand out. First, NTMs in developed countries affect a higher share of products and trade than in developing countries and in particular least developed countries (LDCs) (Panel A). While in LDCs about 40 per cent of imports are on average subject to NTMs, this figure is nearly twice as high in developed countries.

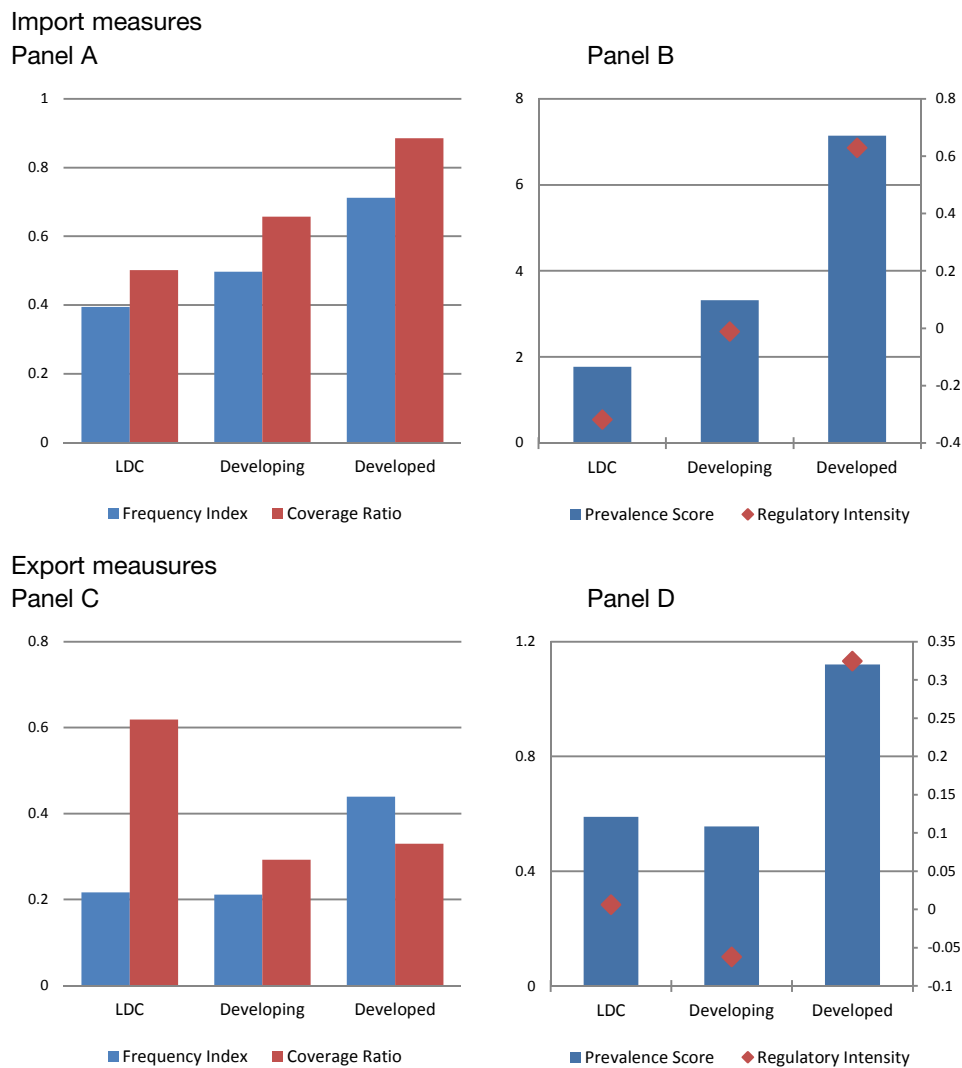
Second, countries use NTMs particularly on products that matter more in their import basket. That is why the Coverage Ratio is consistently higher than the Frequency Index.

⁵ $FI_j = (\sum D_i M_i) / (\sum M_i) \times 100$, where D_i is a dummy variable equal to 1 when the product faces an NTM.

⁶ $PS_j = (\sum D_i N_i) / (\sum N_i)$, where N_i is the number of NTM on product i .

Third, while NTMs affect not only more products in developed countries, NTMs are also more pervasive per product in developed countries (panel B). On average, developed countries use 8 different NTMs on any given product, while developing countries apply 4 and LDC countries only around 2. Another way to measure this is through Regulatory Intensity, which adjusts the Prevalence Score for differences in regulatory intensity and trade importance across products. It confirms that developed countries have higher intensity of regulation than the rest, especially compared to LDCs. Thus, these results suggest that developed countries use NTMs more than developing countries, and especially for products of import importance, both at the intensive and extensive margin.

Figure 3: NTM usage, by UN development status



Regarding export-related NTMs, three results stand out. First, Export NTMs affect more products in developed countries than in developing countries, and also more measures are applied on any product (panel C). Coupled with panel A, these findings suggest that developed countries use both import and export NTMs more than developing countries.

Second, LDCs use regulations more strategically for exports than imports. That is why the difference between the Coverage Ratio and the Frequency Index is higher for export measures than import measures. LDCs apply export measures only on 20% of products, but those products account for more than half of their export value (panel C). In contrast, import regulations affect products and import values similarly in LDCs (panel A).

Third, countries use fewer export NTMs to regulate products. For example, developed countries place, on average, 1.1 export measures on any regulated product, while they apply 7 import measures on them (panel A and D). In sum, export measures are fewer than import measures, but affect a high share of exports in all regions, but especially in LDCs.

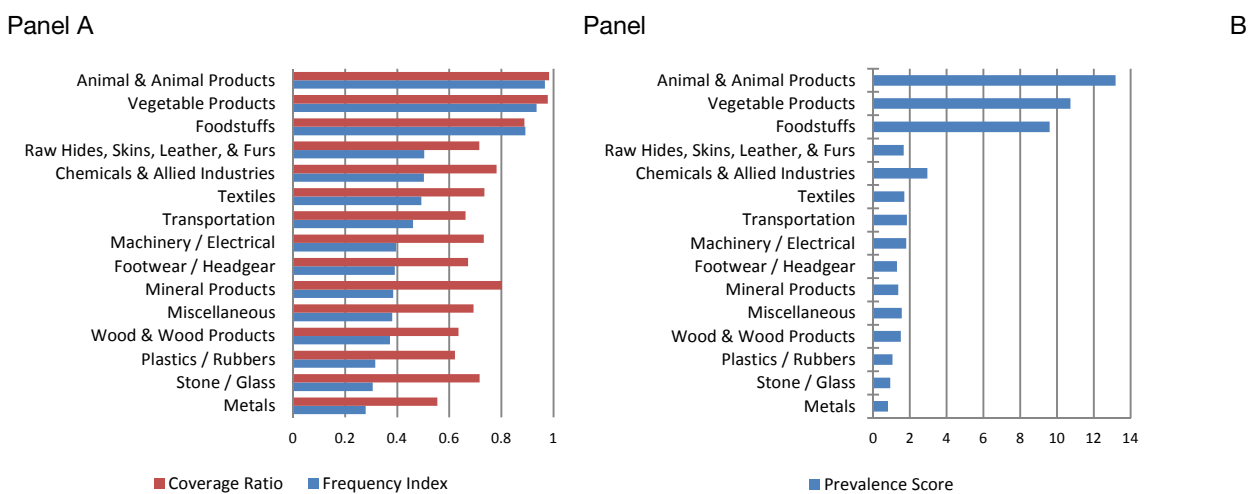
3.2. NTM usage by sector

Figure 4 shows how the incidence and prevalence of NTMs varies across sectors, as defined by sections of the Harmonized System (HS). Three findings are noteworthy. First, sectors exhibit great variation of both regulated products and trade (panel A). While the three product groups corresponding to agri-food have values close to 100 per cent, the Frequency Index is around 40 per cent for the other sectors.

Second, agri-food exhibits the most widespread NTMs usage both at the intensive and extensive margin. In agri-food (sectors 1 to 3), products face on average 11 NTMs. This magnitude of regulation is much higher than in any other sector (less than 2 in most sectors). Yet, it does not come as a surprise. NTMs tend to be more common in agriculture than in other sectors. This is because of technical measures, notably SPS, and because of more traditional forms of NTMs, which are also more frequently applied to agriculture, such as quotas or price mechanisms.

Third, countries tend to use NTMs particularly on products that matter to their import sectors; the Coverage Ratio is consistently higher than the Frequency Index. In the agro-food sector, it is close to 90 per cent; for non-food it is around 70 per cent.

Figure 4: NTM usage of imports, by sector

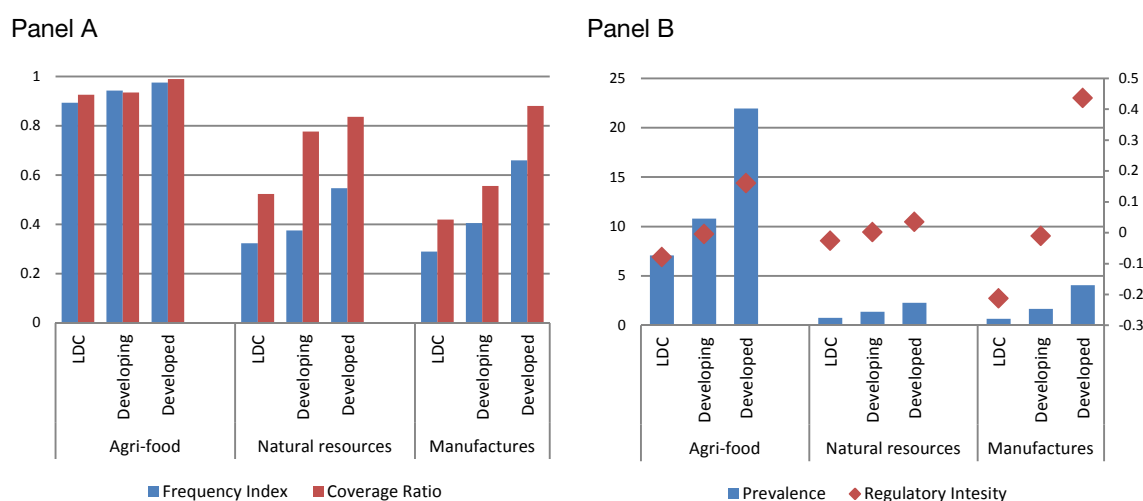


Across all country groups, agri-food⁷ is the most regulated sector (Figure 5, panel A). For this sector, both Frequency Index and Coverage Ratio are around or above 90 per cent in all groups. Agri-food exhibits also the most measures per regulated product groups (Prevalence Score) across all groups (Panel B).

Some other findings are noteworthy. Developed countries regulate a larger share of products and number of measures than the rest, in all three sectors. Thus, the Regulatory Intensity is higher for this region, and this difference is most pronounced for manufactures. Moreover, countries across all sectors and income levels use regulation on products that matter to their import sectors. Both for manufactures and for natural resources, the Coverage Ratio is much higher than the Frequency Index.

⁷ Broad product groups are defined by the Harmonized System (HS) at 2-digit: Agriculture corresponds to HS 1-24, Natural Resources to HS 25-27, and Manufacturing to 28-97

Figure 5: NTM usage of imports, by UN development status and broad product groups



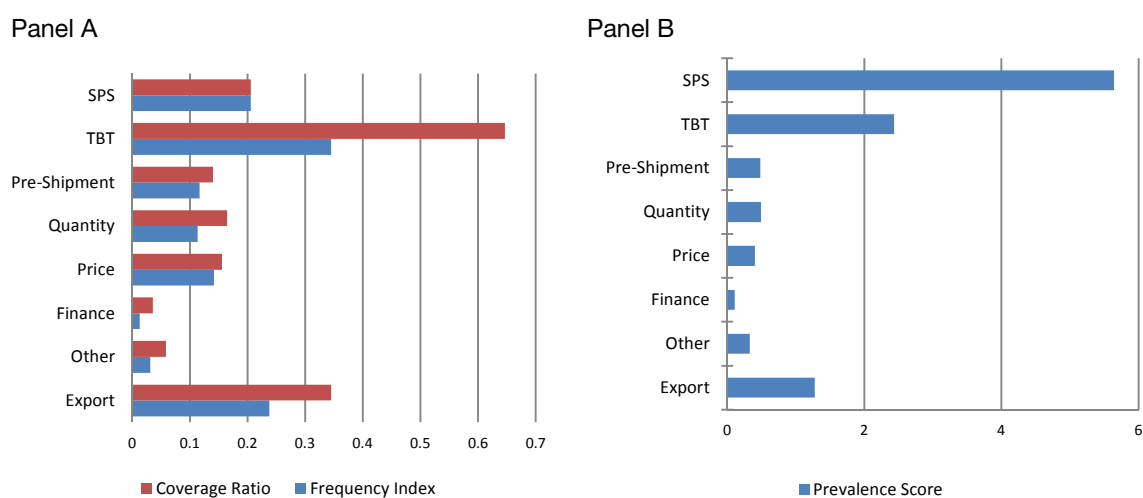
3.3. NTM usage by chapter

TBT measures are the most frequent form of NTMs, affecting 35 per cent of product lines and about 65 per cent of world trade (Figure 6, panel A).⁸ Similarly, countries also use export measures widely, affecting about a quarter of product lines and a third of exports. Export measures comprise mainly licences, restrictions or prohibitions, but also registrations and technical measures such as certification or inspection.

SPS measures cover 20 per cent of world trade. This value is rather low because SPS tend to be more concentrated on agri-food products. Still, the high Prevalence Score (Panel B) suggests that though sanitary measures only cover 20 per cent of world trade, the number of sanitary measures used is the highest compared to other NTM types. Specifically, countries use on average about 6 SPS measures and around 2 TBT for any product.

Other types of NTMs are less frequently used and cover a lower share of trade; pre-shipment, quantity and price measures affect about 15 per cent of world trade.

Figure 6: NTM usage, by chapter

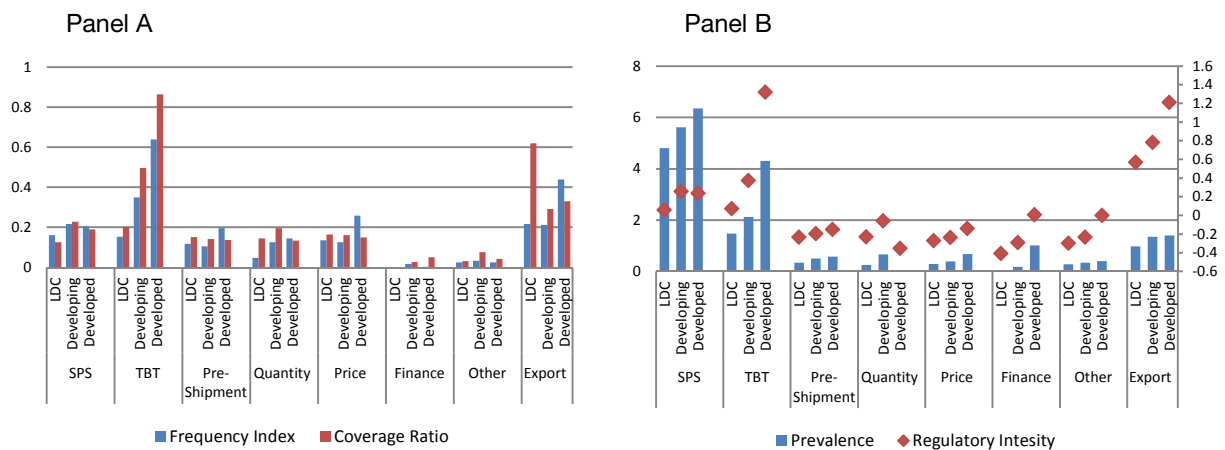


⁸ For these computations, the world averages are the simple average of national values. Since developing countries outnumber the two other groups, the global average is close to that of the developing countries.

Developed countries use TBT measures more than other regions (Figure 7). In fact, all four indicators confirm this. Developed countries use TBT three times as much as LDCs to regulate imports. The usage of TBT by developed countries is even more pronounced when considering the Coverage Ratio, which accounts for the importance of import values. Moreover, developed countries also use a higher number of TBT measures compared to other regions per regulated product (panel B).

Furthermore, countries use export measures differentially across regions. In particular, LDCs regulate products of strategic export importance most compared to other regions. Yet, LDCs use a relatively lower number of export measures per regulated product. This is why Regulatory Intensity for LDCs is the lowest compared to other country groupings.

Figure 7: NTM usage, by chapter and UN development status



4. The Impact of NTMs on International Trade

Incidence indicators are useful to describe the landscape of regulations across products, sectors and countries. However, such statistics provide no information about the actual impact of NTMs on international trade. This section complements the analysis of the previous section by providing estimates of the costs of NTMs in the form of ad valorem equivalents. For illustrative purposes, the estimates are presented by broad categories of products and by country groupings.

4.1. Overview of the data and methodology

The ad valorem equivalents of NTMs presented in here are based on the estimation method developed in Kee and Nicita (2017), which in turn, builds on the work of Kee, Nicita and Olarreaga (2009). The estimation framework allows for two types of AVEs, one assessing the overall costs associated with technical NTMs (as defined by the MAST Classification) and one assessing the overall costs for the remainder of NTMs as a group. NTMs that countries impose on exports are not considered. Estimates are based on data on NTMs as in the new database. The analysis utilizes a reduced sample of NTM data collected between 2012 and 2016. The data is transformed into a cross-section database spanning about 40 importing countries plus the European Union, about 200 exporting countries, and about 5'000 products at the HS 6 digit classification. The additional data required for the estimation originates from TRAINS (tariffs) and the UN Comtrade database (trade flows).

As for interpreting the AVEs of NTMs, the interpretation is similar to that of a tariff: AVEs represent the additional costs that the presence of NTMs has on international trade.⁹ The effect of NTMs is expected to be heterogeneous. Primarily, the impact of NTMs differs across countries because countries make use of NTMs differently. However, distinct from tariffs, the impact of NTMs on the costs of trade generally varies even in the case of identical NTMs. In practice, the effect of specific NTMs on trade may be different across importers because of a host of factors which include implementation methods, stringency, and enforcement mechanisms. The impact of a specific NTM can also be different across exporters because compliance costs are generally different.

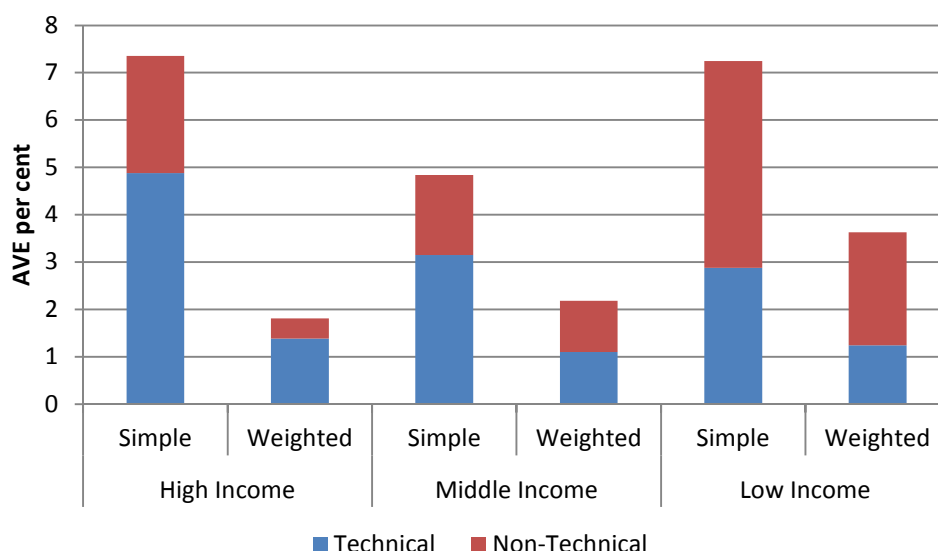
It is also important to note that, different from tariffs, NTMs do not generally or necessarily favour domestic industries. Many NTMs serve specific policy objectives (e.g. consumer protection) and thus cannot be negotiated away without affecting the very purpose they serve. Trade agreements do not seek to eliminate the large majority of NTMs (as in the case of tariffs) but seek only to prevent the protectionist use of NTMs.¹⁰

4.2. Cost estimates of NTMs

What follows is a description of cost estimates of NTMs as measured by AVEs. At the sample mean, the average AVE of NTMs is about 12 per cent, with a standard deviation of about 50. The median is about 3 per cent. These statistics indicate that, although most AVEs are below 3 per cent, their distribution is quite dispersed, with some relatively high values.¹¹ The above statistics represent the additional costs that NTMs have on trade flows for which NTMs are present (i.e. they do not take into account trade flows in which NTMs are absent). As NTMs do not affect all international transactions, the costs imposed by NTMs on overall trade are smaller.

Although the effects of NTMs on international trade are generally different across products and countries, the effects show some notable patterns. To illustrate some of these patterns, Figure 8 depicts the simple average and import weighted average of AVEs for three country groupings (high, middle and low-income).

Figure 8: Ad Valorem Equivalents of NTMs on imports, by income group



Source: Authors calculations

⁹ Note that these costs do not need to be identical for identical NTMs as compliance costs may differ across products and trading partners.

¹⁰ For implications related to the treatment of NTMs in international trade agreements see Hoekman and Nicita, (2017).

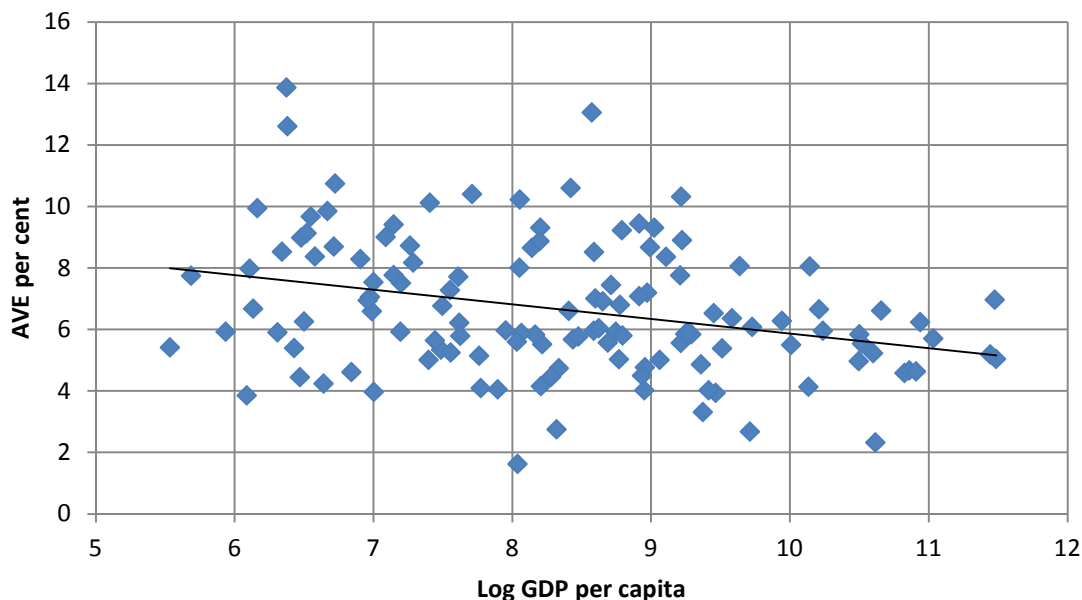
¹¹ In the statistics presented here we exclude the 0.5 per cent upper tail of the distribution.

Simple averages are to be interpreted as the average additional cost that a product incurs when it is imported. Weighted averages are to be interpreted as the additional burden that the presence of NTMs imposes on average on all the observed imports. On a simple average basis, the cost of NTMs is quantified at about 7 per cent for the products imported by high and low-income countries, and about 5 per cent for middle income countries. These statistics are much lower when considering import weighted averages. This is to be expected because the presence of NTMs itself tends to restrict trade.¹² Overall NTMs represent a cost of about 2 per cent to total imports of high and middle income countries, and about 3.5 per cent for low-income countries. The substantial difference between simple and weighted averages is also informative as it suggests that in many cases NTMs can result in nearly prohibitive costs.

Of interest is also that, while simple averages are similar between high and low-income countries, their composition differs. In both high-income and middle income countries the effects of NTMs are mostly due to technical measures (SPS and TBTs).¹³ On the other hand, non-technical measures represent the main source of trade costs in low-income countries. This is the result of high-income countries relying more on technical measures for public policy objectives (e.g. consumers' health and environmental protection). Another reason is that the stringency of the requirement is generally higher in countries with higher level of income. On the other hand, lower income countries tend to rely relatively more on traditional types of NTMs such as price mechanisms and quantity controls, while their technical measures are relatively less stringent. All these factors are reflected in the magnitude of the AVEs.

Although NTMs are often applied to all imports regardless of their origin, they may still have differing distortionary effects on trade. Indeed, the economic literature has often found the effect of NTMs to be harsher for small firms and for low-income countries.¹⁴ There are two factors behind the relatively larger impact of NTMs for lower income countries (UNCTAD, 2017). First, the cost of compliance with many types of NTMs is generally higher for exporters in low-income countries due to weaker infrastructural, organizational, administrative and technical capabilities. Second, NTMs tend to be more widespread in agriculture, an economic sector whose relative importance is higher for low-income countries.

Figure 9: Ad Valorem Equivalents of NTMs on exports, vs. GDP per capita of exporting country



¹² The argument here is similar to that of a simple average tariff and import weighted average tariff.

¹³ Similar results were also found by Cadot et al. (2015).

¹⁴ Disdier et al. (2008), Essaji (2008), Xiong and Beghin (2015), Fontagné et al. (2015), Murina and Nicita (2017), and Nicita and Seiermann (2017). All these studies find that regulatory burdens have a disproportionate effect on the export capacities of low-income countries and smaller firms.

The relatively larger effect of NTMs for low-income countries' exports is evident in the estimated AVEs. Figure 9 plots the simple averages of the AVEs on the exports of each country against its GDP per capita. The negative correlation illustrated in Figure 9 suggests that the average costs of NTMs tend to be higher for countries with lower per capita GDP. In numbers, there is a difference of about three percentage points between the average AVEs of the lower versus the higher income countries.

As noted above, the reasons behind the larger impact of NTMs for lower income countries are not only about compliance costs, but also because low-income countries' exports baskets are relatively more intensive in agricultural products. Agricultural markets are generally more regulated than other categories of products. This is both because of technical measures, SPS in particular, but also because of more traditional forms of NTMs, which are more frequently applied to agriculture (e.g. quotas, price mechanisms).

Figure 10: AVEs of NTMs, by broad category of products

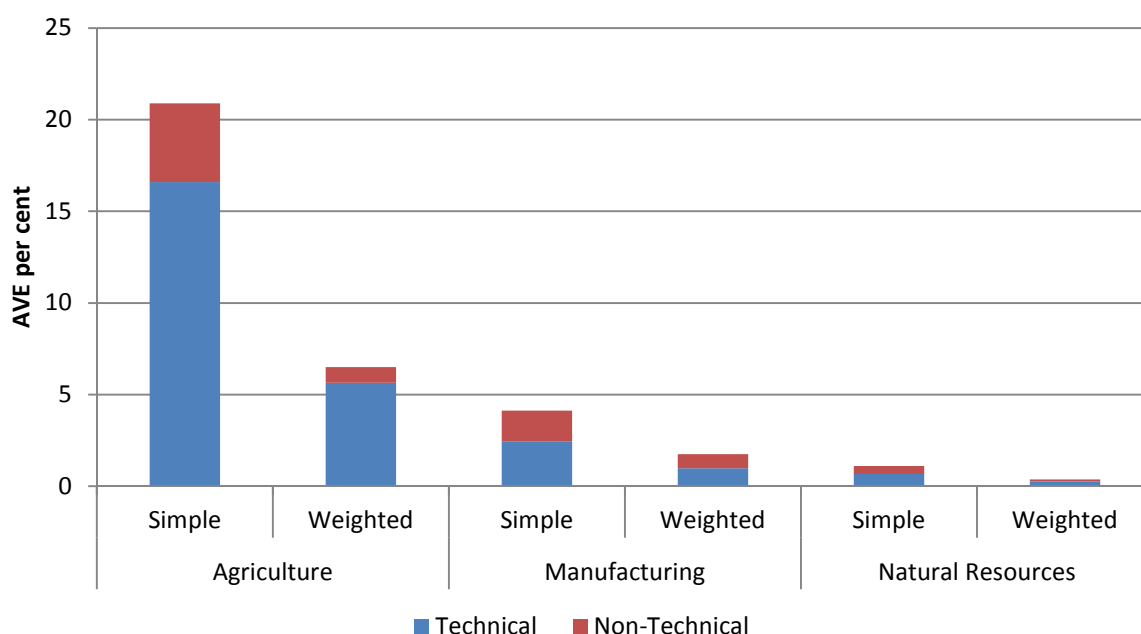


Figure 10 shows the average AVEs for the agricultural sector vis-à-vis that of the manufacturing and natural resources sectors. NTMs add substantial costs with regard to the international trade of agricultural products, about 20 per cent in simple average terms. On a weighted basis, the costs of NTMs represent about 6 per cent. In value terms, NTMs represent a cost to trade of about 75 billion US dollars. On average these costs are mostly due to technical NTMs. The impact of non-technical NTMs on agricultural trade is relatively less important. With regard to manufacturing trade, the impact of NTMs is less severe but still significant. In simple average terms, the AVE of NTMs for manufacturing is about 4 per cent. On a weighted average basis, the cost of NTMs represents about 2 per cent of manufacturing trade. Given that the international trade in manufacturing is much larger than that of agriculture, the costs of NTMs in manufacturing sectors account for about 250 billion US dollars. The impact of NTMs is minimal in relation to products categorized under natural resources.

The larger differences in the impact of NTMs across broad sectors persist at the more disaggregated level. Indeed, the impact of NTMs is heterogeneous not only across countries, but more so across products. Looking beyond broad aggregates, Figure 11 reports average AVEs across 25 economic sectors: 5 agricultural sectors and 20 industrial sectors as defined by the ISIC classification. Among the industrial sectors, AVEs tend to be relatively higher in the sectors of apparel, motor vehicles, electrical machinery, communication equipment, and wood and paper. For these categories, the simple average AVEs are more than 5 per cent. With regard to agriculture, the sectors of oils and fats, vegetable and animal products register the highest AVEs, with a simple average above 20 per cent.

Figure 11: Tariffs and AVEs of NTMs, by economic sector

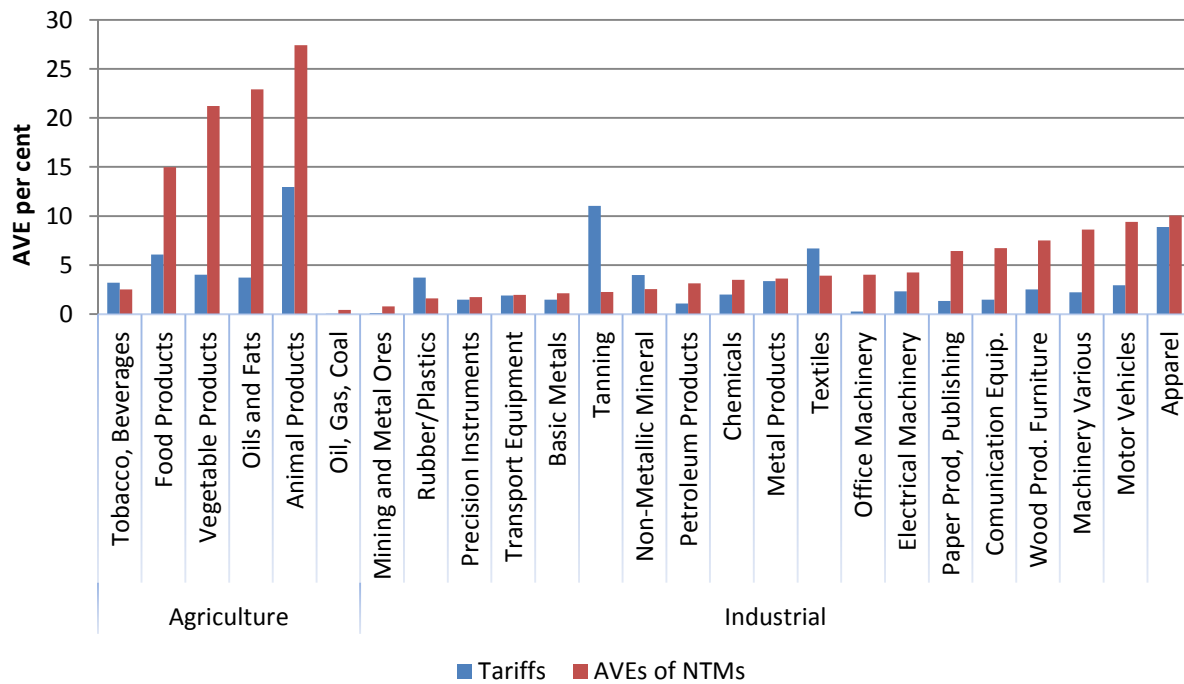


Figure 11 also reports simple average tariffs by sector, therefore allowing the comparison of the effects of NTMs with the magnitude of tariffs. For the large majority of economic sectors, NTMs result in a higher restrictiveness relative to tariffs. This is most evident in the agricultural sectors, but also in some of the industrial sectors such as those related to motor vehicles, machinery and electronics. The only sectors where tariffs dominate NTMs are tanning, textiles, rubber/plastics and non-metallic minerals.

Finally, this section provides an assessment of the importance of NTMs on exports. Figure 12 illustrates the average costs that NTMs add to the exports for each country in the world as measured by its export weighted average AVEs.

Figure 12: Importance of NTMs in adding costs to exports

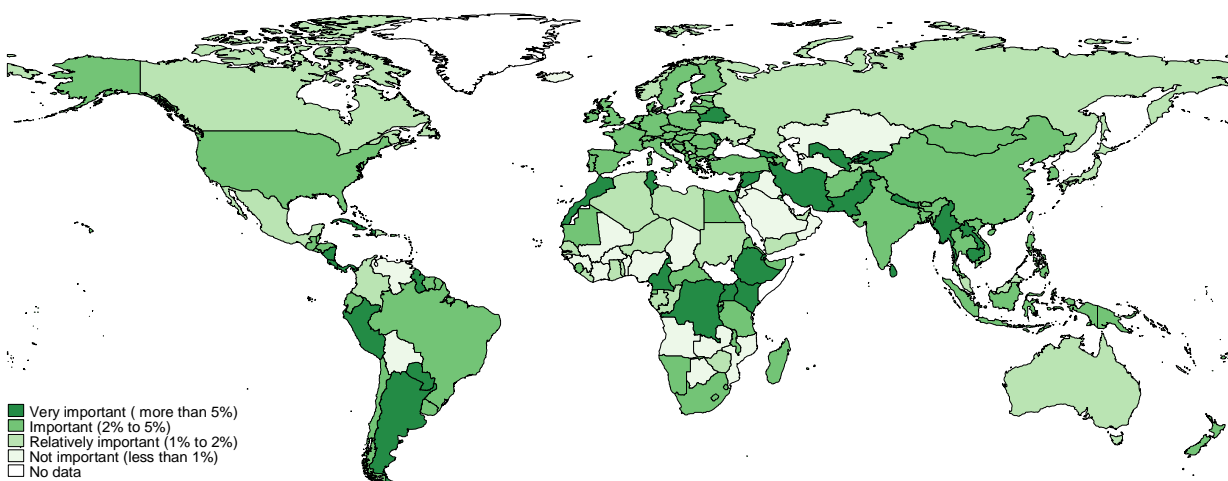


Figure 12 shows substantial heterogeneity. As discussed above, the effect of NTMs on a country's exports depends both on its capability in complying with NTMs as well as on the structure of its economy. Consistent with the patterns described above, NTMs tend to be more relevant for countries whose export basket is tilted towards agricultural products (e.g. many Latin America, East African, South Asian countries) and less so for those countries whose exports are oriented towards natural resources, especially those exporting energy

products (transition economies, Middle Eastern countries, and a number of African countries). Still, NTMs add substantial costs to exports originating in most countries, both developed and developing, including most of the emerging economies.

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