IV. Special topic: Non-tariff measures: Estimating analytical indicators using UNCTAD's Trade Analysis Information System (TRAINS)

Introduction

Data on non-tariff measures (NTMs) are a vital complement to tariff data as NTMs can be as important as tariffs in determining market access. Internationally comparable data on NTMs is scarce, but useful information is made available through UNCTAD's Trade Analysis Information System (TRAINS).

In contrast to transparency on tariff data, with countries regularly publishing information on the tariffs they impose, the opposite has been true for many non-tariff measures in areas such as quantitative restrictions and price restrictions. The importance of these measures has been recognized in many WTO agreements dealing with quotas and trade-protective measures, such as anti-dumping, safeguards or countervailing measures. The WTO Agreement on Sanitary and Phytosanitary Measures (SPS) and the Technical Barriers to Trade (TBT) Agreement also acknowledge the importance of trade regulations in the areas of food safety, protection of the environment, and consumer protection.

In recognition of NTMs' potential to affect trade, UNCTAD published 20 years ago the Database on Trade Control Measures, which contributed to the growing literature on quantification and analysis of the effects of NTMs (UNCTAD, 2002).

Subsequently, the data collection methodology progressed significantly, with the Multi Agency Support Team (MAST) developing what became in 2012 the International Classification of NTMs, which was updated in 2019 (see below).

As with tariffs, there is a need for comprehensive and internationally comparable data on NTMs. The main difficulty is that NTMs do not have numerical values. Instead, they are visible in legislation regulating conditions for the import or export of specific products, processing methods for these products or other factors. To have internationally compatible data, one common taxonomy for NTMs was needed to allow for regular and consistent data collection.

UNCTAD's TRAINS database on NTMs provides this. Its data stem from legal requirements, established on a national basis, that can directly or indirectly affect international trade in goods. The TRAINS NTM database contains comprehensive data for 100 economies.[1] The data cover all requirements that can potentially affect international imports and exports of a specific product in a specific country and for a specific trading partner.

The TRAINS NTM database allows users to access information by product, type of measure, countries imposing the measure, those affected by the measure and several other variables.

This data set complements members' NTM notifications to the WTO. As these notifications are reported by the member applying the measure, it is difficult to compare across countries because of the countries' differing disciplines.

Moreover, not all trade-related measures need to be notified.[2] Also, not all notifications include the product code to which they apply. Notifications provide updates on newly introduced or proposed regulations but members are not obliged to notify all regulations currently in force. While the notifications are a key transparency instrument that is central to multilateral discussions on market access, the dataset is therefore incomplete and does not provide comprehensive "NTM profiles" that would reveal how countries use NTMs as policy tools, with or without the intention to affect trade. The TRAINS NTM database therefore fills important gaps.

UNCTAD actively collects comprehensive NTM data, working with its many national, regional and international partners. In its work with governments, strict quality control and comprehensiveness checks are conducted by UNCTAD's team to ensure that all applied regulations are identified. Each requirement for export or import is registered in the database and classified according to the International Classification on NTMs. This classification was developed under UNCTAD's leadership with MAST (UNCTAD, WTO, International Trade Centre, the United Nations Industrial Development Organization, World Bank, the UN Food and Agriculture Organization, the Organisation for Economic Cooperation and Development, and the International Monetary Fund) and was recognized by the UN Statistical Commission (UNCTAD, 2012 and 2019).

This classification includes more than 150 different types of import measures and almost 30 different types of export measures. By using the International Classification on NTMs, the TRAINS NTM database therefore allows for a fine-tuned analysis. All regulations are coded according to the Harmonized System used for product classification. This allows traders, policy makers and researchers to identify all regulations that traders of any particular good have to comply with.

UNCTAD and its partners follow an elaborate methodology that standardizes the collection and classification approach across countries. This allows for comparable analysis across countries, products and time (UNCTAD, 2016).

The WTO contributes with data for "Contingent trade protective measures" (Chapter D of the classification) which comprises anti-dumping, countervailing measures and safeguard data. This information, based on members' notifications to the WTO, was deemed to be comprehensive and of high quality.

In addition, the WTO is part of the Global Trade Helpdesk (GTH), together with UNCTAD and ITC, that was launched in 2020. The GTH aims to bring together all available data on trade, tariffs and NTMs. Information from all participating organizations is presented in a consistent way. Information about regulatory requirements is mostly based on

1 Counting the European Union as one.
2 WTO agreements stipulate, for each policy area, specific notification requirements. For example, if a sanitary or phytosanitary (SPS) measure follows an international standard, it does not need to be notified.

UNCTAD's NTM data. The WTO contributes its notifications to the GTH and both datasets are interlinked.

The GTH provides a snapshot of all the requirements for import and export that are enforced at a certain point in time. For several countries, there are multiple years of data collection, while for others the data are more limited. The process of data collection, data description, and available information, as well as strengths and limitations of the data, can be found in UNCTAD 2017.

The NTM data also is published in different formats[3] through:

- the World Integrated Trade Solution (WITS)
- the Web Application Trade Analysis Information System
- STATA file for bulk download

Furthermore, inclusion in the database of NTMs derived from national requirements does not imply a judgement on the legitimacy or appropriateness of these requirements. NTMs are recorded in a neutral way with the purpose of fostering transparency for the policy tools that may affect international trade.

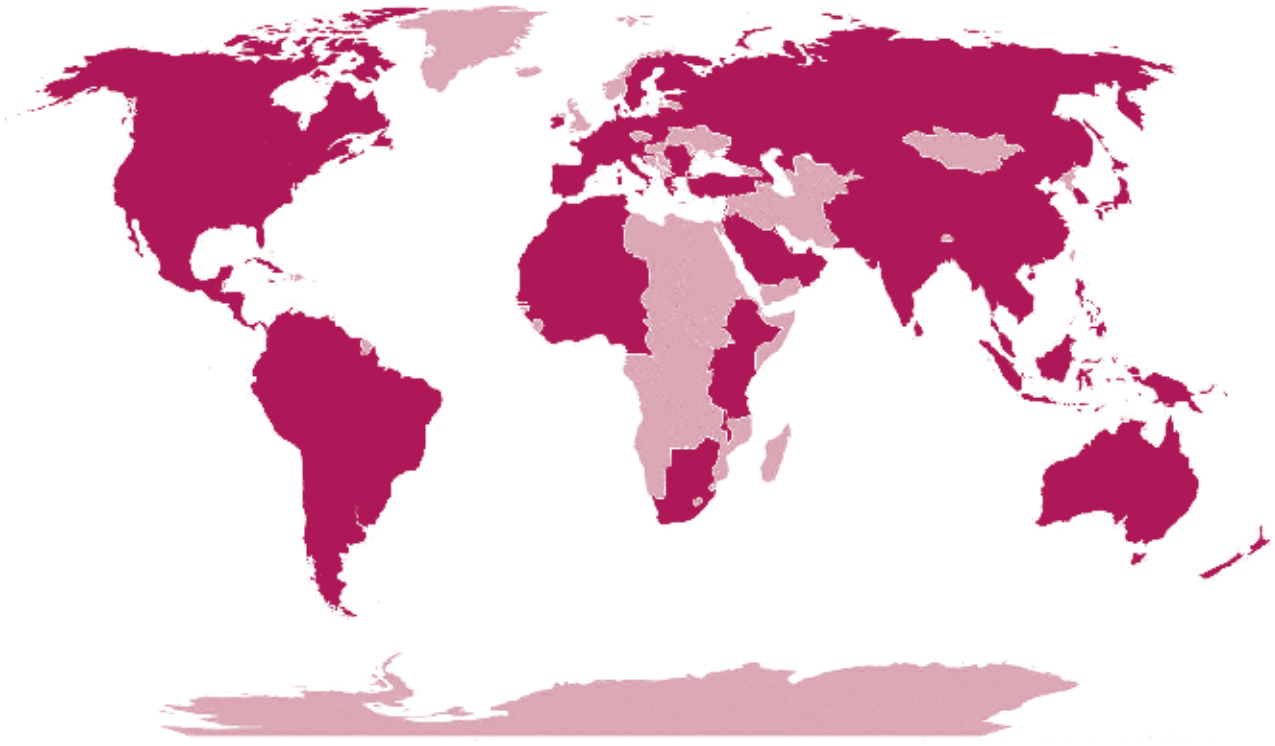
Data availability and dissemination

As of December 2020, UNCTAD's NTM data cover 100 economies,[4] representing 90 per cent of global trade. Figure 1 illustrates the current coverage.

Data is presented for the "years of data collection" carried out in each country. Data were collected in multiple years for some, such as Latin American countries, the European Union, Canada and the United States. For some countries, there are limited years available. For example, all Association of South East Asian Nations members have only two years of data collection: 2015 and 2018.

Each time data are collected for a country, all the NTMs in force at that point are registered in the database. Naturally, some of the regulations in force may be recent, while others may have been in force for many years. The date of implementation of the NTM is also registered. Table 1 shows the data availability.

Figure 1: Data availability of NTM data: Coverage



3 See UNCTAD (2017), Section 5, for more details.
4 Counting the European Union as one.

Table 1: Availability of NTM data: Years of data collection

Code	Country or customs territory	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
AFG	Afghanistan			×							
DZA	Algeria							×			
ATG	Antigua and Barbuda							×			
ARG	Argentina			×	×	×	×	×	×	×	×
ARM	Armenia										×
AUS	Australia						×	×			
AZE	Azerbaijan										×
BHS	Bahamas						×				
BHR	Bahrain, Kingdom of						×				
BGD	Bangladesh								×		
BRB	Barbados						×				
BLR	Belarus								×		
BEN	Benin					×					
BOL	Bolivia, Plurinational State of			×	×	×	×	×	×	×	×
BWA	Botswana								×		
BRA	Brazil			×	×	×	×	×	×	×	×
BRN	Brunei Darussalam						×			×	
BFA	Burkina Faso			×							
CPV	Cabo Verde					×					
KHM	Cambodia						×			×	
CMR	Cameroon						×				
CAN	Canada						×		×	×	×
CHL	Chile			×	×	×	×	×	×	×	×
CHN	China							×			
COL	Colombia			×	×	×	×	×	×	×	×
CRI	Costa Rica					×	×	×	×	×	×
CIV	Côte d'Ivoire			×							×
CUB	Cuba			×	×	×	×	×	×	×	×
DMA	Dominica						×				
ECU	Ecuador			×	×	×	×	×	×	×	×
SLV	El Salvador					×	×	×	×	×	×
ETH	Ethiopia						×				
EUN	European Union	×	×	×	×	×	×	×		×	×
GMB	The Gambia				×						
GHA	Ghana					×					
GRD	Grenada						×				
GTM	Guatemala					×	×	×	×	×	×
GIN	Guinea			×							
GUY	Guyana						×				
HND	Honduras					×	×	×	×	×	×
HKG	Hong Kong, China							×			
IND	India								×		
IDN	Indonesia						×			×	
ISR	Israel							×			
JAM	Jamaica						×				
JPN	Japan						×	×			
JOR	Jordan							×			
KAZ	Kazakhstan								×		

Table 1: Availability of NTM data: Years of data collection (continuation)

Code	Country or customs territory	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
KOR	Korea, Republic of							×			
KWT	Kuwait, the State of						×				
KGZ	Kyrgyz Republic								×		
LAO	Lao People's Democratic Republic						×			×	
LBN	Lebanese Republic							×			
LBR	Liberia					×					
MYS	Malaysia						×			×	
MLI	Mali					×					
MRT	Mauritania						×				
MUS	Mauritius								×		
MEX	Mexico			×	×	×	×	×	×	×	
MAR	Morocco							×			
MMR	Myanmar						×			×	
NPL	Nepal			×							
NZL	New Zealand						×	×			
NIC	Nicaragua					×	×	×	×	×	×
NER	Niger					×					
NGA	Nigeria				×						
OMN	Oman						×				
PAK	Pakistan							×			
PSE	Palestine					×					
PAN	Panama					×	×	×	×	×	×
PNG	Papua New Guinea							×			
PRY	Paraguay			×	×	×	×	×	×	×	×
PER	Peru			×	×	×	×	×	×	×	×
PHL	Philippines						×			×	
QAT	Qatar							×			
RUS	Russian Federation							×			
SAU	Saudi Arabia, Kingdom of							×			
SEN	Senegal			×							
SGP	Singapore						×			×	
LKA	Sri Lanka							×			
SUR	Suriname						×				
CHE	Switzerland						×				
TJK	Tajikistan						×			×	
THA	Thailand						×			×	
TGO	Togo					×					
TTO	Trinidad and Tobago						×				
TUN	Tunisia							×			
TUR	Turkey							×			
ARE	United Arab Emirates						×				×
USA	United States of America					×			×	×	×
URY	Uruguay			×	×	×	×	×	×	×	×
VEN	Venezuela, Bolivarian Republic of			×	×	×	×	×	×	×	×
VNM	Viet Nam						×			×	
ZWE	Zimbabwe								×		

Source. Authors based on TRAINS.

The NTM data are made available through the following three portals:

i. Trade Analysis Information System (TRAINS) at trainsonline.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 can bulk-download a STATA dataset with additional variables that is available upon request.

ii. World Integrated Trade Solution (WITS) at wits.worldbank.org: WITS integrates TRAINS with other trade-related databases, such as United Nations COMTRADE, the WTO's Integrated Data Base (IDB) and the WTO's 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.

iii. Global Trade Helpdesk

The data made available for statistical use are in STATA format, with the analysis based on the unique combination of the variables below.

i. Reporter country enforcing the NTM

ii. Partner country

iii. Product at HS6 level

iv. NTM code at the maximum level of disaggregation (four digits)

v. Year of data collection

This special topic focuses on cross-sectional data. Specifically, it focuses on the latest information available for countries in which data were collected, providing a snapshot of NTM regulation in each of these countries at the time of data collection.

Use of NTMs

The TRAINS NTM database can be used to produce statistics on the use of NTMs. Three basic indicators - frequency index, coverage ratio, and prevalence score - reveal the use of NTMs as policy instruments. They provide information on how often a country uses NTMs, the most common NTM types, and the nature of the most regulated sectors.

The data indicate the incidence and variety of NTMs used as policy tools. They do not reveal how much NTMs would cost to exporters and importers, nor if they restrict or enhance trade, and by how much. In some cases, NTMs could facilitate trade, especially when the requirement has been complied with already.

A joint UNCTAD and World Bank publication (UNCTAD, 2018) observed that developed countries tend to have deeper levels of regulation, covering more sectors and with a higher number of NTMs. The objective may be to ensure consumer safety or product quality. Chapters A and B, which cover SPS and TBT measures, are used more frequently by developed countries. Less developed countries may not have any regulations indicated in these areas as some sectors might not be well regulated.

As well as revealing the policy tools in place by country, the data reveal which sectors are more or less regulated, and with which type of policy tool. Comparison of data between countries may be particularly useful when considering regional integration or market access issues. Major regulatory differences between trading partners may add difficulties for traders.

Finally, data may be used to test hypotheses in economic models and to indicate the possible impact of NTMs on trade. The data may also be used for other development or welfare analysis.

Range of indicators

The "Frequency Index" and "Coverage Ratio" are the two basic indicators used to measure the pervasiveness of NTMs in an economy. They are based on variables that take into account the presence or absence of a measure on a certain product. A third indicator, the "Prevalence Score" (sometimes called the Intensity Index) looks into the use of a certain type of measure, i.e. the number of NTMs for a given product, the average number across a group of products, or the average number of NTMs for a given country.

- The **Frequency Index is essentially the percentage of products affected** by one or more NTMs .[5]
- The **Coverage Ratio is the share of trade subject to NTMs**. This index is also a ratio, but trade weighted.[6]
- **The Prevalence Score is an average of how many measures apply to a given product group.** It can be used, for example, to indicate which group of products is affected by the largest number of NTMs on average. For instance, it can reveal if agricultural products are affected more than industrial products, or to compare the average number of measures among various countries.

5 The frequency index is computed using the products that are effectively traded within the country, i.e., FI is the share of those imported products that have to face at least one NTM.

6 Usually, the Coverage Ratio is computed using the average trade value for the last three years (bilateral and by HS6), so that there would be less zero values. This is relevant because this indicator uses traded products only.

Results and policy conclusions

Figure 2 presents the average results for all the countries in the data set for 2019, or the latest year available in Table 1[7], for import NTMs and export NTMs. Import NTMs are conditions or requirements for import into the country whereas export NTMs are regulations affecting the country's own exports, e.g. obtaining a permit before exporting a chemical product.

Almost 60 per cent of the imported products in the world need to comply with at least one NTM (first light red bar). This represents almost 80 per cent of the value of these imported goods (first red bar). Every imported product needs to comply with more than three NTMs, on average (first green diamond). Almost half of exported products need to comply with 1.3 NTMs, on average.

Figure 3 shows that developed countries have on average over four NTMs on each traded product. This affects around 80 per cent of trade. Developing countries and least developed countries (LDCs) have between two and three NTMs. Half of the regulations that affect exports are more prevalent in developing countries and LDCs than in developed countries, both in terms of trade coverage and in the number of NTMs in place.

Figure 4 shows NTMs by sector. In general, animal, vegetable and food products are highly regulated, with most of these products traded with at least one specific regulation. The intensity of regulations is also high for these products. They have on average 12 NTMs each.

Chemicals, textiles, vehicles, machinery and leather are also highly regulated sectors. A total of around 60 per cent of these products, representing 80 per cent of the imports in these sectors, need to comply with two to three NTMs. The indicators are lower for exports. Each animal, vegetable or food product that is exported has to comply with about two to three NTMs as a requirement from the exporter's own government.

Figure 2: Global results

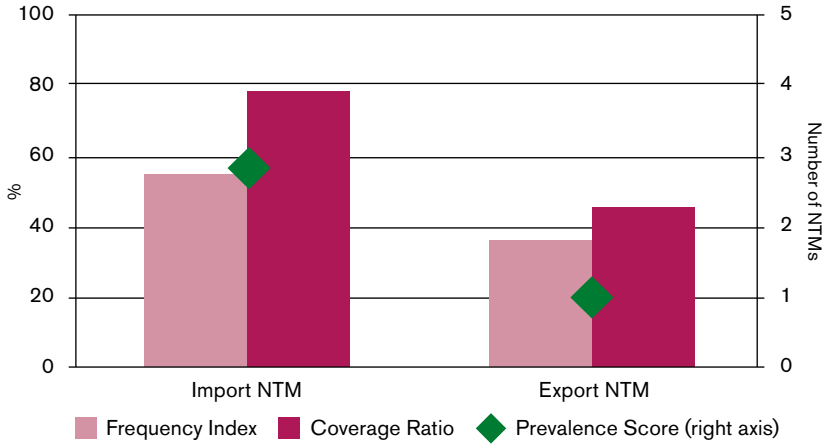
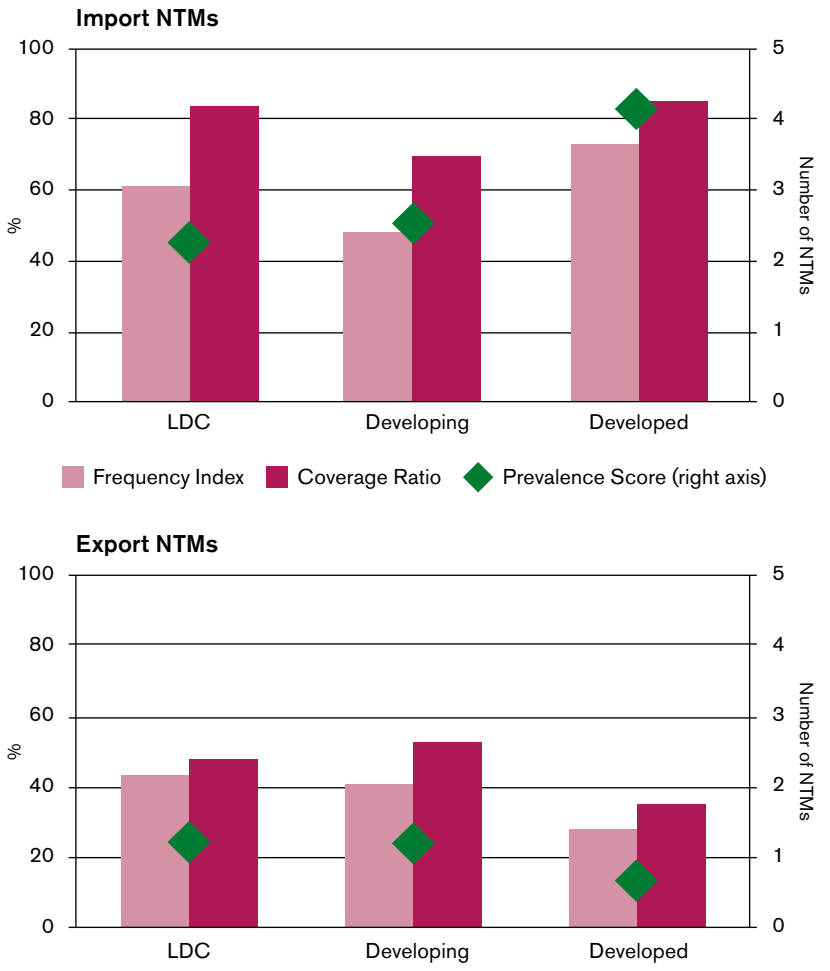
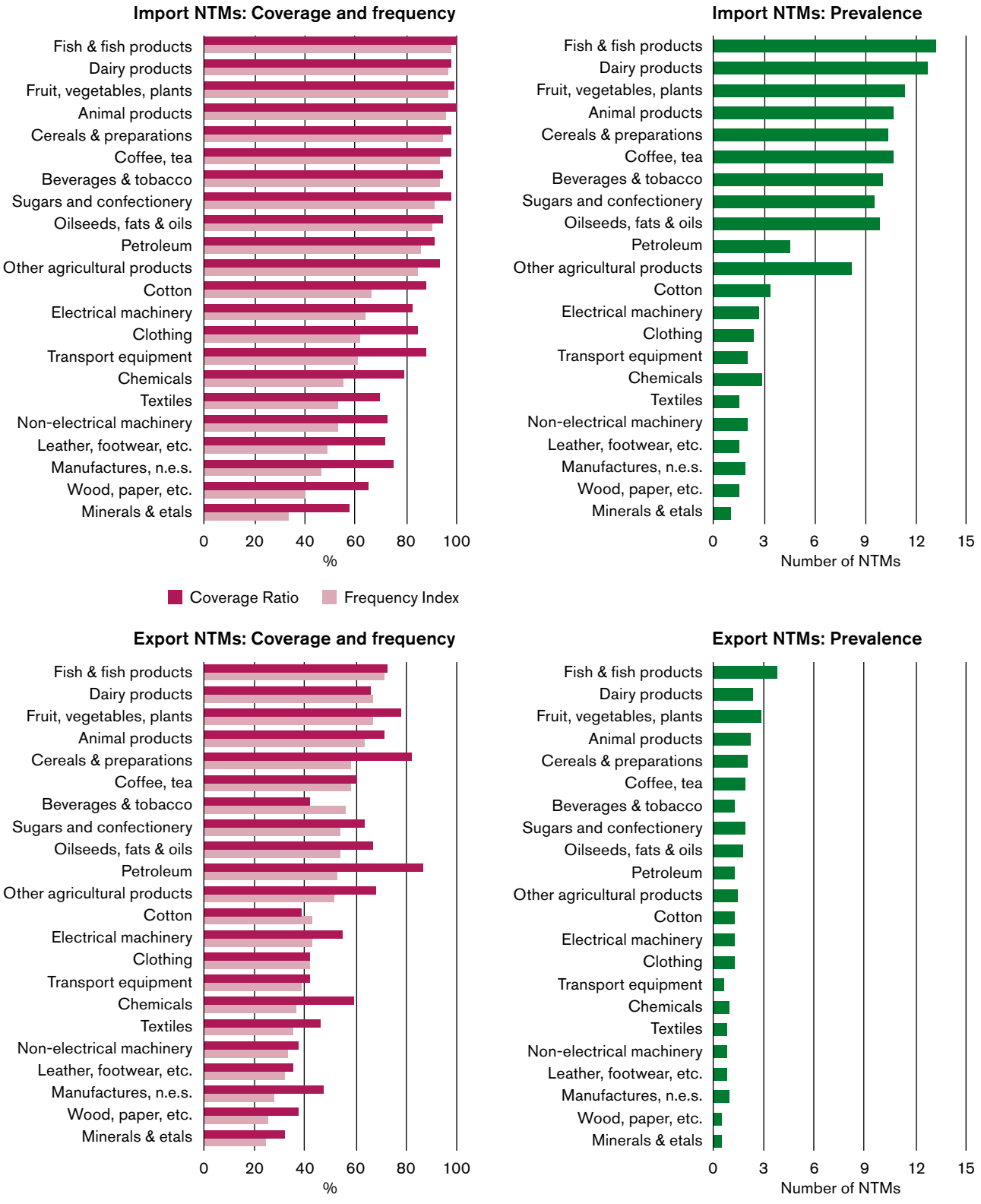


Figure 3: NTM indicators, by development status



7 Indicators for Grenada, Liberia and Tajikistan were not estimated as the corresponding trade information was not available.

Figure 4: NTM indicators, by sector



Download the data:
www.wto.org/statistics

Figure 5 provides information by region and sector group. Developed countries regulate more intensively the agri-food sector and manufactured products compared with developing countries and LDCs. While LDCs have, on average, seven NTMs for each imported agri-food product, developed countries have 13.

Figure 6 displays NTM indicators by country or territory. The indicators are calculated as a share of imported products. The frequency index and coverage ratio can be easily compared because both use the same set of products for each country.

Some developing countries have a very large share of their imported products affected by NTMs. Apart from the cost for traders to comply with regulations, there is also the added cost of bureaucracy. UNCTAD provides a toolkit to analyse the cost and effectiveness of the NTMs in place. The cost effectiveness toolkit implements surveys and in-depth interviews. Recommendations are then provided to streamline the regulatory framework and strengthen policy objectives in the areas of safety, security, and health while avoiding unnecessary cost and burdens to business.

For some countries, the frequency index is low, meaning that only a few of the imported products are affected by NTMs. For those countries, the prevalence score may also be low. This means that there are very few measures imposed on few products. However, the coverage ratio does not normally go below 25 per cent of the value of the country's imports.

Figure 5: NTM indicators, by development status and sector group

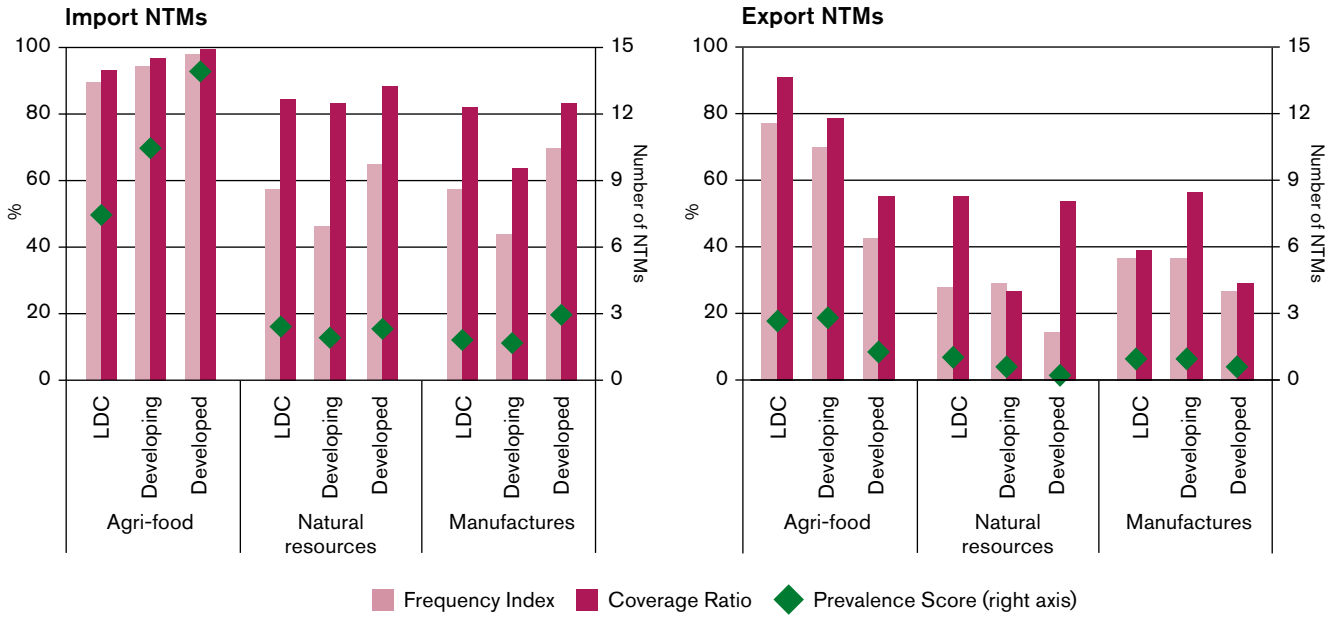


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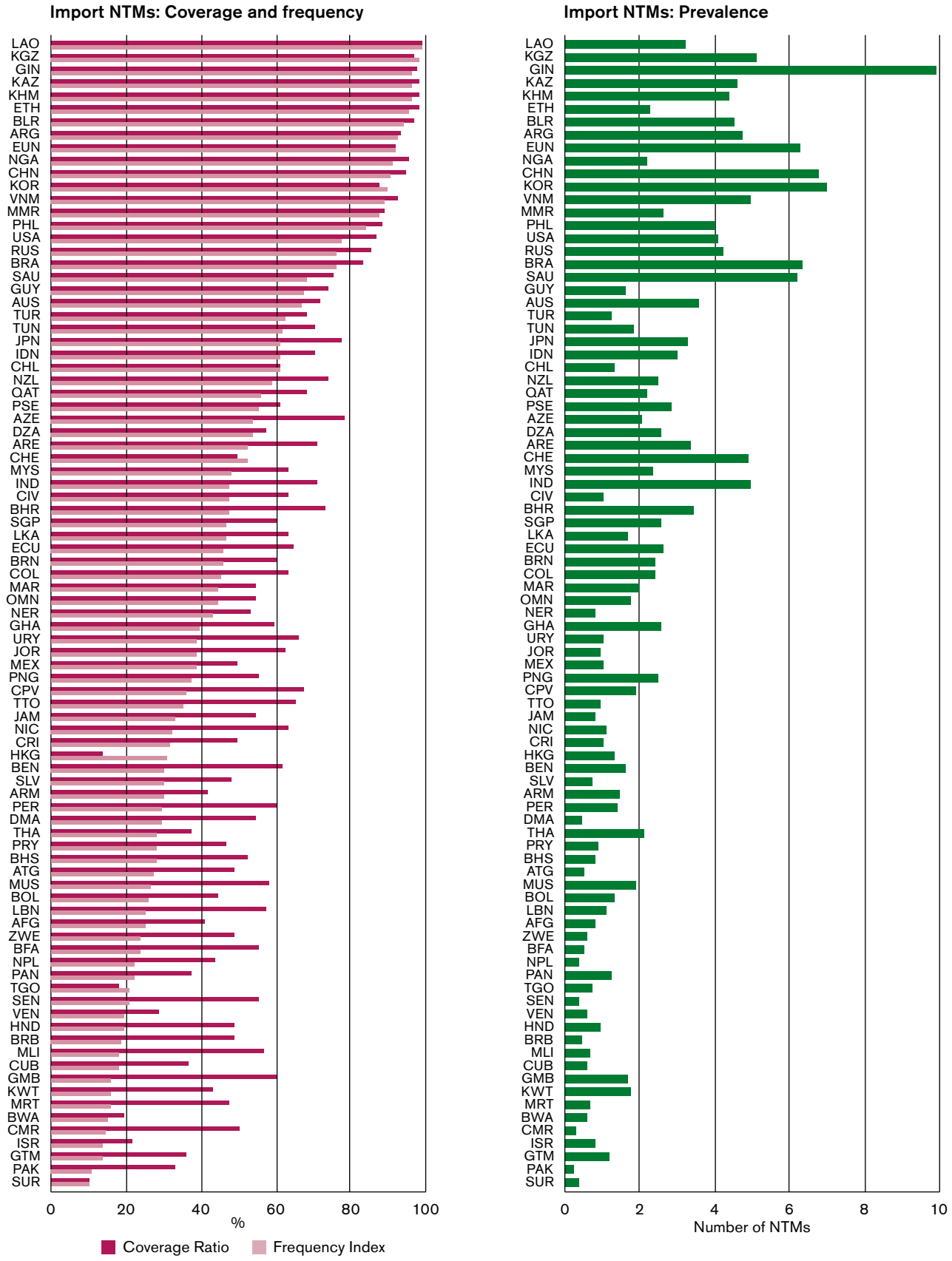
Figure 6: NTM indicators, by country or customs territory*



* Note: For full country name, please refer to Table 1.

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Figure 7: NTM indicators, by type of measure

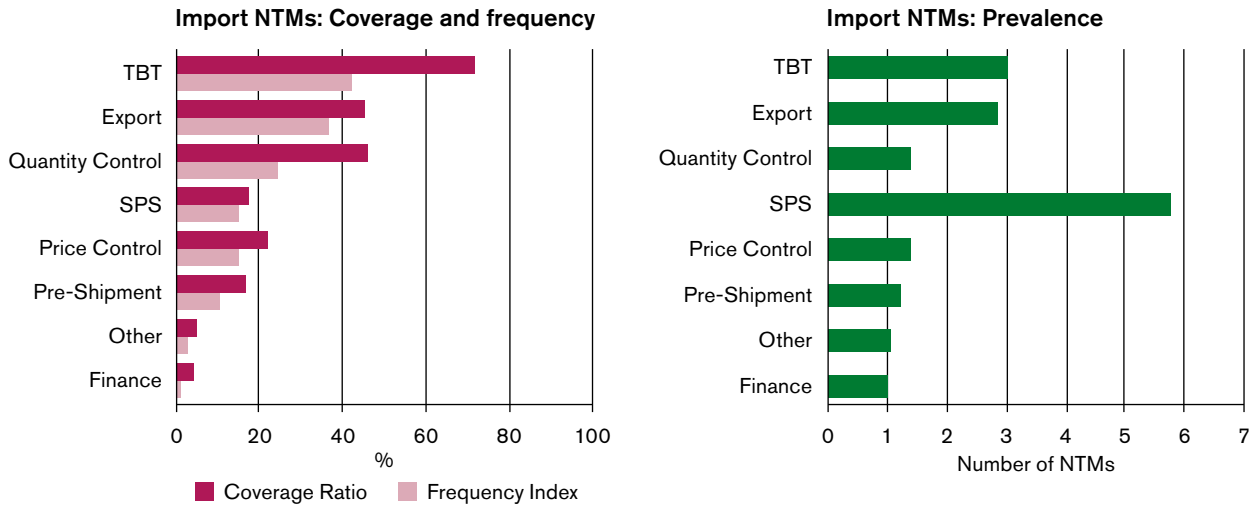

Figure 8: NTM indicators, by sector groups and type of NTM

Figure 9: NTM indicators, by development status and type of NTM

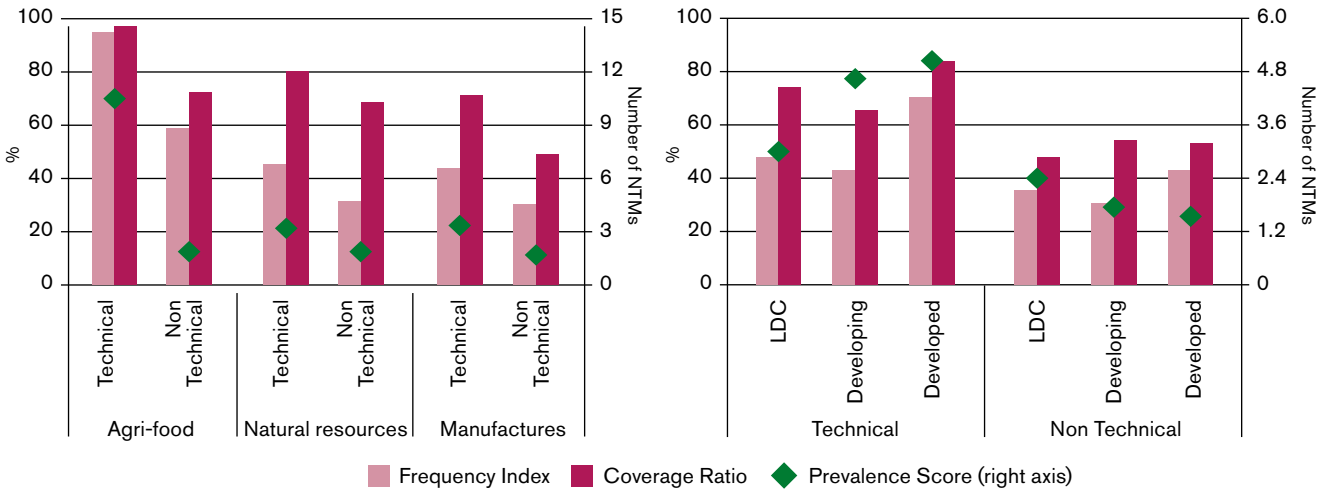

Figure 7 shows use of NTMs by type of measure. More than 40 per cent of the imported products in the world have to comply with at least one TBT measure, which represents more than 70 per cent of imports in 2019. A quarter of the imports in the world have to comply with requirements for licences, quotas or other quantity control measures. This represents half of the value of total imports. The share of SPS NTMs, which mostly concern food and agriculture products, is lower, at around 20 per cent of the global value of imports. However, SPS has the highest value in terms of the prevalence score. Each imported product needs to comply with an average of almost six SPS measures, as opposed to three TBT NTMs on average.

SPS, TBT and pre-shipment inspection constitute "technical measures" while the other NTMs are considered to be non-technical. Figures 8 and 9 show that for all three sector groups, and for all three levels of development, technical measures are more widespread than non-technical measures. Unsurprisingly, the agri-food sector has the highest level of technical measures. Developing countries impose a higher number of technical measures compared with developed countries but the values are similar, i.e. developed countries impose 4.8 technical NTMs on every product while developing countries impose 5.2 on average.[8]

For non-technical measures, LDCs impose the highest number, i.e. 2.3 measures on every product on average.

8 The Kingdom of Bahrain, the State of Kuwait, the Kingdom of Saudi Arabia, China, the Republic of Korea, Guatemala, India, Mauritius, Brazil and Thailand have the highest number of technical measures. Data is from 2015 or 2016 for the first five countries listed above.

Download the data:
www.wto.org/statistics

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Annex

Frequency Index

The **Frequency Index (FI) is essentially the percentage of products affected** by one or more NTMs. More formally,

$$F_i = \frac{\sum D_s M_s}{\sum M_s} . 100$$

The Frequency Index is a ratio calculated using two dummy variables in the numerator: D_s, the presence (or absence) of an NTM on the product, and the M_s, which equals to 1 for every (traded) product. The sum in the numerator is the total "affected" products, and the denominator is the sum of all products; the Frequency Index is simply the ratio between them.[9]

Coverage Ratio

The trade **Coverage Ratio (CR), is the share of trade subject to NTMs**. It can also be computed for a country, or for a region, or a group of products. This Index is also a ratio, but trade weighted. Trade value is represented by V_s. The numerator captures the sum of the import (export) value of those traded products that are affected by an import (export) NTM. It is then divided by the total value of imports (exports).

$$C_i = \frac{\sum D_s V_s}{\sum V_s} .100$$

Usually, Coverage Ratio is computed using the average trade value for the last three years (bilateral and by HS6), so that there would be less zero values. This is relevant because this indicator uses traded products only.

Prevalence Score

The **Prevalence Score (PS) is an average of how many measures apply to a given product group**. It can be used, for example, to tell what group of products is affected by the largest number of NTMs on average. For instance, it can be computed to see if agricultural products are affected by more measures, compared with industrial products, or to compare the average number of measures among different countries.

The formula is similar to the previous cases; D_s is defined above, N_s is the number of NTMs on product s, and M_s is the total number of products (those with and without NTMs).[10]

$$P_i = \frac{\sum D_s N_s}{\sum M_s}$$

9 This simplified formula does not show that it also has a bilateral dimension, but the same principle applies. The products-partners affected in the numerator will equal 1, and all products-partners will count in the denominator.

10 This simplified formula does not show that it also has a bilateral dimension, but the same principle applies. In practical terms, it is double sum. If data are set for the triple "reporter-hs6-partner", the Prevalence Score is the simple mean of the variable that presents the number of distinct codes for each row, considering the traded lines (rows with positive import values only).