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Characterising Non-tariff Trade Policy

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Abstract

Starting in the 1960s with the Kennedy Round of the General Agreement on Tariffs and Trade (GATT), non-tariff measures (NTMs) have been replacing tariffs continuously as the core element of trade negotiations. Today they take centre stage in all EU trade agreements with industrialised and emerging economies. By matching product codes to the rich data of NTM notifications to the World Trade Organization and complementary information provided by the Temporary Trade Barriers Database, we provide a valuable open data source for trade policy analysis. Using data for 148 NTM-imposing economies for the period 1995-2019, we describe the evolution of different types of NTMs along countries and sectors, with a special focus on NTMs implemented by the EU. The analysis of our data, paired with comparisons with other sources, shows the merits and shortcomings of the WTO's service in providing transparency over members' trade policies.

Keywords: non-tariff measures, trade policy, trade barriers, database, open data, WTO, I-TIP, TTBD

JEL classification: F13, F14, F68, O24

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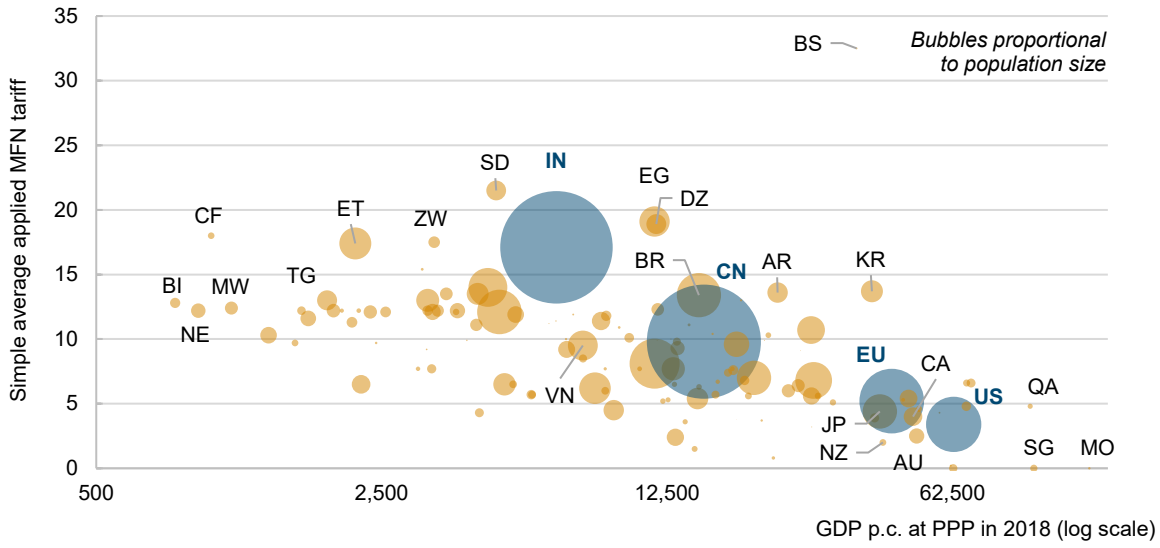
1. Introduction: Visible shifts in trade policy

The world is interconnected as it has never been before. Nowadays, production networks for a single commodity can span dozens of countries. Tariffs for manufactured goods have fallen to historical lows. Hence, deep trade agreements and non-tariff measures (NTMs) have been taking centre stage in the policy debates of industrialised countries at both the multilateral and the bilateral level.

Since the onset of negotiations of the Comprehensive Economic and Trade Agreement (CETA) in 2009 between Canada and the European Union, and even more so with the start of negotiations of the Transatlantic Trade and Investment Partnership (TTIP) in 2013 between the United States and the EU, trade policy has advanced to become an issue of general public interest in Europe.

In 2017 CETA started to apply provisionally, while TTIP was put on ice. Until that year the importance of tariffs as trade policy tools had been decreasing because tariff rates for non-agricultural goods had already declined considerably. With the US administration of President Trump taking office, tariffs experienced an unexpectedly strong comeback. However, taking a longer-term perspective, they are still relatively low. This is particularly true for trade between industrialised countries such as the US and the EU, including many economies with which the EU has recently established deep free-trade agreements (e.g. Canada, Japan, Singapore) or is currently concluding/negotiating such agreements (e.g. Australia and New Zealand). (See Figure 1.)

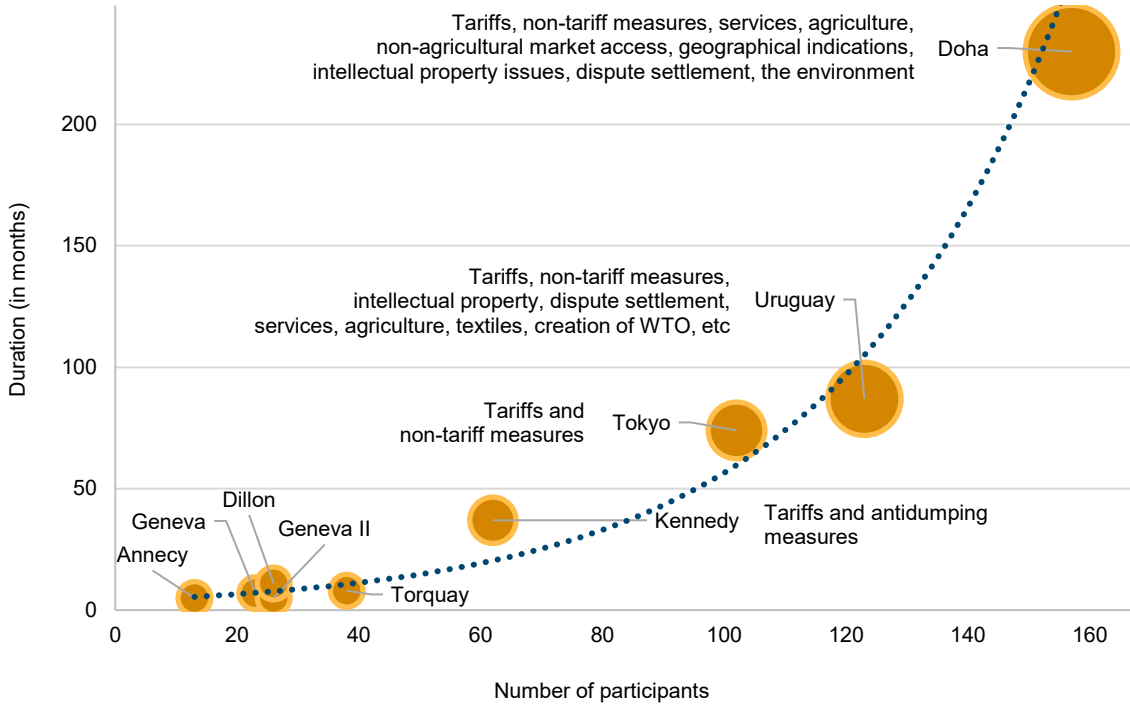
Figure 1 / Applied MFN tariffs in 2018



Note: MFN = Most-favoured nation tariffs applying to all WTO members. ISO2 country codes.
Sources: WTO World Tariff Profiles 2019; World Bank World Development Indicators (Population and GDP p.c. at PPP). Authors' visualisation.

At the same time the number of different types of non-tariff measures being applied is on the rise. Antidumping measures aimed at combating aggressive price dumping were the first type of NTMs being negotiated at the multilateral level during the Kennedy Round of the General Agreement on Tariffs and Trade (GATT) in the 1960s. During the Tokyo Round of the 1970s NTMs already covered countervailing measures against subsidies, import licensing procedures and technical barriers to trade in addition to antidumping (Figure 2). Today, NTMs encompass a wide range of trade policy instruments: from geographical indications for agri-food products to labelling requirements for electronic devices, limits of pesticide residues on imported fruits, and duties to counteract price dumping or subsidised exports. The spectrum is becoming larger, and the number of countries taking part in multilateral negotiations on NTMs (Figure 2) is rising as well. Additionally, the number of countries using these instruments is increasing, as is the frequency with which they are applied.

Figure 2 / NTMs in GATT/WTO negotiation rounds



Sources: WTO (2001); WTO (2020a). Authors' visualisation.

Economists and political scientists can hardly keep up with the growing number of related questions. Some investigate whether these relatively new forms of trade policy tools might serve as substitutes for previously negotiated tariff cuts. Beverelli et al. (2014) find evidence of policy substitution effects between tariffs and standard-like NTMs occurring when the costs of meeting a product standard are relatively low and where the "tariff water" is shallow – i.e. the existing space for tariff variations is narrow. Aisbett and Pearson (2012) show that decreases in bound tariff rates increase the probability of new sanitary and phytosanitary (SPS) measures. However, demographic, governance and environmental determinants appear to be even more important. Recent work by Aisbett and Silberberger (2020) suggests that trade pressures from trade liberalisation encourage divergence in product standards across countries: WTO members with already-high rates of SPS notifications seem to follow a race to the top after tariff liberalisation, while other economies

lower their notification rates significantly. Focusing on applied tariffs and antidumping, Moore and Zanardi (2011) find evidence of substitution effects for heavy users of this instrument among developing countries, as well as evidence of retaliation and deflection effects as determinants of antidumping measures.

In addition, recent studies on the potential implications of politically hot topics, such the United Kingdom leaving the EU (Brexit), indicate that trade effects as well as welfare effects are to an overwhelming extent attributable to changes in NTMs (Dhingra et al., 2017; Aichele and Felbermayr, 2015). In a study for the European Parliament, Emerson et al. (2017) argue that the exit of the UK from the EU Customs Union would increase the trade costs related to non-tariff tariff measures by about 3%, thereby discouraging cross-country production and supply networks.

In general, trade economists argue for the elimination of unnecessary barriers to trade and consequently for a reduction, harmonisation or mutual recognition of NTMs (e.g. Cadot et al., 2015; Baldwin and Evenett, 2009). However, economists are divided over the extent to which NTMs should be on the negotiation table in bilateral and plurilateral trade agreements, as these policy tools often serve primarily purposes that are superordinate to commerce, such as the protection of human, animal and plant life, and might reflect consumer preferences (e.g. Rodrik, 2018; Grübler and Stöllinger, 2018; Aisbett and Pearson, 2012; Sawyer et al., 2008). By their nature, therefore, NTMs cannot be easily compared to or treated like tariffs.

Economic scholars have started to acknowledge that non-tariff *measures* need not be non-tariff *barriers* (NTBs). For some types of NTMs, such as quotas and prohibitions, the effect on bilateral trade is indisputably disrupting. Yet other NTM types, such as SPS measures, have the potential of quality upgrading, which could boost trade. Likewise, some technical barriers to trade (TBTs), such as labelling requirements, provide additional information to consumers, potentially shaping consumption patterns and increasing trust, which might be trade-promoting. These effects may differ by country and sector.

For example, Bao and Qiu (2010) find trade-restricting effects of Chinese TBTs for the agricultural sector, but trade-promoting impacts for manufacturing goods. Bratt (2017), in his estimates of bilateral ad-valorem equivalents of NTMs, finds both positive and negative effects on trade flows for the same NTM across exporters. Exporting countries with higher incomes are better placed to address the adverse effects of NTMs. More trade-restricting NTMs are found for lower-income countries, potentially owing to their more frequent use of bans (Czaga, 2004).

The World Trade Report (WTO, 2012), which was dedicated to NTMs, concluded that these measures could increase international trade whenever the positive effect on the demand side is bigger than the negative impact on the supply side.

The essence of empirical economic policy analysis is the availability and quality of underlying data. This paper introduces a rich, open-access dataset covering a variety of different types of NTMs between the mid-1990s and today.[1] The basis of our investigation constitutes a data compilation of NTM notifications to the WTO, accessible via the Integrated Trade Intelligence Portal (I-TIP).[2] A shortcoming of this extensive data source 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

[1] The wiiw NTM Data is publicly available at: https://wiiw.ac.at/opendata.html.

[2] WTO I-TIP database online: https://www.wto.org/english/res_e/statis_e/itip_e.htm

Harmonised System (HS). We enhance the utility of the WTO I-TIP database for econometric analysis of NTM notifications by imputing missing product codes at the HS 6-digit level. The underlying work builds upon extensive data work conducted at wiiw (Ghodsi et al., 2017).[3]

The remainder of this paper is structured as follows. Section 2 describes the information on NTMs available to us, highlighting most recent notifications with a focus on the EU. It further explains the procedure for matching HS codes to WTO notifications. Section 3 presents the data at hand along country and product categories, drawing parallels with other data sources. Further information on the number of notifications per country and NTM type as well as keywords associated with SPS and TBT measures can be found in the Appendix.

[3] 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.

2. Making use of a new NTM dataset

Despite the growing importance of non-tariff measures in international trade, data on different types of non-tariff measures usable for econometric analysis are rather scarce. Many researchers set up their own NTM datasets to answer their research questions for specific products, NTM types and countries (e.g. Li and Beghin, 2014; Peterson et al., 2013).

Antidumping measures were one of the first types of NTMs for which a comprehensive database covering a wide range of countries and products traceable over time was collected. The database compiled by Chad Bown (2007), which initially contained only antidumping measures, later also included other non-tariff trade barriers. This data collection was published as the Temporary Trade Barriers Database (TTBD) by the World Bank (Bown, 2016).

In 2006 a Multi-Agency Support Team (MAST)[4] was established to develop clear definitions and a classification system of NTMs, providing guidelines for the efficient collection and use of NTM data. It is composed of multiple organisations: the Food and Agriculture Organization of the United Nations (FAO), the International Monetary Fund (IMF), the International Trade Centre (ITC), the Organisation for Economic Cooperation and Development (OECD), the UN Industrial development Organisation (UNIDO), the UN Conference on Trade and Development (UNCTAD), the World Bank and, last but not least, the WTO.

Further multi-country datasets covering different NTM types emerged with the global economic and financial crisis, during which a revival of beggar-thy-neighbour policies with downward trade spirals were feared. These include the NTM-MAP dataset by the Centre d'Études Prospectives et d'Informations Internationales (CEPII) for the period 2009-2015 for 72 economies (Gourdon, 2014) based on UNCTAD's Trade Analysis Information System (TRAINS). The latter has been extended to more NTMs covering the period 2010-2018 (UNCTAD, 2017; updated). In addition, the Global Trade Alert (GTA) by the Centre for Economic Policy Research (CEPR) started in 2009. It is regularly updated and covers a total of 185 economies, with detailed analysis for the G20 (Evenett and Fritz, 2019).

Collaboration efforts also fed into the WTO's I-TIP, serving as a platform for information on trade policy measures. We focus on the subsection I-TIP Goods, which provides all information on NTMs notified to the WTO that apply to merchandise trade. For the sake of simplicity we will henceforth refer to this subsection as the I-TIP database. We complemented the data of the I-TIP with non-duplicate measures available in the TTBD.

In the following two subsections we describe the NTM types featuring in our dataset, exemplified by applications by the EU and our work in transforming and complementing these rich data with matched 6-digit product codes of the Harmonised System (HS) to make it useable for detailed econometric panel data analysis.

[4] See https://unctad.org/en/Pages/DITC/Trade-Analysis/Non-Tariff-Measures/MAST-Group-on-NTMs.aspx

2.1. NTM TYPES UNDER EXAMINATION AND APPLIED BY THE EU

We retrieved information on more than 60,000 notifications of ten forms of NTMs and two types of specific trade concerns notified by WTO members over the period 1995-2019, corresponding to six categories of the UNCTAD NTM classification.[5] UNCTAD (2019) distinguishes 16 types of NTMs, of which 15 are targeting imports.[6]

Technical (standard-like) NTMs constitute the bulk of NTMs

Public debates on NTMs and consumers' concerns tend to centre mainly on two forms of standard-like NTMs, also referred to as technical NTMs: (1) sanitary and phytosanitary (SPS) measures, which primarily target the agri-food sector, and (2) technical barriers to trade (TBTs), which are aimed largely at the manufacturing sector. The literature on the impact of these measures is growing fast, mainly with a focus on one specific product and/or region (e.g. Arita et al., 2017; Dal Bianco et al., 2016; Gelan and Omore, 2014; Peterson et al., 2013). These two types of NTMs are notified most frequently to the WTO, but they are by their nature not necessarily the most trade-restrictive measures.

(i) SPS measures are aimed at protecting human, animal and plant life and can take different forms. If products or characteristics thereof pose a threat to human, animal or plant health, countries can impose temporary prohibitions or restrictions, e.g. in the case of areas affected by avian flu. They can also take the form of standards, e.g. tolerance limits for residues of substances on foodstuff, labelling or hygienic requirements related to food safety. For example, the EU sets for all trading partners alike maximum levels of inorganic arsenic in rice and some derived food commodities[7] and reviews existing maximum levels for lead in a variety of food commodities.[8]

Notifications may also concern the easing of measures. The EU takes measures to prevent the spread of transmissible diseases, such as spongiform encephalopathies (TSEs); these were amended e.g. in 2015, exempting specific types of ovine embryos from any classical requirements related to the disease scrapie.[9] The last non-emergency SPS measures of the EU in our data, which were applied to all partner countries, were initiated in December 2019. They related to animal health requirements for products originating in the EU and returning to the EU after refusal of entry by a third country,[10] and the lowering of maximum residue limits (MRLs) for the pesticides chlorpyrifos and chlorpyrifos-methyl based on the findings of the human health assessment published by the European Food Safety Authority (EFSA).[11]

Examples of *bilateral* SPS measures imposed by the EU include temporary emergency measures, such as the import bans on dried beans from Nigeria owing to pesticide residues at levels exceeding the reference

5 A detailed classification of types of NTMs, including examples, is provided by UNCTAD (2019): https://unctad.org/en/pages/PublicationWebflyer.aspx?publicationid=2516

6 In early 2020 export-side measures received attention as the global spread of the new coronavirus and the related respiratory disease COVID-19 resulted in unexpected shortages of personal protective equipment, which prompted export restrictions – even within the European Single Market. However, over the years the great majority of NTMs have addressed imports. For a brief discussion see Box 1.

7 WTO document: G/SPS/N/EU/120, G/SPS/N/EU/120/Add.1

8 WTO document: G/SPS/N/EU/121, G/SPS/N/EU/121/Add.1

9 WTO document: G/SPS/N/EU/67

10 WTO document: G/SPS/N/EU/361

11 WTO document: G/SPS/N/EU/360

dose as stated by the EFSA,[12] or on certain vegetable products originating from Ghana in order to prevent the introduction and spread of harmful organisms within the EU.[13] The last bilateral emergency measure in our dataset was imposed in November 2019 against Canada, India and the US to prevent the introduction of the Rose Rosette Virus through the import of roses.[14] The most recently implemented regular (i.e. non-emergency) bilateral SPS measure of the EU in our dataset refers to the regularly amended list of feed and food of non-animal origin subject to more frequent official controls on imports. As of mid-2019 it additionally included e.g. jackfruit from Malaysia, peanuts from the US and apricot kernels from Turkey, as well as modifications of control frequencies for other products and trading partners.[15]

Both regular and emergency SPS measures can therefore address specific products and exporting countries, or a variety of product groups and multiple (or all) trading partners at the same time. Overall, more than 30% of all NTM notifications in our dataset concern SPS measures (Figure 3).

(ii) Technical barriers to trade (TBTs) can take similar forms as SPS measures (prohibition, labelling requirements etc.), but they are nonetheless distinctly different. First, they serve a different purpose. An illustrative example is the EU's energy labelling requirement for storage cabinets (e.g. refrigerators). The stated aim of the EU is to direct the market towards more environmentally friendly products by providing more information to consumers.[16] Second, there are no emergency TBTs. Third, there are no bilateral TBTs – they apply to all trading partners. Fourth, while SPS measures mainly target the agri-food sector, TBTs typically address the manufacturing sector, especially machinery and electrical and electronic equipment.

Some recent examples of TBTs notified by the EU include the revision of technical specifications for the interoperability (TSI) of railway infrastructure, intended to improve international rail transport services and an EU-wide market for railway equipment and services.[17] In late 2019 the EU notified the adaptation of templates for approval procedures for two- or three-wheel vehicles and quadricycles according to emission standards Euro 5 and Euro 5+ for vehicles.[18]

The latest TBT notifications by the EU in our data were initiated in December 2019. One notification establishes explicit timeframes for companies' updates of registration dossiers within the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) Regulation, with the aim of improving legal clarity and practical enforceability.[19] TBTs may, however, also address agricultural and food products. The most recently initiated TBT by the EU in the agricultural sector specifies the documents that are necessary when an organic operator applies for a retroactive conversion of land parcels and technical specifications regarding the organic production of livestock, algae, aquaculture and authorised processed food and feed.[20]

Overall, TBTs represent the largest group of NTM notifications in our dataset, with a share of more than 40%.

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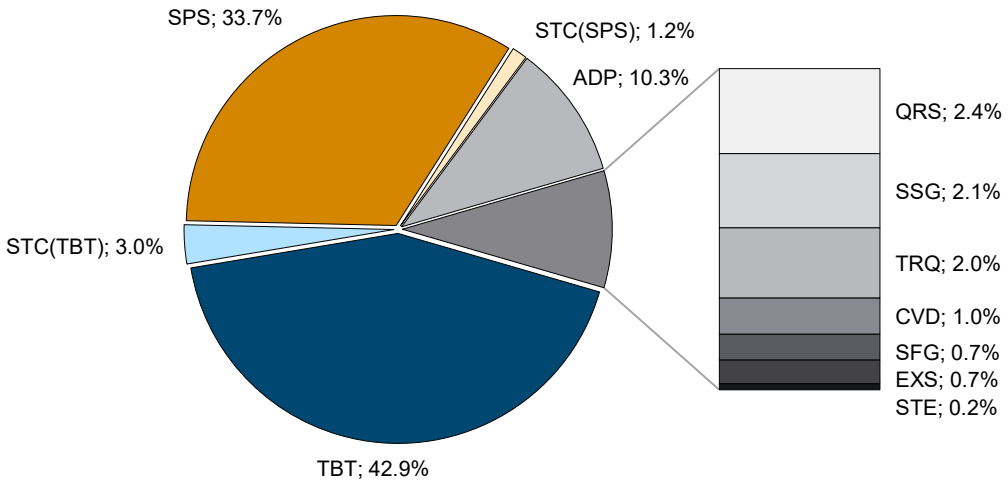
12 WTO document: G/SPS/N/EU/131
13 WTO document: G/SPS/N/EU/148
14 WTO document: G/SPS/N/EU/358
15 WTO document: G/SPS/N/EU/337
16 WTO document: G/TBT/N/EU/178
17 WTO document: G/TBT/N/EU/692
18 WTO document: G/TBT/N/EU/688
19 WTO document: G/TBT/N/EU/695
20 WTO document: G/TBT/N/EU/694

Figure 3 / NTMs by type, 1995-2019



Notes: Number of notifications to the WTO (I-TIP) entering into force or being initiated during Jan 1995-Dec 2019, complemented by non-duplicate measures retrieved from the Temporary Trade Barriers Database (TTBD).
Sources: wiiw NTM Data based on WTO I-TIP and TTBD. Authors' calculations.

Unfortunately, the information on SPS and TBT measures in force is not as extensive as the data on initiations. According to Article 7 and Annex B of the SPS Agreement of the WTO, members shall notify all SPS measures some time before becoming effective, such that (developing) WTO members can become acquainted. However, it further specifies that the notification process is needed whenever the SPS measure deviates from an international standard, guideline or recommendation and has trade implications for other member states (WTO, 2010). Therefore, countries are not obliged to notify final measures upon entry into force, the implementation of international standards, or regulations implemented before the establishment of the SPS Agreement (Bacchetta et al., 2012).

In part, SPS measures and TBTs which eventually apply and appear to have a strong impact on the exports of trading partners can be detected through specific trade concerns (STCs) raised at the SPS and TBT committees of the WTO. Members of the WTO can raise questions regarding other WTO members' proposed NTMs or their respective implementation. Our dataset covers 756 STCs against SPS measures and 1,940 STCs against TBTs.

STCs against SPS measures were highest in the early 2000s, with almost 100 concerns. Their absolute number per year remains relatively constant at around 30. Hence the share of concerns raised against measures notified has decreased significantly over the past years, to less than 2% since 2011. Concerns regarding trading partners' TBTs increased sharply in 2009. In 2011, 2014 and 2016 more than one in every ten TBTs was challenged by a specific trade concern.

Trade defence measures

The purpose of trade defence measures, also referred to as counteracting measures or contingent protection measures, is to temporarily thwart the negative impact from increased imports on the importing economy (e.g. resulting from increased tariff liberalisation).

Within this group, antidumping (ADP) is the most prominent trade policy tool, accounting for about 10% of all notifications in our dataset. In the event of predatory price dumping and proof of the damage to the domestic industry, the importing country can impose ADP duties, thereby increasing the import price and lowering imports. The difficulties of evaluating material injury to the domestic industry caused by aggressive *unfair* pricing of trading partners (and not merely happening simultaneously but independently of trading partners' policies) is one of the main reasons why the "system devised to eliminate the effects of dumping (i.e., antidumping) would itself become a problem" (Zanardi, 2006).

Investigations are summarised in semi-annual reports to the Committee on Anti-Dumping Practices. The latest information included in our data is the report covering the first six months of 2019, published in October that year.[21] The most recent ADP investigations of the EU cover glass-fibre products from Bahrain, China and Egypt, as well as steel road wheels from China. Provisional duties (31.9%-34%) were imposed on urea and ammonium nitrate exporters from Russia, the US and the small Caribbean island state Trinidad and Tobago. Final duties ranging between 10.3% and 83.6% were levied on e-bikes from China, where the normal value used for price comparison was based on EU prices.

Another practice that is considered *unfair* according to WTO norms is the subsidisation of exports. In this case, the counteracting measures are called countervailing duties (CVDs). It is much less frequently used than ADP, representing 1% of our data. Unfortunately, the approaches to determine the economic damage resulting from subsidies are almost as controversial as those for ADP. As noted by Bown and Meagher (2010) regarding the Mexican CVD case against the EU for olive oil, "the review by WTO Panels of trade-remedy measures remains an art in need of more science". It is self-evident that the problem becomes magnified when imported products are subject to simultaneous ADP and CVD investigations – see e.g. Spearot and Ahn (2016) on US measures against India levied on carbon steel. As the semi-annual report from the EU to the Committee on Subsidies and Countervailing Measures shows,[22] this was the case for the already mentioned glass-fibre fabrics from China and Egypt and e-bikes from China in 2019. Definitive duties (25%-33.4%) were imposed on biodiesel originating from Argentina.

Safeguard (SFG) measures are temporary policies that apply only to a specific product but to all exporters of this product in order to facilitate the importing economy to adjust to a sudden strong increase of imports. These measures represent 0.7% of notifications covered by our dataset.

The last safeguard measure in our data dates back to the year 2010. It was triggered by Belgium, which reported that imports of wireless wide area networking (WWAN) modems (including Wi-Fi routers) increased by more than 4,100 percentage points from 2006 to 2009, which was much stronger than EU production and consumption of these products (EC, 2010). The information was not retrieved from I-TIP but from TTBD. According to the 30th annual report from the Commission to the European Parliament on the EU's trade defence activities, this single safeguard investigation over the past ten years was terminated without the imposition of measures (EC, 2012).

The data do not yet cover the EU's first initiation of an SFG investigation since 2002, when the EU imposed an SFG on certain steel products in response to the introduction of a 25% import duty on steel products by

[21] WTO document: G/ADP/N/328/EU

[22] WTO document: G/SCM/N/349/EU

the US in March 2018 (EC, 2019). Duties were set in February 2019, reviewed in October and further amended following the economic downturn related to the spread of the new coronavirus (see Box 1).

Agricultural NTMs

The Agriculture Information Management System (AGIMS) is the source for I-TIP on notifications of special safeguards (SSGs), tariff-rate quotas (TRQs) and export subsidies (EXSs) affecting agricultural trade.

Special safeguards apply to agricultural products in response to a rise in imports or a fall of import prices without any necessary proof of injury. There are 39 WTO members, including the EU and five EU Member States, which have reserved the right to use special safeguard measures on a combined total of 6,156 tariff lines (WTO, 2002a). They are notified to the Committee on Agriculture under the header Market Access. They represent 2.1% of notifications in our dataset but are presumably under-represented, as the following case for the EU exemplifies. AGIMS has reported no EU volume-based SSG and only one price-based SSG. The latter refers to a notification in 1995, when the EU presented a list of tariff lines with respective trigger prices.[23] At the same time, the EU has delivered annual reports on the implementation of market access to the EU, listing products for which volume- or price-based measures have been invoked, stating that additional import measures may be imposed "if the import prices for the above-mentioned products fall below the trigger prices, which have been notified to the WTO (G/AG/N/EEC/2)" in 1995. The latest report was submitted in September 2019 for the implementation year 2018, laying down invoked price-based measures for poultry and eggs.[24] Hence, what can be found in the I-TIP database of the WTO is the basic notification in 1995 and not the varying application over time.

Similar issues arise, potentially more severely, for tariff-rate quotas, applied to 1,425 products by 43 WTO members (WTO, 2002b), for which annual reports on tariff-quota quantities and in-quota imports per tariff line are issued, while the WTO I-TIP database is restricted to the underlying regulations, which do not vary much (if at all) over time. In the case of the EU, the WTO I-TIP contains entries for the 87 product groups for which tariff-rate quotas had been agreed by 1995. In total, they constitute 1.9% of all recorded notifications in our data.

Export subsidies account for 0.7% of notifications in our dataset. In 2001, 25 out of 144 WTO members had export subsidy reduction commitments. During the years 1995-1999, 76%-100% of countries with subsidy reduction commitments but only 24-63% of countries without subsidy reduction obligations were submitting notifications to the WTO (2002c). The WTO I-TIP covers the 20 product groups for which the EU has export subsidy reduction commitments as of 1995, but not the variations in use over the years. For comparison, the GTA dataset reports 281 tariff-rate quotas and 2,671 export subsidies for the period 2009-2019.

NTMs restricting competition and quantities (market access)

NTMs affecting competition include state-trading enterprises (STEs). In contrast to what the name suggests, this type of NTM includes enterprises regardless of whether they are state-owned or state-controlled or not; the crucial criterion is whether the company receives exclusive rights or privileges that shape the level or direction of traded goods (UNCTAD, 2019). They account for 0.2% of all notified NTMs in our data collection. The most recent notification covered by the EU concerns a Swedish retail monopoly for alcohol (see Box 2).

[23] WTO document: G/AG/N/EEC/2

[24] WTO document: G/AG/N/EU/56

Finally, the WTO I-TIP database covers quantitative restrictions (QRS), which represent 2.4% of our notifications data. All measures in force and changes to previously notified measures need to be notified on a biennial basis. The last changes to notifications of quantitative restrictions by the EU (i.e. new restrictions, elimination or modification of restrictions) prior to the coronavirus outbreak are found for the year 2016 (see Table 1).

Table 1 / Regular quantitative restrictions of the EU

No	Quantitative restriction in force as of 01/12/2016	WTO justification
1	Banning of exports of metallic mercury and certain mercury compounds and mixtures and the safe storage of metallic mercury. The prohibition does not apply to exports of compounds used for R&D, medical or analysis purposes.	Protection of human life or health, inter alia.
2	Prohibition of import of controlled substances or of products and equipment containing or relying on controlled substances that deplete the ozone layer.	Protection of human life or health and the environment, inter alia. Montreal Protocol on Substances that Deplete the Ozone Layer.
3	Prohibition or restriction of exports of certain hazardous chemicals. **Modification: Better definition of its scope.**	Protection of human health or the environment, inter alia. Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade. Stockholm Convention on Persistent Organic Pollutants.
4	Restriction of trade in certain animals and plant species for the protection of species of wild fauna and flora. **Modification: Detailed tariff lines have been added.**	Protection of animal and plant species, inter alia. Implementation of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).
5	Trade restrictions of certain goods which could be used for capital punishment, torture or other cruel, inhuman or degrading treatment or punishment. **Modification: Newly notified existing measure.**	Protection of human life or health, protection of public morals, inter alia.
6	Restrictions of import/export of waste. The measures in place establish the procedures and control regimes for the shipment of waste, depending on the origin, destination and route of the shipment, the type of waste shipped and the type of treatment to be applied to the waste at its destination.	Protection of human health and the environment, inter alia. Basel Convention for the Control of Trans-boundary Movements of Hazardous Waste and their Disposal (Basel Convention).
7	Import prohibition on fish caught by vessels flying the flag of a non-cooperating country (Kingdom of Cambodia, Republic of Guinea) as defined in the EU regulation to fight against illegal, unregulated and unreported fishing (IUU Regulation). **Modification: Removal of Belize from the list of non-cooperating third countries in fighting IUU fishing.**	Protection of animal life and of the environment, inter alia.

Source: WTO – G/MA/QR/N/EU/3 (31 January 2017)

BOX 1 / COVID-19 IS STIRRING UP TROUBLE OVER NTMS IN THE EU

As of 23 June 2020, members of the WTO had notified 179 measures taken in the context of the COVID-19 crisis (WTO, 2020b). Of these, 20% are quantitative restrictions, 23% are sanitary and phytosanitary (SPS) measures and 37% are attributable to technical barriers to trade (TBTs). Only 3% of all notifications concern export restrictions, which are in part highly controversial and thus vividly discussed. Most measures target all trading partners alike, e.g. minimum requirements for filtering masks as respiratory protective devices, export authorisations or restrictions of personal protective equipment, facilitation of import procedures for medical products or restrictions on the import of exotic animals, to name but a few.

The EU has been explicitly targeted by only one COVID-related SPS measure, which was introduced by Mauritius with the aim of restricting imports of live animals from China, Iran, South Korea, Switzerland, Réunion and the EU in order to prevent the spread of the coronavirus (G/SPS/N/MUS/18; 23 March 2020). This temporary import ban was lifted in early June. The EU, for its part, has notified an array of response measures, including an SPS measure regarding animal health certificates. As it is difficult to carry out official controls that require the physical presence of control staff in times of *physical distancing*, the EU is temporarily allowing consignments of animals and germinal products from users of the Trade Control and Expert System to be accompanied by electronic certificates instead of the original documents (G/SPS/N/EU/380; 1 April 2020). On 16 June 2020 the EU notified the WTO that the export authorisation of personal protection equipment expired on 25 May without extension or replacement. In the same document it lists new quantitative restrictions in the form of export prohibitions of certain medication and medical devices introduced by six EU Member States (Cyprus, Estonia, France, Greece, Romania and Slovakia) and the United Kingdom (G/MA/QR/N/EU/4/Add.3).[25]

NTM notifications relating to the health crisis are not restricted to medical and pharmaceutical products. The European Commission has amended its safeguard measures on certain steel products, such that "all participants in the EU steel market find their traditional place without undue advantages linked to the asymmetry of the rebound" related to the geographical differences in the speed and timing of the recovery (G/SG/N/10/EU/1/Suppl.7).

BOX 2 / THE PUBLIC GOOD AND BAD OF STATE-TRADING ENTERPRISES

State-trading enterprises (STEs), in particular those with a monopoly status, tend to enhance the value of their host countries' exports and restrict imports, suggesting a protectionist function (see e.g. Pirness et al., 2012, for an empirical analysis of wheat trade). Depending on governments' redistributional targets, STEs might be a perfect substitute for tariffs. Hence, negotiated tariff liberalisations might not bring about the expected benefits when the role of STEs is ignored. Therefore, STEs constitute non-tariff barriers, especially in situations where they restrict imports (see e.g. McCorriston and MacLaren, 2013).

The last notification of an STE by the EU in our dataset concerns the Swedish company Systembolaget, which holds a retail monopoly for sales of alcoholic beverages (spirituous drinks, wines and strong beer) to the general public. The goal of the Swedish government is to improve public health through the elimination of a profit motive and lower sales of alcohol. However, it is not allowed to export alcoholic beverages, although it is entitled to import alcohol at the request of consumers. Trade in alcoholic beverages is, however, allowed for other (non-state) entities (G/STR/N/17/EU).

As such, the European STE represents a barrier to competition and trade. However, it also contributes to the public good – i.e. better public health – which is underlined in a recent study by Stockwell et al. (2018), who estimate the additional deaths and hospitalisations in scenarios where Systembolaget is privatised and replaced either by liquor stores or sales in grocery stores. Their findings suggest an increase in per-capita consumption of 20% in the former and by 31% in the latter case, resulting in more than 700 and up to 1,200 additional deaths per year through alcohol-related morbidity and mortality.

[25] See Grübler and Reiter (2020) for further reading and statistics on tariff and non-tariff trade policy tools to tackle challenges posed by COVID-19.

2.2. EXPLOITING INFORMATION ON NOTIFICATIONS TO THE WTO

The I-TIP database on NTM notifications to the WTO, complemented by the TTBD, is the core dataset of our analysis. Substantial effort has been made to match missing product codes at the HS 6-digit level to each notification needed for panel data analyses. Although we have information on some NTMs that were initiated before the establishment of the WTO in 1995, earlier data are very incomplete.

The Uruguay Round resulted in notification requirements (previously featuring in plurilateral Tokyo Round Codes) being part of the single undertaking and thus applying to all WTO members. In addition, new notification requirements in areas such as services, pre-shipment inspections or rules of origin were added to the WTO framework. Article X of the GATT 1994 on the publication and administration of trade regulations, the Trade Policy Review mechanism, and notifications by member states generate information on NTMs in the WTO. More than 200 different legal notification requirements exist, with a majority relating to NTMs. Although reverse notifications by affected trading partners and specific trade concerns partly fill existing gaps, improvements regarding the completeness and quality of notifications remain a challenge (Bacchetta et al., 2012). The lack of incentives for self-notification and of capacities are factors that explain to a large extent existing notification gaps: on average, the frequency of notifications decreases proportionally to the income and economic size of WTO members. “Over half (25) of the 49 members that did not file a single notification from 1998 to 2011 were located in Africa, and 22 of the members that made no notifications were least-developed countries (LDCs)” (VanGrasstek, 2013). Furthermore, during the early years of the WTO product descriptions and general information on NTMs continued to be imprecisely reported, as many members still had to gain experience with the reporting system.

In view of the issues outlined above regarding the quantity and quality of NTM notifications, and taking into consideration the breaks in trade data time series in the early 1990s owing to the disintegration of the Eastern bloc and the emergence of a new geographical landscape of independent states in Europe, we have restricted our analysis to the period after 1995. The current version of the data encompasses 64,790 observations.[26]

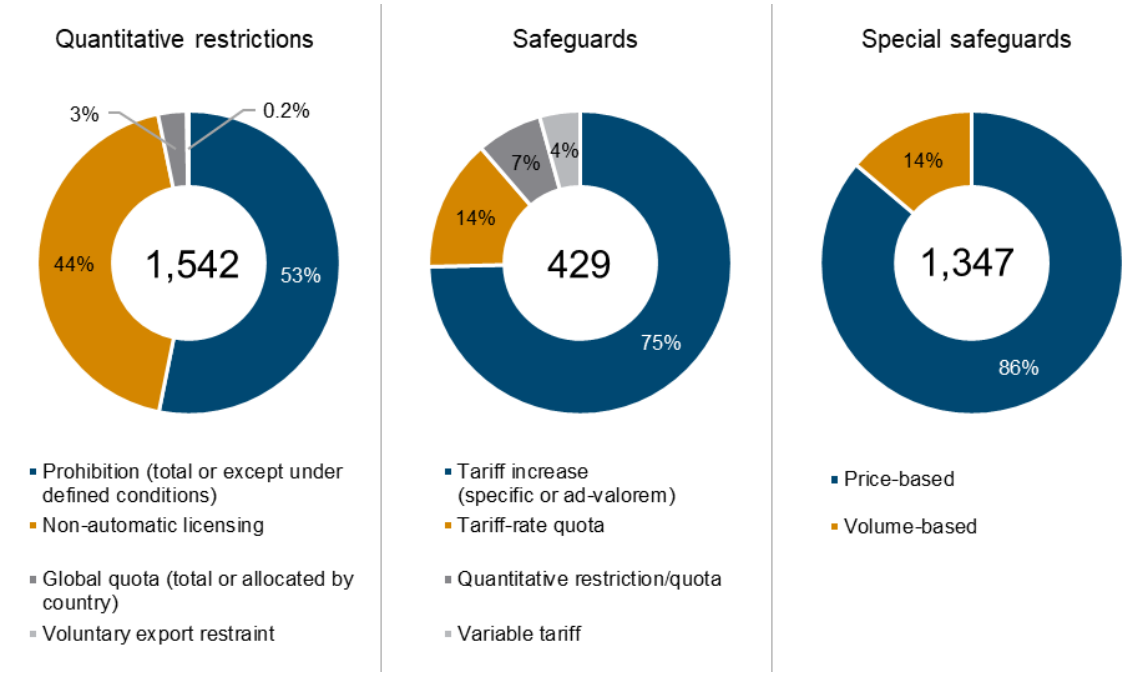
For each notification the I-TIP database provides information on the imposing countries, the targeted trading partners and additional information on the NTM imposed. Our dataset covers 148 WTO members,[27] including the EU, as NTM-imposing countries or territories, and an entry “unspecified” for specific trade concerns raised against SPS measures for which the complainants are not assigned. Also included are trading partners who are non-members but who are affected by measures, as well as an entry “all” for measures applicable to all trading partners, such as TBTs.

Sub-requirements further describe the nature of the NTM in question (Figure 4): SPS measures can be reported as regular notifications (86% of observations) or as a response to an emergency (14%). Three-quarters of safeguard measures take the form of tariff increases, the remainder consists of tariff-rate quotas, direct restriction of quantities or variable tariffs. The great majority of special safeguards applied to agricultural trade are price-based measures. For quantitative restrictions we can distinguish between prohibitions, non-automatic licensing, global quotas and voluntary export restraints. Prohibitions and non-automatic licensing account for 97% of all observed quantitative restrictions.

[26] I.e., 59,836 notified measures across multiple trading partners before merging products.

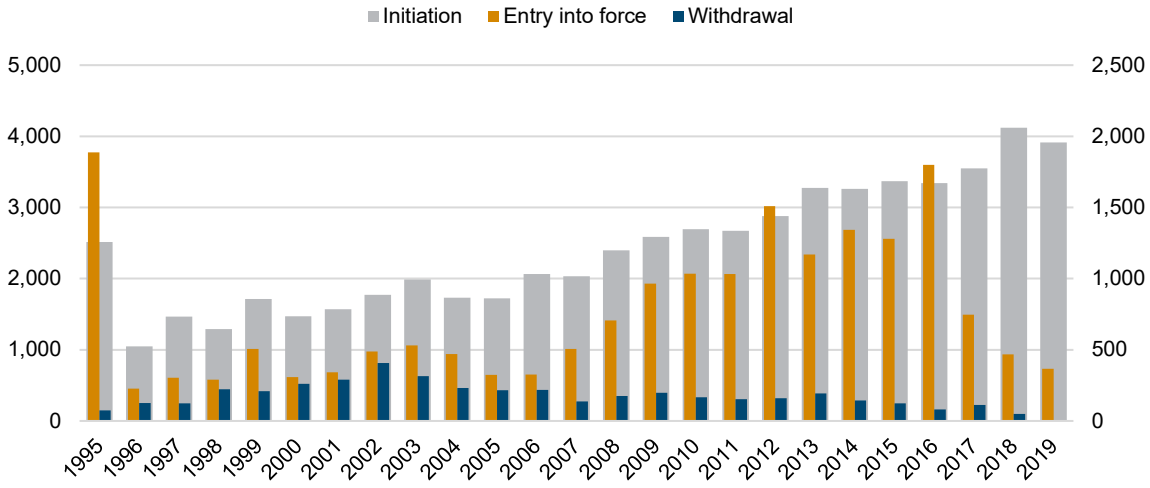
[27] Fifteen members of the WTO are not covered – see Appendix for a list of countries.

Figure 4 / Sub-requirements of selected NTMs, 1995-2019



Sources: wiiw NTM Data based on WTO I-TIP and TTBD. Authors' calculations.

Figure 5 / Notification dynamics by stages (initiation, commencement, withdrawal)



Sources: wiiw NTM Data based on WTO I-TIP and TTBD. Authors' calculations.

The I-TIP database also contains information on the date of initiation,[28] the date of entry into force and, if applicable, the date of withdrawal of the measure. While the number of initiations grows continuously, there is more dynamic observable for measures entering into force, with a first wave in the early 2000s and a second

[28] For some notifications, either the date of initiation or of entry into force is missing. Although measures should be notified before they enter into force, the database also contains measures that were implemented before they were notified to the WTO.

much more pronounced wave starting in 2007 – the year of the world food price crisis, which started one year before the global economic and financial crisis took off (Figure 5).

Out of 64,790 total observations, 93.3% feature a date of initiation, but only 29.2% report a date of entry into force, and 6.8% show a date of withdrawal (Table 2). In line with reporting obligations, the ratio of measures entering into force as a share of initiated measures is 100% for agricultural NTMs and market access measures. The date when specific trade concerns are raised is treated as "in force" date. For trade defence measures this commencement rate ranges between 43% for safeguards and 56% for ADP. For technical NTMs these shares are much lower and less reliable than for other measures, as WTO members are obliged to notify intended measures but not final regulations. Only one out of five SPS measures features a date of commencement. For TBTs a date of entry into force is available only for every tenth notification.

Table 2 / NTM types by stages (initiation, commencement, withdrawal)

	NTM	Initiation	Entry into force	Withdrawal	In force/ initiation (%)	
Technical	SPS	21,802	4,375	0	20%	
	STC(SPS)	0	756	347	100%	*
	TBT	27,778	2,959	0	11%	
	STC(TBT)	0	1,940	0	100%	*
Trade defence	ADP	6,599	3,707	3,414	56%	
	CVD	654	290	288	44%	
	SFG	461	198	321	43%	
Agricultural	SSG	1,347	1,347	0	100%	
	TRQ	1,274	1,274	0	100%	
	EXS	429	429	0	100%	
Market Access	QRS	0	1,542	0	100%	*
	STE	110	110	19	100%	
Total		**60,454**	**18,927**	**4,389**	**31%**	
Share of obs.	**64,790**	**93.3%**	**29.2%**	**6.8%**		

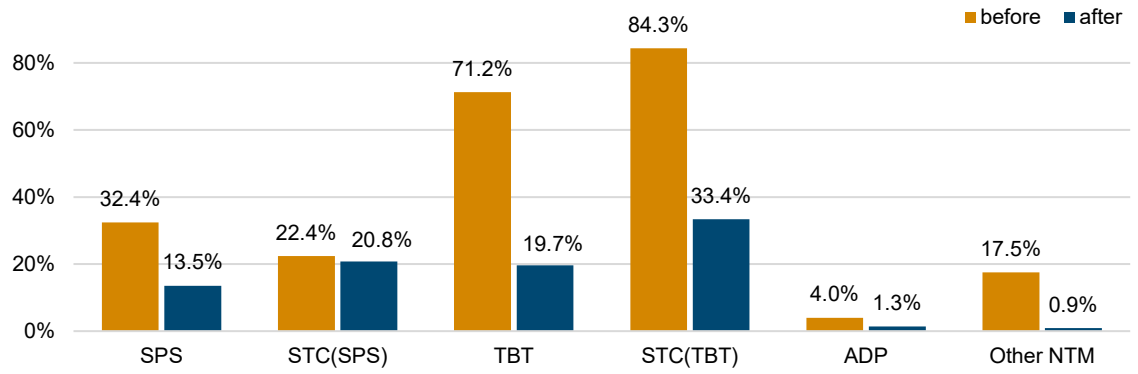
Note: A share of 100% is assigned to STCs and QRS, which feature only the year of commencement.
Source: wiiw NTM Data based on WTO I-TIP and TTBD.

Notifications to the WTO typically also include product or sector descriptions and keywords to describe the issues covered by the measure.[29] However, almost half of all notifications lack information on HS codes. For 33,232 notifications retrieved from I-TIP, HS codes of affected products (at varying levels from 2-digit to 12-digit) were available.[30] Our work filled the gaps following a multi-step automated procedure, which reduced the share of notifications with missing product codes from 46.2% to 14.4% (Table 3). Before our matching exercise, more than 70% of TBTs and more than 80% of STCs raised against TBTs did not contain product codes (Figure 6). Over time, the importance of the TTBD – both for complementing missing notifications as well as for matching HS codes – has decreased. On the other hand, the additional information provided by the WTO Secretariat to assist in the interpretation of notifications has increased, as has the matching procedure by product descriptions (Figure 7).

[29] A frequency table tabulated over the first three keywords mentioned in notifications of SPS measures and TBTs can be found in the Appendix.

[30] Unfortunately, it is not reported which HS revision these reported codes refer to. Our baseline product classification is HS revision 1996. Using correspondence tables provided by WITS, we convert all product codes of earlier and later revisions to HS 1996.

Figure 6 / Notifications with missing HS codes before and after our matching exercise



Sources: wiiw NTM Data based on WTO I-TIP and TTBD. Authors' calculations.

Step 1: *WTO-interpreted HS codes.* The WTO has already taken a first step in matching HS codes according to the interpretation of measures and product descriptions. These "WTO-interpreted HS codes" were available for more than 10,000 notifications, primarily for TBTs. They are typically interpreted by WTO members (trading partners facing the NTMs).

Step 2: *International Classification for Standards (ICS).* The WTO agreements on TBTs and SPS measures require WTO members to notify the ICS classification of the product at the heart of the measure. In addition, some countries use ICS or CAS (a classification for chemical products) in the product descriptions of the NTMs. Extracting these ICS or CAS codes from the product description and matching the corresponding HS codes fills the gaps for an additional 1,400 measures.

Step 3: *Temporary Trade Barriers Database (TTBD)*. We complement the WTO I-TIP data with 1,767 non-duplicate measures not covered by I-TIP, which is particularly relevant prior to the year 2000.[31] In addition, we use it to fill missing HS codes of I-TIP data by matching observations by country pair and date of initiation (or entry into force) and comparisons of respective product descriptions with a string kernel.[32] Matches with a sufficiently high goodness of fit (70% or higher) add HS codes to 82 measures.

Step 4: *Product descriptions*. In this step, we produce a cleaned and stemmed (e.g. using the word "fish" instead of "fishes") version of product descriptions. The product descriptions are compared between notifications containing HS codes and notifications lacking those.[33] We thereby match HS codes for 5,858 observations, primarily for TBTs (more than 3,000).[34]

Step 5: *Set comparisons*. Up to this point, all the matching was based on the comparison of the whole string of the product description. In this step, we split product descriptions into sets of words and compare these between notifications containing HS codes with those for which product codes are missing. The

[31] The WTO states that I-TIP data cover antidumping and countervailing measures initiated and/or with final duties in force since December 2000. See: http://i-tip.wto.org/goods/Forms/Methodology.aspx

[32] We use a string kernel that takes two strings (the two product descriptions) as arguments and compute the number of matching substrings of length 3 or more. See Karatzoglou and Feinerer (2010) for a discussion of string kernels and their implementation for text mining.

[33] In a similar fashion, we tried to match product descriptions of the World Integrated Trade Solution (WITS) with product descriptions of notifications with missing product codes. However, the structure of WITS product descriptions at the 6-digit level resulted in matchings that turned out to be too error-prone to be considered in this analysis.

[34] In addition, there are 24 SPS and 36 TBT notifications with a product description "all" or "all commodities". For these, we assign all two-digit HS codes. As our dataset contains the sources of the HS matching, these can be easily excluded if desired.

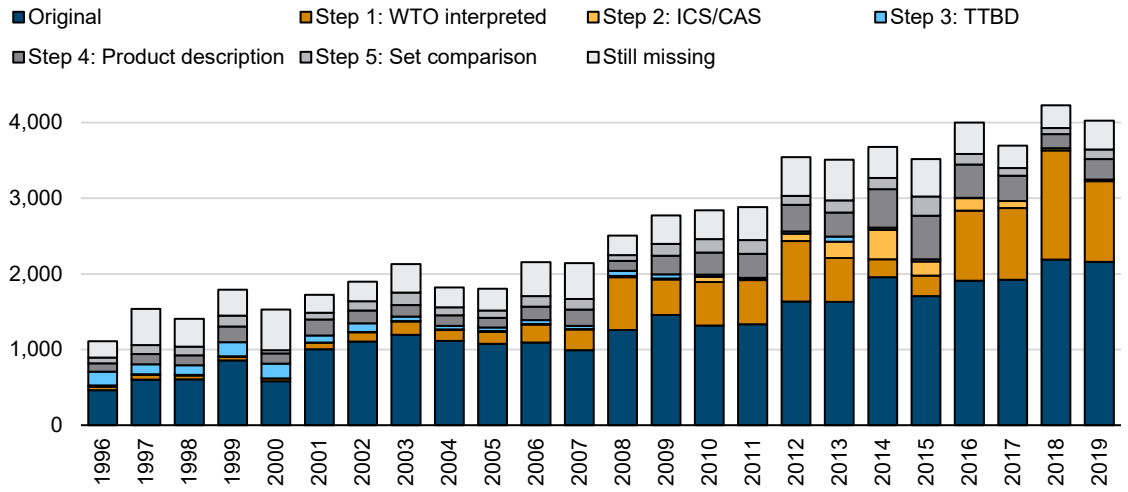
goodness of fit is measured by the Tversky (1977) index.[35] Considering only matches with a goodness of fit of at least 0.7, this step matches HS codes for another 3,115 notifications.

Table 3 / Composition of HS sources by NTM type and data source

	NTM	Original	Step 1 WTO interpreted	Steps 2-5 Matching	Missing	Total	Missing in total (%)
Technical	SPS	14,730	712	3,413	2,947	21,802	13.5%
	STC(SPS)	587		12	157	756	20.8%
	TBT	7,990	8,635	5,691	5,462	27,778	19.7%
	STC(TBT)	304		988	648	1,940	33.4%
Trade defence	ADP (TTBD)*	1,404		86	46	1,536	3.0%
	ADP (I-TIP)	5,018		89	44	5,151	0.9%
	CVD (TTBD)*	139		9	5	153	3.3%
	CVD (I-TIP)	387		112	4	503	0.8%
	SFG (TTBD)*	66		6	6	78	7.7%
	SFG (I-TIP)	318		60	13	391	3.3%
Agricultural	SSG	1,347		0	0	1,347	0.0%
	TRQ	1,271		2	1	1,274	0.1%
	EXS	369		41	19	429	4.4%
Market access	QRS	802	730	6	4	1,542	0.3%
	STE	109		0	1	110	0.9%
Total	**TTBD**	**1,609**	**0**	**101**	**57**	**1,767**	**3.2%**
by source	**I-TIP**	**33,232**	**10,077**	**10,414**	**9,300**	**63,023**	**14.8%**
Grand total		**34,841**	**10,077**	**10,515**	**9,357**	**64,790**	**14.4%**
		53.8%	**15.6%**	**16.2%**	**14.4%**	**100%**	

Notes: * For notifications retrieved from the TTBD, "Original" refers to the TTBD and not the WTO.
Sources: wiiw NTM Data based on WTO I-TIP and TTBD. Authors' calculations.

Figure 7 / Notifications by matching step over time



Note: In this chart, TTBD refers to non-duplicate notifications complementing the I-TIP data and I-TIP notifications for which TTBD was used for product code matching.
Sources: wiiw NTM Data based on WTO I-TIP and TTBD. Authors' calculations.

[35] We calculate the Tversky index as: $(X,Y) = |X \cap Y| / |X \cap Y| + \alpha|X - Y| + \beta|Y - X|$, with $\alpha = \beta = 0.5$.

3. The characteristics of non-tariff measures

This section aims to describe the new data at hand along various dimensions. Starting with the evolution of NTM notifications by type over time, the data are presented along country and product characteristics.

3.1. THE EVOLUTION OF NTMS OVER TIME

The figures for NTMs since 1996 represent measures entering into force or being initiated (in particular in the case of SPS measures and TBTs). However, the high numbers for 1995 rather represent some "stock-taking". As described earlier, for example, tariff-rate quotas for established WTO members are almost exclusively notified for the year 1995, when countries established their respective schemes. Similarly, state-trading enterprises and export subsidies were registered almost exclusively for the year 1995 (Figure 8).

Plotting notifications by NTM type over time once more highlights the growing importance of SPS measures and TBTs. The developments do not change substantially when the numbers are restricted to the 112 countries that were already WTO members in 1995. Another 52 countries (including e.g. China and Russia) joined in 1996 and thereafter and account for 20% of all notifications.

For the year 2019 a record high of 2,046 notifications of TBTs and 1,610 SPS measures can be observed. That same year 82 STCs were raised against TBTs and 20 STCs against SPS measures. Contrasting these figures with the number of specific trade concerns raised at the WTO, we could argue that there were reservations against 7% and 3.5% of all SPS and TBT notifications, respectively. However, STCs may also address regulations of trading partners which were not notified to the WTO. A recent paper by the Economic Research and Statistics Division finds that 32% of STCs against TBTs were raised against non-notified measures and therefore act as a sort of reverse notification (WTO, 2020c). For SPS measures, the ratio of complaints in relation to measures has decreased considerably (from a maximum of 16.1% in 1996 to 1.2% in 2019). By contrast, this ratio tends to increase over time for TBTs, exceeding 10% in 2011, 2014 and 2016.

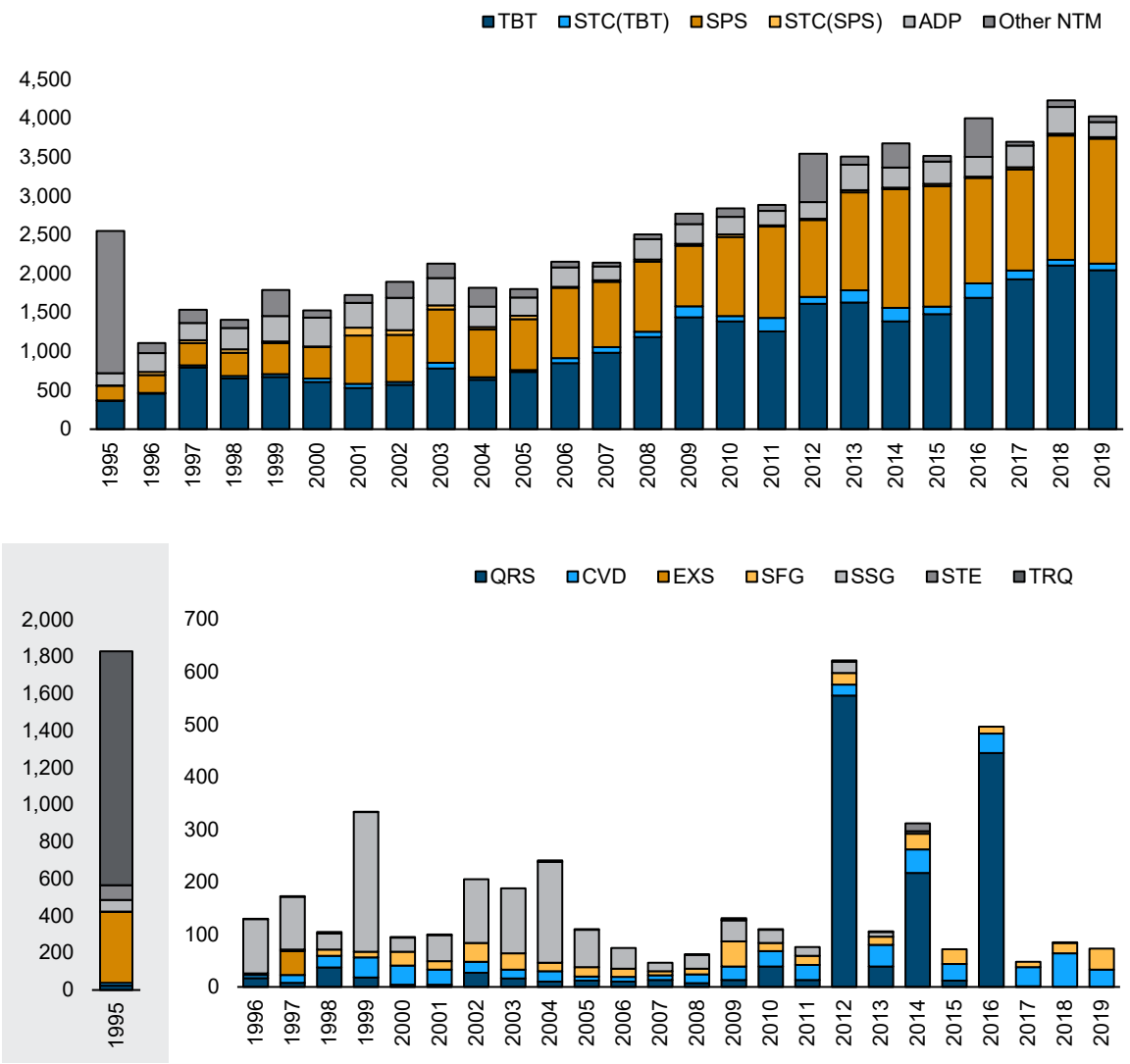
With more than 6,600 observations, ADP represents 10% of notifications and accounts for more observations than all other NTM types put together.[36] The heydays of ADP are observed in the late 1990s and early 2000s. Its popularity increased once more after 2011, with more than 300 notifications recorded for the years 2013 and 2018. Correlations with other trade defence measures are moderately strong (Figure 9). Safeguard measures seem to lag behind CVD and ADP measures. The dynamics of CVD and SFG were very similar until around 2010 but drifted apart thereafter. Among all three contingent protection measures, CVD has developed most dynamically since the economic and financial crisis of 2008/09. The year 2018 shows an exceptionally high number of CVD notifications, which at 64 that year were twice as high as during the preceding years (and the median of 26).

Special safeguards were heavily used in the late 1990s but have gradually dwindled since then. We do not have data on SSGs after 2014. Finally, we observe sharp outliers for quantitative restrictions, with more than

[36] Other NTMs (QRS, CVD, EXS, SFG, SSG, STE, TRQ) account for 5,827 observations (9%). See Figure 3 for shares.

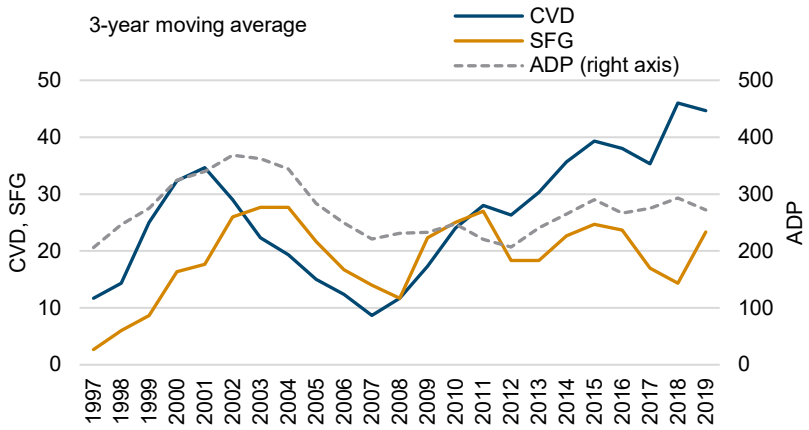
400 notifications recorded for the years 2012 and 2016 compared with the median of 13 notifications per year (Figure 8). Data for the most recent years are not yet available due to the reporting on a biennial basis. For these measures it is important to keep in mind that they often address a number of (if not all) exporters of a specific product/industry, while trade defence measures clearly define targeted goods and exporting countries (or actually specific firms in the case of CVD and ADP).

Figure 8 / NTMs over time



Notes: Number of notifications to the WTO (I-TIP) during Jan 1995-Dec 2019, complemented by non-duplicate measures retrieved from the TTBD. If the enforcement date was not available, the year of initiation was plotted. Different scale in second chart for the year 1995 due to one-time notifications of EXS, STE and TRQ.
Sources: wiiw NTM Data based on WTO I-TIP and TTBD. Authors' calculations.

Figure 9 / Dynamics of trade defence instruments' application



Corr.	ADP_t (ADP_{t-1})	CVD_t (CVD_{t-1})
ADP_t	1.0000	0.3973 (0.1299)
CVD_t	0.3973 (0.2487)	1.0000
SFG_t	0.3233 (0.4834)	0.2789 (0.5092)

Notes: Number of notifications to the WTO (I-TIP) during Jan 1995-Dec 2019, complemented by non-duplicate measures retrieved from the TTBD. If the enforcement date was not available, the year of initiation was plotted. Correlation over non-smoothed time series of annual total number of notifications per NTM type.
Sources: wiiw NTM Data based on WTO I-TIP and TTBD. Authors' calculations.

3.2. THE GEOGRAPHICAL COMPOSITION OF NTMS

As the I-TIP data are a collection of notifications to the WTO, information on NTM-imposing economies is restricted to WTO members. With the accession of Afghanistan on 29 July 2016 the WTO counted 164 members. For the period of our dataset (1995-2019) the I-TIP database covers 148 NTM-imposing members. Coverage is highest in Europe (84%) and Asia (78%) (Table 4). The lower country coverage in America and Oceania stems from missing small island states, including the WTO members Dominica and Saint Kitts and Nevis in the Caribbean as well as the Pacific states Tonga and Solomon Islands in Oceania. Overall, 40% of small island states and three-quarters of all landlocked economies are captured by the data. Major white spots on the map (Figure 10) appear in Africa. This can partly be explained by the fact that there are still some African countries which are not members of the WTO. However, African countries also represent nine out of 16 WTO members for which no data are available. These are African low-income and lower-middle income countries.[37]

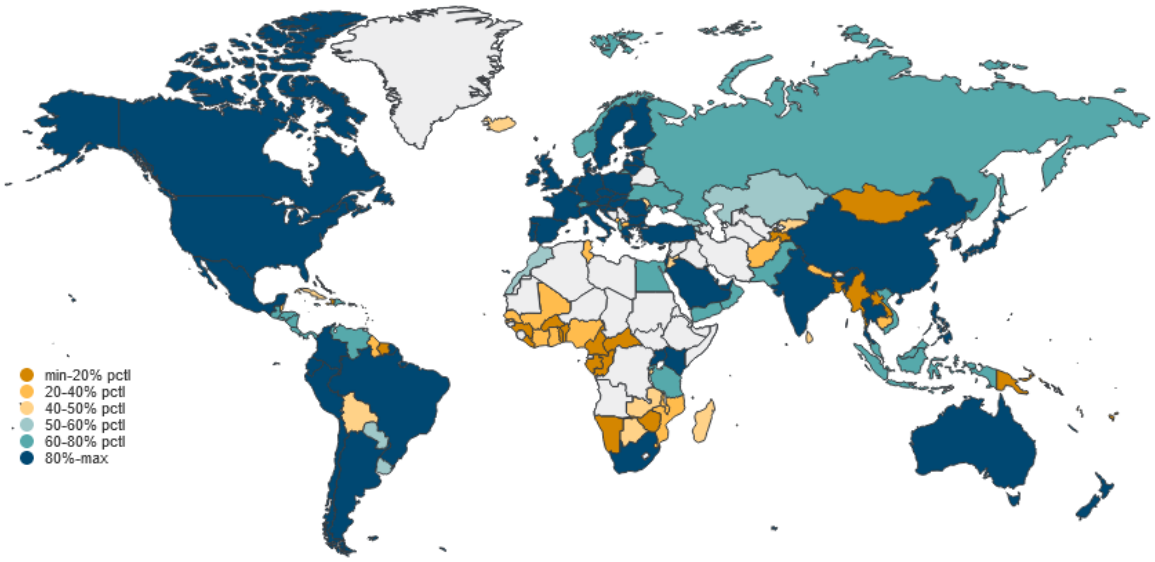
Table 4 / Data coverage by continent

	Number of countries	Continents					Small island states	Land-locked states
		Africa	Asia	Europe	America	Oceania		
Covered	148	35	39	36	32	6	20	27
Not covered	60	18	11	7	14	10	30	9
Coverage	**70%**	**66%**	**78%**	**84%**	**64%**	**38%**	**40%**	**75%**

Notes: Including the EU as an additional entity. Total number of countries per continent based on World Integrated Trade Solution (WITS) plus the European Union, Haiti, Liberia, Taiwan and Tajikistan, which are covered by I-TIP but not by WITS.
Sources: UN List of Small Island States (SIDS). Landlocked countries retrieved from the GeoDist data provided by CEPII (Mayer and Zignago, 2011). WITS – Trade Data Availability (July 2020): https://wits.worldbank.org/countryprofile-dataavailability.aspx?lang=en

[37] See Appendix for details.

Figure 10 / Distribution of NTMs over WTO members, total 1995-2019



Notes: Colour coding by percentiles. For countries in green/blue the number of notifications exceeded the median value.
Sources: wiiw NTM Data based on WTO I-TIP and TTBD. Authors' calculations.

The list of major NTM-imposing economies is led by the US, with more than 7,000 notifications, followed by the EU (Table 5). The gap is much narrower than the first glimpse would suggest, as the data contain 2,604 notifications by individual EU Member States in addition to more than 4,000 notifications by the EU, therefore totalling 6,663 observations. The US and the EU are followed – albeit at a great distance – by Brazil and China (>3,000 each). Canada (>2,500), South Korea (>2,000) and Japan (>1,900), with which the EU has new-generation, deep free-trade agreements, are ranked 5 to 7. The top-ten list is completed by Saudi Arabia, India and Australia, which account for 36%-55% of all notified measures across NTM types and 61% of raised concerns.

Even among these ten economies, the relative importance of different NTM types varies considerably. The US has many agricultural measures – predominantly special safeguards – in place. The EU stands out as a major concern-raising party. India has already employed more trade defence measures than the EU. This is true for ADP as well as for safeguard measures. For the latter, India notified 57 measures, which is three times more than notified by the US (19) and almost ten times higher than the number notified by the EU (6). A comparison between South Korea and Japan shows that the former relies more on tariff-rate quotas while the latter makes more frequent use of special safeguards. Australia appears as a particularly heavy user of quantitative restrictions.

The 148 NTM-imposing WTO members targeted 195 economies and in addition employed NTMs applicable to all trading partners, to which we assigned the fictitious code "WT" (for WTO members or world trade partners). Six of the top ten imposing economies also feature among the top ten affected economies. In this ranking, however, China takes the lead, facing 23% of all trade defence measures in our dataset. Bown (2011) notes that by 2009 China had four times more products subject to contingent protection measures than the second most targeted economies, with more NTMs imposed by other developing economies than by developed ones. The US and the EU occupy the second and third ranks, being the targets of 31% of all raised trade concerns (Table 5).

Table 5 / Top 10 NTM-imposing and -targeted economies, 1995-2019

	Imposing	SPS	TBT	STC	Trade defence	Agri-cultural	Market access	Total
1	US	3,338	1,754	157	1,316	561	59	7,185
2	EU	1,229	1,306	674	647	178	25	4,059
3	BR	1,665	1,062	104	515	17	0	3,363
4	CN	1,314	1,375	241	329	10	88	3,357
5	CA	1,331	731	70	307	32	51	2,522
6	KR	918	955	119	183	142	4	2,321
7	JP	734	873	64	16	191	90	1,968
8	SA	499	1112	29	16	0	0	1,656
9	IN	260	162	119	1028	3	68	1,640
10	AU	696	214	55	376	8	216	1,565
	Top 10	**11,984**	**9,544**	**1,632**	**4,733**	**1,142**	**601**	**29,636**
	% of total	**55%**	**34%**	**61%**	**61%**	**37%**	**36%**	**46%**

	Targeted	SPS	TBT	STC	Trade defence	Agri-cultural	Market access	Total
	WT	**17,795**	**27,778**	**0**	**469**	**3,050**	**1,506**	**50,598**
	% of total	**82%**	**100%**	**0%**	**6%**	**100%**	**91%**	**78%**
1	CN	107	0	119	1,793	0	3	2,022
2	US	247	0	429	348	0	0	1,024
3	EU	52	0	418	152	0	0	622
4	KR	41	0	70	491	0	0	602
5	IN	79	0	44	368	0	0	491
6	JP	72	0	98	264	0	0	434
7	TW	50	0	11	358	0	0	419
8	BR	98	0	108	210	0	0	416
9	TH	46	0	27	281	0	1	355
10	ID	29	0	46	274	0	0	349
	Top 10	**821**	**0**	**1,370**	**4,539**	**0**	**4**	**6,734**
	% of total	**4%**	**0%**	**51%**	**58%**	**0%**	**0%**	**10%**

Sources: wiiw NTM Data based on WTO I-TIP and TTBD. Authors' calculations.

3.3. NOTIFICATIONS BY COUNTRIES' ECONOMIC DEVELOPMENT

Using the income group classification of the World Bank (2020), we group countries in our data into low, lower-middle, upper-middle and high-income countries.[38] For NTM notifications issued by or addressing the EU as a whole, we assigned the high-income group to the EU. Two-thirds of countries listed by the World Bank are covered by the NTM database, with the highest coverages (>70%) for upper-middle and lower-income countries (Table 6).

[38] Using the historical classification by income, some countries change income groups over time.

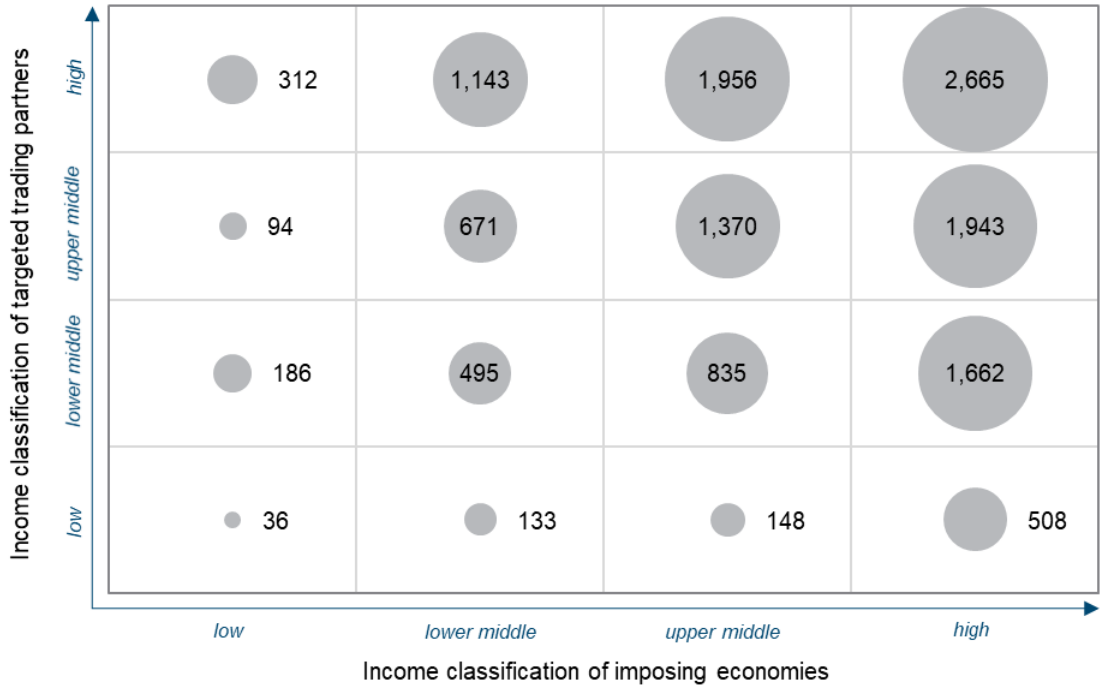
Table 6 / Data coverage by income group

Imposing economies	Number of countries	Income group (World Bank) H	UM	LM	L
Covered	147	43	36	42	25
Not covered	74	26	14	18	15
– of these WTO members	16	2	2	4	7
Coverage	**67%**	**62%**	**72%**	**70%**	**62%**

Notes: H = high income, UM = upper-middle income, LM = lower-middle income, L= low income.
Sources: wiiw NTM Data based on WTO I-TIP and TTBD. World Bank Analytical Classifications (1987-2018). Authors' calculations.

Almost 80% of all notified NTMs are applicable to all trading partners. For the remaining 14,157 observations we can contrast imposing and affected economies by income group (Figure 11). Low-income countries account for 4% of imposed NTMs and were targeted by 6% of observed NTMs. Shares are three times higher for lower-middle-income countries, which issued 17% of NTMs and were targeted in 22% of the cases. The picture for upper-middle-income countries, which initiated 30% of observed NTMs and were affected by 29% of all measures, is relatively balanced. Finally, high-income economies tend to belong to the heaviest users of NTMs, but they are simultaneously also the most frequent targets of NTMs. Even so, they faced a lower number of measures (43%) than they imposed (48%).

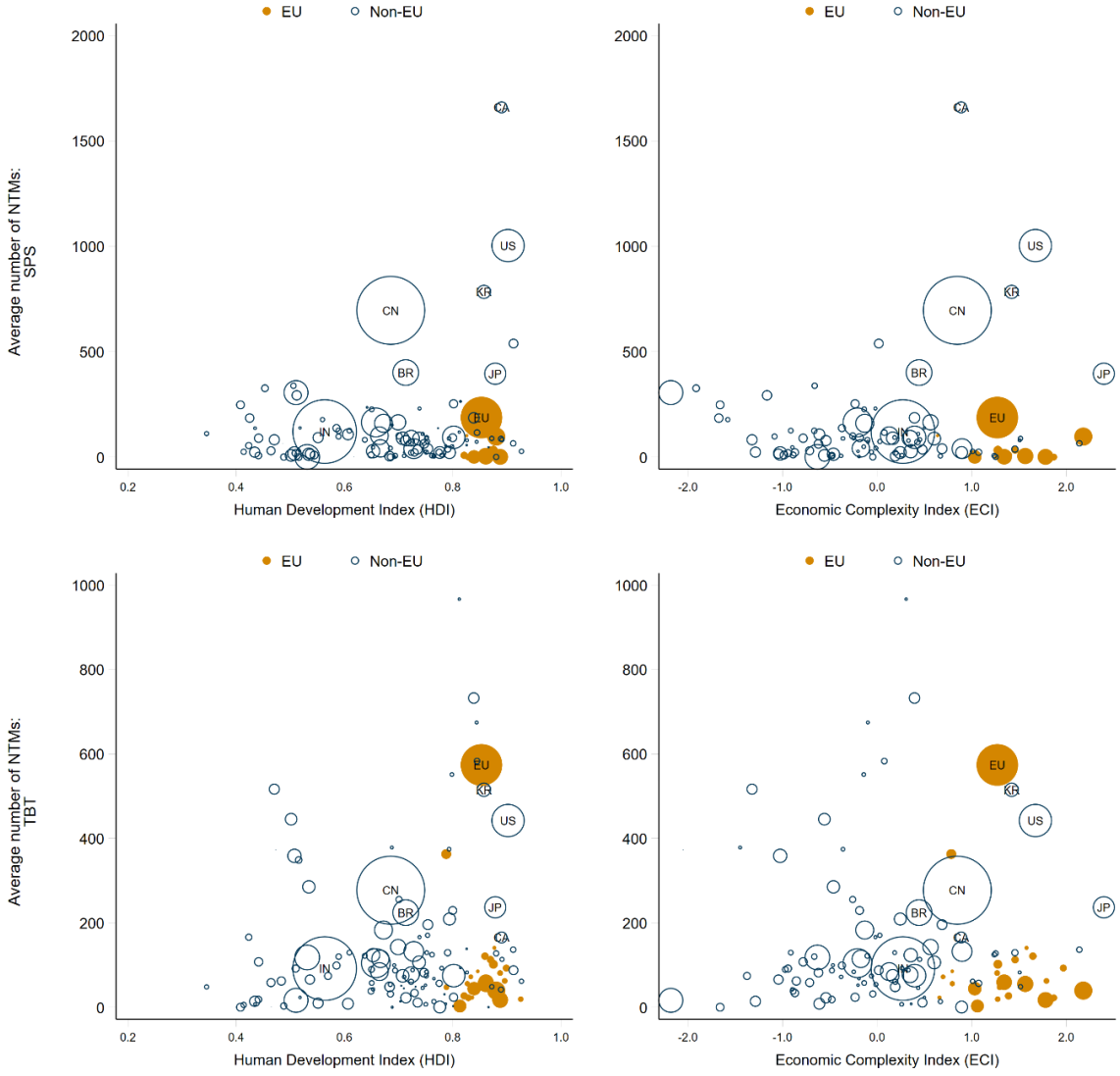
Figure 11 / NTMs by income group of the imposing and affected countries, 1995-2019



Note: Not including NTM types imposed against all trading partners. Including STCs. When NTMs were issued by or targeted at the EU as a whole, we counted the EU as one single high-income entity.
Sources: wiiw NTM Data based on WTO I-TIP and TTBD. World Bank Analytical Classifications (1987-2018). Authors' calculations.

As previously mentioned, we are aware that the dominance of high-income countries in the dataset has multiple roots. Developed economies have the capacity to apply multiple, sophisticated trade policy tools, their consumers ask for higher standards, and their industries are strong and organised to push for trade protection. On the other hand, the data are influenced by differences in reporting with respect to accuracy and completeness of notifications. In addition, current WTO reporting requirements leave room for actions, such that some countries report every NTM applicable, for example, whereas others report only NTMs that depart from international standards.

Figure 12 / Standard-like NTMs by economic development of the imposing economies



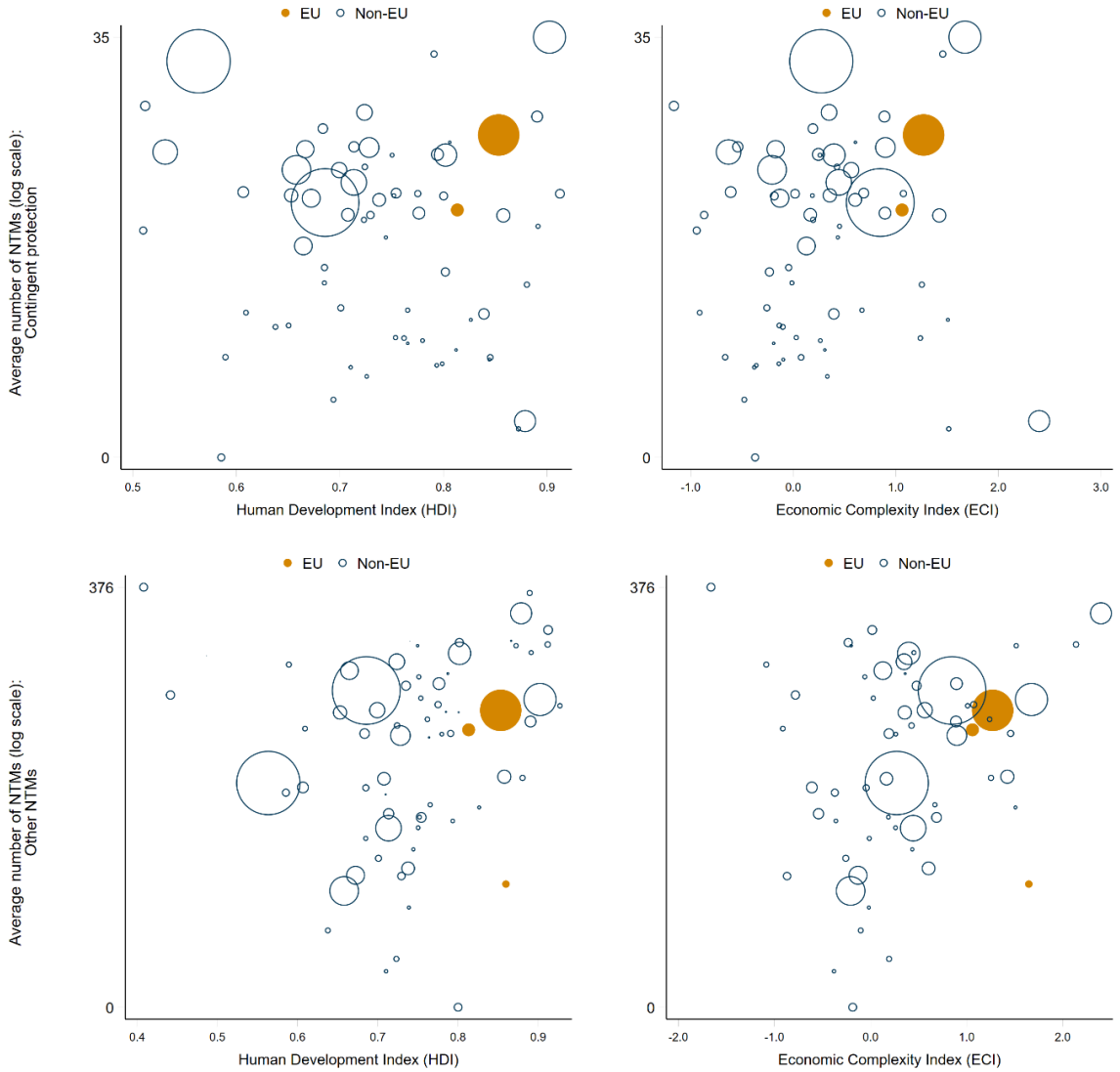
Notes: HDI and ECI indices for the EU were derived as simple averages across Member States. Bubble size proportional to population size.
Sources: wiiw NTM Data based on WTO I-TIP and TTBD, The Growth Lab and Penn World Tables (Feenstra et al., 2015). Authors' calculations.

In addition to income, we plot the average number of NTMs per imposing economy over two other measures of economic development. The Human Development Index (HDI) published by the United Nations captures

countries' GDP as well as the health and educational dimensions of their development. The dataset spans the period 1990-2018, covering all countries in our NTM data apart from Taiwan and Macao (Figure 12).

Furthermore, the Growth Lab at Harvard University (2019) publishes the Economic Complexity Index (ECI). It represents countries' "productive knowledge" by capturing the number and complexity of products they export. It is available for 116 economies in our data for the period 1995-2017 (Figure 13).

Figure 13 / Contingent trade protection by economic development of the imposing economies



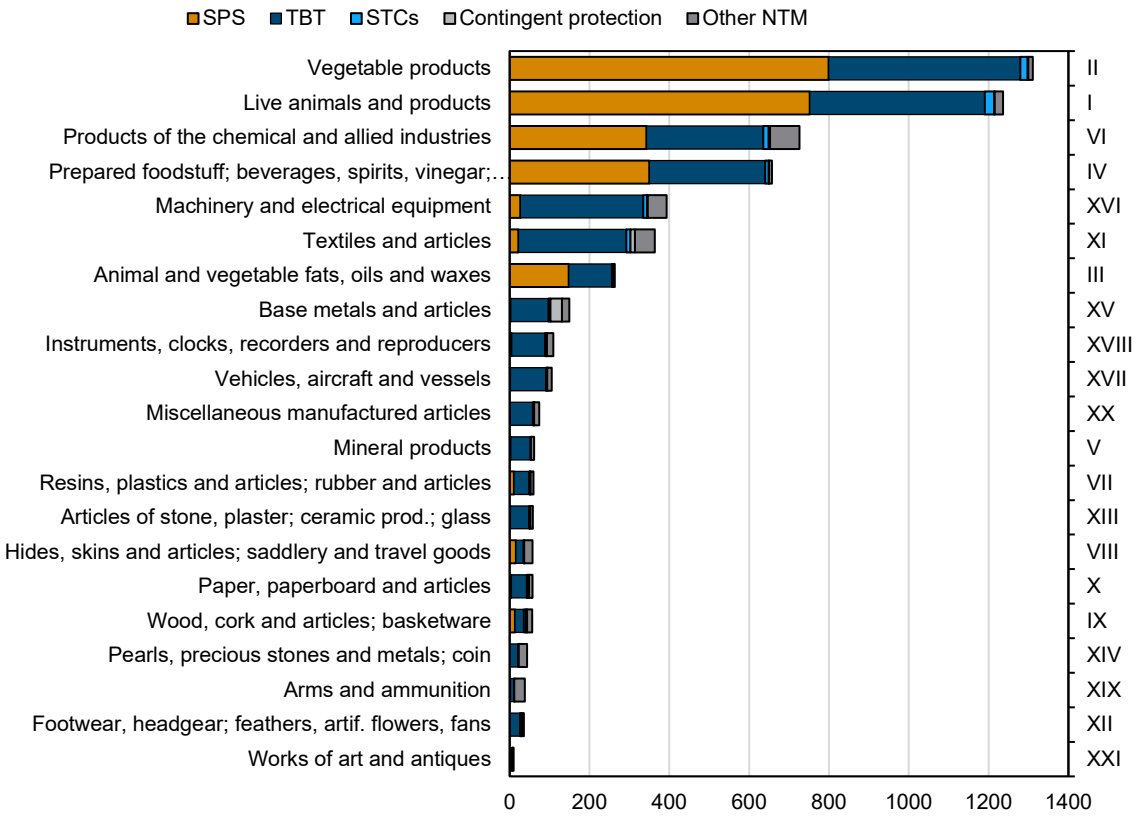
Notes: HDI and ECI indices for the EU were derived as simple averages across Member States. Bubble size proportional to population size.
Sources: wiiw NTM Data based on WTO I-TIP and TTBD, The Growth Lab and Penn World Tables (Feenstra et al., 2015). Authors' calculations.

Both measures show a similar picture.[39] There is great heterogeneity across countries, which is growing with the level of development. No clear relationship is visible between human or economic development and the application of standard-like NTMs. An upward tendency is, however, observable for contingent trade-protective measures (ADP, CVD and SFG) as well as other agricultural and quantitative NTMs in our data (SSG, TRQ, EXS, QRS, STE). Trade defence measures in addition show a pattern where bigger economies tend to use these instruments more often (bigger bubble sizes correspond to bigger populations).

3.4. THE DISTRIBUTION OF NTMS ALONG PRODUCT GROUPS

As many NTMs address multiple products, merging HS 6-digit product codes according to the procedure outlined in section 2.2[40] increases the number of observations from almost 65,000 to more than 6 million, out of which two-thirds concern agricultural and food sectors.

Figure 14 / NTMs by NTM type and HS product section



Sources: wiiw NTM Data based on WTO I-TIP and TTBD. Authors' calculations.

[39] The same holds for plots using expenditure-side real GDP p.c. in 2011 US dollars retrieved from the Penn World Tables.

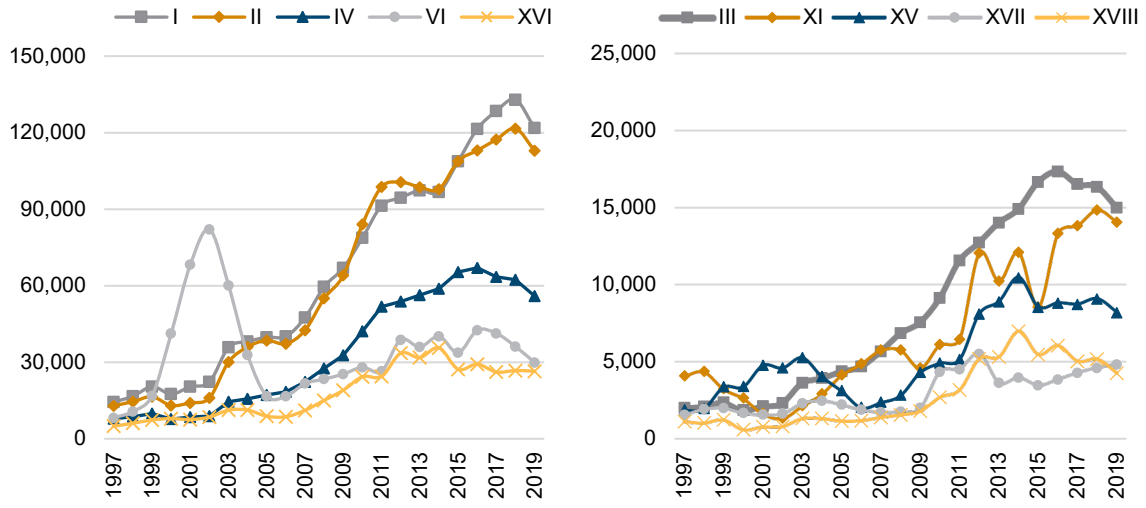
[40] In this section we exclude the above-mentioned 24 SPS and 36 TBT notifications with the product description "all" or "all commodities".

To illustrate the distribution across products, we aggregated our data along 21 product sections of the Harmonised System.[41] For the following figure we calculated the sum of NTM measures applied by each imposing economy for each year and plotted the average over the period 1995-2019. It shows that the product groups facing the highest number of NTMs belong to the agricultural sector: vegetable products (HS section II), followed by animals and animal products (HS section I). Recalling that the primary purpose of SPS measures is to protect human, animal and plant life, it is not surprising that this type is dominating NTM notifications addressing agri-food goods. TBTs appear almost equally important as SPS measures for chemical products (HS section VI) and prepared foodstuffs, beverages and tobacco (HS section IV), but dominate the picture for machinery and electrical equipment (HS section XVI) and textiles (HS section XI).

The primary product category for contingent protection measures comprises base metals and products thereof (HS section XV). Other NTM types (including quantitative restrictions) primarily address chemical products (HS section VI), followed by textiles and machinery. This is confirmed by statistics of the GTA, which reports that basic iron and steel, products of iron or steel, other fabricated metal products, as well as basic organic chemicals and motor vehicles constitute the top-five sectors targeted by harmful interventions.[42]

Within HS sections, the number of notifications has not grown steadily. Strong increases occurred for most of them between 2007 and 2012, showing higher fluctuations since then (Figure 15). Some feature local peaks around the years 2012, 2014, 2016 and 2018. An eye-catching exception is the chemical industry, with a global peak in the early 2000s.

Figure 15 / Number of NTMs by HS product section over time



Note: Three-year moving average. Roman numerals refer to HS sections.
Sources: wiiw NTM Data based on WTO I-TIP and TTBD. Authors' calculations.

[41] As some notifications apply to products of separate sections simultaneously (e.g. to vegetable products and prepared foodstuff) and therefore feature in multiple sections, the sum of notifications over all sections exceeds the number of notifications reported to the WTO.

[42] Accessed in July 2020.

3.5. A NOTE ON AUSPICIOUS COMPLEMENTARY SOURCES

The aforementioned Global Trade Alert (GTA) dataset is based on data collected from (mainly) official sources, independent of notifications by WTO members. With the onset of the global economic crisis it started to monitor protectionist state interventions (Evenett, 2013).

The GTA collects information on trade policy as well as on foreign investment and labour force migration interventions with a focus on the G20. It further incorporates an evaluation of the direction of the intervention: whether it certainly discriminates against foreign interest, is likely to discriminate, or liberalises or improves transparency of policy. Coining the term “populist era” since US President Trump took office, the most recent GTA report shows that trade protectionist rhetoric has eventually translated into greater protectionism and less trade liberalisation worldwide, i.e. it is not confined to the China-US trade war. Measures taken by governments between January 2017 and November 2019 distorted 40% of world trade.

Overall, the ambitions, country coverage and MAST NTM classification of the GTA and the WTO I-TIP are similar. However, their approach, focus and years covered are very different. Data for the GTA are actively collected, while the WTO I-TIP dataset depends on notifications. The focus of the GTA is to provide information on measures that are temporarily impeding trade, investment or workers’ mobility. Within the WTO I-TIP data, the bulk of notifications concerns standard-like NTMs. Finally, the GTA has been tracking government NTM initiatives since 2009, while our amended WTO I-TIP data start in 1995. Hence, while both the GTA and the WTO I-TIP cover non-tariff policy measures, they are significantly different and should be regarded as complements rather than substitutes. For example, a comparison of data for export subsidies and tariff rate quotas between the GTA and WTO I-TIP and information available via AGIMS could enhance research and policy debates on agricultural NTMs significantly and reduce biases, based on notification behaviour (VanGrasstek, 2013) and rules (Bacchetta et al., 2012) as well as the tendency of larger economies to apply less transparent forms of state discrimination (Evenett, 2019).

The importer-exporter product-year structure of the wiiw NTM Sata, which contain country names as well as ISO country codes and HS 6-digit product codes, makes it easy to merge additional data for empirical analysis, ranging from classical gravity variables to World Bank country classifications and UNCTAD’s information on NTMs or tariffs provided via TRAINS.

4. Conclusion

There is a fast-growing literature on the effects of non-tariff measures (NTMs). Data limitations, however, often result in the analysis of one specific type of NTM for a particular product or region. Our work contributes to filling the data gap by processing notifications of NTMs to the WTO between 1995 and 2019. It provides an NTM database usable for econometric analysis, comprising ten NTM types and specific trade concerns (STCs) raised against sanitary and phytosanitary (SPS) measures and technical barriers to trade (TBTs). Publicly accessible data provided by the WTO via the Integrated Trade Intelligence Portal (I-TIP) were complemented by the Temporary Trade Barriers Database (TTBD) and enhanced by imputing missing product codes at the HS 6-digit level of the Harmonised System (HS). Our work effectively reduces the share of notifications with missing HS codes from more than 56% to less than 15%.

The resulting dataset allows the description of the evolution of notified NTMs over time by characteristics of NTM-imposing economies and trading partners and product groups. By the end of 2019, 43% of all notifications were TBTs, followed by SPS measures (34%) and ADP (10%). Product groups affected most frequently by NTMs belong to the agri-food sector, followed by the chemical, machinery, textiles and metals industries. In addition, textiles and metal industries face the most trade defence and quantitative restrictions. While there is no clear relationship visible between the use of standard-like NTMs, such as SPS measures and TBTs, and the economic development of the imposing economy, there are such indications for other types of NTMs.

The new database offers value added for many empirical research questions. It can be used for panel data estimations on trade effects of NTM notifications at a disaggregated product level (HS 6-digit). The variety of covered NTM types allows for the analysis of dynamics and substitutability of the use of NTM forms, e.g. contingent protection measures. The 25-year time span (1995-2019) and broad country coverage, encompassing more than 50 WTO accessions, is fruitful ground for the analysis of the learning curves of emerging and developing economies with respect to the application and notification of NTMs. Finally, the analysis of the data can contribute to the discussion on reforming the WTO and improving its function to increase transparency and predictability in international trade policy.

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Appendix

Appendix Table 1 / NTM abbreviations

NTM	Product group description
ADP	Antidumping
CVD	Countervailing duties
QRS	Quantitative restrictions
SFG	Safeguards
SPS	Sanitary and phytosanitary measures
SSG	Special safeguards
STC(SPS)	Specific trade concerns against SPS measures of trading partners
STC(TBT)	Specific trade concerns against TBTs of trading partners
STE	State-trading enterprises
TBT	Technical barriers to trade
TRQ	Tariff-rate quota

For details, see: http://unctad.org/en/PublicationsLibrary/ditctab20122_en.pdf

Appendix Table 2 / WTO members not covered

Region	Country	ISO2	WTO membership	Income group				Landlocked
				H	UM	LM	L	
Africa	Angola	AO	1996		5	11	9	0
	Chad	TD	1996				25	1
	Dem. Rep. of the Congo	CD/ZR	1997				25	0
	Djibouti	DJ	1995			25		0
	Guinea-Bissau	GW	1995				25	0
	Lesotho	LS	1995			16	9	1
	Mauritania	MR	1995			9	16	0
	Niger	NE	1996				25	1
	Sierra Leone	SL	1995				25	0
Asia	Maldives	MV	1995		10	15		0
America	Dominica	DM	1995		21	4		0
	Saint Kitts and Nevis	KN	1996	9	16			0
Europe	Liechtenstein	LI	1995	25				1
	Luxembourg	LU	1995	25				1
Oceania	Solomon Islands	SB	1996			14	11	0
	Tonga	TO	2007		7	18		0

Notes: Number of years within each income group according to the World Bank. No country-specific measure is recorded for Luxembourg; it is therefore only “indirectly" covered by notifications of the European Union. H = high income, UM = upper-middle income, LM = lower-middle income, L = low income.

Appendix Table 3 / Frequency of first three keywords in SPS notifications

No	Keyword	Freq.	No.	Keyword	Freq.
1	Food safety	12,559	32	Certification	103
2	Human health	9,201	33	Heavy metals	97
3	Animal health	5,325	34	Transmissible Spongiform Encephalopathy	93
4	Maximum residue limits (MRLs)	4,015	35	control and inspection	89
5	Plant health	3,867	36	Dioxins	82
6	Animal diseases	3,758	37	Newcastle Disease	76
7	Pests	3,339	38	Bluetongue	74
8	Plant protection	3,128	39	HACCP Plan requirements	69
9	Food additives	1,684	40	Escherichia coli	66
10	Avian Influenza	1,005	41	Bovine Spongiform Encephalopathy (BSE)	63
11	Contaminants	1,002	42	Irradiation	58
12	Pesticides	934	43	Wood packaging / ISPM15	57
13	Animal feed	748	44	Zoonoses	57
14	Bacteria	604	45	Nematode	45
15	Protect humans from animal/plant pest	534	46	Biological control agents	42
16	Protect territory from other damage2	521	47	Invasive species	29
17	Labelling	459	48	Equivalence	25
18	Foot and mouth disease	449	49	Pharmaceutical products	16
19	Seeds	387	50	Allergens	14
20	Plant diseases	374	51	Animal welfare	14
21	Territory protection	337	52	Citrus canker	14
22	Beverages	332	53	Classical Swine Fever	12
23	Regionalization	307	54	Scrapie	11
24	Feed additives	281	55	Toxins	8
25	Biotechnology	260	56	Mycotoxins	7
26	Aflatoxins	254	57	Traceability	6
27	Fruit fly	171	58	Tolerance exemption	5
28	Veterinary drugs	162	59	Listeria monocytogenes	4
29	Genetically modified organisms	145	60	Salmonella	4
30	Packaging	124	61	Sudden Oak death	1
31	Fungi	105	62	H1N1 influenza	1

Data source: WTO I-TIP. Authors' calculations.

Appendix Table 4 / Frequency of first three keywords in TBT notifications

No	Keyword	Freq.	No.	Keyword	Freq.
1	Protection of human health or safety	10,787	189	Packaging	233
2	Safety	7,562	19	Nutrition information	223
3	Food standards	6,921	20	Consumer protection	215
4	Labelling	3,839	21	Protection of animal or plant life	207
5	Human health	3,080	22	Conformity assessment	168
6	Quality requirements	2,744	23	Plant health	163
7	Protection of the environment	2,674	24	Animal health	152
8	Prevention of deceptive practices	3,150	25	Organic agriculture	121
9	Consumer information	1,962	26	Cost saving and increasing productivity	112
10	Telecommunication/Radiocommunication	953	27	Genetically modified organisms	88
11	Other	861	28	Crime protection	75
12	Harmonization	790	29	Electromagnetic compatibility	62
13	Metrology	660	30	National security requirements	57
14	Trade facilitation	567	31	Animal welfare	40
15	Food contact materials	273	32	Food additives	6
16	Animal feed	272	33	Pesticides	3
17	Protection of animal or plant life or h	268	34	Biofuels	1

Data source: WTO I-TIP. Authors' calculations.

Appendix Table 5 / Data coverage: Total number of NTMs by imposing country

	Technical				Trade defence			Agricultural			Other			
ISO2	SPS	STC (SPS)	TBT	STC (TBT)	ADP	CVD	SFG	SSG	TRQ	EXS	QRS	STE	Total	Rank
AE	239	3	469	18			4						733	26
AF	3		2								18	1	24	106
AG	4												4	135
AL	234	2	93										329	46
AM	28	1	85				6						120	73
AR	236	16	434	20	461	4	7						1,178	18
AT	1	1	4										6	129
AU	696	32	214	23	333	38	5		2	6	216		1,565	10
BB	5	1	10					88	36			1	141	67
BD			2										2	140
BE	10	2	210	16									238	55
BF	6												6	129
BG	27				1		10		72	44			154	64
BH	230	3	565	10			4						812	24
BI	8		61	8									77	87
BJ	6		2										8	125
BN	3		2										5	132
BO	19	3	43	6									71	88
BR	1,665	20	1,062	84	499	12	4		1	16			3,363	3
BW	3		111										114	75
BZ	9		12										21	112
CA	1,331	23	731	47	235	67	5		21	11	48	3	2,522	5
CF	3		10										13	122
CG	2		3										5	132
CH	82	2	309	2				10	28	5	39		477	36
CI	23		17								6		46	98
CL	652	6	579	19	35	6	24		1				1,322	13
CM			8										8	125
CN	1,314	37	1,375	204	315	12	2		10		44	44	3,357	4
CO	330	4	285	26	122	1	12		58	18		13	869	23
CR	248	6	199		12	1	5	5	9		18	2	505	35
CU	16	2	19								41		78	86
CV	4												4	135
CY	11		1							9			21	112
CZ	25	5	360		4		9	9	24	16			452	37
DE	11	5	25	4									45	99
DK	3		252										255	51
DO	77	2	246	6	5		6		8				350	44
EC	312		476	67	5		17		14			1	892	22
EE			15				1						16	118
EG	106	3	243	23	104	14	14						507	34
EL		2		1									3	138
ES	8	5	76	1									90	82
EU	1,229	164	1,306	510	554	87	6	71	87	20	22	3	4,059	2
FI	2		97										99	77
FJ	4		1										5	132
FR	15	4	255	29									303	48
GA		1	2										3	138
GD			28										28	105
GE	23		106								15		144	66
GH	5		13	1									19	116
GM	2		5										7	127
GN	11		1										12	123
GT	81	3	106		2		1		22				215	58
GY	1		23										24	106

ctd.

Appendix Table 5 / (cont.)

	Technical				Trade defence			Agricultural			Other			
ISO2	SPS	STC (SPS)	TBT	STC (TBT)	ADP	CVD	SFG	SSG	TRQ	EXS	QRS	STE	Total	Rank
HK	43		81	2							142		268	50
HN	69	4	95		3								171	60
HR	1	5	39	1			2		8				56	93
HT	1		1										2	140
HU	22	2	35	5			3	5	70	16			158	63
ID	134	21	127	64	139		34		2	1			522	33
IE			3	17									20	114
IL	9	6	1,153	14	63		2		12	6		7	1,272	15
IN	260	24	162	95	958	13	57		3		59	9	1,640	9
IS	8	1	2						86	2			99	77
IT	3	1	35	10									49	97
JM	16		110	1	6		1					1	135	71
JO	43	1	47	1	1		19					1	113	76
JP	734	44	873	20	14	1	1	173	18		85	5	1,968	7
KE	126		940	11									1,077	19
KG	16		48	7			11						82	85
KH			22										22	110
KR	918	30	955	89	179		4	75	67		3	1	2,321	6
KW	66	2	527	11			3						609	30
KZ	55		24	7	7						29	1	123	72
LA	3		1								12		16	118
LC			55										55	94
LK	42		53										95	79
LR	1		3										4	135
LT			35		7		1		1				44	100
LV	46		30		7	2	2		4				91	81
MA	69		28		14		11		16				138	70
MD	25		52	3			3		3			1	87	83
ME	49		15										64	90
MG	78				1		8						87	83
MK	12		7						1				20	114
ML	21		2								20		43	101
MM			2										2	140
MN	2		7										9	124
MO	24		18								20		62	91
MT												1	1	144
MU	17		10								9		36	104
MW	16		39										55	94
MX	462	17	642	23	213	12	2		11	5	57	2	1,446	11
MY	43	5	255	8	92		5		13				421	39
MZ	8		15										23	109
NA			1										1	144
NG	29	1	8										38	103
NI	116		159		3			6	2		32		318	47
NL	68	1	614	10									693	29
NO	38	1	81	13				2	214	11			360	43
NP	29		9	3									41	102
NZ	679	13	124	15	59	5			3	1	126	1	1,026	20
OM	122	4	403	7			4					1	541	32
PA	70	9	107		6		2		14	1			209	59
PE	1,123		122	23	137	12	3				5		1,425	12
PG			1										1	144
PH	535	4	284	1	21		16	11	14		17		903	21
PK	1		108	1	131	3	2						246	52

ctd.

Appendix Table 5 / (cont.)

	Technical				Trade defence			Agricultural			Other			
ISO2	SPS	STC (SPS)	TBT	STC (TBT)	ADP	CVD	SFG	SSG	TRQ	EXS	QRS	STE	Total	Rank
PL	25	5	7		12		6	288	35	17			395	42
PT			1										1	144
PY	29		115		3								147	65
QA	126	2	566	10			4						708	27
RO	25	4	90						7	13			139	68
RU	222	16	90	42	71	2	8		4		93		548	31
RW	1		284	8									293	49
SA	499	4	1,112	25	10		6						1,656	8
SC	51		4								6		61	92
SE			227	6									233	56
SG	62	2	67	3	2						108		244	53
SI	22	1	118		1		1		20				163	62
SK	20	5	47				3	3	24	17			119	74
SN	7	1	14										22	110
SR		1	1										2	140
SV	133	4	259	1	2		3		1				403	40
SZ	8		9										17	117
TG	12		2										14	121
TH	288	7	669	47	99		6		23		73	3	1,215	17
TJ			6										6	129
TN	3		28	1			5		13				50	96
TR	120	11	157	13	294	3	29			44	30		701	28
TT	5	1	119	1	13								139	68
TW	555	9	393	13	82	5	2	105	22		42	3	1,231	16
TZ	28		366	8									402	41
UA	165	3	160	2	70	3	16		1		4	1	425	38
UG	113		1,155	8									1,276	14
UK	4	1	52	10									67	89
UN		24											24	106
US	3,338	70	1,754	87	958	339	19	496	52	13	59		7,185	1
UY	62	2	37	11	9					3	44		168	61
VC	1		13									1	15	120
VE	13	10	35	1	39	2	9		62	72		1	244	53
VN	109	10	156	39	12		6		2			2	336	45
VU			1										1	144
WS			1										1	144
YE	57		167	7									231	57
ZA	74	9	285	10	262	12	7		53	62			774	25
ZM	4		88				1						93	80
ZW	6		1										7	127

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