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**REVEALED CONCERNS: A NEW LOOK AT THE IMPACT OF NON-TARIFF
MEASURES ON AGRI-FOOD TRADE**

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PRELIMINARY AND INCOMPLETE VERSION-PLEASE DO NOT CITE

Abstract:

Despite recent data collection efforts, which has systematically revealed a large and diverse universe of policy measures, identification and quantification of non-tariff measures (NTMs) remains elusive. In this paper, we attempt to shed new light on the landscape of sanitary and phyto-sanitary (SPS) measures impacting agri-food trade by considering a novel revealed concerns-based approach. We exploit detailed information contained in the World Trade Organization's (WTO) SPS and TBT committee meeting minutes on specific trade concerns as a way to 'reveal' major cross-cutting NTM concerns exporters are facing in importing markets. We catalogue the nature and duration of these measures across countries, products and specific classes of NTMs for the period 1995-2014. Preliminary results indicate that developed countries play a significant role notifying specific concerns, although developing country notifications are growing more recently. While animal diseases and tolerances are identified as recurring concerns in meat and fruits and vegetable trade, respectively, a number of concerns related to testing and quarantine, customs procedures, certification and import permits are also on the rise. The results have important policy implications for the current mega-regional trade deals.

Keywords: Specific trade concerns, non-tariff measures (NTMs), sanitary and phyto-sanitary (SPS) measures, technical barriers to trade (TBT).

JEL Codes: F13, Q17

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1. Introduction

We have witnessed a significant shift in the focus of agricultural trade policy concerns from border related costs such as tariffs, quotas, and exports subsidies that dominated much of the research and policy agenda in the lead up to the Uruguay Round Agreement on Agriculture (URAA), to non-tariff measures and a plethora of standards and 'behind-the-border' regulatory policies. While tariffs remain high on a handful of agricultural sectors and tariff-rate quotas guarantee at least some access in certain markets, most agricultural economists agree that new 21st century obstacles to trade are more obscure in nature and have the potential to be more trade distorting (Beghin, Maertens and Swinnen 2015; Josling, Roberts, and Orden 2004; OECD 2005; WTO 2012). Indeed, the ability of countries, both developed and developing, to secure agricultural market access with bilateral and multilateral partners depends increasingly on regulatory and product compliance issues that go beyond the traditional instruments of import protection. As Baldwin (1999) noted more than a decade ago: "...the lowering of tariffs has, in effect, been like draining a swamp. The lower water level has revealed all the snags and stumps of non-tariff barriers that still have to be cleared away" (pg 237).

Broadly defined, NTMs are policy measures, other than ordinary customs tariffs, that can potentially have an economic effect on international trade in goods, changing quantities traded, or prices or both (UNCTAD 2010). These measures are often justified on the grounds that they are necessary to correct market failures to monitor and control the quality, characteristics, and safety of imported food products. On the other hand, because WTO Members have considerable policy flexibility on the products and countries from which to apply NTMs, these measures can deliberately or unnecessarily impede trade (Arita, Mitchell and Beckman 2015; USTR 2014; Cadot et al. 2015).

Among the potential list of NTMs affecting agri-food trade, Sanitary and Phytosanitary (SPS) measures and Technical Barriers to Trade (TBT) stand out in particular in terms of prevalence, economic significance, and negotiating challenges in reforming these oftentimes contentious obstacles to trade. First, SPS measures are pervasive in agri-food trade because of the sensitive nature of issues such as food safety and the protection of plant and animal health from pest and disease risks. Second, the World Trade Organization (WTO) Agreement on the

Application of SPS measures permits countries to adopt their own set of standards provided these measures are based on a risk assessment, not discriminatory between countries with similar conditions, and are minimally trade distorting to prevent the disingenuous use of these measures as instruments of disguised protectionism (Josling, Roberts and Orden, 2004). Third, SPS and TBT measures are the most frequently encountered NTMs in agri-food trade according to data collected from official sources such as the United Nations Conference on Trade and Development's (UNCTAD) Trade Analysis and Information System (TRAINS) and the WTO's new Integrated Intelligence Portal (I-TIP). They are also considered among the most relevant impediments to exports, according to a small sample of NTM business surveys conducted by the World Bank and International Trade Centre (World Bank 2008; ITC 2011).

Despite their widespread use, how and to what extent SPS and TBT measures affect agri-food trade are generally not well understood (WTO 2012). A critical challenge impairing empirical assessment is the lack of suitable data to examine these measures. This is in part due to the vast number of SPS and TBT measures in place. Since 1995, over 18,000 SPS and 26,000 TBT notifications have been reported to the WTO. These notifications include a diverse and heterogeneous array of policies and regulatory standards, from specific maximum residue limit for Sulphur Dioxide on cinnamon exports by Sri Lanka to the European union (EU) to somatic cell requirements in dairy products by the EU, to fumigation requirements for insects. The measures include requirements on labelling and marketing that can have relatively little effects on trade, or may even help to facilitate trade (Beghin, Disdier, and Marette 2015).

Although there is no complete global inventory of public and private NTM measures, multi-country and multi-institutional efforts to define, classify and categorize NTMs and their role in international trade have been undertaken, the most recent being the UNCTAD (2015) report culminating several years of effort by an expert committee termed the Multi-Agency Support Team (MAST). In principle, UNCTAD maintains and periodically updates the TRAINS database that classifies and organizes NTM information for well over 100 different types of measures. However, while the self-notification data available in TRAINS and WTO Member notifications available in I-TIP may be compiled for different types of measures, the sheer number of measures is often an impediment to progress in NTM research. Researchers are

impaired by the inability to distinguish between measures that are of prime concern – those in which policy-makers have a vested interest in targeting resources to negotiate equivalency, reciprocity or harmonization, versus measures that are of inconsequential. As result, currently available data are limited in the ability to assess the significance of NTMs as a barriers to trade across a motely of measures, markets, and commodities and identifying areas most needed in reform. What are the major cross-cutting concerns for SPS/TBT measures on the global landscape? How have these concerns changed over time? Which countries have maintained the most troublesome obstacles to trade? Which countries have complained most vocally about these measures? Which commodities have the largest recorded incidences of concerns? Are most concerns typically resolved? And if so, how long does it take for these measures to get resolved? Answers to these basic although critical questions remain open and form the basis of this study.

In this paper, we attempt to shed new light on the landscape of SPS and TBT measures and their impacts on agri-food trade by considering a novel concerns-based approach. Instead of relying on notification-based data and attempting to tabulate and quantify the vast universe of NTMs (see Disdier et al. 2008), we exploit information discussed and summarized in the SPS and TBT committee meetings over time as a way to ‘reveal’ the major cross-cutting concerns of exporters. The WTO SPS and TBT committees is a venue by which exporters can voice specific trade concerns (STCs) deemed important enough to raise formally through committees where clarification or consultative resolutions are sought. We compile and organize the rich information contained in these meetings to develop a novel database on exporters’ revealed concerns. The revealed concerns approach allows us to sort through NTMs which likely constitute significant “barriers”, as opposed to catalysts or justified measures to protect plant, animal or human health. The revealed SPS and TBT concerns approach is both novel and advantageous because policy-makers may have little incentive to notify their own SPS measures but have all kinds of incentive to notify the “barriers” of their partners. Thus, our inventory of revealed NTM concerns allows us to gain considerable insight on the nature, size, shape and scope of a list of cross-cutting SPS and TBT barriers in agriculture and food product trade.

This paper proceeds as follows. First, we provide an overview of the NTM literature to illustrate where we stand and the state of the art on this issue. In this review, we assess the use of notification-based data that has been largely employed in the literature. Second, we discuss the use of STC data as a way to examine NTMs and highlight the possible advantages of employing a revealed concerns-based approach. We then conduct a detailed tabulations of revealed SPS and TBT concerns across countries, commodities, type of concerns, and time. The resulting analysis paints a global picture of past and present SPS and TBT issues as revealed by agricultural exporting countries. Finally, we conclude by identifying policy prescriptions from this analysis and recommendations for fruitful research directions in this area.

2. Literature review

The list of challenges in empirical assessments of the effects of NTMs such as SPS/TBTs is long and varied (Deardorff and Stern, 1997; Ferrantino, 2010; Beghin et al., 2012). Unlike tariffs, NTMs are not always transparent, directly quantifiable, easily modeled, and data and information on specific types of NTMs is limited. How and when they are applied, and on which countries and commodities have typically only been feasible through case-study approaches. Indirect estimation of NTM costs, or the ad valorem equivalent for use in computable general equilibrium (CGE) models, is challenging because in many cases one does not observe the true counterfactual—that is, the value of trade without the NTM (Arita, Mitchell and Beckman 2015).

A key issue underlying these challenges is the role of data. However, the problem is not necessarily the lack of data or information on NTMs. Information on NTMs may be compiled from official sources from government and international organizations to assemble extensive databases of trade policy measures and regulations that may affect trade. The WTO provides one of the largest depositories of NTM information, made possible by Members' requirement to notify through the SPS Committee a draft of any regulation or measure that can potentially effect trade. Since 1995, there have been over 18,000 SPS and 26,000 TBT measures notified to the WTO, with each measure relating to a different type of regulation that may, or may not, affect trade.

The data challenge arises from lack of a systematic database which is capable of sorting and classifying NTM information in a meaningful way for economic assessment. The United Nations Conference on Trade and Development (UNCTAD) Trade Analysis and Information System (TRAINS) provides the most comprehensive and widely used data for researchers to assess NTMs. In partnership with the WTO and other international organizations, UNCTAD has made great efforts to systematically organize NTM information under different types of measures and tabulate these measures at the HS6 digit commodity code. TRAINS uses information collected through WTO notifications and complements this information from official government sources to tabulate the number of different measures across commodities. In 2006, the database was updated to provide an improved classification system. The classification led by the Group of Eminent Persons on NTMs developed a tree/branch structure where measures are categorized into chapters depending on their scope and design. Appendix A displays this classification scheme for SPS and TBT measures.

Using the UNCTAD trains data, several studies have employed this notification based information to examine the economic effects of NTMs on trade. Given the sheer number of measures included, and the difficulty in organizing the information, simple frequency indices and coverage ratios are some of the approaches used to assess the extent of NTMs (Fontagne, von Kirchbach, and Minouni, 1995). Other studies have used the database to calculate quantity-impact measures based off of econometric estimates of the effects of these measures. Kee et al. (2008) used TRAINS data to estimate the ad valorem effect of price control, quantity restrictions, monopolistic measures and technical regulations. Disdier et al. (2008) and Fontagné, Mimouni and Pasteels (2005) employ the TRAINS data to estimate the effects of SPS and TBT measures. Gourdon and Nicita (2012) employed the updated version of the data to provide a descriptive analysis of the incidence of the various types of NTMs both across countries and economic sectors using simple frequency indices and coverage ratios. UNCTAD (2013) estimated overall trade restrictiveness indices with the TRAINS data and found NTMs to be two to three times larger than tariffs in terms of their effects on agricultural trade.

There are several important limitations of the UNCTAD TRAINS database (Peterson et al. 2013; Grant, Peterson and Ramniceanu 2015). First, TRAINS relies predominately on self-

reported notifications by importing authorities. While countries are obligated and many fulfill their reporting commitments, many of the measures reported are legitimate measures or have little or no effect on trade, and are thus of little concern for exporters. Further, some measures are trade facilitating because they represent important quality and/or safety enhancements of the product (Xiong and Beghin 2014). As such, countries often report thousands of NTMs that have never been raised as an SPS or TBT concern by exporters or escalated to a formal trade dispute. As a result, self-reported notifications tend to be overwhelmed by the sheer number of measures, many of which may be of little concern to exporters. While the TRAINS database attempts to classify all measures, it is not possible to effectively identify which NTMs are of actual concern or applied with protectionist intent.

Second, there is a lack of consistency of reporting behavior and countries are only obligated to report new measures, limiting the comparability of notification-based information.¹ Third, the amount of information that is contained in these notifications is limited. Even if an NTM is notified in the TRAINS database very little information exists describing the type of measure affecting trade, and on which countries and products the measure applies. Fourth, TRAINS does not contain a bilateral (i.e., country-pair) dimension which means researchers must assume that if an import measure is notified it applies to all exporters.

Fifth, some sensitive measures such as those notified under the precautionary principle of the Agreement on the Application of SPS measures are not reflected in the TRAINS database. The precautionary principle – such as the measures adopted in the beef hormone dispute between the US and EU - allows national governments to adopt provisional, and oftentimes stringent, SPS measures to protect domestic plant, animal and human health until the time when appropriate scientific information becomes available.² Sixth, use of NTMs changes over time as new types of measures appear when new ingredients or supplements are registered for

¹ Unlike agricultural tariffs for which WTO Members are required to notify rates and any changes in applicable duties, NTMs are generally not subject to such comprehensive reporting requirements.

² The language in the SPS agreement suggests objective reviews of precautionary SPS measures be conducted within a “reasonable period of time” although what constitutes a “reasonable” length of time is subject to debate and generally established on a case-by-case basis.

use or cost saving input technologies such as new pesticides becomes available. Given the enormous data collection effort required of the TRAINS database, it often takes several years or even a decade before new measures or changes to existing measures are catalogued. Finally, the country coverage of the updated TRAINS version is not comprehensive. Less than 40 countries have been compiled and many of these are not updated in subsequent years.

A growing body of empirical literature has emerged exploring the relationship between NTMs and international trade. Because of data limitations, most empirical investigations of NTMs employ either broad-based inventory approaches which attempt to cover the widest possible scope of notified NTMs, or focus on a single case-study where better information is available for a specific type of measure. Swann et al. (1996) found that non-tariff standards generally promoted trade in the United Kingdom (UK). Their results initially challenged the predominant view that standards restrict trade. Subsequent studies have often found negative effects on trade. Examining the trade impacts of country specific and bilaterally shared standards in 12 OECD countries and 471 industries over the period 1985-1995, Moenius (2004) finds a negative effect of national standards on trade in non-manufacturing sectors. Using frequency and converge ratios for 61 product groups, including some agri-food commodities, Fontagné, Mimouni and Pasteels (2005) find that SPS and TBT measures have a negative impact on agri-food trade but not necessarily on trade in industrial products. Disdier, Fontagne, and Mimouni (2008) use notification frequencies on NTMs and the *ad valorem* tariff-equivalents estimated by Kee, Nicita and Olarreaga (2008) to estimate broad-based impacts of NTM regulations on agri-food trade. They find that NTMs have a negative influence on trade in cut flowers, processed food products (e.g. beverages) and meat, but a strong positive influence on trade in cereals, wool and albuminoids/starch.

An equally important broad-based empirical assessment of the trade effects of NTM regulatory heterogeneity was accomplished in the NTM-IMPACT project (see Orden, Beghin and Henry 2012 for a summary). A broad set of regulations and standards measured on a comparable basis for the EU and nine of its trade partners were assembled by collaborators at twelve institutions. The vast array of NTMs covered by the project are technically complex and difficult to evaluate, aggregate, and quantify. Winchester et al. (2012) articulated these

challenges and described the procedures followed to develop a comprehensive snapshot of EU regulatory heterogeneity in 2008-09 including measures for import requirements concerning food safety, animal and plant health, labeling, traceability, conformity assessment and certification requirements. Indices of the heterogeneity of trade regulation (HIT) were computed in each of these areas. Concluding evidence from this project indicates that regulatory differences in NTMs negatively impact EU trade.

Conversely, case-study approaches have been conducted in the context of standards and residue limits related to food safety and plant health. Jayasinghe, Beghin and Moschini (2009) depart from broad-based inventory approaches and focus on a particular product – US corn seed exports. Making use of the EXCERPT database, the authors use a count variable to determine the number of SPS measures affecting corn seed exports and find that trade is decreasing in the number of foreign SPS/TBT standards required. Similarly, Peterson et al. (2013) and Grant et al. (2015) focus on phyto-sanitary treatments (i.e., Methyl Bromide, Cold and refrigeration treatments, etc.) impacting US fresh fruit and vegetable trade. Both studies find that SPS measures tend to reduce US trade initially. However, an innovation in their study is that exporters can overcome the fixed costs of establishing treatment facilities once exporters accumulate product treatment experience in the global market place such that the negative phyto-sanitary trade effect vanishes.

Case-study approaches to maximum residue limits have offered a number of additional insights. Otsuki et al. (2001) finds a negative effect of the EU's aflatoxin standard on African groundnut exports. Moving from the CAC standard established by the FAO and the WHO to the more stringent European Commission standard decreases African exports of cereals, dried fruits, and nuts to Europe by \$670 million. Xiong and Beghin (2012a) recently overturned the estimated effect in Otsuki et al. (2001), by considering possible demand enhancing effects of SPS regulations. However, other case-studies addressing many of the econometric criticisms raised in Xiong and Beghin (2012a) tend to corroborate the significant negative effects of MRL stringency. Examples include Wilson and Otsuki (2004) for MRLs on chlorpyrifos in banana exports; Wilson, et al. (2003) on the effect of residue limit standards on tetracycline in beef exports; Chen, et al. (2008) on food safety standards impacting China's exports of vegetables,

fish and aquatic products; Drogué and DeMaria (2012) on MRLs affecting apples and pears; and Disdier and Marette (2010) on antibiotics impacting crustaceans exports.

In summary, while case-study approaches have the benefit of signaling out a specific measure, it is difficult to compare across SPS measures. On the other hand, broad-based approaches are useful for an overall picture, yet it is difficult to distinguish between important and unimportant measures. The aim of this paper is to blend case-study and broad-based approaches by developing a targeted approach based on a novel database of *revealed* SPS concerns.

3. Revealed Concerns Database

The WTO SPS Committee is a venue by which members can bring attention to, discuss, and potentially resolve specific trade concerns (henceforth STCs). The committee allows members to exchange information on STCs and discuss inconsistencies associated with implementation of the SPS agreement. STCs are not a formal trade dispute in any legal sense. In fact, only 43 trade disputes related to SPS have escalated out of STCs since the WTO made available detailed information about each concern. Finally, and perhaps more importantly, there is no obligation for members to raise a concern. This is important because unlike simple NTM notifications, STCs provide a strong signal that if exporters are concerned enough to raise the NTM policy issue in the formal SPS committee meetings, they must have reasons to believe their partners' SPS policies are unduly restricting trade or violating implementation of the SPS agreement. The advantage is that this type of 'revealed concern' approach allows us to focus on measures more likely to be targeted for reform.

Since 1995, over 400 STCs have been raised by exporting countries referencing measures maintained by their import trading partners. The STC database includes a rich set of information. Each of the over 400 concerns provides detailed information on the nature of the concern, the HS four and six-digit products affected, the member raising and the member maintaining the STC (i.e., bilateral detail), third-party countries supporting the concern (i.e., multilateral context), the years the concern was (is) active, whether the concern escalated to a formal trade dispute, the severity of the concern based on the number of times the STC was subsequently raised in the SPS committee, whether the concern remains resolved or

unresolved, the specific language used by exporting nations to describe the trade impacts of the measure, and the duration of the concern. We have tabulated and classified each of the SPS concerns since 1995 into two sets of cross-cutting categories (TBT concerns will be finished in a later version of this paper). First, we follow UNCTAD's NTM classification taxonomy of NTM-related SPS measures listed in Appendix A with categories A1 (Prohibitions) through A9 (SPS measures, not elsewhere specified (nes)) along with corresponding sub-headings. Secondly, because UNCTAD's taxonomy is rather broad, we also created ten of our own specialized classifications to more effectively organize STCs according to the nature of the concern. These are listed in Table 1 along with a description and/or example of the concerns falling under each of the ten categories (animal disease related, customs, procedures, certification and licensing, conformity standards and risk assessment, food additives and alterations, microbiological, phytosanitary treatments, plant contamination, production and process requirements, and tolerances and limits)

Mandated in the WTO SPS and TBT Agreements are the establishment of committees to provide a forum for consultations to carry out the objectives of the respective agreements. Committee meetings are held regularly and are intended to discuss SPS/TBT issues, monitor and advance harmonization efforts, and establish norms of the agreement. A critical mechanism of the committees is the consideration of specific trade concerns (STCs). At a meeting, members may raise an STC for any such concern regarding SPS and TBT issues. For example, the last WTO SPS committee meeting which convened on March 16-17, 2016, specific trade concerns raised included the EU over India's revisions of maximum levels of food additives in products, Chile's concerns over Australia's delays in approving Chilean exports of poultry products, concerns over Vietnam's restrictions on Chilean fruit due to fruit flies, and China's suspension of bovine meat imports from the EU over concerns about the Schmallenburg virus in sheep, cattle and goats. Other concerns were reported as resolved. For example, Nigeria's concern over excessive plant certification delays of hibiscus flowers commonly used in beverages and imported into Mexico was reported as resolved.

After removing a few concerns related to non-agricultural products and cosmetics, the resulting database is a panel of 381 specific trade concerns between the years 1995 through the

end of 2014. For each concern however, there are often several countries and products involved including importing countries maintaining the measure, exporting countries raising the measure and supporting countries that may also be impacted. Between 1995 and 2010, fully 100 countries were involved in either raising, maintaining or supporting a given STC. Further, we also observe the HS product codes affected by the SPS measures although the HS codes vary between 2-digit and 6-digit chapters. In total, there were 140 agricultural HS product codes impacted by STCs. Twenty-three products (17% of STCs) were defined at the 2-digit chapter heading, 94 products (67% of STCs) were defined at the 4-digit heading and 21 products (16% of STCs) were defined more specifically at the 6-digit level of the HS. Adding these HS products and the countries maintaining, raising and supporting the concern expands the original 381 STCs to 2,720 observations in the database.³

4. Analysis of Revealed Concerns/STCs

In this section we present a preliminary but incomplete descriptive tabulation of the STC information to get a sense of the main SPS issues raised as specific trade concerns. Our focus here is tabulating concerns across countries, products and types of SPS measures as well as the average duration of concerns.

Specific Trade Concerns since 1995

We first examine STCs across time. We observe that the frequency of concerns raised has been fairly consistently across time. Following the initial WTO agreement, concerns have varied from less than 10 to more than 40 concerns raised per year. There was a slight spike in 2002, in part due to many concerns raised over the outbreak of BSE in the US. Overall, the amount of concerns continues to be quite active with new concerns being raised every year and a record number of trade concerns being raised in the WTO's most recent March 2016 meeting (not shown in the figure).

³ This number will increase even more when we merge the STCs to the trade data on a country-pair basis in a subsequent version of this paper.

Specific Trade Concerns across WTO NTM Subject Codes

Figure 2 presents the SPS STCs by broad WTO categories: Animal Health, Food Safety, Plant Health, and Other. We observe that animal health makes up the largest category of SPS measures. Animal disease outbreaks such as bovine spongiform encephalopathy (BSE), swine flu, and avian influenza are some of the largest related concerns. Many of the concerns are related to measures being overly protective compared to international guidelines and lack of regionalization. Animal Health concerns is followed by food safety concerns which makes up approximately 31% of measures including concerns over tolerance limits, over difference substances in foods and feed, and microbiological criteria on final products. Plant health accounts for a relatively smaller percentage of concerns, with pest-control related concerns making up the largest SPS measures in this category.

Specific Trade Concerns by maintaining and raising/supporting members

Figure 3 has two panels showing the number of STCs as maintained by importing countries and the exporting countries either raising or supporting the concern. The figure indicates that the EU has by far the most number of concerns raised against its measures. The United States and Japan closely follow. The high number of concerns in the EU and Japan may be in part due to the relatively higher standards both countries require. Overall we observe that STCs are concentrated among the largest agri-food import markets. This should not be a surprise as we expect that exporters are more likely to raise concerns on measures of more economic importance, and would expect that such concerns are related to larger markets. Nevertheless we observe that STCs have been raised on smaller, developing country markets, with China, Brazil, and Indonesia also having many of their SPS measures raised as specific trade concerns.

The second panel of figure 3 shows the number of STCs by raising and/or supporting countries. The United States has raised the most STCs. The US is followed by the EU and Argentina. Once again, the highest participation in raising or supporting STCs is among developed and emerging countries. However, we also note that many small agricultural

exporters also raise STCs. Peru, Cuba, Indonesia, Senegal and other developing countries have all raised a significant number of concerns.

Specific Trade Concerns by Sector and NTM Type across Countries

Figures 4 and 5 examine the breakdown of specific trade concerns across commodities and NTM types for selected markets. We observe that concerns across commodities vary significantly across importing markets. For the EU, measures for fruits and vegetables and cereal products, make up the largest concerns. For the U.S., most concerns are related to measures imposed on fruit, vegetables and meat products. For China, measures related to meats make up the largest concern. We observe that the distribution of concerns raised across commodities and countries are not necessarily aligned with the levels of protectionism that would be expected across these commodities.⁴ For some politically sensitive commodities in a given country, few or no STCs have been raised, when in fact there is a high level of protectionism, (e.g. rice in Japan and Korea, meat products in India and Russia, sugar in the U.S.). As discussed earlier this is in part due to different commodities (meats and fruits) having a higher need for SPS protection. However we also must keep in mind the selective sample the STCs provide. The STCs reflect only a sub-sample of concerns brought up in SPS/TBT committees related to measures exporters would like to see reformed in a timely manner. As discussed earlier these concerns are tilted to larger markets, which are of more economic interest for exporters. In addition, the concerns are tilted towards measures that are viewed as critical barriers, but not so critical or contentious, such that they are unlikely to be addressed. As a result, it is possible that some SPS/TBT issues which may be considered as the most egregious disguised barriers to trade, may not be brought up through the SPS/TBT committees, because they may be perceived as having a small likelihood of being addressed.

Specific Trade Concern Duration

⁴ NTMs have been viewed as trade policy instruments that could be used to help protect domestic producers. Studies have provided evidence that NTMs and tariffs are substitutes (Kee, et al. 2009) as well as complements (Dean, Ludema, Signoret, Feinberg and Ferratino (2009)).

Another interesting tabulation from the STC database is the average duration of concerns. Overall, 44% of all SPS STCs are reported as being resolved or partially resolved. The remaining 56% of the STCs are not reported as being resolved. These concerns may have reached a resolution at some time, but may not have been reported to the WTO. It is not possible to know to what extent unreported concerns are ultimately resolved. However, if an STC has not been subsequently raised in further committees, it is likely that the concern has been resolved but unreported.

Figure 6 examines the duration of STC concerns by different SPS types. For concerns that have not been reported as being resolved and have not been raised in subsequent committees, we estimate these concerns to be resolved 3 years after they were subsequently raised. The figures indicate that while most measures are ultimately resolved, they generally require a considerable amount of time to be addressed. On average, SPS issues take 3 to 4 years to be resolved. Concerns require a significant amount of bilateral engagement and it takes time for regulatory agencies to adjust different measures in response to the concerns of exporters. Furthermore some concerns last a very long time, sometimes taking more than a decade to be ultimately resolved.

For example concerns over BSE restrictions has been a longstanding issue that still has not been completely resolved today. In many of the importing countries that had imposed BSE-related trade restrictions, the loosening of these restrictions was very gradual and followed a highly precautionary approach. For years, Japan, which experienced its own case of BSE in 2001, only allowed U.S. beef from cattle younger than 21 months to enter into their market despite the World Organization for Animal Health's (OIE) recommendation that beef obtained from cattle less than 30 months of age be allowed for importation from a "controlled risk" country such as the United States.⁵ After years of talks, Japan, as of February 1, 2013, began to allow the import of beef from cattle less than 30 months of age. By contrast, Australia still retains its strict import restrictions on North American beef, although U.S. beef and beef products are currently undergoing a risk assessment to attain market access.

Longstanding SPS issues are not uncommon. Avian influenza and the EU's regulation on novel foods are other examples of SPS STCs that have been under discussion for many years. Several of these measures ultimately require dispute settlement (India with HPAI). The lengthy time of these measures may not necessarily be due to protectionist motivations, but could be driven by institutional challenges of having

⁵ U.S. beef status of "controlled risk" was upgraded (deemed lower risk) to "negligible risk" in May 2013.

regulatory agencies be more responsive to foreign exporter SPS concerns. The long duration of unnecessary SPS measures is an important consideration of the economic costs behind these barriers. More work is needed to understand why some measures of concern have taken a longer time for resolution than other measures.

5. Conclusions

In this paper, we attempt to gain preliminary new insight of the landscape of SPS/TBT measures and how they have affected agri-trade by considering a novel concerns-based approach. Instead of relying on notification-based data on the vast universe of measures in place by importers, we exploit information contained in SPS and TBT committees as a way to 'reveal' the major cross-cutting concerns of exporters. Our study finds that the amount of concerns have been fairly consistent over time. Animal health concerns due to disease outbreaks, food safety concerns over tolerance limits, and pest-control related concerns make up the chief concerns for trade. The level of concerns are higher for larger markets and countries which have been viewed as having higher standards. Across major markets we find that measures for fruits and vegetables in the EU, fruit, vegetable and meat products in the U.S., and meat products in China, are key sources of concerns. Finally, our findings indicate that the duration of concerns is an important consideration for economic costs. SPS concerns take years to be resolved, and can thus impede trade for a significant amount of time.

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Table 1. NTM Classification of Specific Trade Concerns

NTM	Abbreviation	Description/Example
1. Animal Disease Related	ADR	FMD, BSE, and applications of waste from infected animals on other sectors
2. Customs, Procedures, Certification, Licensing	CPR	Discretionary import licensing problems; Certification procedures; Excessive comment periods for new regulations
3. Conformity Standards & Risk Assessment	CRA	Mandatory risk assessment before entry of.
4. Food Additives & Alterations	FAD	Restrictions on ingredients and substances added to food
5. Microbiological related	MICB	Salmonella, Campylobacter, listeria, etc.
6. Treatments	PHT	Cold& heat treatment, fumigation, pest-free zones, systems approaches to pest risk
7. Plant Contamination	PLCT	Diseases on plant parts, noxious weed seeds, pests
8. Production & Process Requirements	PPR	Hygiene requirements, Grade A facilities, restrictions on hormones/beta agonists
9. Tolerances and Limits	TOL	Maximum residue limits, tolerances, international standards

Source: Author's compilation based on specific trade concerns

Figure 1. Number of Specific Trade Concern Notifications through 2016

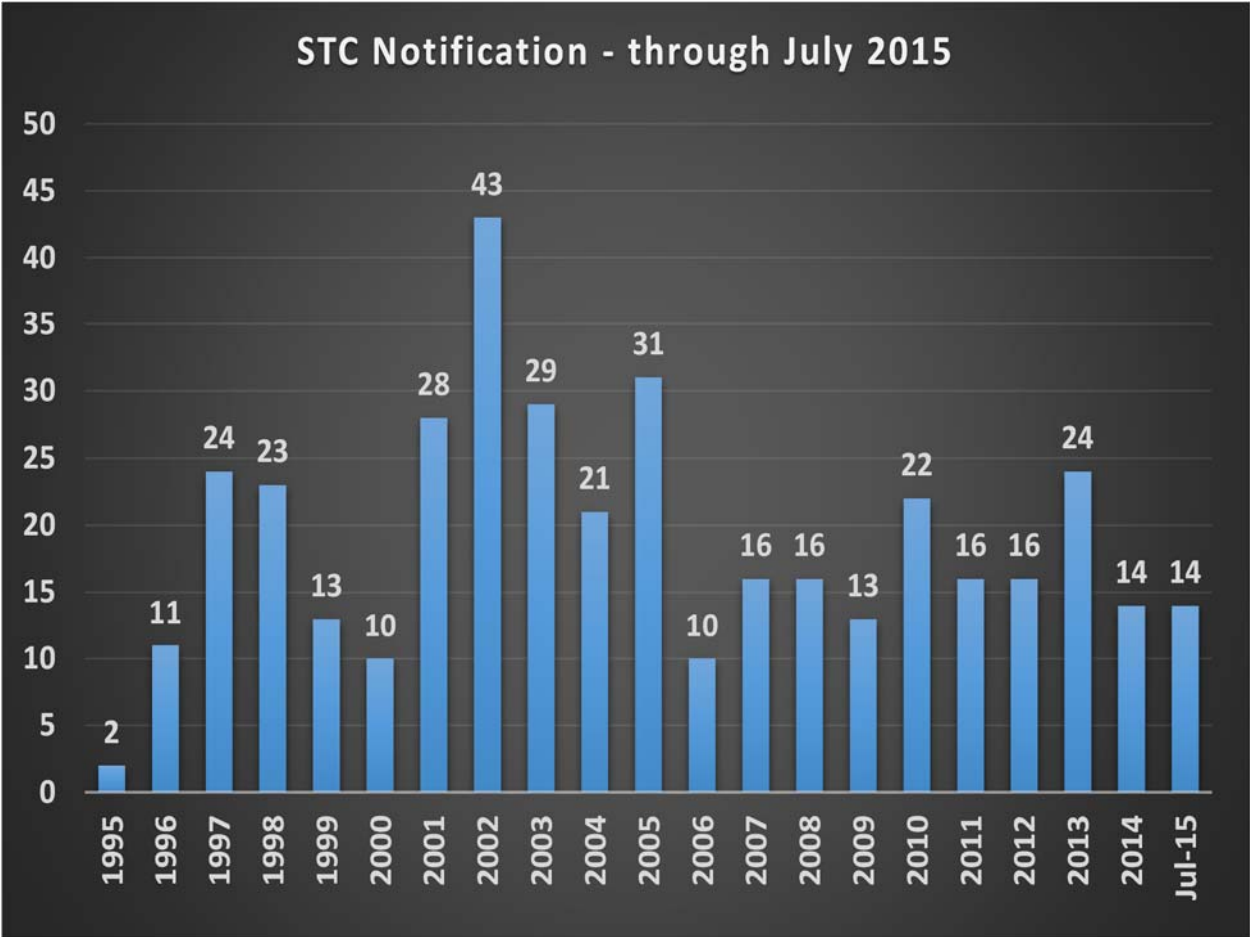
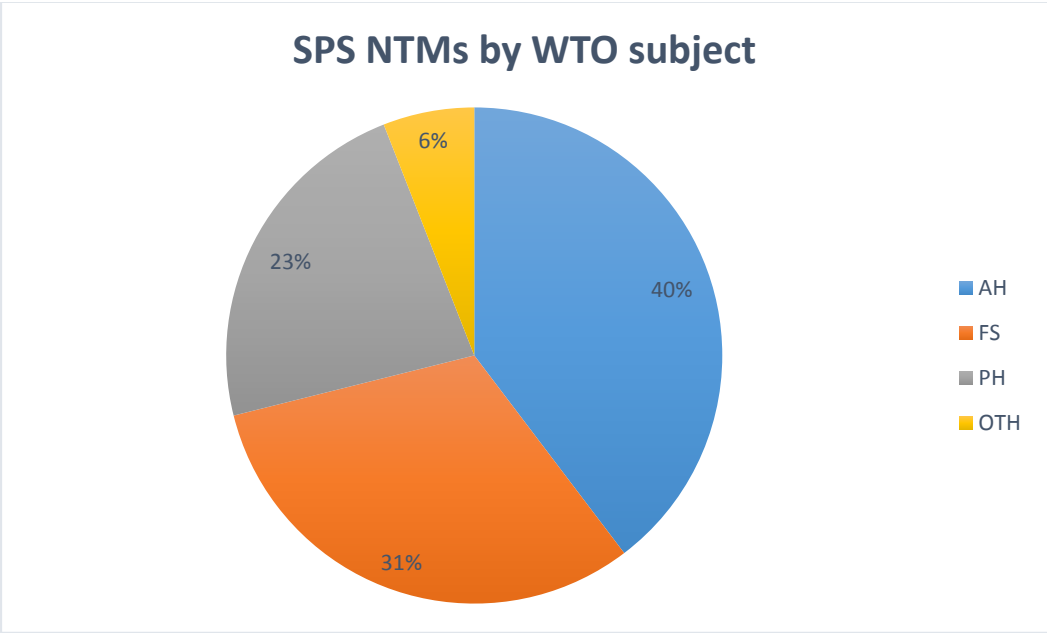


Figure 2. Share of Specific Trade Concerns by WTO Subject Code



AH: Animal Health; FS: Food Safety; PH: Plant Health; OTH: Other concerns related to licensing and certification

Figure 3. STCs by Maintaining and Raising/supporting Countries

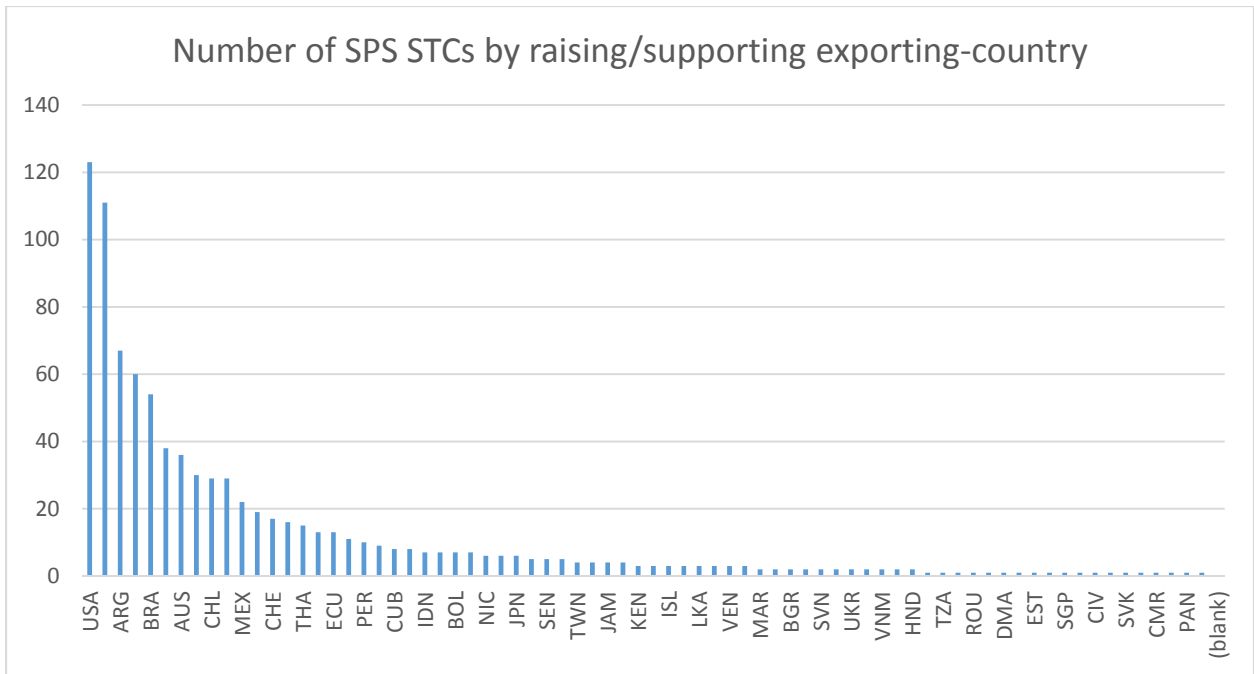
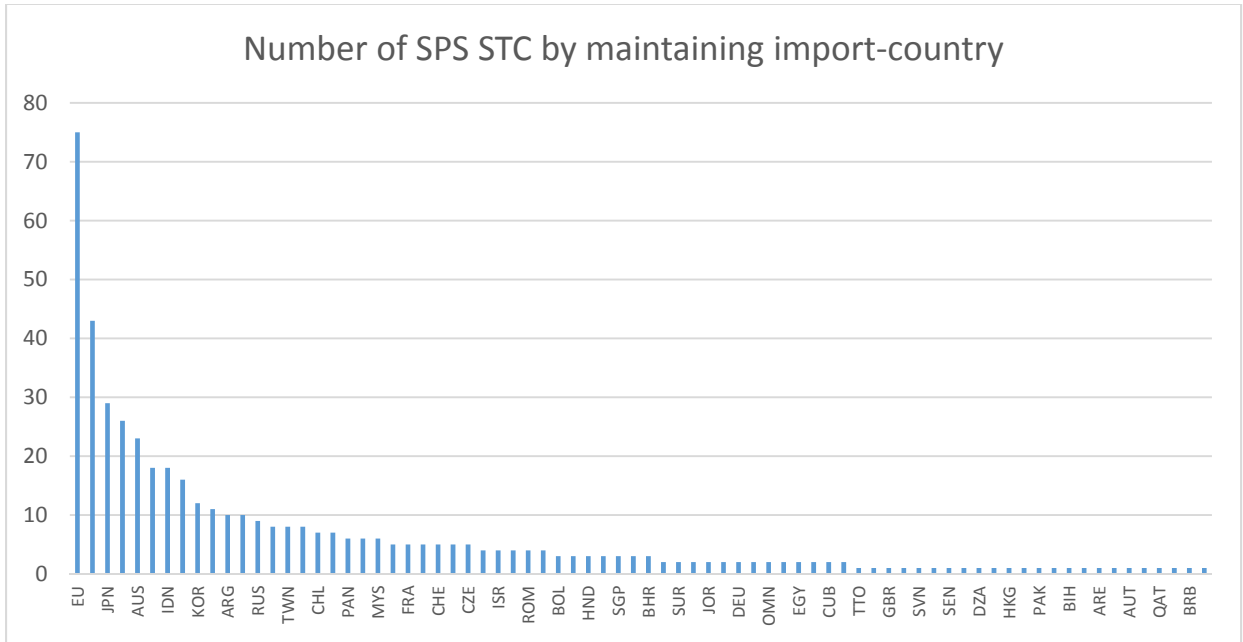


Figure 4. STCs by sector for selected countries

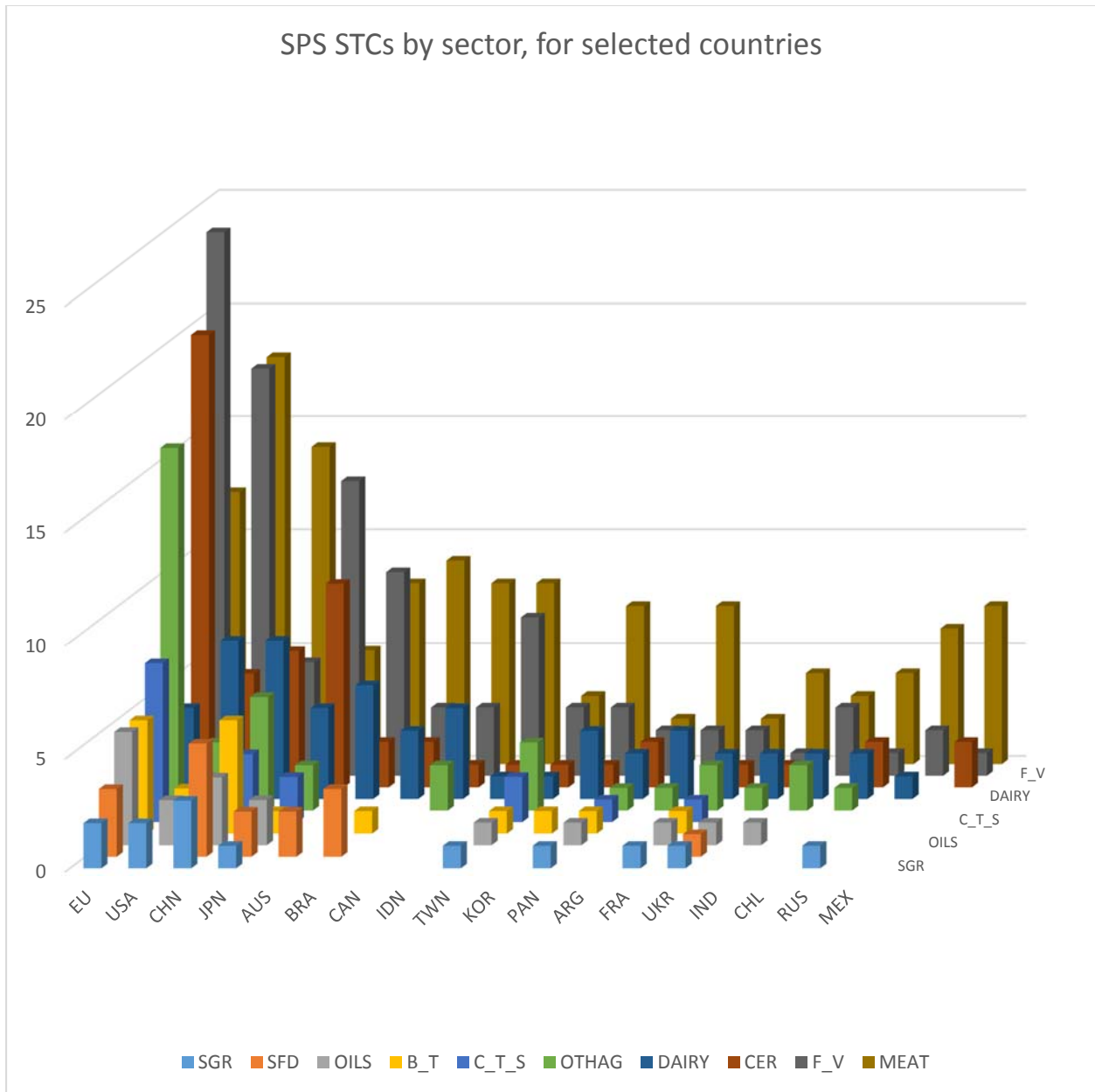


Figure 5. STCs by NTM type for selected countries

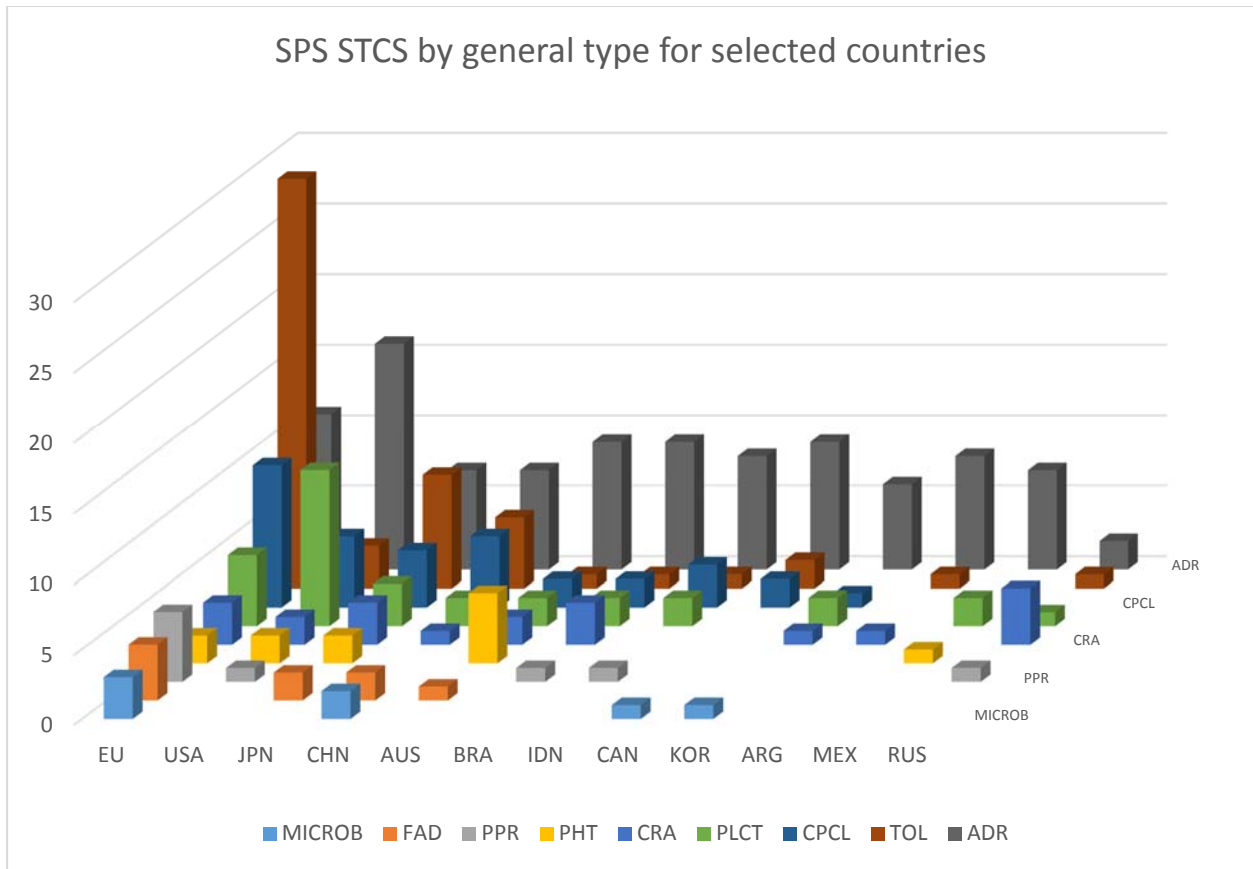
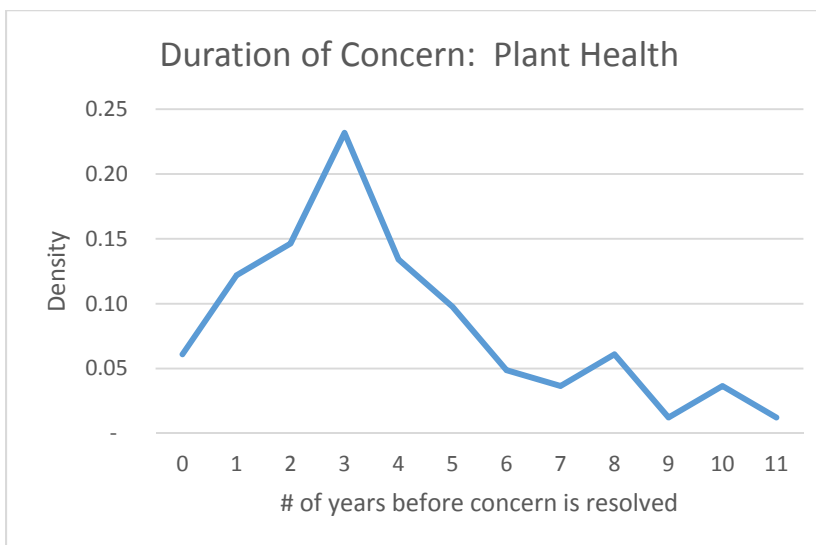
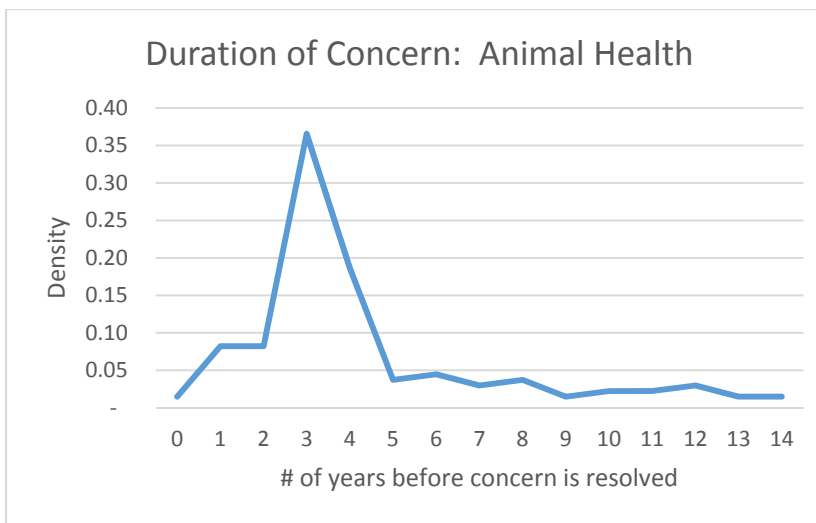
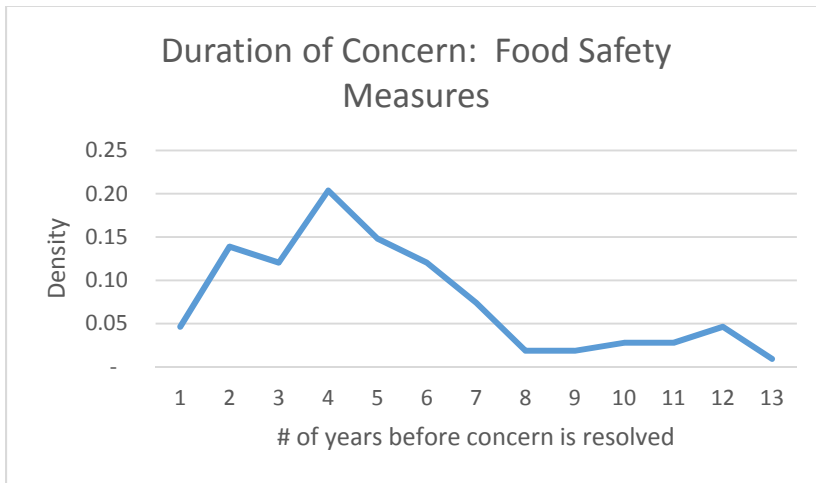


Figure 6. Duration of STCs by WTO NTM Subject Code



Appendix A. UNCTAD Classification of Non-Tariff Measures

UNCTAD NTM Classification Scheme	
A1	Prohibitions/restrictions of imports for SPS reasons
A11	Temporary geographic prohibitions for SPS reasons
A12	Geographical restrictions on eligibility
A13	Systems approach
A14	Special authorization requirement for SPS reasons
A15	Registration requirements for importers
A19	Prohibitions/restrictions of imports for SPS reasons, not elsewhere specified (n.e.s.)
A2	Tolerance limits for residues and restricted use of substances
A21	Tolerance limits for residues of or contamination by certain (non-microbiological) substances
A22	Restricted use of certain substances in foods and feeds and their contact materials
A3	Labelling, marking and packaging requirements
A31	Labelling requirements
A32	Marking requirements
A33	Packaging requirements
A4	Hygienic requirements
A41	Microbiological criteria of the final product
A42	Hygienic practices during production
A49	Hygienic requirements, n.e.s.
A5	Treatment for elimination of plant and animal pests and disease-causing organisms
A51	Cold/heat treatment
A52	Irradiation
A53	Fumigation
A59	Treatment for elimination of plant and animal pests and disease-causing organisms
A6	Other requirements on production or post-production processes
A61	Plant-growth processes
A62	Animal-raising or catching processes
A63	Food and feed processing
A64	Storage and transport conditions
A69	Other requirements on production or post-production processes, n.e.s.
A8	Conformity assessment related to SPS
A81	Product registration requirement
A82	Testing requirement
A83	Certification requirement
A84	Inspection requirement
A85	Traceability requirements
A86	Quarantine requirement
A89	Conformity assessment related to SPS, n.e.s.
A9	SPS measures, n.e.s.

Source: UNCTAD (http://unctad.org/en/PublicationsLibrary/ditctab20122_en.pdf).