Research for AGRI Committee - Agricultural trade: assessing reciprocity of standards

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Research for AGRI Committee - Agricultural trade: assessing reciprocity of standards

Agriculture and Rural Development

Policy Department for Structural and Cohesion Policies
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Abstract
The aim of this study is to provide an assessment of the application of the reciprocity principle in EU agri-food trade at global level. The report provides substantial evidence for progresses occurring at worldwide level in regulatory rapprochement. Scientific cooperation, collaboration between risk assessment bodies, harmonization of control procedures and early warning systems for emerging hazards can facilitate progress in this direction, reducing transaction costs and information asymmetries in agri-food trade.

This document was requested by the European Parliament's Committee on Agriculture and Rural Development.

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LIST OF ABBREVIATIONS

AI	Avian Influenza
ADP	Antidumping Measures
AMA	Agricultural market access
AMT	Antimicrobial Treatment
ANVISA	National Agency of Sanitary Surveillance (Brazil)
AQSIQ	Chinese General Administration of Quality Supervision, Inspection and Quarantine
ASEAN	Association of South-East Asian Nations
ASF	African Swine Fever
BPI	Bureau of Plant Industry (The Philippines)
BSE	Bovine Spongiform Encephalopathy
CAP	Common Agricultural Policy
CETA	Comprehensive Economic and Trade Agreement with Canada
CSF	Classical Swine Fever
DAC	Department of Agriculture and Cooperation (India)
DCs	Developing Countries
DGIF	Dirección General de Inspección Fitozoosanitaria (Mexico)
DOST	Department of Science and Technology (The Philippines)
EC	European Commission
EFSA	European Food Safety Authority
EU	European Union
FAO	Food and Agriculture Organisation
FDA	US Food and Drug Administration
FDI	Foreign Direct Investment

FIAP	Food Improvement Agents' Packages
FMD	Foot-and-Mouth Disease
FSL	Food Safety Law
FSIS	US Food Safety and Inspection Service
FSMA	US FDA Food Safety Modernization Act
FSSAI	Food Safety and Standards Authority of India
FSSR	Food Safety and Standard Regulation
FTAs	Free Trade Agreements
F&V	Fruit and Vegetables
GA	Global Agreement
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GIs	Geographical Indications
GMO	Genetically Modified Organism
GFL	General Food Law
HACCP	Hazard Analysis Critical Control Point
HLD	High Level Dialogues
HPAI	Highly Pathogenic Avian Influenza
HS	Harmonised System of trade data
IMF	International Monetary Fund
IMS	US Inter State Conference of Milk Shipments
IOC	International Olive Council
IOOC	International Olive Oil Council
IPPC	International Plant Protection Convention
IPRs	Intellectual Property Rights
IPS	Integrated Pest Management

ISO	International Organization for Standardization
LHCA	Korean Livestock Health Control Association
LPAI	Low Pathogenic Avian influenza
LOD	Limit of Determination
MADB	Market Access Database
MAFRA	Korean Ministry of Agriculture, Food and Rural Affairs
MAPA	Ministry of Agriculture, Livestock and Food Supply (Brazil)
MB	Methyl Bromide
MFN	Most Favoured Nation
MRLs	Maximum Residue Level
MS	Member State
MCRZI	Module for the request for zoosanitary import requirements (México)
NAFTA	North-American Free Trade Agreement
NAMA	Non agricultural market access
NAPs	National Action Plan
NBTs	New Breeding Techniques
NCBP	National Committee of Bio-Safety of the Philippines
NEC	National Emission Ceilings
NGOs	Non-Governmental Organizations
NPPO	National Plant Protection Organization (The Philippines)
NTBs	Non-Tariff Barriers
NTMs	Non-Tariff Measures
OCA	Other Counteracting Measures
OECD	Organisation for Economic Co-operation and Development
OIE	World Organisation for Animal Health / Office International des Epizooties
PCA	Partnership and Cooperation Agreement

PDO	Protected Designation of Origin
PGI	Protected Geographical Indication
PQIS	Plant Quarantine Information System (India)
PRAs	Pest Risk Analysis
PRTs	Pathogen Reduction Treatments
PTAs	Preferential Trade Agreements
QIA	Korean Animal and Plant Quarantine Agency
OISA	Oficina de Inspección de Sanidad Agropecuaria (Mexico)
QRS	Quantitative restrictions
RoOs	Rules of Origins
RTAs	Regional Trade Agreements
SAGARPA	Secretaria de Agricultura, Ganaderia, Desarrollo Rural, Pesca y Alimentación (Mexico)
SCC	Somatic Cell Count
SEFAG	Service of Agriculture Inspection (Brazil)
SENASICA	Servicio Nacional de Sanidad, Inocuidad y Calidad Agroalimentaria (México)
SICPA	Information System for the Search of Authorised Establishments (México)
SMEs	Small and Medium Enterprises
SP	Strategic Partnership
SPS	Sanitary and phytosanitary
STCs	Specific Trade Concerns
TBT	Technical Barriers to Trade
TDCA	Trade and Development Cooperation Agreement
TFEU	Treaty on the functioning of the European Union
TPC	Third Party Certification
TPP	Trans-Pacific Partnership

TRAINS	Trade Analysis and Information System database
TRIPS	Trade-Related Aspects of Intellectual Property
TRQ	Tariff-rate Quota
TSD	Trade and Sustainable Development
TSE	Total Support Estimate
TTIP	Transatlantic Trade and Investment Partnership
UNCTAD	United Nations Conference on Trade and Development
USA	United States of America
VIGIAGRO	Supervisory Board of International Agriculture and Cattle Raising (Brazil)
WFD	Water Framework Directive
WITS	World Integrated Trade Solution
WTO	World Trade Organization

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GLOSSARY

Coexistence principle: Legal regime in WTO under which a geographical indication and a trademark can both be used concurrently to some extent even though the use of one or both would otherwise infringe the rights conferred by the other.

Conformity assessment procedures: Procedures demonstrating that a product being placed on the market complies with all legislative requirements.

Coordination or alignment: **Co-ordination**: gradual narrowing of relevant differences between regulatory systems, often based on voluntary international codes of practice (sometimes called **alignment**).

Establishment approval: List of firms eligible for exporting as a way to achieve high food safety and product quality.

Geographical indications (GIs): Denomination signalling the geographic origin of a good.

Geographical restrictions (GRs): Measures impeding imports of certain products from a specific country or region.

Harmonisation: Standardisation of regulations in identical form, i.e. equivalence of regulation

Intensive Margin: Volume of trade where a bilateral trading relationship already exists.

Extensive margin: Probability of trading when a new trading bilateral relationship is established between countries that have not traded in the past.

Mutual recognition: Acceptance of regulatory diversity while making sure the same goals are being aimed at, i.e. equivalence of results. Sometimes called **reciprocity** or **equivalency**.

Non-tariff Barriers (NTBs): Restrictions that result from prohibitions, conditions, or specific market requirements that make the import or export of products difficult and/or costly.

Non-discrimination: Equal treatment given to national and imported products (article 2.3 of WTO). The aim of this principle is to avoid the application of unjustifiable asymmetrical requirements between domestic production and imports, which as a result may have protectionist effects.

Non-tariff measures (NTMs): Policy measures, other than ordinary customs tariffs, that can have an economic effect on international trade in goods, changing quantities, prices, or both. Examples of NTMs are quotas, subsidies, trade defence measures and export restrictions.

Pest risk analysis (PRA): Risk analysis conducted by regulatory plant health authorities to identify the appropriate phytosanitary measures required to protect plant resources against new or emerging pests of plants or plant products. It is intended to protect the country's agriculture from damage that can be caused by harmful (quarantine) pests, which can be brought in along with imported commodities.

Precautionary principle (Art. 5.7 of the SPS agreement): "Safety first" approach to deal with scientific uncertainty. If relevant scientific evidence is insufficient, members may adopt SPS measures, on a provisional basis, while seeking additional information about the risks posed by a hazard.

Regionalisation, or zoning: Method implemented by countries to create and maintain areas with a particular health status, in order to enable and promote international trade, in accordance with the recommendations of Chapter 1.3.5 of the OIE International Animal Health Code (the Code). The criteria for the establishment and maintenance of a particular animal health status must be laid down by the national Veterinary Authority and must be based on the specific epidemiology of each disease considered. These criteria may differ in each case with respect to the existence or non-existence of

natural barriers, the quality and range of disease containment measures, including the use or non-use of vaccination, the control of animal movements to and from the zone in question, and, especially, the extent of surveillance carried out by the Veterinary Services in the area.

Regulatory convergence/ regulatory divergence: Alignment of regulations.

Risk Analysis: Evaluation component of the broader risk assessment process, which determines the significance of the identified risk concerns. Simplifying, it is the actual quantification of risk.

Risk Assessment: Processes and technologies that identify, evaluate, and report on risk-related concerns.

Risk Management: Continuing process to identify, analyse, evaluate, and treat loss exposures and monitor risk control and financial resources to mitigate the adverse effects of loss. We typically simplify this a little and describe it as the Identification, Analysis (or Measurement), Treatment and Monitoring of risk.

Sanitary and Phytosanitary Measures (SPS): Measures applied to protect human or animal life from risks arising from additives, contaminants, toxins or disease-causing organisms in food.

Specific trade concerns (STCs): Issues related to specific measures (such as technical regulations, standards and other requirements) maintained by other members discussed within the WTO Technical Barriers to Trade (TBT) Committee.

Technical Barriers to Trade (TBT): Measures that refers to technical regulations and procedures for assessment of compliance with technical regulations and standards. Examples of TBT are labelling requirements.

Trademarks: Indication of the commercial origin of a good or service.

Transparency principle: Under the SPS Agreement, countries undertake to: i) announce publicly their intention to introduce a measure, ii) notify through the WTO Secretariat the contents of the measure, iii) upon request of another member, provide further details about the measure, iv) allow time for comments from other members, discuss them if required and consider this process in the final proposal (Annex 2, Par. 5). The SPS Agreement itself establishes exceptions to this in cases where the aforementioned process can be counterproductive, since urgent problems related to sanitary and phytosanitary issues can arise.

EXECUTIVE SUMMARY

Background

Over the past decades, the reduction in tariffs through multilateral and regional trade agreements has provided greater opportunities for the expansion of global agri-food trade. However, in order to trade globally and access markets for high-value products, food operators must meet international production standards.

The use of international standards worldwide helps make trade more transparent and efficient. It also contributes to public health, environmental protection or animal welfare. Standards ruled by multilateral bodies have an increasing impact on trade in agricultural and food products. This includes the Sanitary and Phytosanitary Measures (SPS agreement) and on Technical Barriers to Trade (TBT agreement) under the WTO, the *Codex Alimentarius Commission of the FAO*, and others.

However, there is a wide variety of standards implemented outside these multilateral bodies. EU standards increasingly regulate food safety, animal and plant health, animal welfare and environment protection. Standards are also part of the Common Agricultural Policy (CAP) which requires compliance with several of these standards (referred to as 'management requirements' and 'good agricultural and environmental practices') to receive direct payments. Food safety requirements (concerning traceability, contamination prevention, feed additives, hygiene requirements, hormones treatments, etc.) play a crucial role inside both in the CAP and in the EU Food Law, to ensure food quality and safety "*from farm to fork*". EU food regulations lay down requirements for horizontal issues (General Food Law, official controls, etc.) as well as vertical (category-specific) requirements (food additives, packaging materials, etc.).

In addition to standards set by public institutions, a variety of private entities use voluntary standards, which are an important part of the international trade framework. However, mandatory standards remain the predominant form of European governance over food safety, animal welfare and environment protection – and the focus of this report.

Outside the EU, many public food standards exist both in their legal regulation and their enforcement that are different from the EU standards. These differences create problems for trade and can also be used to affect competitive advantage of farmers or the food industries. "Regulatory fragmentation" may thus imply significant additional costs for producers that have to modify their products and/or undergo extra conformity assessments (possibly for no added food safety or other public benefits). These costs may be particularly significant for farmers and agri-food SMEs, and constitute an insurmountable market access barrier.

In a context of declining tariff barriers in global markets, and where the social concerns and expectations often differ between countries, standards and regulatory tools have become elements of strong debate in international trade negotiations (at multilateral, regional or bilateral level). Differences in standards may be used to affect trade. Countries with low standards may be able to produce at lower costs, giving them a potential competitive advantage vis-à-vis EU farmers who face extra costs when complying with the European legislation. On the other hand, countries may use regulatory differences as a mechanism to protect domestic markets against imports. Some studies have argued that this protectionist use of standards has increased in recent years as trade agreements have constrained the use of import tariffs and quotes, the traditional mechanisms of protection.

However, as the role of standards has grown, reciprocity of *product standards and product procedures* have become increasingly important aspects of EU trade agreements. Most EU free trade agreements in the past did not have the purpose to create conditions analogous to those of the internal market. In

the past trade agreements point essentially to multilateral provisions and were far from symmetric. In addition, animal welfare and environmental standards are not usually part of the '*mutual recognition agreements*' (MRAs) and some sensitive agricultural products are frequently excluded from trade agreements. Trade agreements can also be achieved by applying the *mutual recognition principle* (or' *equivalency*' approach) on food production standards.

The EU is the world's biggest trading bloc and has the largest numbers of Free Trade Agreements (FTAs) in the world. In its approach to standards in new trade agreements, the EU has tried to achieve two objectives. On the one hand it follows European trade policy wants to contribute to the liberalization of world trade by lowering customs and trade barriers (as in Article 206 TFEU). On the other hand it wants to guarantee European consumers standards regarding food safety, animal welfare, environmental protection and minimum social standards – and thus to prevent a race-to-the-bottom on standards.

In 2015, the European Commission set out a new trade strategy for the European Union through a Communication known as "*Trade for all*". The strategy wants to make sure that as many people as possible (consumers, workers, SMEs and citizens in general) have access to the benefits of trade. The "*Trade for all*" strategy also implies guaranteeing EU standards on consumer, environmental and social protection. Part of this is providing consumer confidence in the safety of the food products they buy and how food products are made (e.g. fair working conditions and without harming the environment or animal welfare). This new trade strategy envisages reciprocal and effective opening of trade, while also enhancing global governance on issues like food safety, public health, environmental protection and animal welfare.

Objectives of the Study

The objectives of the study are to provide qualitative and quantitative assessments on the application of the reciprocity principle of standards in the EU agri-food trade and inform Members of European Parliament of any potential threats to both competition and consumer protection from an unequal application of the food production standards.

In pursuing this objective, the report documents the growth and extent of standardisation in EU agri-food trade and analyses the major drivers of food standards and their implementation at the global level. The study combines a thorough review of the existing literature and available datasets with new analyses of specific important aspects of standards and EU agri-food trade, in particular relating to food safety, animal and plant health, animal welfare and environment protection. An important issue is our analysis of the application of the reciprocity principle in food standards, which is analysed through a combination of data analysis and specific case studies.

Key Findings

Agri-food production and trade are increasingly regulated through stringent standards on quality, safety, environmental, and ethical aspects. These standards are imposed by governments (public standards) but also by private companies and third parties (such as NGOs) and have spread geographically through trade and foreign direct investments (FDI). Interestingly, while the use of standards has been criticized for hampering trade, the emergence and spread of standards across the world has coincided with the growth of global trade in agricultural products. Moreover, the growth has been the most pronounced for those products where standards are most important, such as fruits, vegetables, seafood, meat and dairy products.

Standards have also transformed the structure and the organization of global and local value chains. Compliance with increasingly complex and stringent food standards require tighter vertical

coordination within value chains. It may also have implications for the position and investment of farms in the value chains, competition at various stages in the value chain, and the welfare of farmers and consumers.

Standards almost always affect trade, but the impact can be positive or negative depending on the nature of the standard, the product, the (international) markets and institutions, etc. Standards can enhance trade and welfare by *reducing asymmetric information* (eg by guaranteeing certain safety and quality attributes), by *reducing externalities* (e.g. guaranteeing the absence or limits of undesirable environmental or social externalities), by *reducing transaction costs* in trade, etc. All these effects of standards will typically enhance trade and welfare. However, standards can also be used to *protect domestic producers* against imports, especially when traditional protectionist instruments such as tariffs have been reduced as a consequence of trade agreements and agricultural policy reforms.

It is difficult often to disentangle between both effects, and, not surprisingly, vested interests have an incentive to distort information on the impacts. This makes the conceptual analysis and empirical studies on the impact of standards complex, and makes it difficult to identify the "optimal standard" from a social welfare perspective. It is also likely that the "optimal standard" may differ between countries, due to differences in economic development, comparative advantage, consumer preferences, institutions and infrastructure, etc. These differences add another layer of complexity in the discussions on the costs and benefits, and therefore the desirability of harmonization of standards.

International **harmonization and coordination of standards has become ever more pertinent in recent years** as agri-food trade has continued to grow and it is increasingly governed by a wide variety of standards. Yet it should be noted that if differences in standards between countries or trading blocs are large, **harmonization and regulatory rapprochement of standards does not necessarily only have benefits.** Complete harmonization can be costly in terms of deviating from a country's social optimum.

Historically, the WTO has played a pivotal role in working towards international coordination of regulations and standards. Yet, despite major advances in the development of global standards and common conformity assessment under the institutions recognized in the WTO international trade rules on standards and regulations (TBT and SPS agreements), domestic and import regulations continue to differ from country to country.

Moreover, there are growing complaints about the obstacles that these standards and their implementation pose for trade increase, as reflected in the continuously growing number of "specific trade concerns" (STCs) that WTO members submit.

The EU received the highest number of official complaints (STCs) – about 20% of the total STCs are about EU policies. The STC issues raised by the EU often concern a criticism towards import length and lack of transparency in bureaucratic procedures in many trade partners, mainly LDCs.

At the same time, the EU has submitted the largest number of official complaints - about 20% of total number of STCs was submitted by the EU about its trading partners' policies. The United States and China are also among the top 4 of countries submitting and receiving STCs. Other active countries include Brazil, Mexico, Canada and Australia. Small developing countries are much less active, presumably because of the high (political or economic) costs of submitted such STCs.

Despite the growing number of STCs, **there are many areas of trade concerns where substantial progress in harmonization and/or mutual recognition is made.** For example, more than half of the issues raised by the EU have been positively solved in a reasonable time, showing the positive impact of increased collaboration between countries on specific issues.

Our case studies also document (a) progress in harmonization and in removal of trade-constraining practices, as well as (b) continued (unnecessary) problems of standards and their implementation for trade. Because of the difficulty and complexity of identifying general effects (which are likely to depend on specific standards, countries, products, market conditions etc.), it is important to focus in detail on a series of case studies. Our report provides evidence on progress and problems in regulatory rapprochement of standards, either in the form of harmonization (as, for example, in the case of MRLs) or in the form of mutual recognition (as, for example, in the case of GIs) for the EU and its trading partners.

Some specific areas of progress (in harmonization and removal of trade-constraining practices), and of continued problems of standards and their implementation for trade are:

Procedures: The case studies on Mexico, Philippines and Brazil are examples of how STCs by the EU have ultimately resulted in changes and enhanced trade. Bilateral negotiations, reciprocal knowledge and technical support from the EU helped in making progress. Further progress requires greater efforts in scientific cooperation, collaboration between risk assessment bodies, harmonization of official controls, improved traceability and improvement of early warning systems for emerging hazards.

MLRs and zero tolerance: MRLs can act like unintended trade barriers due to misaligned regulatory systems. For example, the EU (and aligned countries) fixes the MLR at a default level of 0.01 while the US and aligned countries require zero tolerance. Harmonizing MLR for these substances would enhance the degree of harmonization by a great extent, reducing transaction costs for suppliers without jeopardizing food safety.

Regionalization: The lack of implementation of the regionalization principle affects trade in large countries as the EU and the US when a sanitary problem occurs in these countries but is confined to a specific region. The regionalization principle is only applied by a relatively small number of WTO members but it features in many disputes and STCs on animal zoonosis and fruits and vegetables. In countries where the EU is not considered as a single entity (as illustrated in our case studies about pig exports to Mexico and fruit and vegetables exports to Brazil), the burden of negotiations and documentation fall upon single EU member states.

In recent years Regional Trade Agreements (RTAs) are replacing multilateral agreements as the main arena for major trade negotiations, and also as the main area for discussions on potential harmonization of standards. This is particularly important for the EU as the EU has been at the forefront of this evolution with the largest number of FTAs in the world. These RTAs can serve as a laboratory or stepping stone integration of specific standards in global trade agreements.

The integration of Geographical Indications (GIs) in recent EU trade agreements with South Korea and in the CETA with Canada are examples of the integration of standards in new bilateral trade agreements. They represent milestones regarding the inclusion of GIs and the increased protection of GIs in international trade agreements. However, achieving more protection for EU GIs in future (bilateral) trade agreements may require additional EU market access concessions in other areas.

Remaining Issues and Actions for the Future

Although significant progress was made on some aspects of harmonization of standards and more than half of the STCs were solved in a reasonable time, several problems remain. Some key problem areas and potential ways to address these that came out of our analysis are the following.

Some issues are very difficult to solve, especially when there is no agreement on the scientific evidence of potential impacts and the process to deal with risk. This is especially the case in the areas of plant health, animal health and food safety. Examples are the cases of citrus black spot, GMOs, hormones in

beef, antibiotics use in animal production. There could be an important role of the scientific community to avoid unnecessary conflicts by providing the latest evidence with regard to new agricultural and food technologies. However, as the GMO and beef hormone cases are documenting, more scientific evidence does not necessarily lead to changes in regulations. All developed countries attempt a high level of food safety for consumer protection, but the perception of risk and how to deal with this may be different to the extent that they are very difficult to harmonize, such as e.g. in the EU's precautionary approach versus the countries like the US who use a different regulatory model.

Conflict resolution could result from better collaboration between risk assessment bodies, harmonization of official controls, improved traceability and improvement of early warning systems for emerging hazards. International bodies are trying to stimulate this and to play an active role in this. Examples are the role of the International Olive Council (IOC) in olive standards; the OECD calculator, the OECD seed scheme, the Food Safety Cooperation Forum, the FAO Committee on Commodity Problems, etc.

Modernization of the Codex Alimentarius is also needed through a harmonization in methodologies and data. This modernization of the Codex could also be used to assist farmers and other stakeholders in developing countries' supply chains to implement the necessary changes in order to meet EU standards. The EU can play a role by contributing to the institutional capacity and technical knowledge in developing countries with regard to standard setting, implementation and enforcement.

INTRODUCTION: THE STATE OF PROGRESS IN ACHIEVING THE RECIPROCITY OF STANDARDS

KEY FINDINGS

- The number of SPS notifications has continuously increased in recent years. In 2016, the total number of notifications amounted to 1392, 88 of which were presented by the EU (6,3%).
- The share of notifications submitted by developing countries has also risen, accounting for 62% of the total in 2016.
- The product groups with the highest number of public standards (mostly SPS and TBT) are live animal and vegetables products.
- Standards in developed countries are more stringent on average

Despite major advances in the development of global standards and common conformity assessment under the institutions recognized in the WTO international trade rules on standards and regulations (**TBT and SPS Agreements**), domestic and import regulations continue to differ from country to country. While encouraging governments to orientate their import requirements towards internationally agreed standards, WTO rules maintain the right of countries to impose their own standards – as long as they are non-arbitrary, non-discriminatory and least trade-restricting. Individual countries thus remain the main regulatory authorities on food standards (including food safety standards).

The SPS Agreement recognizes the right of Member States to adopt specific SPS measures with the aim of protecting human, animal, and plant life or health. According to the SPS agreement of the WTO, food safety standards include all relevant laws, decrees, regulations, requirements and procedures including, *inter alia*, end product criteria; processes and product methods; testing, inspection, certification, and approval procedures; quarantine treatments including relevant requirements associated with the transportation of animals and plants, or with the materials necessary for their survival during transport; provisions on relevant statistical methods, sampling procedures and methods of risk assessment; and packaging and labelling requirements directly related to food safety.

Member States of the World Trade Organization (WTO) are required to notify the organization before SPS or TBT measures are in force. SPS measures primarily target the agri-food sector, while technical barriers to trade (TBTs) mainly aim at the manufacturing sector.

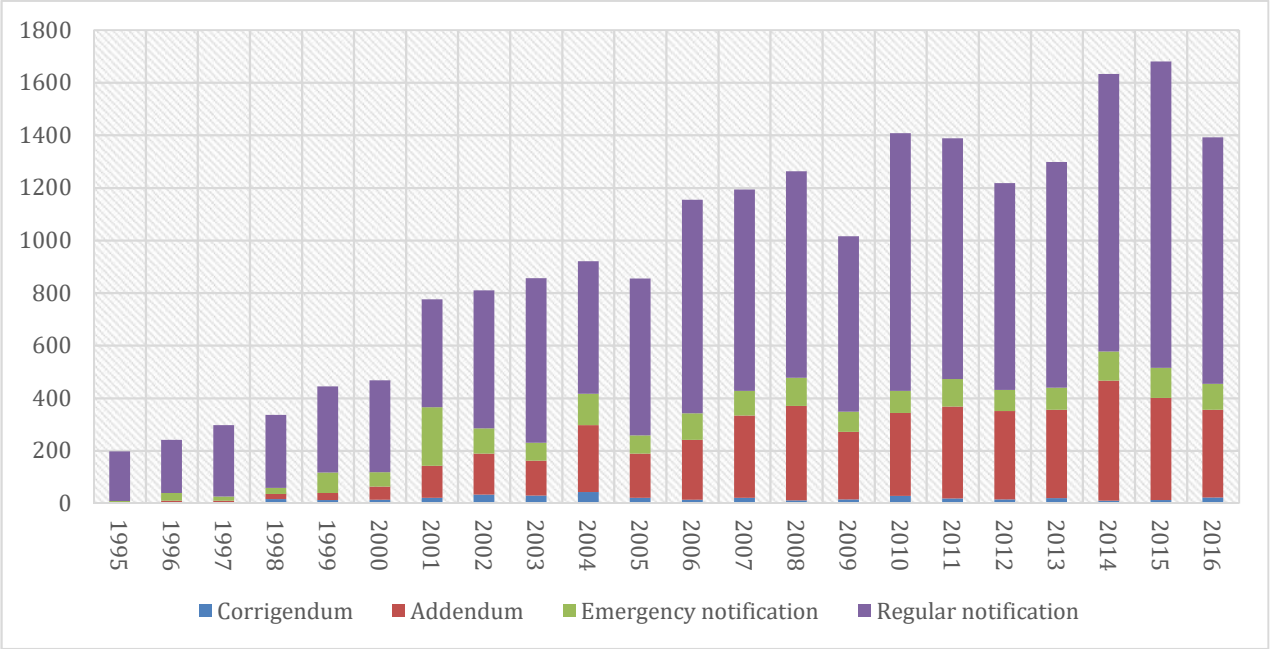
Article 1.1 of the **SPS Agreement** defines the scope of application of the Agreement, while the Article 1.2 and Annex A defines SPS as follows: "*SPS measures include all relevant laws, decrees, regulations, requirements, and procedures including, among others: end product criteria; processes and production methods; testing, inspection, certification, and approval procedures; quarantine treatments, including relevant requirements associated with the transport of animals or plants, or with the materials necessary for their survival during transport; provisions on relevant statistical methods, sampling procedures, and methods of risk assessment; and packaging and labelling requirements directly related to food safety*". Thus, SPS measures comprise laws, decrees, regulations, requirements, and procedures that governments apply to protect human, animal, or plant life or health from risks arising from the entry or spread of plant- or animal-borne pests or diseases, or from additives, contaminants, toxins, or disease-causing organisms in foods, beverages, or feedstuffs.

The SPS Agreement, to which all WTO Members are party, explicitly recognizes that governments have the right to adopt regulations related to food safety, such as certification, testing and inspection, and quarantine, and to establish the levels of protection from risk they deem appropriate. The SPS Agreement also encourages harmonization of SPS measures among WTO Members, where appropriate (USTR, 2014).

The SPS Agreement requires WTO Members to publish promptly all adopted SPS measures in a manner that enables other interested WTO Members to become acquainted with them prior to their entry into force.

The number of SPS notifications has increased considerably in recent years. **Figure 1** illustrates the number of notifications (meaning new or revised SPS standards) since 1995. There are three types of notifications in the case of a measure that poses problem of health's protection. "*Regular*" notifications cover all cases which do not involve urgent problems of health protection. *Emergency measures* are defined as cases "*where urgent problems of health protection arise or threaten to arise*". These measures may be notified either before or immediately after they come into effect, with an explanation of the reasons for resorting to emergency action. Finally, an *Addendum/Corrigendum/Revision* may be used depending on whether there are changes to the regulatory document that has previously been notified or there was an error made in the original notification or when a particular regulation has had a major review. The majority of notifications are "regular" SPS notifications. Since the start of the WTO in 2016, 20,874 SPS measures were notified, of which 14,019 as regular notifications, 1835 as emergency SPS and 5021 as addenda/corrigenda notifications.

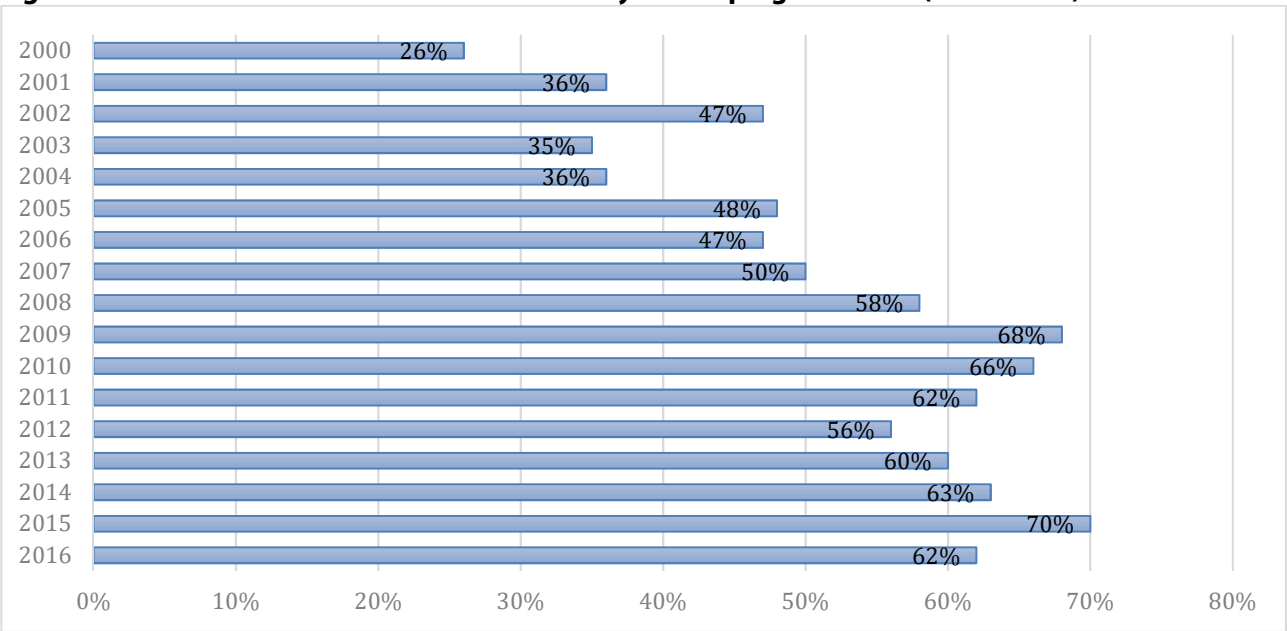
Figure 1: Number of SPS notifications (2000-2016)



Source: WTO System management.

While food standards of higher income countries are often considered more stringent and more elaborate, SPS notifications submitted by developing countries have also greatly increased in number. In 2016, developing countries accounted for 62% of all SPS notifications (see **Figure 2**). North America (350), South and Central America (322) and Asia (408) having submitted the highest number of notifications. SPS notifications presented by the EU amounted to 88 in 2016 (6,2%).

Figure 2: Share of SPS notifications submitted by developing countries (2000-2016)

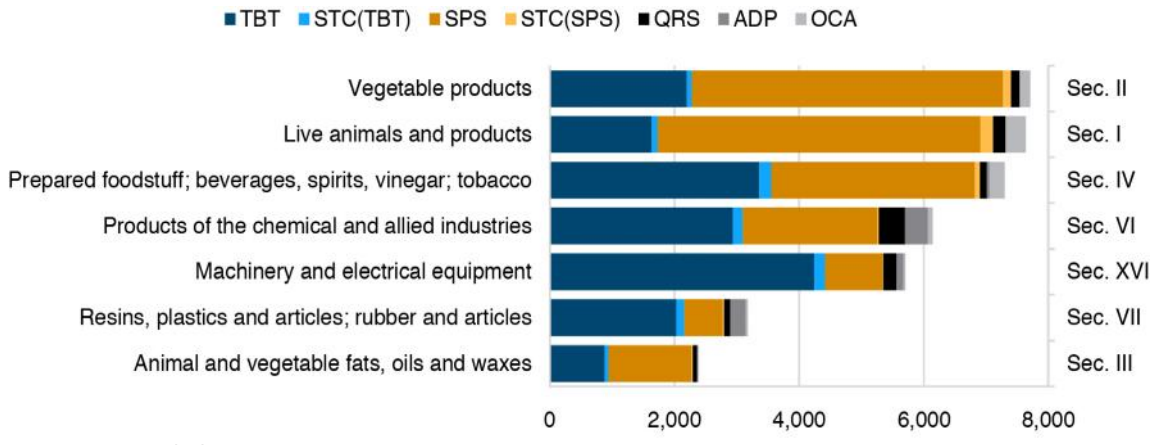


Source: WTO System management.

SPS and TBT measures apply not only to agricultural and food products, but also to products from other sectors. However, they are most important for the agri-food sector. Thanks to data compilation of **NTM notifications** provided by the WTO I-TIP the following set of NTM types may be distinguished: (a) Technical barriers to trade (**TBTs**) are standards and regulations not covered by SPS measures, such as standards on technical specifications of products and quality requirements; (b) Sanitary and phytosanitary (**SPS**) measures aim to protecting human or animal life and include e.g. regulations on maximum residue limits of substances such as insecticides and pesticides, assessments of food safety regulations or labelling requirements; (c) Antidumping measures (**ADP**) aiming at combating (predatory) dumping practices that cause injury to the domestic industry of the importing country; (d) other counteracting measures (**OCA**); (e) the traditional trade policy tools of quantitative restrictions (**QRS**) such as quotas.

Figure 3 illustrates the importance of NTMs (which includes both SPS and TBT) for different sectors. Classifying NTM notifications according to the 21 product groups of the Harmonised System, the three product groups with the highest number of NTMs in 2014 belong to the agri-food sector : plant products (Section II) has the highest number, followed by live animals (Section I), and beverages and prepared foodstuffs (Section IV). The total number of the three groups is close (more than 7000 each) and more than in e.g. chemicals or electrical equipment (Sections VI and XVI).

Figure 3: NTM applying in 2014, by NTM type and HS product section



Source: WTO I-TIP, wiiw calculations

SPS and TBT measures are **public standards**. At the same time, **private standards** are increasingly used by the food industry and retailers for monitoring process and product attributes. Systematic data on private standards are hard to find because private standards are complex and sometimes overlap.[1] They vary with respect to the actors involved, the attributes they address and the motivations behind the standard. Yet the few indicators that are available suggest a parallel explosion of private standards: the number of Global GAP-certified producers increased from 18,000 in 2004 to 112,600 in 2011 (GlobalGAP, 2014, Beghin et al. 2015). Such regulatory fragmentation implies significant additional costs for producers and traders that have to modify their products and/or undergo duplicative conformity assessment for no added safety or other public benefit, and in some cases it can constitute an insurmountable market access barrier (EU, Trade for all, 2016). The costs due to regulatory divergences are connected to information gathering on different markets , adjusting to different regulatory requirements and undertaking complex and heterogeneous conformity assessment and customs procedures. These might be due to diverging laboratory testing, certification, inspection and audit procedures, resulting in unnecessary duplications of work, time delays, costs for staff, capital, fees (OECD, 2016). OECD work quantifies these costs due to regulatory heterogeneity as equivalent to tariffs of 20 75% depending on assessed sectors and countries (Nordas, 2016).

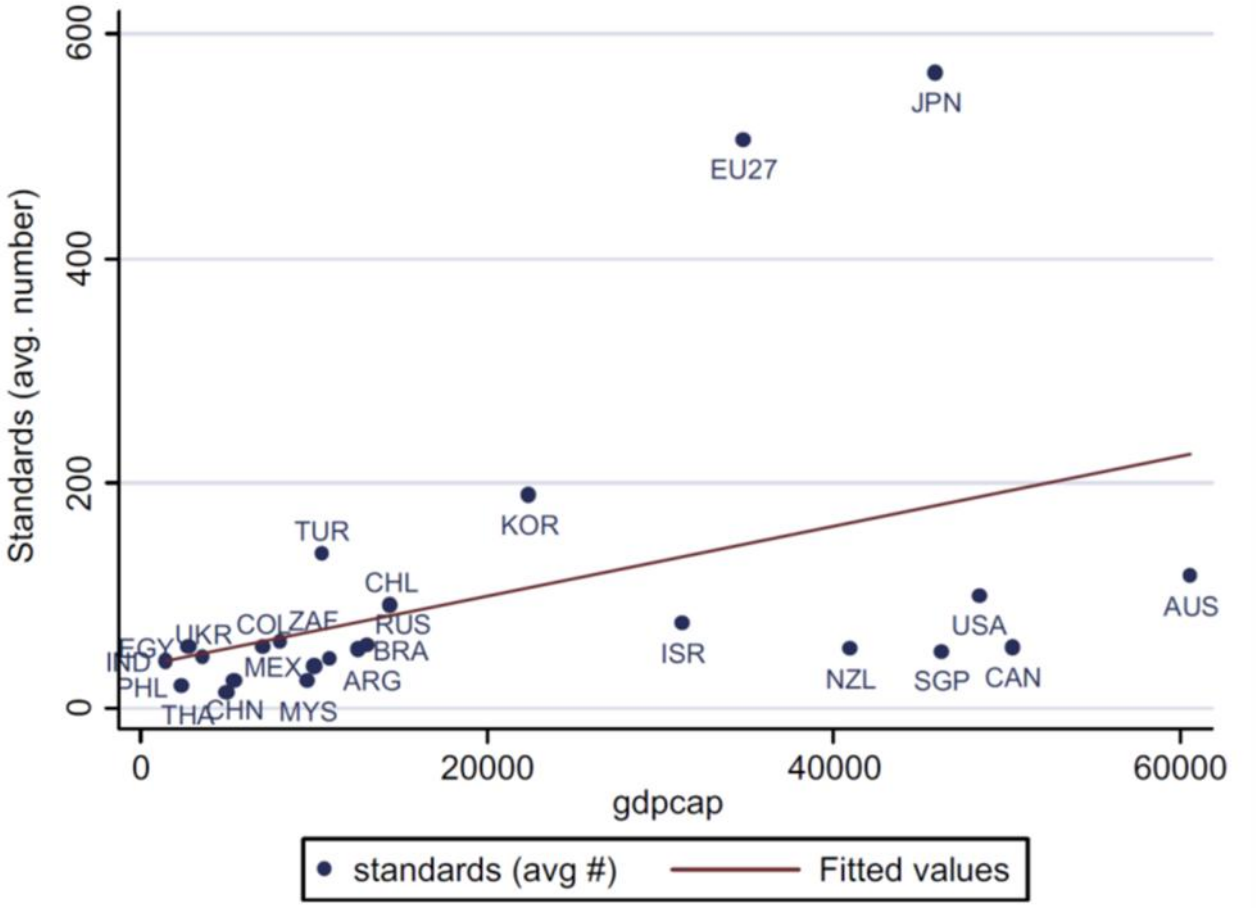
Box 1: The classification of non –tariff measures (NTMs)

The commonly used definition of NTMs is that of UNCTAD 2012 (http://unctad.org/en/PublicationsLibrary/ditctab20122_en.pdf) that states that non-tariff measures (NTMs) are policy measures, other than ordinary customs tariffs, that potentially have an economic effect on international trade in goods, changing quantities traded, or prices or both. This classification is based on a tree/branch structure where measures are categorized into chapters depending on their scope and design. Each chapter is differentiated into sub-groups to allow a finer classification of the regulations affecting trade. In practice, the NTMs classification encompasses 16 chapters (A to P) and each individual chapter is divided into groupings with a depth of up to three levels (one, two, and three digits). Although a few chapters reach the three-digit level of disaggregation, most of them stop at two digits. Each chapter of the classification comprises measures with similar purposes but an effect on trade that varies considerably. While some groups of NTMs have clear restrictive impacts, others have uncertain effects.

On average there is a positive correlation between the number of food standards and the level of development although there is much variation among the rich countries (see **Figure 4**). Differences in regulatory systems depend upon many factors such as income level, risk assessment, resources, variation in taste and technologies (Sykes 1995, 1999; Egan 1998). Developed countries impose stricter standards, in particular with regard to SPS measures as growing public concern about health and safety issues encourages the governments to improve the quality and safety of agricultural products by the use of NTMs. The most often cited reasons for this are the higher level of income and the greater consumption of goods of higher quality in developed countries (e.g. Ferro et al., 2015). However, Swinnen and Vandemoortele (2012) and Swinnen (2018) point out that differences in infrastructure, institutions, and media organizations matter as well and that this leads to a political coalition favouring higher standards in rich countries and lower standards in poor countries.

[1] Note that the difference between "*public*" and "*private*" standards is less clear than it sounds. See Henson and Humphrey, 2010.

Figure 4: Food standards measured against importers' per capita GDP



Source: Ferro et al. (2015).

An important issue in the current trade policy debate is how to manage regulatory divergences and resulting trade barriers. Several policy options exist to increase the compatibility of NTMs across trading nations. These include, for example, (for public standards) **harmonization**, **equivalence**, or **mutual recognition** and (for private standards) **certifications** of international private standards. As is obvious from the difficult and much contested discussions on these issues in trade negotiations, these are not trivial policies to implement or agree on. Their potential success depends upon several factors, several of which will be analysed in this study, such as the extent of the regulatory divergence, the interests at stake, the institutional capacity of countries to deal with risk assessment and food controls.

In the field of reciprocity much progress has been made with regard to organic food. The EU has recognised several third countries as having equivalent organic production rules and control systems. Some third countries have also recognised the EU as equivalent through equivalence arrangements or agreements. These recognitions enable European consumers to choose from a wide range of organic products whilst providing export opportunities for EU producers. Third countries recognised by the EU are listed in Annex III to Regulation (EC) No 1235/2008 (JO L 334, 12.12.2008[2]) (Argentina, Australia, Canada, Costa Rica, India, Israel, Japan, New Zealand, Republic of Korea, Switzerland, Tunisia, and USA).

Great attention is paid in **CETA** and in the negotiation on **TTIP** to the "*Harmonization of standards*". Standards and regulations are key elements in both cases but a major distinction can be found in the domain of standards. While in CETA the standards of the importing country will prevail, negotiations in TTIP strive towards a mutual recognition of standards. The CETA agreement does not eliminate the

[2] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32008R1235

differences in standards; in fact, imports need to comply with the rules of the importing market. In the TTIP negotiations the US insists on regulatory cooperation focused on the harmonization of the standards.

Regarding TTIP, the US and the EU share the same idea in terms of reaching a high level of food safety for consumer protection (the '*EU General Food Law*' and the '*US FDA Food Safety Modernization Act*' - *FSMA*[3]). Nevertheless, the perception of the risk and the approach to setting food standards in these two countries is different. The difficulties in the TTIP negotiations vary by product. Regulations on animal and plant health are not very controversial, given the work of such international agencies as the OIE (*Office International des Epizooties*) and the IPPC (International Plant Protection Convention) that have improved the transparency and scientific basis for trade regulations. Similarly, regarding the use of pesticides, the two countries have converged thanks to international regulatory cooperation.

Other issues are less likely to solved easily. These involve human disease and risk as perceived by importing countries like the issues relative to beef hormones, antibiotics, pathogen reduction techniques and zoonotic diseases (Josling and Tangerman, 2014). This also includes the EU demand for recognition of Geographical Indications (GIs) and the EU's use of the 'precautionary approach' such as in the case of Genetically Modified Food (GMO), hormones in beef and antibiotic in animal production. In other cases, the US adopts more stringent regulations such as for so-called mad cow disease (BSE) in beef and dairy products or the chlorine-washed chicken to reduce salmonella. A controversial case, within the EU, is represented by the legislation on new breeding techniques(NPBTs). Since the 1980s, many new plant-breeding techniques have been developed. Many of these new approaches deploy biotechnology. These new techniques allow targeted gene modifications to be obtained more precisely and faster than by conventional plant-breeding techniques[4]. Although the applied methodology and changes achieved in the genome of the crops differ from earlier transgenic approaches the question still arises as to whether crops obtained by these techniques should be classified as GMOs (Lusser et al., 2012, Atanasova, A., Keiper, F. 2018). The Commission is currently working on a legal interpretation of the regulatory status of products generated by new plant-breeding techniques, which was expected in 2016 but has not been published yet. Following a recent opinion from the European Court of Justice(ECJ)[5] gene editing technologies as **mutagenesis should be largely exempted from EU laws on GM food**, except, for example, where gene editing was used to insert foreign DNA in a precise location. A final and binding opinion on the interpretation of EU law from the ECJ is expected in summer 2018 . The working group set up by the EC completed its work in 2012. The experts all agreed that organisms developed through cisgenesis and intragenesis fell under Directive 2001/18/EC, but remained divided on the regulatory status of most of the other new techniques. Two opinions issued by EFSA[6] concluded that the existing guidelines for risk assessment applicable to GM plants were also appropriate for cisgenic and intragenic plants, and for the ZFN-3 technique. The view that the safety of new crop varieties ought to be assessed according to their characteristics, rather than the method by which they are produced, is shared by a range of bodies, including the UK Biotechnology and Biological Sciences Research Council (BBSRC), the German Academies, the European Plant Science Organisation (EPSO), the Dutch Government, the Austrian Environment Agency and the French High Council for Biotechnology (HCB). In its resolution of 25 February 2014 on 'plant breeding: what options to increase quality and yields', Parliament noted that it was important to develop and use new plant-breeding techniques and to be open to the technologies available. Parliament expressed concern at the Commission's delay in assessing new breeding techniques, and called on the

[3] https://ec.europa.eu/food/safety/general_food_law_en & https://www.fda.gov/Food/GuidanceRegulation/FSMA/

[4] For a global overview based on published literature reviews, scientific reports and existing published opinions, refer to report issued by the EC's High Level Scientific Advice Mechanism (SAM), *'Explanatory Note on New techniques in Agricultural Biotechnology'*, European Technology Platform, 28 April 2017.

[5] C-Case 528/16 - Opinion delivered on 18 January 2018.

[6] https://www.efsa.europa.eu/sites/default/files/160621a-p01.pdf

Commission to clarify their regulatory status. Again with its resolution of 7 June 2016 on technological solutions for sustainable agriculture in the EU, Parliament supported the need for continuous progress in innovative[7].

Regional Trade agreements provide a cooperative environment where progress in international regulatory cooperation can be made either through increased regulatory convergence either through specific provisions and information exchanges. Mutual recognition of conformity assessment, although less ambitious than regulatory rapprochement, is one of the approaches in practise (Correia de Brito et al., 2016). It means that governments recognize conformity assessment bodies and accept the results of conformity assessment because they have been recognized as compliant with recognized standards of quality. The alignment of conformity assessment methods and procedures must be based on evidence, including scientific evidence, allowing identifying methods most suitable for identifying specific product or process characteristics. Co-operation therefore needs the involvement of technical experts (von Lampe et al.,2016)

[7] European Parliament resolution of 7 June 2016 on technological solutions for sustainable agriculture in the EU (2015/2225(INI))

1. ANALYSIS OF THE CURRENT STATE OF PLAY OF THE HARMONIZATION/MUTUAL RECOGNITION/ RECIPROCITY PRINCIPLE IN EU TRADE FROM AN EXTENSIVE LITERATURE REVIEW

KEY FINDINGS

- Standards may both stimulate or reduce trade: they can be non-tariff protectionist instruments but they can also reduce transaction costs, information asymmetries and negative externalities, which may stimulate demand, supply, and thus trade.
- The "economics" and the "politics" of standards are difficult to separate.
- The rapid spread and growth of standards across the world has coincided with the growth of global trade in agricultural products.
- Standards and NTMs can profoundly change the structure and the organization of value chains.
- Empirical studies document mixed effects on smallholder inclusion but most positive effects on farm income, food security, and rural development in LDCs.
- Complete harmonization can be costly in terms of deviating from a country's social optimum.
- As such, the impact of harmonization of NTMs should be assessed on a case-by-case basis.

Adulterations and fraud in agricultural products and processed food have existed ever since farm products and food were first exchanged. Standards to prevent fraud have been introduced by governments, religious authorities, private companies and NGOs. In recent years, standards have improved rapidly, both geographically and in addressing new concerns. Production and trade are increasingly regulated through stringent public and private standards on quality, safety, environmental and ethical aspects.[8] These standards have spread geographically through trade and foreign direct investments (FDI)[9] and have transformed global and local value chains (McCullough et al. 2008, Swinnen 2007). Interestingly, while use of standards has been criticized for hampering trade, the emergence and spread of standards across the world has coincided with the growth of global trade in agricultural products. Moreover, the growth has been the most pronounced for those products where standards are most important, such as fruit, vegetables, seafood, meat and dairy products (Maertens & Swinnen 2014).

There are two broad lines of debate, in the trade and the development literature, with (surprisingly) little overlap (Swinnen 2016). In this report, we focus on the debate and analysis related to standards and trade.[10] A crucial question in this debate is whether standard-like **NTMs** are (non-tariff) trade barriers. As international trade agreements such as the WTO have contributed to a global reduction in tariffs, it is often argued that countries have turned to standards as new instruments to shield their domestic markets from foreign competition.[11] **Standard-like NTMs** are often said to be protectionist and costly for producers,

8 Private standards are often more stringent than public ones (Fulponi 2007; Vandemoortele & Deconinck 2014). Producers that are GlobalGAP certified increased from around 20.000 in the mid-1990s to around 120.000 in 2011 (Maertens & Swinnen 2014). GlobalGAP is a private sector body that sets voluntary certification standards and procedures for good agricultural practices.

9 FDI has been triggered by several factors, including investment liberalizations and economic growth in emerging and developing countries (Dries et al. 2004; Dries & Swinnen 2004; Reardon et al. 2003).

10 The "standards and development" debate focuses on (a) whether standards are excluding small and weakly capitalized producers from the "high standard value chains" and (b) for those who can participate, whether they are hurt by rent extraction through superior bargaining power of increasingly concentrated downstream agents, or whether they may benefit from institutional innovations in the value chains (Swinnen 2016). See arguments in e.g. Chiputwa et al 2015; Chiputwa & Qaim 2016; Dries et al. 2009; Maertens & Swinnen 2009; Minten et al. 2009; Reardon et al. 2003, 2009; Unnevehr 2000; Warning & Key 2002.

11 See arguments in e.g. Anderson et al. 2004; Augier et al. 2005; Beghin et al. 2012; Brenton & Manchin 2002; Fischer & Serra 2000; Maertens & Swinnen 2007; Marrette & Beghin 2010; Van Tongeren et al. 2009.

risking the exclusion of especially smallholder farmers, but they can also help to tackle market imperfections like informational asymmetries.

These issues have been debated in the academic literature and in the policy arena. Organizations such as OECD and WTO have studied and analysed their **role and effects**. Standards are also central issues in major trade negotiations such as TPP, CETA and TTIP. A key reason for the complexity of the analyses and the policy debate is that standards affect both **equity and efficiency**, meaning that they may simultaneously enhance economic efficiency and redistribute rents to certain sectors. These simultaneous effects make policy analysis and advice complicated and also means that "the economics" and "the politics" of standards are more difficult to separate than in the case of e.g. trade tariffs.

A distinctive feature of the rise of standard-like NTMs is that they have spread unequally across the world, leading to considerable regulatory diversity between countries and regions. Such regulatory fragmentation implies significant additional costs for producers that have to modify their products or undergo additional conformity assessments without added value. This, in some cases, can constitute an insurmountable barrier to market access (European Commission 2015). Additionally, NTMs in developed countries are generally more stringent (or more difficult to comply with) than NTMs in developing countries, giving the debate a distinct **North-South dimension**.

We assess the literature on the current debate on the harmonization and reciprocity of standards, which will serve as the starting point for the quantitative and qualitative analyses in the rest of this report. **First**, we will briefly outline how harmonization and reciprocity are being approached and measured in the literature. **Second**, we will provide an overview of different studies focusing on the harmonization of standards based on the impacts studied, with special consideration for the methodologies used in such studies. The outcomes we will consider are trade, welfare, industrial organization, labour and international relations. Our review draws and builds on earlier reviews, especially those of Beghin et al (2015), Swinnen et al. (2015) and Swinnen (2016, 2017).

1.1. Harmonization of Standards and Its Measurement

Harmonization, or more generally, the regulatory rapprochement of regulation (Hooker & Caswell 1999) denotes the efforts made by governments to promote cooperation and trade by adhering to the **principle of equivalence**, i.e. ensuring that the differences between rules and laws in different countries do not stand in the way of achieving benefits in international markets. Here, we will discuss two different means to achieve regulatory rapprochement: harmonization on the one hand and mutual recognition (also referred to as reciprocity) on the other.

Harmonization is the most far-reaching form of regulatory rapprochement as it entails making regulations in different countries identical. As it is the most far-reaching form, it is also the most costly since it requires at least one country or region to completely adapt its rules and regulations in a certain area (Carbonara & Parisi 2007). In addition to this one-off adaptation cost, deviating from a country's social optimum in terms of regulation represents a recurring and potentially perpetual cost (Van den Bergh 1998).

Mutual recognition (also sometimes referred to as **reciprocity** or **equivalency**) denotes the acceptance of regulatory diversity while making sure the same goals are being aimed at. In other words, mutual recognition strives towards **equivalence of results**, not equivalence of regulation. In the field of mutual recognition, much progress has been made with regard to different food types. For example, the EU has recognized several third countries as having equivalent organic food production rules and control systems. In turn, some third countries have recognized EU regulations as equivalent through similar arrangements

or agreements. These recognitions enable European consumers to choose from a wide range of organic products whilst providing export opportunities for EU producers.[12]

The **measurement** of harmonization or reciprocity of standards has been the subject of a stream of recent investigations on heterogeneity across countries for SPS and standard-like NTM regimes, using maximum residue limits and other policies that can be aggregated meaningfully. This goes beyond simple counts of NTMs and looks at stringency in deviation either from international standards (Li & Beghin 2014) or from another reference value such as the highest value (Liu & Yue 2013) to gauge unusual stringency, if not protectionism. Bilateral heterogeneity of policies is also measured with the presumption that heterogeneity in regulation impedes trade (Liu & Yue 2013, Vigani et al. 2012), especially asymmetric heterogeneity, when one country is more stringent than another (De Faria & Wieck 2014). Several distance measures are used. Drogué and DeMaria (2012) use a Pearson correlation coefficient of pesticide residue limits per product between any two countries trading the product. Winchester et al. (2012) use the Gower index, which takes the sum over policies of the absolute value of the difference in policy requirements between any pair of countries, normalized by the maximum difference in the data set between any two countries. Several heterogeneity indices can be developed for different types of regulations affecting sectors, and their separate effects can be econometrically assessed. Other analyses of harmonization and reciprocity use deviation from ISO standards as an indicator or lack thereof (Curzi et al. 2018), or they use adherence to ISO standards and mutual recognition of certification as a harmonized certification mechanism (Blind et al. 2013, Czubala et al. 2009).[13]

In the rest of this chapter, we provide an overview of key insights from these studies on the (lack of) regulatory harmonization or reciprocity in the field of food standards and its effects.

1.2. Impact of Regulatory Harmonization

As a guide through the existing literature, we classify the studies according the specific impact or outcome that is being studied: trade, welfare, industrial organization, labour and North-South relations.

1.2.1. Trade

Given the emphasis on the potential protectionism of standards, trade is by far the most studied area in the discussion surrounding the harmonization of NTMs. The rapid growth of standards in recent years raises the question whether standards are non-tariff measures (NTMs) used for protectionist purposes. Trade economists have focused considerably on the potential or presumed protectionism of standard-like NTMs, especially in the context of commitments to decrease or eliminate tariffs and expand imports under tariff-rate-quota schemes following multiple multilateral and preferential trade agreements (Bacchetta & Beverelli 2012). Studies have analysed the impact on trade both theoretically and empirically.

A key argument is that the implicit comparison of standards with tariffs in the trade debate is not entirely valid. A basic result of international economic theory is that in a small open economy, the socially optimal tariff level is zero. A positive tariff level constrains trade, is harmful to social welfare, and is by definition protectionist. However, this is not necessarily the case for standards since this ignores the potential consumer or societal benefits induced by standards, such as the reduction in transaction costs and information asymmetries or the reduction in negative externalities. Once one allows for these effects, the optimal standard is usually not zero (see also Beghin 2013, Marette 2016 and Marette & Beghin 2010).

Taking this into account, Swinnen and Vandemoortele (2011) develop a model, which shows that no simple relationship exists between the trade effects of a standard and the social optimum. Standards may both

[12] For an overview of the importance of mutual recognition for international cooperation, see Correia de Brito et al. (2016). For an economic perspective on mutual recognition, see Pelkmans (2003).

[13] For more examples of heterogeneity indices, we refer the reader to Annex I.

stimulate trade ("catalysts") or reduce trade ("barriers"). We refer to Annex II for a conceptual illustration of a case where standards increase trade.

In summary, the optimal standard in the presence of asymmetric information or externalities is conceptually complex. Standards do affect trade. Only in very special circumstances would standards not affect trade: this is when the effect on domestic production exactly offsets the effect on consumption. It depends, among others, on the relative ability of domestic and foreign industries to comply with the standard.

1.2.2. Welfare

The welfare implications of differences in NTM regimes between countries receive considerably less attention than the trade implications. Often, a partial equilibrium analysis is undertaken whereby the welfare implications for suppliers, users and external effects are studied separately. Other studies have used household level data to look at the effects of tightening standards on farmer welfare. Both will be discussed here briefly.

The partial equilibrium approach focuses on key components of welfare or **cost-benefit analysis** of a specific set of policies affecting a single or small set of related markets/commodities and the associated market imperfections addressed by standard-like NTMs. These partial equilibrium analyses rely or extend upon other approaches to measure NTMs (tariff equivalent/price wedge, gravity/export demand estimation) to look at their impact on market allocation and potential externalities (Disdier & Marette 2010, Peterson & Orden 2008, Yue & Beghin 2009, Yue et al. 2006) and, in the context of global chains, on heterogeneous firms and the labour market (Swinnen 2007). This approach can also be combined with an econometric estimation of key economic responses to the regulations to analyse, which are then incorporated into the model. Most of these studies incorporate the possibility of external effects introduced by trade and derive welfare effects of the prohibitive policies.

Yue et al. (2006) analyse the implications of removing SPS regulations in the Japanese apple market, accounting for and estimating the imperfect substitution between local and imported apples as well as the trade cost and the potential pest infestation linked to imports. The welfare gains from removing restrictive SPS policies are beneficial, even when significant infestation occurs. Peterson and Orden (2008) incorporate seasonal effects, imperfect substitution, and risk levels in their analysis of the opening of the US avocado market to Mexican and Chilean products. They show that the opening induces net welfare gains to the US economy, even in the presence of pest infestation.

Several studies analyse prohibitive NTM policies such as phytosanitary bans or excessively stringent standards choking trade. James and Anderson (1998) analyse the Australian banana case, showing that policies are welfare-reducing, even under implausibly large infestation levels. Yue and Beghin (2009) analyse prohibitive Australian policies faced by New Zealand apple exporters and derive the forgone trade and associated welfare losses for Australian consumers. Orden and Romano (1996) analyse US-Mexico avocado markets and show that the US ban at the time was motivated by capture of the policy process by US avocado interests. The risk of infestation was small, and the ban dramatically increased the US price.

A large number of household-level studies analyse the impacts of tightening standards on poor households involved in global value chains, often as farmers or workers. Early studies warned about the dangers of marginalization of the poor with increasing standards (Reardon et al. 2001). Recent empirical studies document mixed effects of high-standard trade on exclusion of smallholders and find mostly positive effects in terms of increased household and farm income (Miyata et al. 2009, Rao et al. 2012), reduced risk and income variability (Ramaswami et al. 2009), increased farm productivity (Rao & Qaim 2011), increased technology adoption and quality of produce (Dries & Swinnen 2004), poverty alleviation (Maertens & Swinnen 2009), and increased food security (Minten et al. 2009).

1.2.3. Industrial organization of agricultural trade and food value chains[14]

To understand the mechanisms of how the welfare effects described in the previous section arise - and to understand the extent to which these effects can be attributed to standards - it is important to understand how standards affect the industrial organization and structure of supply chains. Standards and NTMs can profoundly change the structure and organization of value chains. Standards reduce transaction costs in the chain because they reduce information asymmetries between buyers and suppliers about quality, safety and other product characteristics (Hudson & Jones 2003, Jaffee & Masakure 2005). However, standards increase fixed production costs and transaction costs related to conformity assessment (or shift those costs from buyers to suppliers) and thereby create economies of scale and advantages for larger suppliers (Dolan & Humphrey 2000, Gibbon 2003, Maskus et al. 2005). These cost implications are a concern for agri-food value chains in low and middle-income countries with a larger number of small and poor farms. In such markets, implicit norms about food quality and safety in the local market differ substantially from the quality and safety standards that prevail in international markets (Henson & Humphrey 2010, Henson & Jaffee 2008, Reardon et al. 2009).

Compliance with increasingly complex and stringent food standards and monitoring of this compliance throughout the supply chain require tighter vertical coordination (Swinnen 2007, 2016). Additionally, upstream in the supply chain, in the relations between producers and processing or exporting companies, there is a move toward vertical coordination and contract farming and toward complete ownership integration and large-scale estate farming. Tighter forms of coordination facilitate monitoring of compliance with standards and reduce transaction costs in high-standard trade. Especially in low- and middle-income countries, where factor markets are highly imperfect, vertical coordination is imperative for the adoption of high standards. As Swinnen and Vandeplas (2011) put it, vertical coordination is driven mainly by the combined effect of standards and local market imperfections, preventing local suppliers from investing in technology and quality production processes without support from their buyers in contract-farming schemes.

1.2.4. Impacts on labor markets

The increased reliance of value chains on large-scale plantations and vertically integrated farms instead of smallholder farms means that more of the gains from trade in agriculture emerge through labour market effects (hired labour on large-scale farms) instead of through product market effects. In addition, standards increase the need for labour-intensive postharvest handling (e.g., for washing, sorting, labelling), which further increases the importance of labour market effects.

Empirical studies of these labour market effects in high-standard trade show significant implications for rural households in developing countries. Maertens and Swinnen (2009) and Maertens et al. (2011) find that employment in large-scale horticultural export companies in Senegal (which emerged as a response to increasing standards) is easily accessible for the poor and for rural women and that this employment creates substantial income gains for rural households and results in substantial poverty reduction. Nonmonetary welfare benefits of female employment include increased child schooling and reduced fertility rates (Maertens & Verhofstadt 2013, Van den Broeck & Maertens 2015). Mano et al. (2011) show that employment in the cut flower export industry in Ethiopia significantly reduces poverty. Rao and Qaim (2013) point out that among smallholder vegetable farmers the demand for hired labour, especially for female labour, increases as a result of inclusion in high-standard supermarket chains in Kenya. The evidence in other recent papers is more doubtful. For example, Trifkovic (2014), using per capita consumption expenditure as a measure of welfare, finds no effect of employment in pangasius estate farms in Vietnam on the welfare of workers.

[14] This section is based on Beghin et al. (2015).

1.2.5. Impact on international relations

The promotion of international relations is rarely discussed as an explicit outcome in studies on the harmonization of standards, but is almost always implicitly considered, especially when the outcome is related to trade.

One of the only papers looking more explicitly at North-South relations is Disdier et al. (2015). They capture harmonization of NTM regulation in economic integration agreements in the context of North-South trade, when Southern countries harmonize up to their Northern partners' standards. Results suggest that deep North-South integration involving standards harmonization may be harmful to South-South trade. Additionally, Jongwanich (2009) comments on how multilateral efforts between North and South are needed to address the potential negative effects caused by Northern standards.

When it comes to (trade) relations between developed countries, most of the focus is on trade agreements like CETA (between the EU and Canada). In this context, Hoekman (2015) proposes several mechanisms to induce regulatory cooperation, which are then applied to recent trade agreements. As one of the biggest free-trade agreements between developed countries, the North-American Free Trade Agreement (NAFTA) has also received considerable attention. For instance, Grossman and Krueger (1991) as well as Husted and Logsdon (1997) find that NAFTA contributed positively to Mexico's policy-making, especially with respect to environmental policies.

1.3. Some conclusions

Standards in international trade are what John Beghin (2013) referred to as "*a challenge for the profession*" because there is no blanket policy recommendation paralleling those on tariffs or quotas. The simple "standards as protectionism" arguments ignore the social benefits of standards in terms of consumer welfare, for example by reducing asymmetric information, and in terms of reducing externalities in society. Including these other effects of standards makes the impact of standards on trade, welfare, industrial organization, labour and North-South relations much less obvious as has been demonstrated extensively in this review. One can conclude that the direction and magnitude of **effects on trade are sector-specific and specific for different standards**. Consequently, while there are obvious benefits emanating from the harmonization of NTMs across regions or countries, this may also engender some unintended effects.

The complexity and nuances of conceptual findings (see for instance Section 3.1) complicate the empirical measurement and its use for policy. The **empirical implementation** of such concepts is sensitive to the definition of welfare, the nature of the standards and of the associated (fixed or variable) costs (Baldwin 2000, Marette 2016). The informational requirements are huge: one needs reliable estimates of fixed and variable costs for heterogeneous firms and valuation of external effects by consumers. Moreover, the policy instruments involved are often dissimilar and difficult to aggregate; data are scarce for effects of public regulations and almost non-existent for private standards. Beghin et al. (2015) conclude that sorting out the protectionism of standards is complex once one moves beyond simple detection strategies and that policy prescriptions on standards depend on the particular context of the policies. Economists should be **careful to promote a zero-standard environment or the systematic harmonization of standards** but at the same time be aware that the **level and nature of specific standards** in trade settings may well be suboptimal.

2. ASSESSMENT OF THE LEVEL OF RECIPROCITY IN EU TRADE AGREEMENTS FOR AGRI-FOOD PRODUCTS

2.1. Assessment of SPS reciprocity between the EU and its world partners, through an analysis of specific trade concerns (STCs) ON SPS

KEY FINDINGS

- The average number of STCs raised each year is about 20. The number of STCs was particularly high between 2000 and 2005, probably due to the spread of animal diseases outbreaks.
- The EU is the WTO member towards which most SPS STCs have been raised (18%) and that has raised the majority of STCs towards third countries, followed by the US (11%).
- Argentina, China, Canada and Brazil have actively participated in raising STCs.
- Small developing countries have raised few STCs, probably due to high political and opportunity costs.
- Most of the issues raised toward the EU concern EU domestic regulations on MRLs of pesticides and veterinary drugs allowed in agri-food products. The EU is often blamed for imposing unnecessary measures on novel food (including exotic products).
- Most issues raised by the EU concern animal health and bureaucratic import procedures of trade partners.
- Trade concerns can also be raised to anticipate the potential notification of a measure, as results of lobbying from WTO members. One example is the case of the EU legislation on endocrine disruptors for plant protection.
- There are many areas of trade concerns when substantial progress in harmonization and/or mutual recognition is possible. More than half of the issues raised by the EU have been positively solved.

Specific trade concerns (STCs) are issues raised at the WTO by countries affected by SPS standards, which they deem to be unjustified and particularly restrictive. These concerns are presented in either written or oral form, by individual WTO members in the SPS committee.

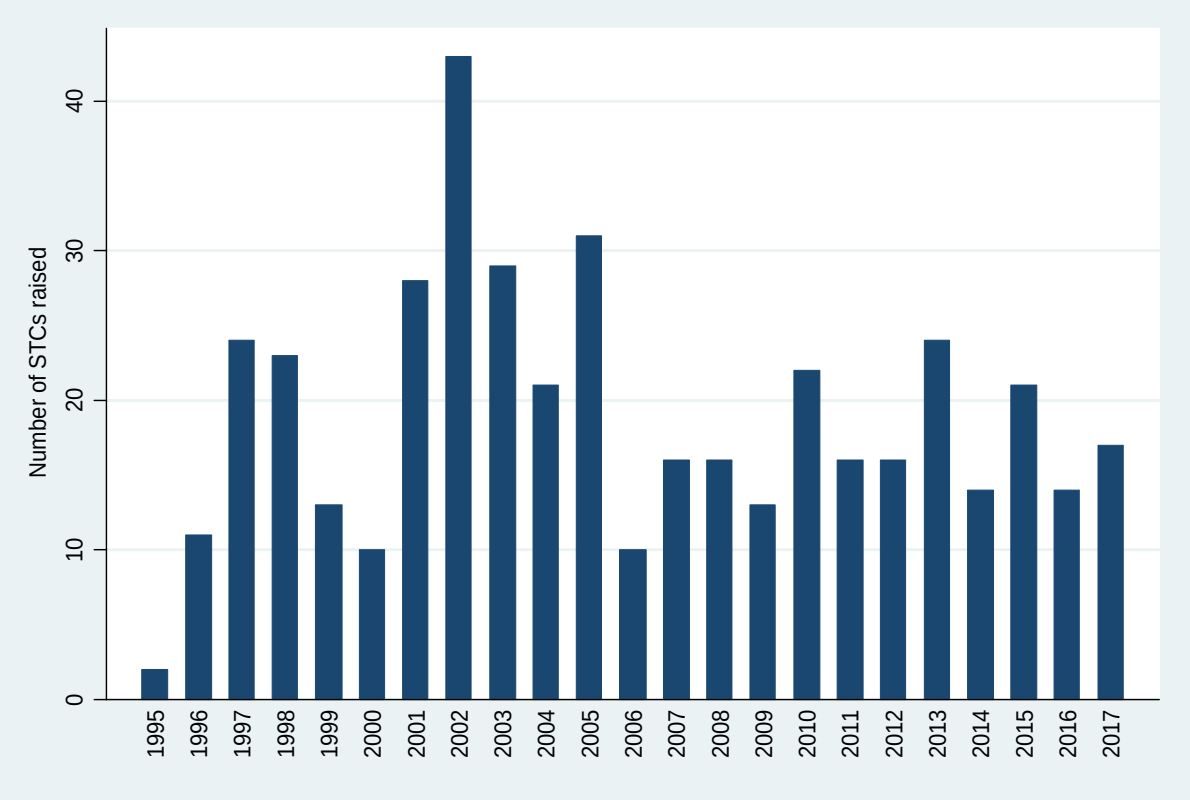
STC issues are then usually discussed bilaterally between countries maintaining the restrictive trade measure and the country raising the STC, until the issue is addressed. Most of the issues are addressed in this way. The SPS Committee thus acts as an instrument to increase the transparency of members' SPS regimes and as a first informal step in the dispute settlement process (Jensen, 2002). Only in rare cases if a solution is not found and the trade dispute is then addressed by the WTO.

Each STC provides information on (i) the country raising the concern and the country imposing the measure; (ii) the year of the concern; (iii) the product subject to the concern at the HS4 digit level; and (iv) the type of measure and subject of the concern; (v) the eventual date of resolution of the concern. In this report we focus in particular on STCs raised on **Sanitary and Phytosanitary (SPS) measures**. Using these data, we try to shed some light on the **main controversies** that have been faced by the European Union (EU) versus its trade partners in order to clarify the main points of contention of the EU within the WTO setting, and to highlight where the lack of reciprocity in SPS measure seems to be particularly relevant.

2.1.1. The diffusion of SPS STCs over time

Since 1995, a total of STCs have been raised at the WTO SPS committee is 434[15]. **Figure 5** shows the evolution of the number of STCs raised each year at the SPS committee. On average about 20 STCs are raised each year. The number of STCs was particularly relevant between 2000 and 2005, probably due to the spread of animal diseases outbreaks (e.g. BSE, Avian Influenza etc.).

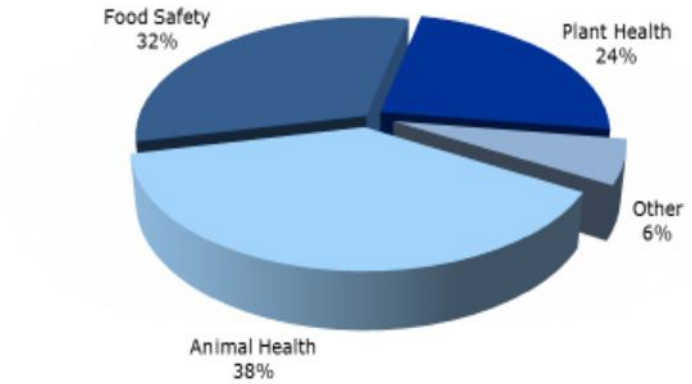
Figure 5: Number of new SPS-related specific trade concerns 1995-2017



Source: calculation based on WTO I-TIP database (accessed April 2018).

The STC database may be used to analyse which countries and issues are most involved in SPS STCs. Figure 6 displays the most important STC issues since 1995 : 32% involve food safety, 38% animal health; 24% health and 6% other issues.

Figure 6: Percentage of STCs for agri-food since 1995



Source: WTO 2017

[15] These numbers only consider the first date where each issue is raised. Indeed, the same issue is often raised several times until a solution is not found.

Table 1 presents the list of the TOP 10 WTO member countries toward which STCs have been raised and the list of the TOP 10 WTO member countries that have raised STCs from 1995 to 2017. As shown in the left panel of **Table 1**, the European Union is the WTO member toward which most SPS STCs have been raised (18%), followed by the USA (11%), Japan and China (6-7%). Other countries such as Australia, Brazil etc. account for 4% or less. As regards the f TOP 10 countries raising STCs in the same period, as shown in the right panel of **Table 1**, the EU and the USA both raised 20% of the [16]of the STCs raised at the SPS committee of the WTO. Argentina has raised 47 different STCs (about 11% of total STCs), while China, Canada and Brazil each raised about 30 SPS STCs (7-8%), and India 22 (5%) What clearly emerges from these data is that the EU and the USA are the main protagonists of the various trade issues raised at the SPS committee.

What is also important to note from the comparison of the two lists of countries is that countries that are blamed for maintaining trade restrictive measures, are also actively raising concerns toward other countries. This is especially the case for the EU and the US, which are at the top in both lists and China which is number 4 in both lists. Australia, Brazil and Mexico are in the top 5-10 in both lists. These countries are all large traders that have a strong incentive to pursue their interest in the SPS committee. Since raising STCs might be costly, most of them are raised toward larger export markets, where eventually the benefit may be higher than if raised toward smaller (and poorer) markets where the costs risk to exceeding the benefits. On the other hand, developing countries have a low incentive to raise STCs probably due to high political and opportunity costs. Indeed, STCs may turn into trade disputes, which however may be very expensive, and thus these countries often do not have the economic power to address them (Fontagné et al., 2015).

Table 1: TOP 10 WTO members maintaining SPS restrictive trade measures and TOP 10 WTO members raising specific trade concerns - 1995-2017

Member Maintaining the measures			**Member Raising the Concern**		
Country	**#**	**%**	**Country**	**#**	**%**
European Union	78	18.0%	United States	88	20.3%
United States	47	10.8%	European Union	87	20.0%
Japan	29	6.7%	Argentina	47	10.8%
China	28	6.5%	China	34	7.8%
Australia	18	4.1%	Canada	31	7.1%
Brazil	16	3.7%	Brazil	30	6.9%
Indonesia	14	3.2%	India	22	5.1%
South Korea	13	3.0%	Australia	12	2.8%
Canada	12	2.8%	Chile	12	2.8%
Mexico	12	2.8&	Mexico	12	2.8%

Source: calculation based on WTO I-TIP database (accessed April 2018)

[16] It is worth mentioning that, while STCs are usually raised toward on single country, STCs are often raised by more than one country. For this reason, the number of STCs raised by the different countries largely exceeds the number of the STCs notified by the WTO.

In order to give an overview over the considered period of how STCs have evolved worldwide, **Map 1** shows the number of HS 4-digit product subject to STCs by country at five different points in time, namely the years 2000, 2005, 2010 and 2015[17]. The area relative to each world country is coloured according to the number of HS 4-digit products subject to STCs: where lighter blue means no products or few products subject to STCs, while darker blue represents countries where trade restrictive measures have been blamed on several products being subject to STCs. It clearly emerges that from the very beginning, the EU is the WTO member where more STCs have been concentrated, and this phenomenon remains persistent over time. If we take for example the panel relative to the year 2015, the figure shows that the **EU** has more than 1000 HS 4-digit products subject to STCs.[18] If we consider instead the **USA**, which are constantly among countries with more products covered by STCs, the number of products subject to STCs is barely one half of that of the EU. Taking for instance the year 2015, the number of products covered by STCs for the USA is close to 500.

Despite entering in the WTO only in 2011, **China** is one of the countries with more products covered by STCs (**MAP 1**). This suggests that Chinese domestic regulations on SPS are consistently different with respect to those of other WTO members, and hence, the process towards higher harmonization in agri-food standards is no easy task.

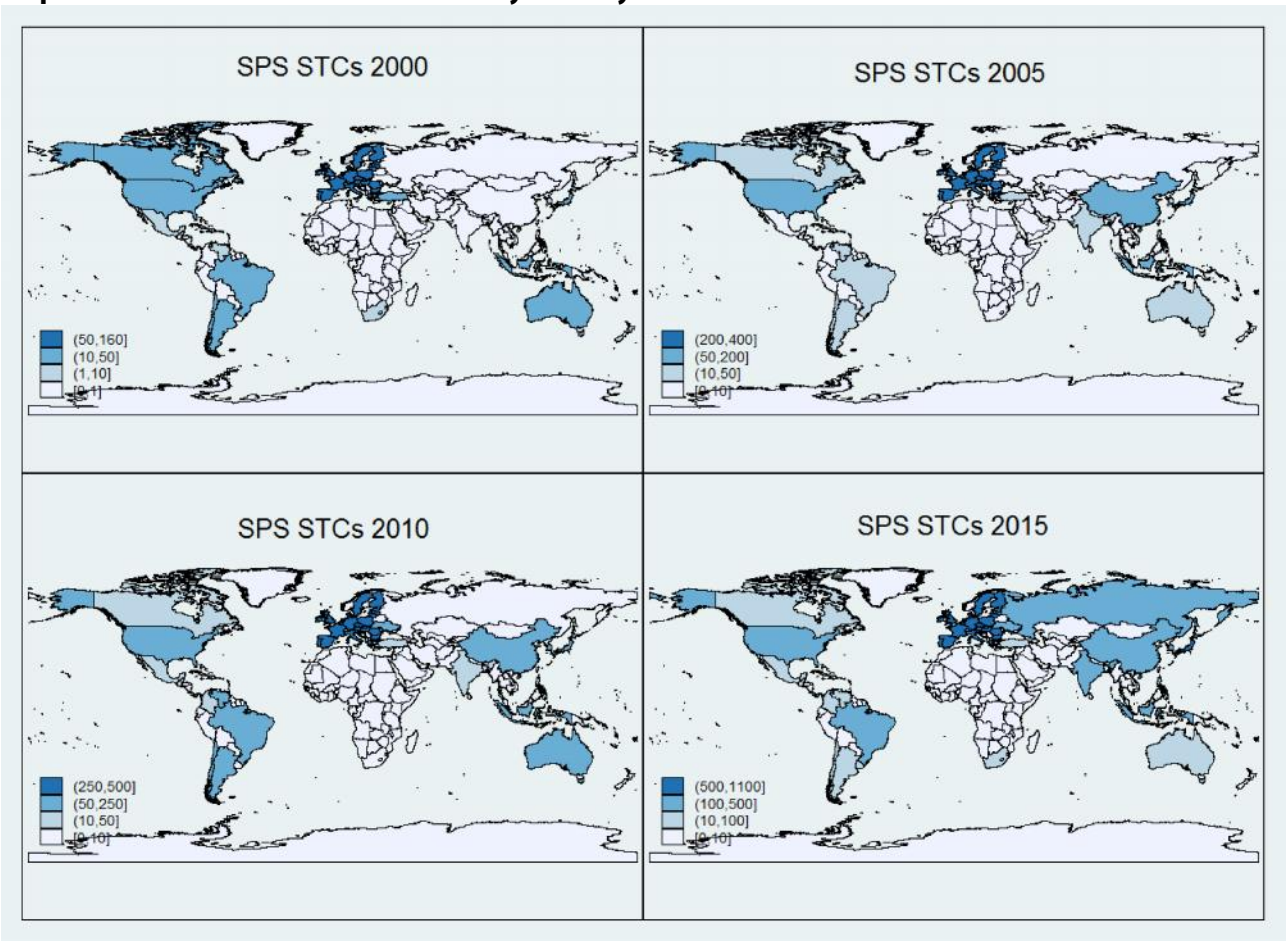
Among the other countries, only **Canada, Australia and Latin American Countries** (in particular Argentina, Brazil and Chile) present a relevant number of products covered by STCs. More recently, also **Russia** which entered the WTO in 2012 has a considerable number of products covered by STCs. However, the issues raised toward Russia seem to be the result of political sanctions rather than an actual difference in standard harmonization. As already seen with regard of the total number of STCs raised, there is a clear distinction between developed and developing countries in terms of number of products covered by STCs. In particular **African countries** do not have any SPS measure that is considered trade-restrictive by other WTO members.

The case of developing countries is particularly important to consider. While it has been widely proved that only a few middle-income countries appear to benefit from the impositions of food standards, developing countries in general are considerably burdened by the cost of the implementation of these measures (Jensen, 2002). From this perspective, it might worth making a further step to consider the particular needs of these countries, both in terms of SPS requirements and the time allowed between the notification and the implementation of the measure (Henson et al., 1999), without laying too much emphasis on this form of special or different treatment (Roberts et al., 1999). Indeed, a differential treatment would not be beneficial for these countries, and for food safety in general, while some special form of assistance may improve their ability to meet stricter food standards (Roberts et al., 1999).

[17] Each STC usually refer to more than one HS 4-digit product. For this reason, the number of products subject to STCs largely exceeds the number of STCs raised at the WTO.

[18] As reported in the figure's note, the darkest blue category spans from 500 to 1100. However, data reveal that the exact number of products covered by STCs for the EU in the year 2015 is 1032.

Map 1: Number of SPS STCs over time by country

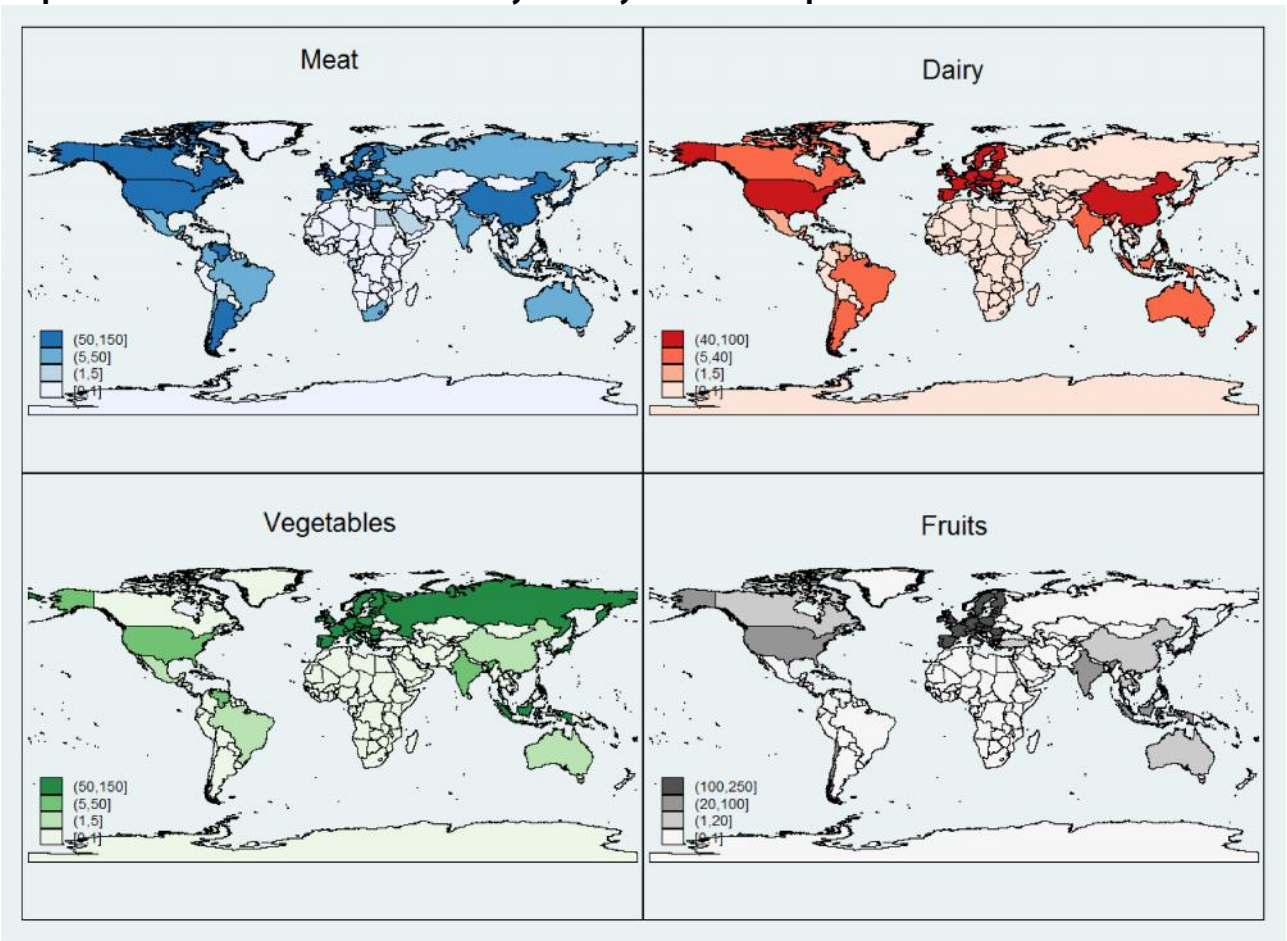


Source: Authors' elaboration based on WTO I-TIP database

A further step toward a better comprehension of how the imposition of restrictive SPS measures affect trade flows, envisages the analysis of how **products** among the WTO members are differently involved in STCs. For this purpose, **Map 2** shows at the country level for four different classes of products (i.e. meat, dairy products, vegetables and fruit), which actually cover the vast majority of STCs, the number of HS 4-digit products covered by STCs, through all the period considered. The EU is the country with more HS 4-digit lines covered by STCs, for all four groups of products considered, while the USA shares the leading role with EU only in the meat and dairy categories. When looking at the single product categories, not surprisingly, **meat products** have been the target of a large number of STCs raised toward a different set of countries. Indeed, the dark blue areas indicate that the EU share the leading role in terms of products subject to STCs with USA, Canada, China, Argentina and Venezuela. All these countries have been the target of STCs on a number of products ranging from 50 to 150, suggesting that there is great attention to domestic regulations on meat, especially due in particular to the growing number of food scares and zoonosis occurring. Considering **dairy products**, the EU shares the leading role with the USA and China in terms of products toward which STCs have been raised. In these countries, as indicated by the dark red area, in the considered period STCs have been raised on 40 to products. Considering other countries, only a few HS 4-digit products have been subject to STCs in a handful of countries, namely Canada, Brazil, Argentina India, Indonesia and Australia. Most of the other countries present no STCs on dairy products.

The cases of **vegetable and fruit products**, as shown at the bottom of **Figure 3**, present similar patterns. An exception is represented by Russia in the case of vegetable products, which however, as previously mentioned, is the result of international political sanctions rather than an actual problem of Russian regulation on vegetable products.

Map 2: Number of SPS STCs over time by country for different products



Source: Authors' elaboration based on WTO I-TIP database

2.1.1.1. Main points of contention between the EU and its trade partners

In this section, we will make an attempt to classify all the SPS STCs into macro-categories, in order to have an overview of the main points of contention that have seen the EU involved in the period in question. This analysis may be particularly important in the effort to bring about improved worldwide reciprocity in food standards. Other works have previously considered SPS and, in general, NTM measures as a whole, in order to assess their role in affecting trade patterns (e.g. Hooker, 1999; Roberts et al., 1999; Jensen, 2002). However, none of them focus specifically on the EU, and provide a comparable detailed classification of STCs. [19]

After a carefully review of all the STCs that have seen the EU actively involved, we identified six different and mutual exclusive categories into which we can classify the STCs. The first relates to **plant and animal health** and groups STCs raised on issues concerning the MRLs on pesticides and veterinary drugs. The second is **human health**, and includes all the STCs raised on domestic regulations on imported food products aimed at ensuring food safety and/or due to food scares, and thus for example prevent the import of products involved from countries where a zoonosis has occurred (e.g. BSE in the EU). The third refers to **Certification/Labelling and Inspections**, especially bureaucratic issues, and in particular STCs raised toward countries imposing regulations on certification or labelling of imported agri-food products, or inspections procedures at the time that an imported product arrives in the destination country. The fourth category groups STCs raised toward domestic regulation imposed on **genetically modified organisms** (GMOs). The fifth concerns STCs on **food processing**, i.e. regulations imposed by WTO members on the

[19] For instance, Roberts et al. (1999), considering in particular the case of US, made an attempt to classify overall Technical Trade Barriers, by considering their role as policy instruments, and looking at the scope of the measures and the regulatory goals.

production process required for imported agri-food products (e.g. animal welfare). The last concerns **notification/harmonization** and groups all the STCs raised toward countries that have not notified SPS measures imposed domestically to the WTO , which prove to be trade-restrictive, or, in general, concerns regulations on domestic measures that depart from those previously agreed and harmonized between the other WTO members.

Below we explore all the above categories in greater depth, in order to ascertain the main topics that are discussed within these categories. First we discuss the case of the EU as the main target of STCs raised by other WTO members, and then analyse the case of the EU as a WTO member raising concerns toward other countries.

2.1.2. The EU as a WTO country maintaining trade-restrictive SPS measures

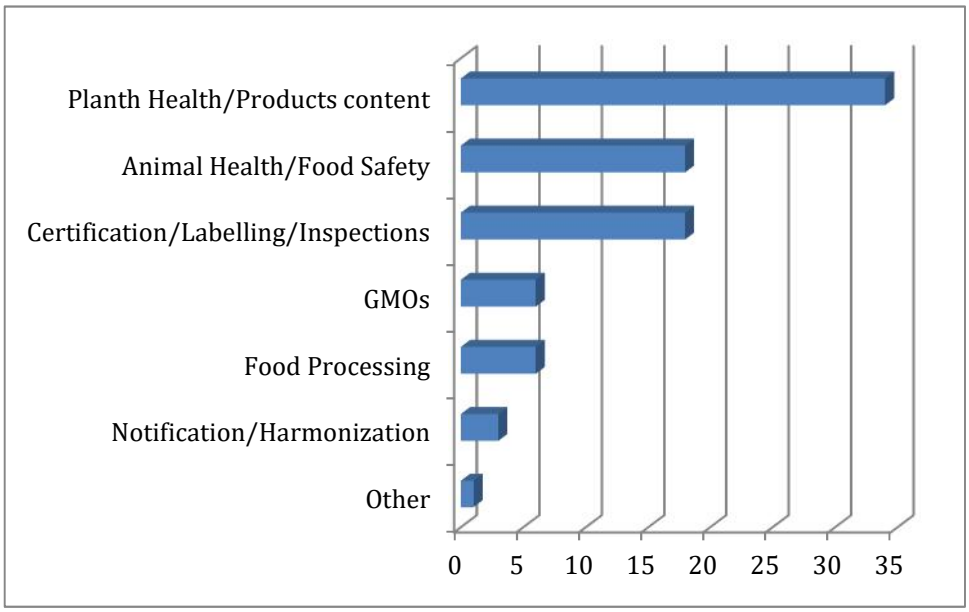
Over the period considered, the EU has been the target of 86 different SPS STCs raised by different WTO members, 29of which have been declared resolved (33%), or at least partially resolved. As appears clearly evident at first sight (**Figure 7**), most of the issues raised toward the EU regard the EU's domestic regulations concerning MRLs on pesticides and veterinary drugs allowed in agri-food products. This category accounts for about 40% of the total number of STCs raised toward the EU (34 out of 86), and can thus be considered as the main bone of contention between the EU and the other WTO members. These STCs regard almost exclusively **vegetable and fruit products**, and the vast majority are raised by developing countries. The se latter, with the aim of exporting their products to the EU, often blame the EU for imposing MRLs that are too strict to be practicable, and that go beyond the standard imposed by the Codex. Such issues are difficult to address, as only 10 out of 34 reported a positive solution, which often consist in adopting a new international harmonized standard. However in most cases, the EU has refused to be more tolerant on limits as requested by countries raising STCs. Besides the well-known problem of MRLs there are two examples of STCs raised toward the EU on plant health issues that are worth analysing to shed light on the dynamics of discussions in the SPS committee. The first is an STC raised by South Africa regarding the EU's restrictive import measures on South African citrus exports infested with **citrus black spot**.[20] This issue has been on-going since 1992, and was again brought to the attention of the SPS committee in 2013. South Africa contended that the EU's measures were not scientifically justified and lacked a technical basis. Therefore, infested fruit did not pose a significant pest risk. From its own perspective, the EU declared that its territory was free from citrus black spot. Hence the restrictions in place reflected the EU's desire to maintain this freedom. This issue has been raised four other times in the SPS committee and has also been supported by other countries (i.e. Argentina, Brazil and Zambia), but it has never been resolved. Although these countries consider this measure to be damaging for their exports of citrus, the EU remains inflexible in its position. This example proves how is difficult in some cases to find a solution when plant health is concerned.

Another interesting example concerns the STCs raised by USA, Argentina and China (and supported by many other countries) in March 2014 toward the intention of the EU to conduct an impact assessment to define the criteria to identify **endocrine disruptors for plant protection**.[21] This example is particularly interesting because it does not refer to a SPS measure notified by the EU to the WTO, but it is a concern that anticipates the potential notification of a trade-restrictive measure, justifying other WTO members to lobby in a way to prevent the application of any potential measure.

[20] WTO, Committee on Sanitary and Phytosanitary Measure, "*European Union – Phytosanitary measures on citrus black spot – Concerns of South Africa*", G/SPS/R/71, paras. 4.15-4.17, June 2013.

[21] WTO, Committee on Sanitary and Phytosanitary Measure, "European Union revised proposal for categorization of compounds as endocrine disruptors – Concerns of the United States", March 2014 G/SPS/R/74 paras. 4.3-4.4.

Figure 7: Classification of SPS STCs raises toward the EU



Source: Authors' elaboration on WTO Information Management System

Another relevant category that encompasses 18 STCs raised toward the EU concerns **human health issues**. Most of these measure imposed by the EU are due to the occurrence in the exporting countries of **zoonosis** (e.g. Avian Influenza in China), and are thus aimed at preventing the spread of such diseases in the EU. The countries concerned, which usually state that the zoonosis has been eradicated raise these STCs or, they ask the EU to apply the principle of regionalization, according to which only imports of products coming from certain regions (where the disease has actually occurred) can be impeded. On most occasions these STCs find a natural solution once the zoonosis is definitely eradicated from the country involved. In other cases, these issues are addressed with countries raising the concerns providing to the EU with a risk assessment on such products, to ensure that they are safe. This class of STCs thus does not show any particular source of lack of harmonization or reciprocity, as these SPS measures are set up in cases of emergency to prevent the domestic spread of zoonosis.

Instead, an important category where there is certainly room for improvement in the harmonization of standards concerns **Certification/Labelling/Inspections**. In this category 18 STCs have been raised toward the EU in the period considered. In most of the cases the EU imposed certification and further inspection upon products coming from abroad, in order to reduce the risk of import unsafe products. The EU is thus often blamed for imposing unnecessary restrictive measures that often require additional costs to be borne by exporting countries. One example that perfectly fits this class of issues concerns the EU regulation on **novel food** that was envisaged to enter into force in 2007. According to the EU this regulation targeted new food technologies, including genetically modified products, and new products (like exotic products) entering for the first time in the EU. This measure imposed upon exporting countries the need to certify the safety of such products according to standards imposed by the EU. Almost one year prior to this measure entering into force, Colombia, Ecuador and Peru, supported by many other countries (especially from South America and Central America), raised a concern on this measure, as its application would prevent the export of exotic products lacking this certification. According to these countries the certification and the procedures required by the EU were unnecessary, as these products had been consumed for centuries in these countries without showing any risks for the human health. Yet the countries argued that the costs of undertaking scientific studies to motivate what they argued were not proportional to the health risks and were excessive, especially for small-scale farmers and exporters. From its own perspective, the EU though that this measure would promote trade, instead of preventing it, and considered the position of these countries untenable. This issue is still on-going, and has been raised 22

more times since 2006, without finding any final solution. This example may help shed light on how distant are the positions in terms of product safety and certification requirements between the EU and developing countries. From this perspective, there might be room to make some steps forward in reciprocal knowledge, and to go toward a harmonization process that may recognize on the one hand the strict requirements of the EU, and, on the other, the difficulty of these developing countries, especially for very small farmers or producers, in meeting such stringent standards.

The EU is often blamed for maintaining an unjustified protectionist position on **GMOs**. Concerning this category, six different STCs have been raised toward the EU in the period considered, especially by the USA, Argentina and Canada. While in many countries the use of GMOs in food and feed productions is long consolidated, the EU has so far always maintained a prudent behaviour toward these products. The case of GMOs represents an important bone of contention between the EU and the USA in particular, which perfectly reflects their different attitudes toward food safety issues. While the consumption of GMO food and feed products in the USA is widespread, EU consumers are more cautious regarding their consumption. Thus, the EU, in absence of a certain proof that these products are safe for human health, has decided to allow only the use of GMOs for animal feed consumption. However, as proved by the STCs raised at the SPS committee, some WTO members blame the EU that its decision to prevent the consumption of biotech products for human consumption has no scientific basis, and thus it represents an unjustified trade-restrictive measure. In addition, as it emerges from the analysis of this category of STCs, the EU's strict requirements on labelling and traceability of biotech products even for animal consumption is unnecessary. The GMOs issues may well be the most difficult to address among those discussed in the SPS committee, as it goes beyond a strict EU regulation in terms of food safety requirements, such as in the case of MRLs. However, as this issue is considered of primary importance for some large markets that are important EU partners (especially USA) it is likely that the on-going discussions will head towards an attempt to find a solution that will be mutually satisfactory.

The category of STCs raised toward the EU concerning **food processing** includes six different STCs. Almost all these issues concern the process of production and treatment of animal products. For instance, an interesting case is represented by the EU regulation that does not allow the import of poultry products when antimicrobial treatments (AMTs) have been used. This concern was raised by the US in 2006 toward the EU, and was motivated by the fact that, although the European Food Safety Authority (EFSA) had concluded that antimicrobial washes were safe for human health, the EU had not yet allowed the import of such products. The EU banned the use of AMTs in poultry because they could be misused in order to compensate for poor hygiene conditions throughout the production chain. This issue is still on-going, and has been raised two more times by the USA. Other similar issues are mainly focus on heat treatment requirements on animal products, and thus do not seem to represent a big hurdle for international trade flows, or, at least, where not yet addressed, a solution appears to be possible. From this perspective, there is certainly room for improvement on this kind of SPS measures toward better harmonization of standards.

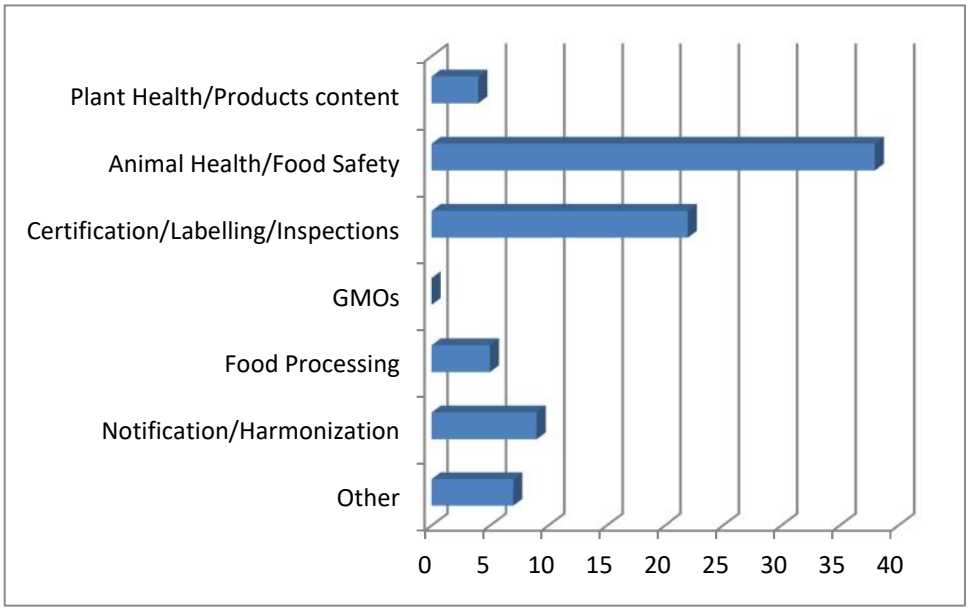
The last category includes three other STCs on **notification/harmonization** and encompasses minor trade restrictive measures, such as the lack of a prompt notification to the WTO of the imposition of a new SPS measure, or concerns different regulations between EU members.

2.1.3. SPS measures considered trade-restrictive by the EU

In the period considered, the EU has raised 87 different STCs toward other WTO members, of which 47 have been declared as resolved, or at least partially resolved. Our classification of SPS STCs led to the following results, presented in **Figure 8**. At first sight it clearly emerges that the patterns of STCs raised by the EU toward other countries changes significantly with respect to the previous case, where the EU was the target of STCs raised by other WTO members. The most important difference with respect to the previous case is in the category of **plant and animal health**, where the EU has raised in the considered period only 4 STCs.

In particular, these concerns do not refer to strict regulations in terms of MRLs allowed in agri-food products, but to the presence of certain substances in food or feed products, especially food additives. Hence, we can argue that, given that the EU is considered the WTO member imposing the strictest regulations in terms of food safety, and, thus imposes stringent regulation on the content of agri-food products, it is not surprising to find out that this kind of issues does not represent a major problem for the EU.

Figure 8: Classification of SPS STCs raised by the EU



Source: elaboration on WTO Information Management System

Looking at **Figure 8** it clearly emerges that the category in which the EU has raised the large majority of STCs is **animal health**, where 38 STCs have been raised (43% of total STCs raised by the EU). In the period in question, the EU has been involved in a number of zoonosis, which have then led to the proliferation of food scares, both within the EU and among extra-EU countries. Considering in particular zoonosis like Bovine Spongiform Encephalopathy (BSE), Avian Influenza and the African Swine Fever among the others, animal products coming from the EU have often been considered unsafe. Thus, several countries have imposed import restrictions from the EU of the animal products involved [22]. From its own perspective, the EU brought to the attention of the other WTO members in the SPS committee that products exported by the EU were safe, or at least, invoked the principle of regionalization. Most of these issues were declared resolved, or at least partially resolved (about 50%). Once the various zoonosis were officially declared as eradicated, then import bans were lifted. From this perspective we can argue that such measures do not suffer from the problem of harmonization, as this category encompasses measures that are imposed in emergency situation and are then usually lifted after the emergency has been resolved.

Another important category where the EU raised several STCs is the one relative to **Certification/Labelling/Inspection**, where the EU raised 22 STCs over the period considered. This category encompasses issues that are raised by the EU toward other WTO members most of the time due to bureaucratic problems that highlight the lack of harmonization in domestic regulations between WTO members. In this category it is no easy task to find a mainstream encompassing most of the STCs raised by the EU, as several different issues are included. Various examples can be made in reference to this category. For instance, in 2013 the EU raised a concern toward India, about the request made to exporting countries to provide certification on animal products free from a number of diseases and about being processed with

[22] On this matter, see the case studies on Mexico, Korea and China in the next section.

heat treatment at 70°C for 30 minutes. The EU stated that these requirements go beyond the agreed international standards. For example, India required that exporting countries certify freedom from a number of diseases for which the World Organization of Animal Health (OIE) or the Codex had not set an international standard, although India had not provided a science-based justification for these import requirements[23].

The European Union further noted that under the SPS Agreement, import conditions should be no stricter than the measures applicable to the domestic market, and Indian legislation allowed non-heat treated processed pork meat within its domestic market. From its own perspective, India has always been reluctant to change its regulation, as it aimed to protect domestic food safety. Despite some step forward, this issue has been raised six more times by the EU, supported by Canada, and an agreement has not yet been found.

The extreme **length of some bureaucratic issues** is another important example of EU STCs within this category. A number of STCs have been raised by the EU concerning the long time needed by some WTO members to assess risk analysis on the imports of various products, that impeded some products entering in these countries. Another issue concerning the length of some procedures has been raised by the EU toward the USA, which were blamed for conducting excessively long inspections on fruit and vegetable products, although the high perishability of these products does not support such long inspections times.

Other bureaucratic issues lie at the root of STCs raised by the EU in this category. For instance, in 2008 the EU raised a concern toward Oman and other Gulf Cooperation Council (GCC) countries, as these countries required **health certificates of products imported by national embassies**. According to the EU health certificates issued by the competent authorities should not need to be ratified by embassies, as this leads to additional steps, fees, and undue delays. Furthermore, embassies sometimes refuse to provide such ratification, creating additional trade delays and problems. Another STC that was raised by the EU toward Saudi Arabia, regarded the import restrictions on **poultry products**. In addition, the EU noted that Saudi Arabia required EU Member States to cover all the costs of inspection visits, and also to pay a fee of EUR 20,000 per establishment. This issue has not yet been declared as resolved as according to the EU Saudi Arabia's requests were unacceptable.

All these examples may lead to the conclusion that there is certainly room for improving harmonization and the reciprocity in regulations, when especially bureaucratic issues are considered. **Better harmonization in SPS measures** may probably help to shorten the long times requested by most such procedure, and thus it may help to further foster international trade between WTO members.

There have been no issues raised by the EU concerning **GMOs**. This reinforces the idea that GMOs are not a priority issue for the EU. Also food processing does not represent an important topic toward which the EU has raised many concerns. In the period considered, only four concerns were raised within this category, and they were always positively addressed.

Another category where the EU raised a number of STCs is the one relative to **Notification/Harmonization**, where in the period considered the EU raised nine STCs. Most of these STCs are raised toward countries that did not notify a SPS measure to the WTO. Lack of notification of domestic measures often makes trade difficult with these countries as leading exporting countries get to discover them ex-post rather than ex-ante. An interesting example possibly leading toward a better harmonization of an SPS measure, may be found in a STC raised by the EU toward the USA in 2008, which were blamed for imposing a very old regulation (from the 1920s) on **trade of dairy products**. According to the EU, with the support of New Zealand, an update of this rule toward a more recent and harmonized regulation may further improve exports of dairy products toward the USA. Despite some steps forward, this issue is still on-going.

[23] On this matter see the case studies on Mexico, Philippines and Brazil in the next section.

A final remark is devoted to the STCs raised by the EU and classified in the category "*Other*". Most of the STCs included here concerns measures imposed by Russia, especially on imports of EU products. Despite the official reason behind these SPS being attributed to food safety reasons, without any particular scientific basis according to the EU, we have reason to believe that these measures have been imposed by Russia due to political reasons. However, this issue lie beyond the scope of this report.

Overall, considering the different STCs raised by the EU toward other WTO members, the situation appears to be less critical. Indeed, more than half of the STCs raised by the EU have been positively addressed in the period considered. In general, most of these issues are related to food scares, and thus find a natural solution once the different zoonosis are eradicated. Analysis of these STCs also highlights that further effort in the harmonization process of SPS measures may be directed toward certain **bureaucratic issues** (related to certifications, risk analysis, inspections, etc.) that could shorten the length of some procedures, and would thus confer great benefits on international trade flows.

2.2. Case studies for the qualitative/quantitative assessment of food production standards

Following the analysis of the previous section, we have selected a number of case studies that cover a wide **range of countries**, **standards** and **typology of agreement**. The case studies analyse in depth the main areas of controversy and implications for achieving the harmonization in order to answer to questions concerning the distance in countries standards as regulatory structures.

Since 2007, the EU has been negotiating a "new generation" of trade agreements going beyond targeting tariffs by including ways of reducing non-tariff barriers to trade. These new agreements are trying to improve market access for both goods and services and increase investments opportunities, eliminating duties and setting common SPS and TBT (Box 2). **Agreements** with Canada, Mexico, the Philippines, South Korea and the USA include a specific chapter on SPS measures.

Box 2: The state of play of EU Negotiations and trade agreements	
Country/region	**Negotiating Directives**
FTA Negotiations	
USA	Negotiating directives obtained in June 2013
CANADA	Negotiating directives obtained in April 2009
JAPAN	Negotiating directives on 29 November 2012
ASEAN: Singapore; Malaysia; Vietnam; Thailand; Indonesia; Philippines; Myanmar/Burma*	Negotiating directives obtained in April 2007; *Negotiating directives for an investment protected agreement adopted in March 2014
INDIA	Negotiating directives obtained in April 2007
AUSTRALIA	Commission proposed negotiating directives in September 2017. The Council discussions on the texts are on-going.
NEW ZEALAND	Commission proposed negotiating directives in September 2017.
MERCOSUR	Negotiating directives of 1999
MEXICO	Negotiating directives of 2016
CHILE	Negotiating directives of 2017
MOROCCO	Negotiating directives for a DCFTA adopted by the Council on 14 December 2011
TUNISIA	Negotiating directives for a DCFTA adopted by the Council on 14 December 2011
Candidate Countries	
TURKEY	Draft Negotiating directives adopted by Commission on 21 December 2016.
BOSNIA AND HERZEGOVINA	
SERBIA	
Other negotiations	
ARMENIA	Directives for a negotiation of a Framework Agreement were adopted by the Council on 12 October 2015
AZERBAIJAN	Directives for a negotiation of Comprehensive Agreement were adopted by the Council on 7 November 2016
BELARUS	Conclusions of the European Council on Belarus of 15 February 2016 call for 'the acceleration of the implementation of measures aimed at enhancing EU-Belarus cooperation in a number of economic, trade and assistance related fields'.
KYRGYZSTAN	College adopted joint recommendations to the Council on 2 June 2017
UZBEKISTAN	College adopted joint recommendations to the Council on 14 May 2018
CHINA	The Council authorised the Commission to initiate negotiations for a Comprehensive EU-China Agreement on 18 October 2013. The mandate to launch negotiations on a new Partnership and Cooperation Agreement with China was approved by the Council in December 2005

The case studies (**Table 2**) analyse **standards and regulations** between EU and Brazil, Canada, China, India, Morocco, Mexico, the Philippines, South Korea, Thailand and the United State of America. Meat, fruit and vegetables, cereals and dairy products are **sectors** in which lack of transparency, lack of harmonization of requirements, redundant checks, and market access procedures are present. We also analyse the issue of **GIs** in the context of trade agreements with the US, Canada and South Korea.

Table 2: Summary of case studies

Countries	Issues
Brazil	Plants and plant products subject to pest risk analysis (PRA)
Canada	GIs
China	Non-recognition of EU regionalisation due to avian influenza
	Import conditions related to milk and dairy products.
	SPS on F&V(MLRs)
India	Restrictions on imports of plants and plant products relating to fumigation treatments.
	Olive standards
Mexico	Import restrictions on fresh fruit and vegetables (MLRs)
	Import restrictions on pork
Morocco	SPS on F&V (MLRs)
Philippines	Market access procedures for fruit and vegetable
	SPS on rice (MLRs)
South Korea	Import restrictions on bovine meat and meat-related products relating to Bovine Spongiform Encephalopathy (BSE)
	GIs
Thailand	SPS on rice (MLRs)
USA	Dairy Standards
	Beef Hormones

Source: Market Access Database (MADB)

The desired level of food safety and quality of imports is ensured by requirements that are often complex. In addition to import standards requirements checked at the border, importing countries may require that products meet additional requirements that usually consists in the establishing approval, whose aim is to list firms eligible for exporting as a means of achieving high food safety and products quality. Table 3 compares the establishment approval system in Mexico, Russia, South Korea and the USA.

Table 3: Approval system for agri-food import in selected countries

Importing country	List of products for establishment approval in the importing countries	Acceptance of listing by authorities of exporting countries	Inspection of exporting establishments	
			By authorities of exporting countries	By authorities of importing countries
Mexico	Yes (beef)	Yes	Yes	No (in some cases inspection for first approval)
South Korea	Yes	Yes	Yes	Yes (for the first approval and with exceptions for good businesses)
Russia	Yes	No	Yes	Yes
USA	Yes	Yes	Yes	Not formulated as a requirement for establishment approval

Source: Country's food safety authority

2.2.1. Quantitative analysis of data on legal limits in food standards

KEY FINDINGS

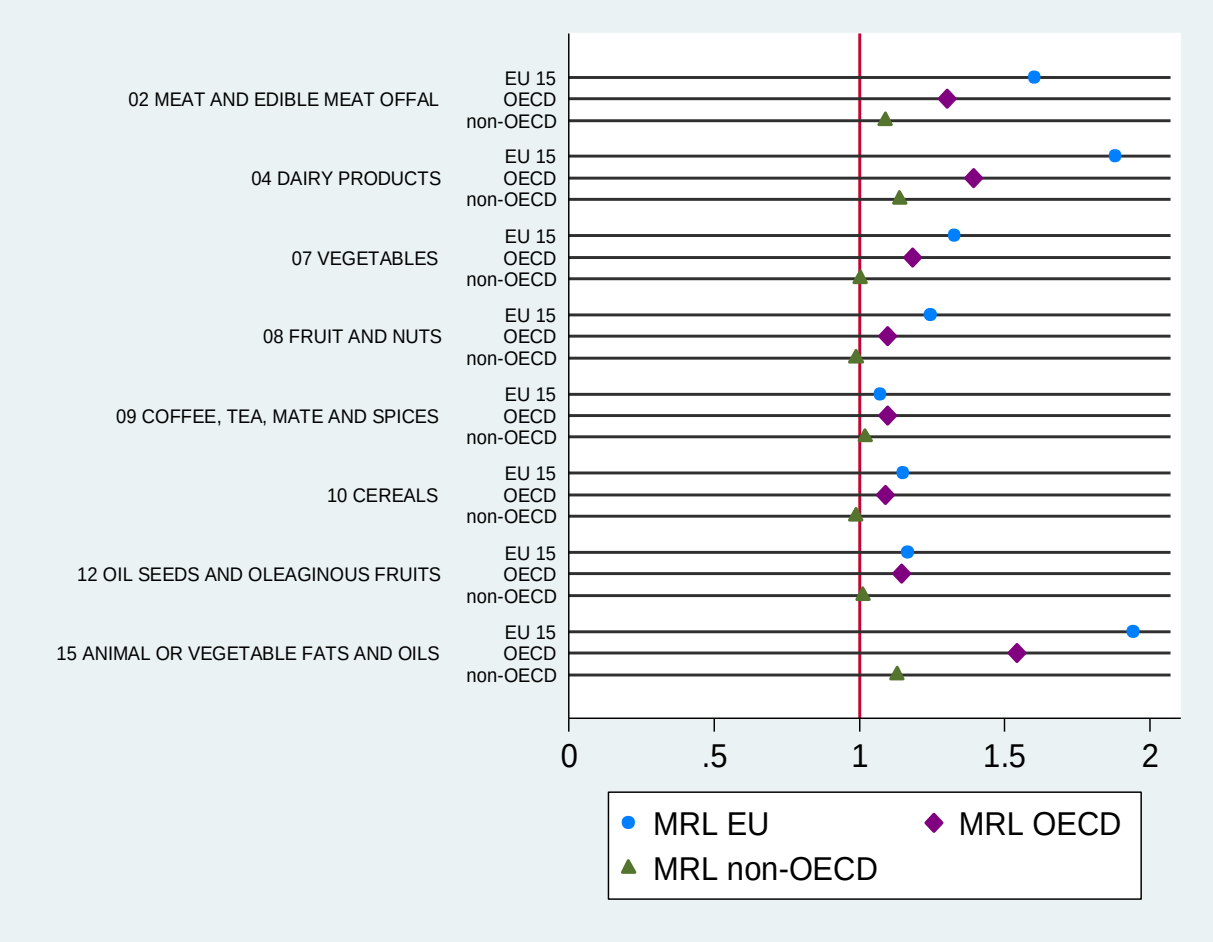
- The number of regulated substances is increasing over time at worldwide level.
- Only a small share of the total number of substances is harmonized under the Codex.
- Countries do not have harmonized approaches towards no–tolerance: the EU and the US represent the two alternative positions: regulatory rapprochement with this respect would represent a huge progress towards harmonization.
- Although the most widely used private standards GlobalGAP is aligned with EU public regulations, there are examples of the private retailing sector imposing stricter limits on residues.

Maximum Residue Levels (MRLs) of pesticides are intended to protect consumers' health and to ensure the adoption of good practices by farmers. The MRL is the maximum quantity of a residue legally permitted on food products.

According to WTO rules, SPS measures should be based on (i) international standards such as those of the Codex Alimentarius, (ii) science, including assessment of risk, (iii) a temporary principle of precaution in the absence of international standards or scientific evidence. Countries are free to set their own standards based on science. Consequently, each country establishes MRL autonomously on the basis of national conditions and good agricultural practice. Hence the **number of regulated substances and their MLR may differ from country to country** and a pesticide permitted in one country may be non-regulated in another. The approval process in a country is based on field studies on the quantity of residue levels which could remain in the product after harvest in the worst case. Therefore, the substance considered is applied at the maximum of its recommendation for a given crop.

Curzi et al. (2018) empirically show that the lack of harmonization in food standards affects international trade of agri-food products between EU and the rest of the world. Following the methodology developed by Li and Beghin (2014), they compare the restrictiveness of standards of a given country with the one imposed by the Codex Alimentarius. As shown by **Figure 9** the EU sets higher restrictive standards in comparison with the other countries. The vertical line is set at the value of 1, which represents the standard referred to in the Codex. In all sectors considered in the analysis, the EU shows, on average, a higher score than OECD and non-OECD countries, except for coffee, tea and spices, where the average score is slightly lower than in OECD countries. The scores of OECD countries are, on average, higher than those of non-OECD in all sectors.

Figure 9: Average MRL scores EU versus OECD versus non OECD members

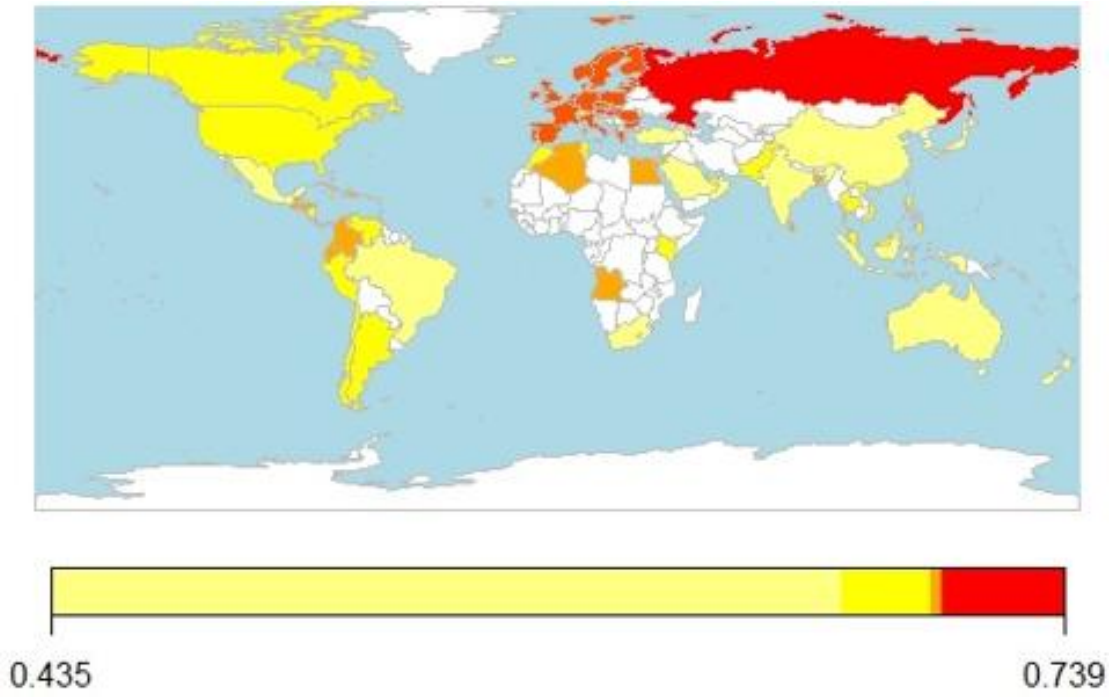


Source: Curzi et al. (2018)

Li, Xiong and Beghin (2017) analysed the policy formation of food safety standard, showing that high-income countries with large population tend to adopt more stringent MRLs. Furthermore, stricter MRLs are established for strategic and competitive sectors and MRLs and import tariffs behave as substitute policy tools.

Carrere et al. (2018) explain whether or not MRLs are determined by "*precautionary legitimate objectives*" and what are the causes of national divergences. For such purposes, by crossing the value of the MRLs and the level of long-term effects (LTEs), they compute a "health score" able to determine whether a country can be considered as more cautious than others (**Map 3**). This map provides a description of the **level of precautionary principle**; countries referring to the rules of the Gulf Cooperation Council (GCC) report a lower score, implying that the GCC country group is less concerned with human dietary exposure, while countries such as the EU and Russia are more cautious.

Map 3: World distribution of the Health Score



Source: Carrere et al. 2018

2.2.1.1 Comparing MRLs standards

As seen in section 2, the measurement of harmonization or reciprocity of standards has been the subject of a stream of recent investigations on heterogeneity across countries. These studies use maximum residue limits (MRLs) looking at stringency in deviation either from international standards (Li & Beghin 2014) or from other reference values (Curzi et al. 2018; Demaria and Drogué 2017, Winchester et al., 2012; Drogué and Demaria 2012; Li and Beghin, 2014)[24].

The main source of information used in this chapter is the database Agrobase-Logigram's Homologa, which provides data for 80 countries and with 120 000 products (**Table 3**). The table shows that that the number of regulated substances is constantly increasing over time. The EU, Japan and Switzerland are the countries regulating the larger number of pesticides whereas Thailand, the Gulf Cooperation Council and ASEAN countries set limits for a much lower number (20, 17 and 78 respectively). Other countries, such as South Korea, Turkey and Norway have increased the number of regulated substances between 2008 and 2016. Indeed, countries can recognise Codex MRLs as the reference in their standards or decide to follow a **"positive list" approach**. The higher number of active substances in the European Union regulation with respect to countries such as USA, Australia and Argentina lies in the choice of the default values for non-admitted substances which are set at "zero" in these countries and therefore below the EU default limit (0.01 mg/kg). When the domestic MRL for a specific pesticide or crop is not estabilished, residues must be either 'zero', below a specified default limit (generally 0.01 mg/kg) or below the concentration of dietary intake concern. In addition, countries can fix as a default value the MLR of the importing country, i.e. the EU (**Box 3**).

[24] For more examples of heterogeneity indices, we refer the reader to Annex I.

Table 3: Number of pesticides registered between 2008 and 2016

Country	2008	2011	2014	2016
Argentina	263	299	313	324
ASEAN	60	64	76	78
Australia	366	378	366	388
Brazil	303	312	322	331
Canada	201	239	293	304
Chile	163	112	165	167
China	137	165	383	389
CODEX	163	180	207	224
Colombia	163	180	173	175
Egypt	163	180	173	175
EU	541	555	534	1102
Gulf Council Cooperation	-	-	17	17
Hong Kong	-	-	353	359
India	166	150	149	153
Indonesia			112	193
Israel	284	300	270	265
Japan	613	630	651	704
Korea South	391	426	463	493
Malaysia	170	170	161	176
Mexico	219	269	220	224
New Zealand	199	230	292	315
Norway	267	455	473	1104
Russian Federation	314	356	451	463
Singapore	-	107	107	107
South Africa	328	329	338	342
Switzerland	429	487	475	497
Taiwan	354	379	362	391
Thailand	20	20	62	62
Turkey	348	407	407	536
Ukraine	-	324	366	392
USA	365	484	393	391
Vietnam	-	-	163	165

Source: Agrobase-Logigram's Homologa database

Table 4 reports the maximum and the minimum limit by country, the number of regulated substances and an estimation of the distance with the EU, using the Beghin index calculated on the list of the **1102 regulated by the EU**[25]. According to the index definition (see **Annex I**), a country's regulation is considered as more stringent that the EU's regulation if the value of the index is higher than 1 and less stringent otherwise.

[25] In their study Li and Beghin (2014) use a list of substances common for all countries, considering the *Codex Alimentarius* as a benchmark.

Table 4: Minimum and Maximum MRLs value by country in 2016

Country	Min MRL	Max MRL	Index Apples	Index Grapes: Wine	Index: Oranges	Index: Rice	Index: Wheat	Index: Tomatoes
Argentina	0.001	100	1.923	1.979	1.941	2.033	1.962	1.931
ASEAN	0.002	50	0.763	0.775	0.767	0.782	0.779	0.768
Australia	0.00002	1000	1.923	1.906	1.948	1.912	1.915	1.940
Brazil	0.002	400	0.777	0.792	0.763	0.765	0.773	0.791
Canada	0.01	1000	0.184	0.227	0.171	0.167	0.221	0.222
Chile	0.002	100	0.754	0.767	0.764	0.778	0.768	0.770
China	0.005	90	0.741	0.761	0.760	0.777	0.759	0.750
Gulf Cooperation Council	0.01	110	0.779	0.782	0.781	0.787	0.785	0.782
Hong Kong	0.002	1000	0.738	0.752	0.757	0.759	0.753	0.750
India	0.002	400	0.763	0.769	0.764	0.775	0.777	0.762
Indonesia	0.002	100	0.779	0.778	0.776	0.788	0.787	0.782
Israel	0.005	400	0.810	0.804	0.797	0.785	0.795	0.810
Japan	0.0005	1440	0.803	0.816	0.806	0.856	0.872	0.817
South Korea	0.001	1000	0.687	0.701	0.684	0.717	0.733	0.705
Malaysia	0.01	500	0.765	0.775	0.756	0.762	0.780	0.763
Mexico	0.001	1000	2.046	2.073	2.066	2.091	2.068	2.035
Morocco	0.01	100	0.767	0.773	0.763	0.783	0.776	0.771
New Zealand	0.0003	1000	0.198	0.229	0.176	0.177	0.208	0.224
Norway	0.001	1500	0.782	0.781	0.783	0.781	0.784	0.784
Philippines	0.01	80	0.787	0.787	0.788	0.781	0.788	0.789
Russian Federation	0.0001	200	0.752	0.787	0.758	0.730	0.748	0.769
Singapore	0.01	400	0.742	0.752	0.747	0.767	0.767	0.747
South Africa	0.01	1000	0.951	1.077	0.963	1.037	1.019	1.015
Switzerland	0.002	1500	0.735	0.742	0.741	0.744	0.747	0.745
Taiwan	0.001	100	0.762	0.777	0.780	0.744	0.785	0.781
Thailand	0.01	50	0.768	0.775	0.769	0.779	0.780	0.767
Turkey	0.001	50	0.721	0.721	0.715	0.726	0.737	0.726
Ukraine	0.005	1500	0.814	0.828	0.788	0.751	0.776	0.812
USA	0.005	6000	1.932	1.928	1.968	2.015	1.951	1.916
Vietnam	0.002	1000	0.748	0.763	0.755	0.780	0.772	0.764

Sources: Authors' computation based on FAS USDA and Homologa Database

The index ranges between 0.16 and 2.09. Argentina, Australia, Mexico and USA show a higher index value and thus their regulations can be considered **more stringent than the EU's**. Japan, South Africa, Israel and Ukraine have an index ranging between 0.80 and 1.037, showing the highest level of harmonization. This is partly due to sharing with the EU the same approach on the default values. Countries ranging between 0.72 and 0.78 are those that refer to the Codex rules. Canada and New Zealand show the lowest index meaning that these countries are less stringent than the EU.

The lack of harmonization that emerges from **Table 4** may act as a serious barrier in international trade. When considering regulated pesticides – besides those where default values are applied for no tolerance -, the value of the index shows a lower distance (**Table 5**). **In table 5, column 2** shows the number of pesticides where MLR is equal between the Eu and the partner country, **column 3** the number of substances regulated only by the EU or by the partner country, **column 4** the total number of substances regulated by the two country besides the ones for which default vales are applied, **column 5** the estimate of the distance among regulations calculated on the latter number of substances[26], **column 6** the share of non-harmonized substances[27]. In this case the index ranges from 0.02 that is the distance in the rice MLR between the EU and Thailand and 0.94 for the oranges MLR between the EU and South Africa. On the one hand, it is evident that when only regulated substances are considered the distance between the EU and other developed countries is lower showing a substantial harmonization in MLRs. On the other hand, there is a substantial distance between the EU and some LDCs for key products, mainly due to the fact that many substances in these countries are not regulated in the Codex. In general, table 6 highlights a more stringent approach in the EU. This result is vey different from the one that we have seen in **Table 4**. Thus, in evaluating the complexity of MRLs the list of missing or non-regulated substances plays a key role.

On our opinion, the different treatment of non-admitted substances in the EU and in the US and in respectively aligned countries, represents a **huge cost for EU producers** as products can be rejected and destroyed in the destination markets. Nevertheless, even without considering such substances, the share of non–harmonized substances is still very high (90% on average as **column 6 of Table 5**) representing a high cost for producers. Thus, a greater effort in pursuing harmonization in MRLs at worldwide level is required in order to reduce transaction costs and information asymmetries.

[26] When a substance is not regulated in a country, we use as a default value the maximum value for the same substance found in others countries regulations.

[27] A table with the distance for each substance where regulation is not harmonized is reported in Annex VI.

Table 5: Number of regulated pesticides for selected market and products – 2016

	MRL EU = MRL PARTNER	MRL Non harmonized	TOTAL	DISTANCE	% of non-harmonized substances
	a	b	A + b		
Tomato					
China	21	352	373	0,81	94.3
Morocco	63	274	337	0,18	81.3
Apples					
China	22	350	372	0,70	94.0
Japan	45	718	763	0,83	94.1
Mexico	4	319	323	0,93	98.7
USA	29	320	349	0,80	91.6
Rice					
Philippines	6	321	327	0,08	98.1
Thailand	8	319	327	0,02	97.5
Oranges					
Brazil	11	316	327	0,14	96.6
Morocco	49	249	298	0,11	83.5
USA	19	315	334	0,81	94.3
Grape-Wine					
Argentina	10	309	319	0,85	96.8
Australia	32	331	363	0,81	91.1
Chile	65	296	361	0,17	81.9
South Africa	3	314	317	0,94	99.0
USA	37	323	360	0,90	89.7

Source: Author's computation based on Homologa Database

We now provide a description of some regulatory divergences with regard to specify country-product pairs (**Table 5**). As an example, in the case of **tomatoes** the number of total approved substances is 373. Among these, the EU regulates 250 pesticides and China 52; only 71 are regulated by both countries. For 68 of those the EU MRL is less stringent than the Chinese one, while for 26 substances EU MLRs are less stringent than the Codex. The average distance between the two countries is 0.106 showing stricter rules in the EU. Some substances regulated in China are not allowed in the EU such as 2.4-D-SODIUM-SALT, CHLORDIMEFORM, COUMAPHOS, DEMETON or PHOSFOLAN-METHYL. The reason why regulations are not harmonized are due to national specificities. More particularly, when a specific country's **National Dietary Exposure Assessment** is conducted it is either concluded that the estimates of exposure are acceptable because below health based guidance values and unlikely to pose a public health concern, or not acceptable. In the first case a country can adopt the Codex value or a value higher than the Codex, while in the second case the substance a lower – more protective - MRL can be set. When scientific information are missing the limit of determination (LOD) is applied.

The case of tomatoes between the EU and Morocco is quite similar. Of 337 active substance regulated, 106 are regulated in both countries. For 43 pesticides, the EU MRLs are less stringent than those in Morocco but the average distance measures 0.2015 showing a more stringent approach in the EU.

From the selected case studies emerges that there is a **process of regulatory convergence (Box 3)**. Exporters that maintain more stringent domestic MRL regulations have less difficult in complying with foreign markets MRL. Adjusting to different regulations imposes costs on firms and government. However, in order to increase the MRL convergence it is necessary to build networks, strengthen relations and open communications channels.

Box 3: Default value for missing MRLs by country

	Rule when a pesticide is not registered
Argentina	Codex 2- Zero-tolerance
Australia	Zero-tolerance
Brazil	Codex
Canada	Default limit of 0.1 mg/kg
Chile	Codex
China	1- Codex 2- Limits applied by reference countries (EU, USA)
EU	Default limit of 0.01 mg/kg
India	No default limit. If no MRL exists, Codex MRL may be recognised.
Indonesia	If no MRL exists, Codex MRL applies.
Israel	If no MRL exists, Codex MRL applies.
Japan	Default limit of 0.01 mg/kg
Korea	1- Codex 2- Limit of most similar group of product 3- Default limit of 0.01 mg/kg
Malaysia	If no MRL exists, Codex MRL applies or a default MRL of 0.01 mg/kg applies.
Mexico	Zero-tolerance
New Zealand	1- Codex recognized for imported food 2- Australian MRLs recognized for food imported from Australia. 3- Default limit of 0.1 mg/kg applies
Norway	EU limit
Philippines	No default limit
Russia	1- Codex 2- Memorandum with Chile and the EU 3- MRL of the most similar product 4- MRL of the country of origin
Singapore	If no MRL exists, Codex MRL applies.
South Africa	EU limit
Switzerland	EU limit
Thailand	If no MRL exists, Codex MRL applies.
USA	Zero-tolerance
Vietnam	If no MRL exists, Codex MRL applies [Vietnam banned substances, including captan, endosulfan and methyl-parathion are not to be used/prohibited for exports to Vietnam].

Source: Authors' compilation on countries' regulations.

2.2.2. Case study 1: EU/US on Dairy and Meat products

KEY FINDINGS

- Over the last 20 years, tariffs on meat products have declined and SPS standards increased. For dairy products there was a smaller decrease in tariffs but a stronger increase in SPS standards.
- The average number of SPS active at 6-digit level is very similar between the EU and US for both dairy and meat products.
- However, there exist significantly differences in the nature of SPS issues.
- In the meat sector, 'conformity assessment' and the 'prohibition or restriction of imports' for SPS reasons, present the highest level of dissimilarity. These two groups show significantly greater EU regulatory activities than those of the US.
- In the dairy sector the asymmetry between the two countries is even larger, in particular on SPS concerning 'prohibition or restriction of imports' with the EU SPS regulations impressively more extensive than those in the US.
- In the US, 50% of measures concerns restriction /prohibition on the use of certain substances, and requirements related to labelling, marking and packaging.

The concerns over food safety and market access in international trade, attracted much attention on food standards (e.g. Disdier et al., 2008; Jongwanich, 2009; Liu and Yue, 2013; Xiong and Beghin, 2012). Trade impacts of SPS standards are ambiguous. In the case of incomplete information on traded products, SPS can facilitate trade by certifying that products are safe for the consumer. However, if these measures are used in a protectionist way, they induce an increase in trade costs and have trade-impeding effects. Key challenges in quantitative analyses relate to the accounting, measurement and comparability of standards because of their often complex definitions and diverse impacts.

In the specific context of **meat and dairy SPS measures**, and in order to measure the US-EU SPS similarity, the use of typical measures, such as the frequency index and coverage ratio, is prevented, as every tariff line is covered by at least one SPS standard. Moreover, a product could be subject to a sanitary standard through a single measure as well as with different groups of SPS measures. Thus, to overcome this measurability problem and in order to obtain a measure which takes into account also of the number of SPS standards by group, we follow Gourdon (2014) by measuring the 'prevalence' of SPS standards (P_SPS). The index measures the average number of SPSs affecting an imported product, and is obtained by weighting SPS data with the world or bilateral imports (IP_SPS and IP_SPS2) (see **Annex I** for details).

To analyse the US-EU similarity/dissimilarity in SPS regulations, we consider data from two different sources. The first is the WiiW NTM Database, a data compilation of WTO notifications of non-tariff measures (NTMs).[28] The database covers 44,450 measures notified to the WTO for more than 100 importers and over 5,000 products and range from 1995-2015. The key advantage of the WiiW dataset is that it allows the time variation in SPS measures to be studied, though it does not distinguished among the various issues covered by such measures.

To explore the SPS measures at a more detailed level and to measure the prevalence score index, we use a second source of data based on the NTMs classification drawn up by UNCTAD. The dataset covers

[28] The dataset is publicly accessible via the Integrated Trade Intelligence Portal (I-TIP Goods): (*http://i-tip.wto.org/goods/default.aspx?language=en*).

all NTM measures from chapters A to I, and chapter P, divided into groupings at three digits.[29] The UNCTAD's NTM data is made publicly available through the World Integrated Trade Solution (WITS) portal developed by the World Bank.[30]

2.2.2.1 The SPS notified to the WTO

Measurements based on SPS notifications to the WTO provide an overview of the pervasiveness of standard-like NTMs in importing countries. As shown in **Figure 10**, the SPSs notified in both meat and dairy sectors are on the rise since the WTO agreements on SPS took effect. In the meat sector (**Figure 10A**) the average number of SPSs notified strongly increased in both countries, increasing from few measures in 1995 to an average of 150 (130) measures notified by the US (EU) at the end of the period in question.

Understanding whether custom tariffs and standards are substitutes or complements is a challenge. The existing empirical evidence, although scarce, seems rather to support the substitution hypothesis (see Olper, 2016 for an overview). However, there is also evidence of complementarity in the literature (see Ray, 1981; Goldberg and Pavcnik, 2005). In our specific context, the relationship existing between tariffs and SPS standards shows a **strong decline in the average tariff** for both the US and EU countries, and a **contemporaneous increase in the number of SPSs over the period 1995-2015**. These trends seem to provide evidence of trade policy substitutability in the **meat sector**, in line with the branch of literature that supports this substitution hypothesis (e.g. Kee, Nicita and Olarreaga 2009).[31] At the same time, the different relationship existing in the **dairy sector**, where, especially in the US, the tariffs remain almost constant and the SPSs notified to the WTO show a considerable increase over the period (Figure 10B), seems to support a complementarity hypothesis.

The two countries show a partial similarity in the number of measures notified in the different groups of **meat products** over the period. The number of SPSs globally notified to the WTO at the end of 2015 and across the HS 4-digit groups in the meat sector mainly concern the group of fresh, chilled or frozen poultry for both countries (25%).[32]

By contrast, with regard to the **dairy sector**, the number of SPS measures notified by the US was three times larger than what was notified by the EU. Both countries concentrate more than half of SPSs measures in three groups of dairy products: concentrated milk and cream, cheese, and the (not in shell) bird's eggs.

[29] The EU and US UNCTAD dataset present some difference in structure. EU data reports all NTM active toward all countries at HS 8-digit level, while the US reports, at HS 6-digit level, NTMs active to all countries plus the additional country specific NTMs. To compare the number of SPS that the US and EU have got at a common HS 6-digit level we counted all the EU 8-digit products which, inside each 6-digit product, present different SPS measures (e.g. A120, A130, etc.), and all US measures active toward the EU. The latter are obtained by adding the (highest) number of SPSs active toward the EU countries to the SPSs active toward the world.

[30] Other data used in the analysis concern tariffs and bilateral trade. Tariff data come from the TRAINS database, that contains information on the effectively applied tariffs at HS 6-digit product level over time. Bilateral trade data come from the United Nations COMTRADE database. The annual data on US and EU world (bilateral) imports are averaged over the period 2012-2014 to reduce the high variability existing at HS 6-digit level. UNCTAD, TRAINS and COMTRADE dataset were downloaded from WITS.

[31] Note that the relationship between SPSs and tariffs, reported in Figure 10, is a simple correlation not a serious test on complementarity/substitutability between policies.

[32] This result seems mainly driven by the large number of product lines included in this 4-digit group (29% of HS02 product lines).

Figure 10: Tariffs and SPS measures notified to the WTO for meat and dairy products in the US and EU

Figure 10A. Meat sector

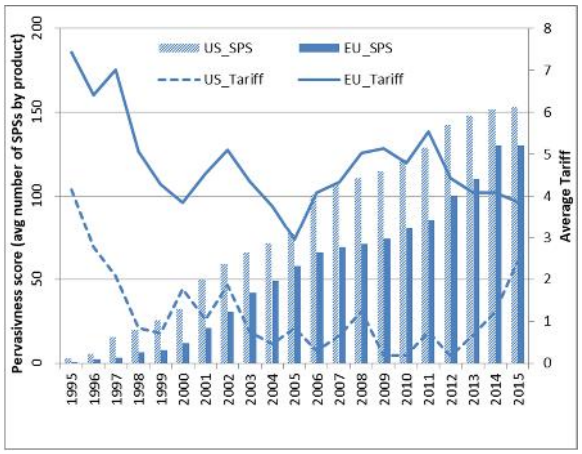
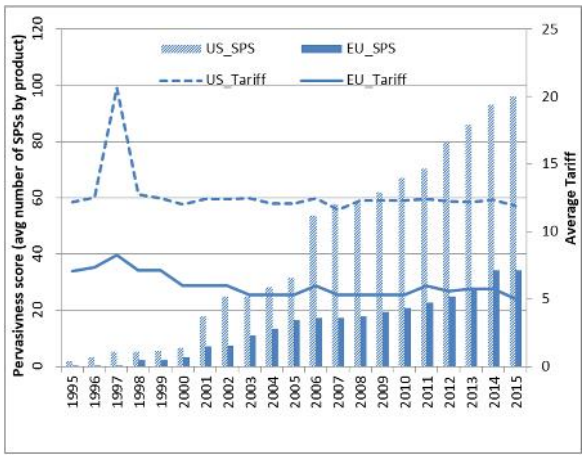


Figure 10B. Dairy sector



Source: Authors' elaboration using WiiW and TRAINS data

2.2.2.2 SPS measures in US and EU

There are around 2500 SPSs active in the **meat sector** in both EU and US. On **dairy products** the EU has 1700 and the US 1844 measures. Although similar in number, the issues covered by these SPS measures differ strongly in the two countries when we distinguish the nature of these SPS standard as measured at 3-digit level (see **Figure 11** and **Table 7**).

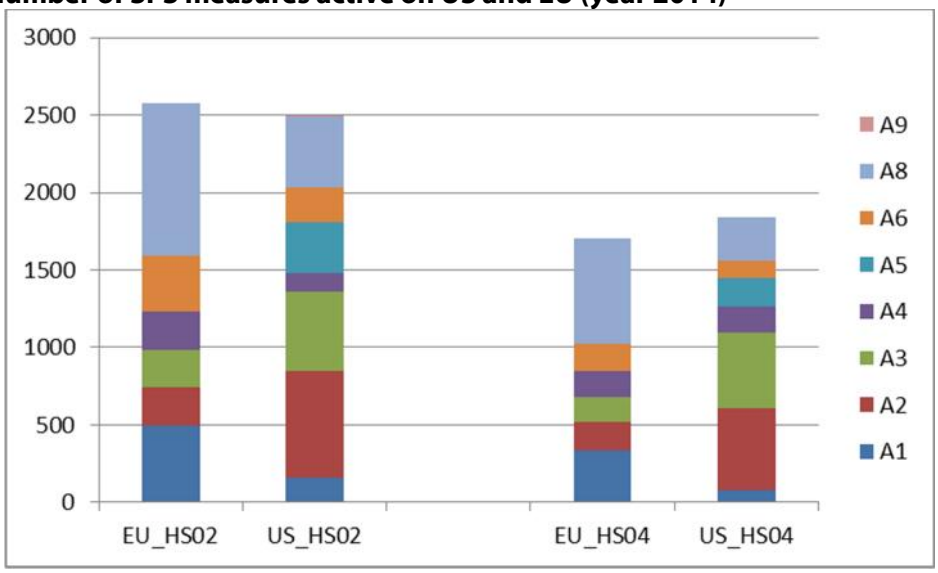
Table 6: Number of SPS measures active in the US and EU (year 2014)

	HS_02		*HS_04*	
Technical Regulations:	**EU**	**US**	**EU**	**US**
A1 Prohibitions/restrictions of imports for SPS reasons	492	157	337	76
A2 Tolerance limits for residues and restricted use of substances	248	688	178	532
A3 Labelling, Marking and Packaging requirements	244	512	165	484
A4 Hygienic requirements	248	120	169	175
A5 Treatment for elimination of plant and animal pests and disease-causing organisms in the final product (e.g. Post-harvest treatment)	-	330	-	183
A6 Other requirements on production or post-production processes	358	225	175	106
Conformity Assessment Procedures:				
A8 Conformity assessment related to SPS	988	456	678	288
A9 SPS measures n.e.s.	-	2	-	-
Total SPS measures	2,578	2,490	1,702	1,844

Sources: Authors' elaboration using WITS-UNCTAD database

Non-tariff measures are classified according to UNCTAD classification 2012.[33] Measures classified under A1 through A6 are technical regulations, while those in A8 are their 'Conformity Assessment Procedures'. The small number of measures classified with A9 are those not specified elsewhere.

Figure 11: Number of SPS measures active on US and EU (year 2014)



Sources: Authors' elaboration using WITS-UNCTAD database.

Comparing the SPS measures active in the EU and US, it emerges that the share of each group of measures differs between countries. However, the pattern of active regulations is quite similar inside within country sectors. More specifically, using the UNCTAD classification of SPS standards the most important issues covered by these regulations are as follows.

In the EU, **conformity assessment (A8)** represents the largest share of SPS measures, with the 38% (40%) of total measures active in the meat (dairy) sector. It includes measures concerning testing, certification, inspection and traceability requirements. The second largest share of EU measures, close to 20% in both sectors, concerns the **prohibition and the restriction of imports (A1)**. In particular, these SPS standards prohibit "*imports of specified products from specified countries due to lack of evidence of sufficient safety conditions to avoid sanitary and phytosanitary hazards*" (A120), and/or require special authorization from the relevant government agency of the destination country for SPS reasons (A140). The other EU SPSs are almost equally shared among measures concerning tolerance limits of substances such as fertilizers or pesticides (A2-A210), labelling requirements (A3-A310), requirements related to **good manufacturing practices (A4)**, and requirements on how food or feed production should take place and should be stored in order to satisfy sanitary conditions (A6-A630 and A640).

Differently, in the US and for both meat and dairy sectors, 50% of SPS measures concern restriction or prohibition on the use of certain substances contained in food and feed (A2-A220) and requirements related to **labelling, marking and packaging (A3)**. In these two groups of measures, the SPSs active in the US are up to three times the EU ones. Also in the US **conformity assessment group (A8)** there is a large share of SPS measures (up to 18% in the meat sector). These measures are mainly related to traceability requirements, or to testing and certification requirements. Finally, the group of measures concerning '*treatments for elimination of plant and animal pests and disease-causing organisms in the final product*' **(A5)**, such as cold/heat treatment, irradiation or fumigation, affects 10% of the country's SPS standards. This group of measures is present only in the US.

[33] Details on the UNCTAD international classification of NTM can be found at http://unctad.org/en/PublicationsLibrary/ditctab20122_en.pdf

2.2.2.3 Prevalence score index for meat and dairy products

The import-weighted prevalence index measured, distinguishing the nine groups of SPSs, is reported in **Figure 12**[34]. The figure shows that the degree of reciprocity in SPSs can differ among the nine groups. In the meat sector, **'conformity assessment' (A8)** and the prohibition or **restriction of imports** for SPS reasons **(A1)** are the two issues that present the highest level of dissimilarity between the EU and US. In particular, these two groups show an index that in the EU is five times greater than in the US. By contrast, the US prevalence score concerning the 'tolerance limits for residues and restricted use of substances' is twice that of the EU (see **Figure 12A**).

Figure 12: Prevalence score index (world import.weighted) in the meat and dairy sector

Figure 12A. Meat sector

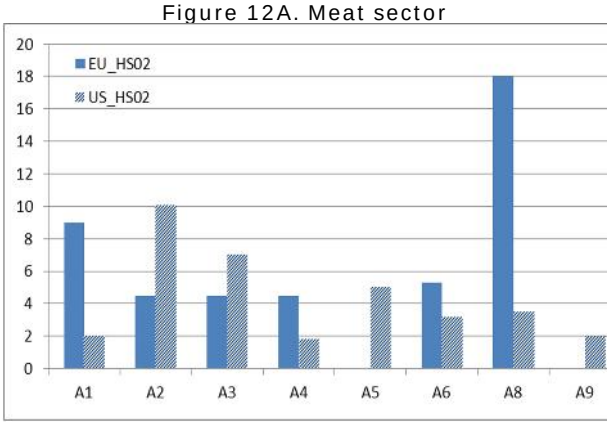
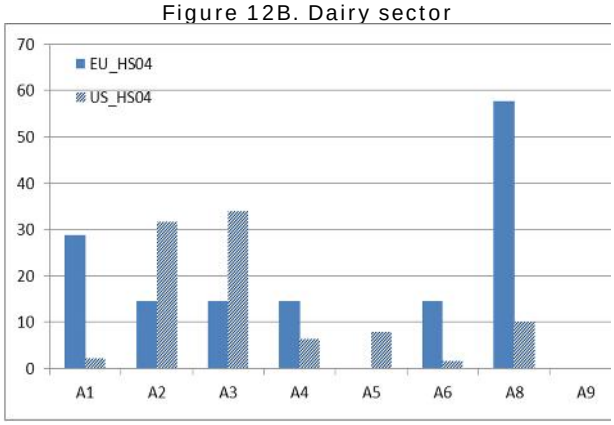


Figure 12B. Dairy sector



Sources: Authors' elaboration using WITS -UNCTAD database (year 2014)

In the dairy sector the asymmetry between the two countries results even larger, in particular on SPS concerning prohibition or restriction of imports (A1). Indeed, as reported in **Figure 7**, the EU index for these measures is 13 times larger than the US one. This group of measures **(A1)** is the second largest in the EU, after conformity assessment **(A8)**, an issue that includes the highest number of SPSs in the EU. By contrast, the US measures are mainly concentrated in labelling, marking and packing requirements **(A3)** and in the restrictions on the use of substances **(A2)**. Also for these two groups of measures there is high dissimilarity between countries, as the US index IP_SPS is almost twice hat the one of the EU.

What observed using the IP_SPS index draws a picture in line with previous data description (see **Figure 11**).

2.2.2.4 The trade concerns in the meat and dairy sectors

US vs. EU

The Report on Sanitary and Phytosanitary Measures of the Office of the United States Trade Representative (USTR) sets out some specific SPS concerns with the EU. Other than the WTO dispute between the United States and the EU over US beef raised with growth-promoting hormones, there are two main SPS concerns in meat (pork and poultry) and one in dairy products. The first is an **EU ban on pork produced with ractopamine**, a veterinary drug that promotes lean meat growth in pigs and certain other farm animals. As a consequence of this ban, U.S. pork exporters must participate in the burdensome "Pork for the EU Programme" to verify that the pork has not been produced using ractopamine. In addition, U.S. pork shipments to the EU must undergo laboratory testing to verify the absence of ractopamine residue. The US complaints that these requirements act as a major impediment to US pork exports to the EU, confining US exports to a small group of US suppliers. The second ban started in 1997, when the EU began blocking imports of US **poultry products that had**

[34] For a more detailed analysis see **Annex II.**

been processed with pathogen reduction treatments (PRTs). The EU has further prohibited the marketing of poultry as "poultry meat" if it had been processed with PRTs. In late 2002, the United States requested the EU to approve the use, in processing poultry intended for the EU market, of four PRTs that are approved for use in the United States: chlorine dioxide, acidified sodium chlorite, trisodium phosphate, and peroxyacids. In May 2008, the European Commission prepared a proposal that approved the use of the four PRTs for processing of poultry, but imposed highly trade-restrictive conditions. EU Member States rejected the Commission's flawed proposal, first at the regulatory committee level and then, in December 2008, at the ministerial level. In January 2009, the United States requested consultations with the EU on whether the EU's failure to approve the four PRTs was consistent with the EU's commitments under various WTO agreements, including the SPS Agreement. The United States continues to engage the EU regarding the drafting and approval of a draft regulation authorizing the use of PAA as a PRT in poultry.

The open SPS issue in the dairy sector concerns the **EU limits on the number of somatic cells permitted in raw milk**, as measured by the somatic (non-reproductive) cell count (SCC). Exporters of dairy products to the EU must demonstrate that the milk used in the production of the exported products meets the EU's SCC requirements. The EU's SCC limit is burdensome for U.S. exporters since the Food and Drug Administration (FDA) has established higher SCC levels than the EU permits. The FDA considers the SCC level to be a quality rather than food safety criterion and, as such, believes that statements about SCC should not be required in health attestations contained in export certificates. The United States continues to work with EU authorities to resolve this issue.

EU vs. US

According to the Market Access Database (MADB) and concerning SPS, the EU currently has two open issues with the United States on meat products, both related to the BSE problem, and one on dairy products.

In meat sectors, the SPS concerns the import restrictions on a number of animals and animal products relating to **Bovine Spongiform Encephalopathy (BSE)**. In 1997, the US introduced rules on the import of ruminant animals and products thereof from all European countries based on concerns about BSE. The US aligned import requirements to the OIE standards by drafting a 'BSE comprehensive rule' in March 2014. However, before trade can resume, establishments must be approved and Member States re-instated by the Food Safety and Inspection Service (FSIS) for compliance with hygiene rules. The EU complains that this process, unnecessary lengthy and burdensome, is on-going for several EU Member States.

The second open issue concerns the closure of US market to any EU **sheep/goat meat** since 1998, when US introduced import restrictions on meat of ruminants on the basis of BSE concerns. In 2016, the US published a proposed (draft) TSE rule to bring its legislation in line with international standards (OIE). To date, the final rule has still not been published. In addition, once this new rule would allows for imports as regards animal health requirements, a lengthy application process is imposed on each interested EU Member State which wants to bring sheep/goat meat into the US market, to show compliance with food safety requirements. The EU continues to work with the USA to find a solution on this matter.

Finally, SPS in the dairy sector concerns all **"Grade A" milk products** (pasteurized, liquid products such as cream or yogurt) that must come from establishments approved and listed by the Inter State Conference of Milk Shipments (IMS). There is no generic definition of Grade A products. The Interstate Conference can always add products to the Grade A list and then, automatically, the Pasteurized Milk Ordinance applies to these products.

2.2.3. Case study 2: EU/Mexico on Import restriction on Pork

KEY FINDINGS

- Mexico does not recognize the EU as a single entity.
- Requirements are not always transparent and easy to understand.
- Dealing with complex requirements increases costs for exporters.
- Further liberalization should be achieved primarily through reciprocity in procedures rather than on single issues.

Since the 1990s, Mexico has been committed to increasing its integration and trade liberalization by signing free trade agreements (FTAs). Mexico's trade policy is one of the most open in the world. The integration strategy is meant to provide economic benefits and also potentially reduce Mexico's economic dependence on the United States (EP, 2017; EC, 2015). Indeed, the United States is by far the most significant Mexico trading partner. In order to develop and increase trade with other trade partners, Mexico has signed 11 free trade agreements involving 46 countries (United States and Canada under the North American Free Trade Agreement [NAFTA], Chile, Colombia, Costa Rica, Nicaragua, Peru, Guatemala, El Salvador, Honduras, Israel, Japan, and the European Union).

2.2.3.1 *The EU – Mexico Trade Agreement*

The EU-Mexico Economic partnership, [Political Coordination and Cooperation Agreement – Global Agreement – GA], in the form of Free Trade Area (FTA), was signed on December 8th, 1997 and entered into force in October 2000 for the part related to the trade in goods and in 2001 for that related to services. It includes trade liberalization, political dialogue and broadened cooperation in different areas. Since then, several changes happened. On the EU side, the number of Members States has increased and the EU has experienced a deeper integration process. At the same time, Mexico has experienced significant, profound and comprehensive transformations. It has implemented policies aiming to consolidate the open economy model and improving democratic standards. Mexico has also carried out significant reforms in strategic areas such as energy, taxation, telecommunications, finance and investment. Although the current FTA works well, it does not cover new trade issues and does not take into account the more recent political and economic development in the EU and in Mexico. From this perspective, a review of the agreement is needed and since 2013 EU and Mexico have been working on modernising the GA. Since 2016, seven round of negotiations have taken place. At the core of the new relations there is political dialogue, competitiveness and growth and, cooperation for sustainable development and good governance. As regards to political dialogue, the purpose is to create of EU-Mexico High Level Dialogues (HLD) on topics related to Human Rights, Security and Law Enforcement, Environment and Climate Change, by considering a large variety of bilateral, international and regional issues including Iran, Syria, and the situation in the Middle East.

Trade relation between the EU and Mexico are included in the trade pillar, which consists of two agreements, the GA itself and the GA's trade component. The latter deals with trade, capital movement and payments and public procurement competition, intellectual property rights and other trade-related provisions. The EU-Mexico trade liberalisation has been mainly focused on trade in goods, and only a minor liberalisation of trade in services has been achieved. With regard to trade liberalisation in services, Mexico provides the EU with the same access to financial services enjoyed by the United States and Canada under the NAFTA. With respect to other services, actors have committed themselves only to not introducing new restrictions in national legislation. The trade liberalisation in goods is much broader, although limited. The EU eliminated its tariffs on industrial goods in 2003, whereas Mexico

had a longer transition period until 2007. As regards agricultural products, the EU eliminated some tariffs in 2008 and Mexico in 2010. This resulted in 62 % of EU-Mexico trade in agricultural goods being fully liberalised at the end of a 10 years' transitional period. However, **both countries protect a number of sensitive agricultural products such as cereals, meats and dairy products**.

The GA's trade pillar regulates trade in nine different areas, including Sanitary and Phytosanitary (SPS) measures, Rules of Origins (RoOs), standards and technical regulations procedures. These provisions do not always go beyond existing WTO commitments.

In 2008 the EU signed a Strategic Partnership (SP), a document indicating strategies for the future where emerging countries play an important role.

A pending issue in the reviewing of the agreement is the inclusion or not in the negotiation of the products excluded from trade liberalization. Other issues concern Geographical Indications (GIs), anti-corruption practices, regulatory cooperation, subsidies, trade and sustainable development (TSD). Additional topics to be reviewed are investments, technical barrier to trade (TBT), competition and public procurement, SPS and intellectual property rights (IPRs). Although there have been 35 negotiation proposals, problems still persist as there is no consensus on topics such as investment protection, public procurement, market access, rules of origin and GIs.

2.2.3.2 EU-Mexico Trade relations

In 2017 Mexico was the 12th largest trading partner of the EU (**Table 8**), while in the same year the EU was the second largest export market for Mexico and its third largest source of import after USA and China (**Table 9**). Currently, the primary supplier to Mexico is the USA, benefiting, not only, from its geographical proximity but also from NAFTA. The EU trade with Mexico is dominated by Germany, Spain, France, Italy, Belgium, the UK and the Netherlands .

The EU is the world's second producer of **pork** after China - with 150 million pigs and a yearly production of about 22 million t of carcasses - and the largest exporter of pork and pork products. Germany, Spain and France are the EU's main producing countries. They represent together almost half of the EU's total slaughter. The EU has a self-sufficiency of about 111% and exports about 13% of its total production. Most of the EU's pork exports go to East Asia, especially China.

Table 7: Top 10 EU trading partners

	IMPORTS			**EXPORTS**				**TOTAL TRADE**			
	Partner	**Value Mio €**	**% Extra EU**		**Partner**	**Value Mio €**	**% Extra EU**		**Partner**	**Value Mio €**	**% Extra EU**
	World	1858257	100	1	World	1879431	100		World	3737688	100
1	China	374823	20.2	2	USA	375845	20	1	USA	632021	16.9
2	USA	256176	13.8	3	China	198200	10.5	2	China	573023	15.3
3	Russia	145094	7.8	4	Switzerland	150813	8	3	Switzerland	261220	7
4	Switzerland	110407	5.9	5	Russia	86186	4.6	4	Russia	231280	6.2
5	Norway	77433	4.2	6	Turkey	84490	4.5	5	Turkey	154251	4.1
6	Turkey	69760	3.8	7	Japan	60493	3.2	6	Japan	129373	3.5
7	Japan	68880	3.7	8	Norway	50702	2.7	7	Norway	128135	3.4
8	South Korea	50017	2.7	9	South Korea	49805	2.7	8	South Korea	99822	2.7
9	India	44184	2.4	10	United Arab	42616	2.3	9	India	85907	2.3
10	Vietnam	37018	2		India	41723	2.2	10	Canada	69182	1.9
15	Mexico	23835	1.3	11	Mexico	37937	2	12	Mexico	61772	1.7

Source: EC, DG trade

Table 8: Top Ten Mexico trading partners in 2017

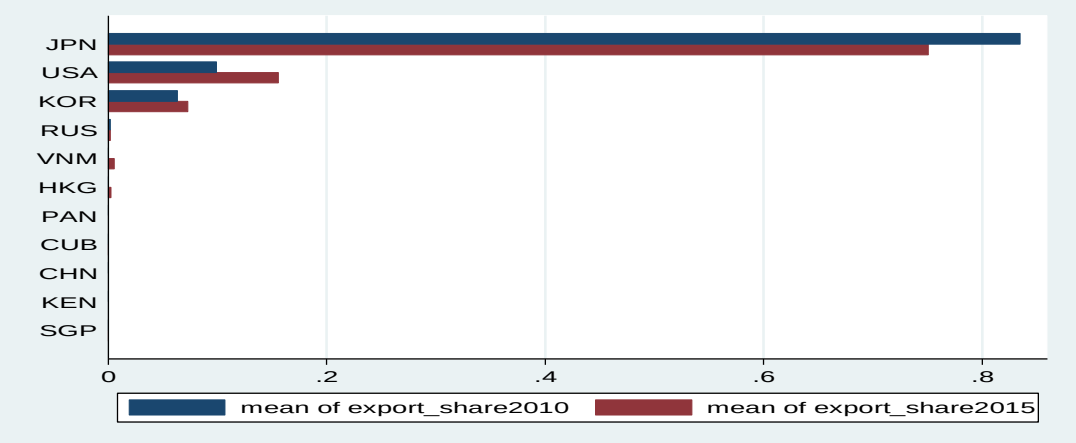
IMPORTS				EXPORTS				TOTAL TRADE			
	Partner	**Value Mio €**	**% World**		**Partner**	**Value Mio €**	**% World**		**Partner**	**Value Mio €**	**% World**
	World	393,774	100.0		World	362,353	100.0		World	756,127	100.0
1	USA	182,541	46.4	1	USA	289,436	79.9	1	USA	471,977	62.4
2	China	69,571	17.7	2	EU 28	20,445	5.6	2	China	75,513	10.0
3	EU 28	45,443	11.5	3	Canada	10,074	2.8	3	EU 28	65,888	8.7
4	Japan	17,063	4.3	4	China	5,942	1.6	4	Japan	20,653	2.7
5	South Korea	14,790	3.8	5	Japan	3,590	1.0	5	Canada	19,258	2.5
6	Canada	9,184	2.3	6	Brazil	3,259	0.9	6	South Korea	17,826	2.4
7	Malaysia	7,401	1.9	7	South Korea	3,036	0.8	7	Brazil	8,363	1.1
8	Taiwan	6,982	1.8	8	India	2,955	0.8	8	Malaysia	8,030	1.1
9	Thailand	5,568	1.4	9	Colombia	2,801	0.8	9	India	7,666	1.0
10	Brazil	5,105	1.3	10	Chile	1,597	0.4	10	Taiwan	7,358	1.0

Source: EC, DG trade

Mexico is an important player on the global pork market especially in relation to trade, both at the import and export sides. Indeed, Mexico is the fourth largest global importer of chilled and frozen pork after China, Japan and Italy. Trade is dominated by the US, with a market share of over 85%. The only other significant supplier is Canada. Both these countries have duty-free access under NAFTA, unlike other suppliers where the import tariff is 20%. Because of this, the EU is not a significant supplier for Mexico.

Mexico's largest pork trading partner is Japan, which accounts for 75-80% of total volumes of exports followed by USA and South Korea as shown in **Figure 13**.

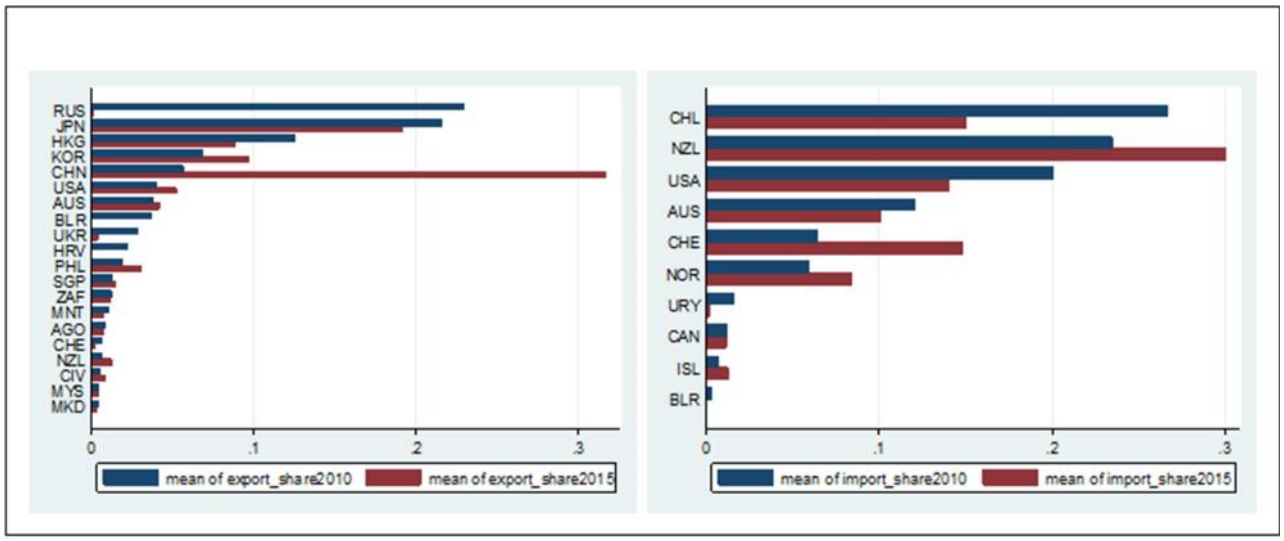
Figure 13: EU Partners' share of Mexico in pig exports, 2010-2015



Source: Elaboration on COMTRADE database

Between 2010 and 2015, the composition of the EU's main trading partners for pork changed. Until February 2014, Russia was the top player for the EU, then, Russia then closed its own market to the EU products because of the outbreak of African Swine Fever (ASF) in areas in the EU close to the border with Belarus. In 2015 China was the top trade partner of the EU followed by Japan, Honk Kong and USA (**Figure 14A**).

Figure 14: Trading partner's share on EU pork exports and imports, 2010-2015



Source: Authors' computation based on the COMTRADE database

2.2.3.3 The trade concern on pork

According to the Market Access Database (MADB), the EU currently has two SPS open issues with Mexico, the first one on fruit & vegetables (F&V), and the second on pigmeat. Both these measures can potentially impede trade. The SPS issues on **F&V are concerned with import permits** which are very burdensome to obtain and require costly and disproportionate measures.

The second issue concerns the Mexican **ban of imports of pigs from the EU**, following the African swine fever (ASF) and the classical swine fever (CSF). Negotiations between parties are still on-going. The Mexican authorities have collected information from EU Member States on the animal health status and control measures applied at MS level. Denmark, Italy and Spain plants have been approved for export to Mexico, but only Danish exporters can ship fresh or frozen pork and pork variety meat while Italian and Spanish exports are so far limited to processed pork products.

In order to export **meat products** to Mexico foreign establishments must comply with Mexican import requirements and obtain prior approval from the Mexican Ministry of Agriculture. By this way exporting enterprises are included in the approval listing and can obtain the export certificate

Mexico applies a **burdensome and costly procedure when listing establishments for exports**. The authorities of Mexico require on-the-spot evaluations for each establishment at the expense of EU exporters. **A prelisting is in place for dairy products but not for meat**. The EU has requested the equivalence for all products and has negotiated a deal with Mexico with the purpose of removing the existing barriers for some sectors.

Because of the non – recognition of the EU as a single market, a second issue is represented by the **"Born raised and slaughtered in one MS only" – clause**. Since 1 April 2015 the EU has applied new rules on the labelling of fresh, chilled and frozen meat, which require fresh, chilled and frozen pork to be labelled with "*Country of Rearing and Country of Slaughter*". However, if the pig has been born, reared and slaughtered in one country, there is a voluntary option to indicate the "origin" country (name of MS or third country). If the meat does not originate in one single Member State, the information required is: "reared in", "slaughtered in" and the batch code identifying the meat supplied to the consumers or mass caterer. Where criteria are not met the legislation requires "reared in several MS" or

in "non-EU countries". Finally, where several pieces of meat, of the same or of different species, correspond to different labelling indications the label must indicates the list of the relevant Member States or third countries in accordance with the requirements set out in the Regulation for each species and the batch code identifying the meat supplied to the consumer or mass caterer.

Mexico carried out audits in seven member states (BE, DE, IT, FR, PT, PL and RU) during summer 2015 in order to evaluate the **possible recognition of the EU as a single entity** for the exports of fresh pork and pork products. The results of the audits are meant to simplify the procedures by allowing the pre-listing of exporting establishments.

The EU and Mexico are engaged in a modernisation of the current trade agreement, but the relationship between the EU and Mexico still looks unequal. Requirements are not always transparent and easy to understand, approval procedures are long and non-transparent, waiting period for inspection visits are very long and audits are not system-based but rely on individual establishment approval. The negotiation of clearer rules could be useful to stimulate trade relations between countries. In order to allow for smooth trade, Mexico should recognise the EU as a single entity and food legislation should be conform to Codex Alimentarius standards.

Box 4: Mexico's procedures for food imports

In order to export animal products an import certificate is needed. This document confirms that live animals, products of animal origin as well as biological, chemical and pharmaceutical products and feed for animals to be imported have been inspected and comply with the applicable zoo-sanitary requirements. The certificate is to be applied for by the importer, his legal representative or the customs agent at the corresponding Inspection Office for Agricultural Health, General Directorate of Phyto- and Zoo-sanitary Inspection of the National Service of Health, Food Safety and Agro-Alimentary Quality assigned to the Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food = Oficina de Inspección de Sanidad Agropecuaria (OISA), Dirección General de Inspección Fitozoosanitaria (DGIF) del Servicio Nacional de Sanidad, Inocuidad y Calidad Agroalimentaria (SENASICA) de la Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación (SAGARPA).

Before the import certificate may be applied for, the relevant zoosanitary requirements and requirements concerning the reduction of risks of contamination as prescribed by the SENASICA for the product in question must have been complied with, as applicable.

The physical inspection of the consignments may also be conducted at establishments within the country if these have been duly authorised by the SAGARPA. In this case, the documentary inspection must be carried out at the customs office of entry, whereupon a compliance report of the documentary inspection is issued. The consignments may then be transported to the authorised establishment, where the physical inspection takes place.

In case of meat, carcasses, guts, entrails and further products and sub-products of animal origin for human consumption which necessitate refrigeration (dairy products, sausages, etc.), the certificate must bear, inter alia, the net weight of the commodities to be imported, the lot number, the date of slaughter, processing, packaging and/or expiry (according to the type of product) and the number of the authorised exporter in the Information System for the Search of Authorised Establishments (SICPA)[35].

[35] This certificate is only required for the following code: 0203.11.01, 0203.12.01, 0203.19.99, 0203.21.01, 0203.22.01, 0203.29.99

Prior to any import operation, importers must enquire about the applicable zoosanitary requirements for the products to be imported. The online system entitled module for the request for zoosanitary import requirements (MCRZI36) has been implemented by the DGSA to this effect. Only if the system does not yet display any import requirements for the specific product and country of origin or provenance in question must the abovementioned application be submitted.

The exact scope of goods the importing of which must comply with the requirements presented in the MCRZI is stipulated by the "Agreement on the classification and codification of goods the importation of which is controlled by the Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food through the National Service of Health, Food Safety and Agro-Alimentary Quality" of 3 September 2012 and its amendments.

If zoosanitary requirements are applied for at the SENASICA, one of the following outcomes is possible: a) the product to be imported is subject to regulations as well as the stipulation of these regulations; b) the entry of the product is prohibited, e.g. for reasons of quarantine of the country of origin/provenance, c) a pest risk analysis (PRA) or evaluation is necessary; d) there already exist applicable zoosanitary requirements in the MCRZI.

Upon arrival in Mexico, the consignments are subject to documentary and/or physical inspection in order to determine whether they comply with the applicable zoosanitary requirements. In the affirmative case, an Import Certificate for Live Animals and Animal Products is issued electronically, which is consulted by the customs authorities for clearance purposes.

2.2.4. Case study 3: EU/South Korea on BSE

KEY FINDINGS

- Korea has gradually reduced its support to agriculture but this is still much higher than the OECD average.
- Because of serious reoccurrences of highly infectious diseases and consequent substantial financial loss, Korea has tightened internal policies for animal disease control.
- Despite the FTA, liberalization between South Korea and EU is still incomplete and highly asymmetric.
- South Korea still imposes restrictions on import of EU meat due to the BSE outbreak in 1997, although the EU's response to BSE has proven successful.
- Further liberalization should be based primarily on aligning requirements with international standards and the SPS agreement.

2.2.4.1 Main agricultural policy developments

Korea has gradually withdrawn its support to agriculture reducing price support and introducing a range of direct payment programmes and an agricultural insurance. Total support to agriculture (TSE) as a percentage of GDP has significantly declined over the analysed period from 8.6% in 1986-88 to 1.7% in 2014-16 but is still higher than the OECD average. Non-tariff measures on rice have been transformed into a tariff system (2015) and import restrictions on agricultural products are now in the form of tariffs and tariff rate quotas (OECD, 2017a).

A new five-year (2016-20) promotion plan for environmentally friendly agriculture has been implemented. The government plans to increase the share of pesticide-free (including organic) cultivation area and generally to reduce the input of chemical fertilisers and pesticides in crop production. In December 2016, a co-operation fund was created to support the agriculture and

[36] The MCRZI is accessible via *http://sistemas.senasica.gob.mx/mcrz/moduloConsulta.jsf*.

fisheries sectors that could be adversely affected by trade liberalisation through free trade agreements (FTAs). The fund will be used to provide education to youths from farm households and to improve rural welfare and development.

2.2.4.2 The FTA between EU and South Korea

In 2011 the EU concluded the FTA with South Korea. This FTA is the first of a new generation of FTAs and it is the first trade agreement with an Asian country. The FTA progressively eliminates duties for industrial and agricultural goods.

For a limited number of highly sensitive agricultural and fisheries products the elimination of tariffs is extended for a period exceeding seven years. **Rice and rice products are excluded** from the Agreement. On the EU side, duties on fresh tomatoes, oranges and rice are not reduced. On the Korean side, the tariff schedule takes up to 20 years for apples, pears; up to 18 years for some oil seeds and oleaginous, green tea, sesame oil; up to 15 years for some vegetables, meat, products of animal origin or the milling industry, preparation of vegetables, beverages; up to 10 years for some dairy products, live trees and other plants, cereals and sugar. Tariff rates remain unchanged for specific products (some fish products, pepper, barley, soya beans, onion, citrus fruit, garlic). Finally, special schedule for the removal of tariff rate quotas (TRQs) are granted to some fish products, grapes, dairy products, honey, oranges and malt.

Before the FTA only 2% of EU agricultural products entered South Korea duty free. About 70% of the tariff was eliminated with the provisional application of the FTA; the 99% was eliminated in 2016. The EU's average applied tariffs are 6.5% and Korean average applied tariffs are 12.2%. After year 3 of the agreement, 45% of tariff lines is at 0; after 5 years at 65; after 10 years will be at 85%, finally after 18 years at 95% (Table 10). The remaining 5% contains some exceptions. As regards alcohol, wine is duty free from the first year, whisky after 3 years. Pork is duty free from year five, while frozen pork belly after 10 years of the transition period.

Thanks to the FTA, duties on EU agricultural imports to Korea will fall by 380 million euros annually, Korean duties are 35% on weighted average. The liberalization therefore allows EU products to improve their competitiveness in the Korean region.

Table 9: Timeline of agricultural product liberalization KOREA-EU

Tariff line liberalisation (in %)	Agricultural products
Year of entry into force	40%
Year 3	45%
Year 5	65%
Year 10	85%
Year 18	95%

Source: EU-Korea FTA

The agreement also addresses the issue related to NTBs on industrial good (automotive, pharmaceutical, medical devices and electronics). The arrangement creates new opportunities for market access in services and investments, competition policy, government procurement, intellectual property rights, transparency in regulation and sustainable development. Thanks to the strategic partnership signed in 2010 and entering into force on 1 June 2014, the EU and South Korea strengthened cooperation on political and social issues, namely human rights, climate change, energy security, non-proliferation of weapons of mass destruction and counter-terrorism.

The FTA contains a specific chapter on SPS measures with the aim of facilitating trade between regions in animals and animal products, plants and plant products while maintaining the prescription relative

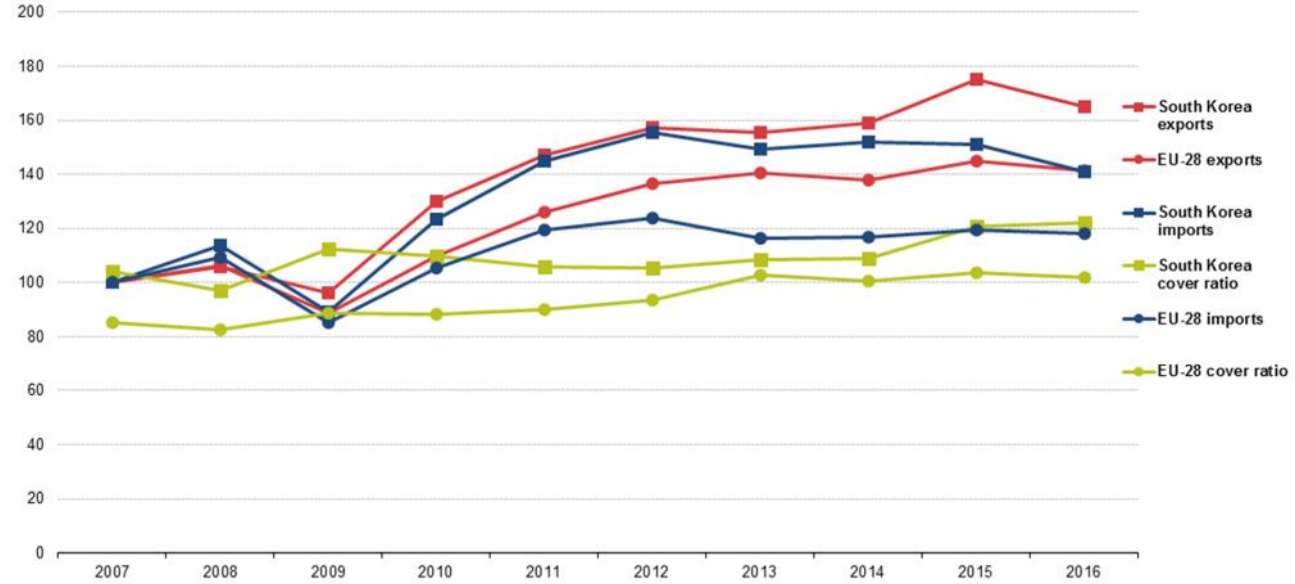
to level human, animal and plant health at high levels. In the same chapter, measures meant to develop and ensure full transparency as regards all SPS measures are addressed. With the aim of having a common understanding on animal welfare, the chapter includes also provisions on cooperation.

Thanks to the FTA the EU has consolidated its position over some of the EU's others competitors such as USA, Canada, Chile, New Zealand and Australia. The FTA provides a high duty savings as trade between the EU and South Korea is expected to increase. A study of CEPII/ATLASS consortium pointed out that the FTA is expected to more than double EU-South Korea bilateral trade in the next 20 years compared to a scenario without the FTA. According to a Forizs and Nilson (2017) the FTA has generated greater EU export growth than expected. A study of the European Parliament (2016) confirms that in the first three years of implementation of the FTA there was a significant increase in EU agricultural and food product exports (food +26% and beverages +27%), in which the highest increases were in meat (+15%) and dairy products (+27%). From 2008 to 2014 agricultural and food products account for a much larger share of total EU exports to South Korea from 4.9% to 15%.

2.2.4.3 Trade between the EU and South Korea

In 2016, South Korea was the sixth largest exporter and importer of goods in the world with a share of 4.0 % of world exports and a share of 3.2 % of world imports. In the same year South Korea was the ninth largest EU partner for exports and the eighth largest partner for imports. The EU's trade position with South Korea turned in a surplus from 2007 to 2016. Manufactured goods have an 87% share of EU exports to South Korea and account for 94 % of EU imports from South Korea. Germany is the largest importer (EUR 6.4 billion) from and exporter (EUR 17.4 billion) to South Korea. South Korea is the sixth largest exporter (EUR 448 billion, 4.0 %) and importer (EUR 367 billion, 3.2 %) in the world, in both cases between Hong Kong and Canada. Figure 15 shows the evolution of trade in the EU and Korea over the period 2007 to 2016.

Figure 15: Total trade between EU and Korea - 2007 to 2016



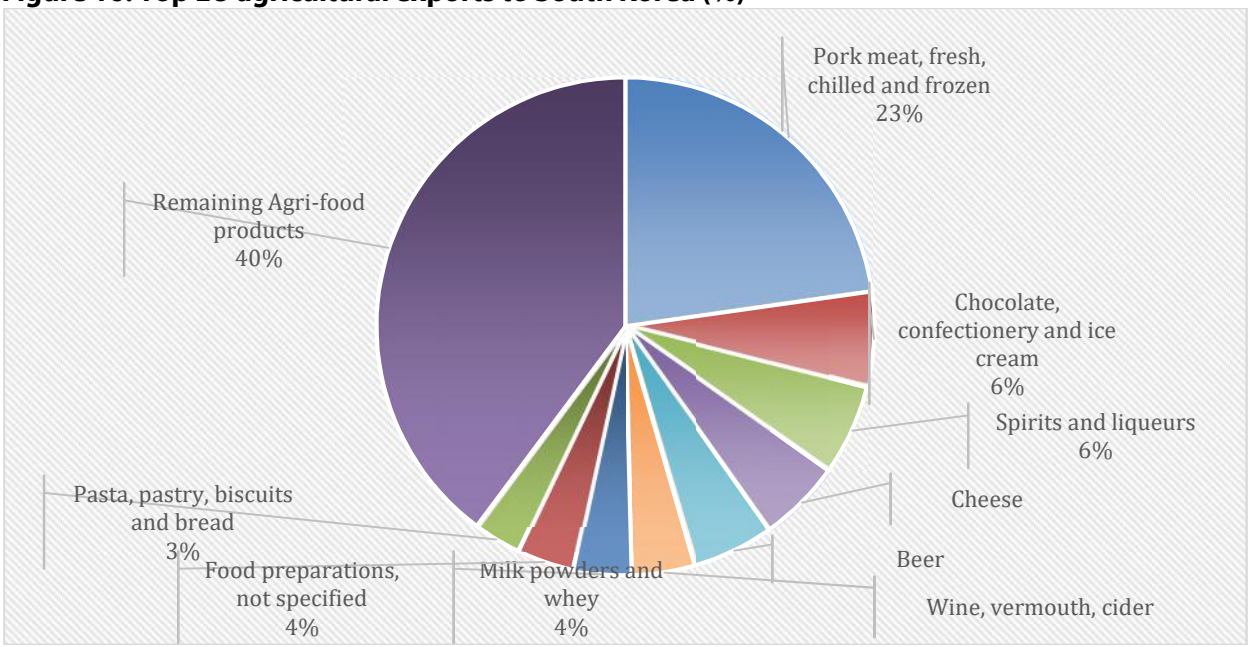
Notes:
- While the trade balance provides information on the absolute value of trading positions, the cover ratio provides a relative measure that is based on the ratio (expressed in percentage terms) between the value of exports and the value of imports; if exports are higher than imports then the cover ratio will be above 100.
- Exports and imports are indexed at 100 in 2007

Source: EUROSTAT

From 2007 to 2011 imports and exports for both regions developed in a similar way with a low point in 2009 followed by a recovery in which both exports and imports of South Korea grew more than those of the EU. After 2012 exports continued to increase for the EU and South Korea, while imports remained more or less constant. The cover ratio (exports divided by imports) increased for both countries.

Concerning agricultural products, the **agricultural trade balance** with South Korea is positive for the EU. In 2015 EU agricultural exports reached a record level of € 2.4 billion. Overall, the EU has become the second most important trading partner in agricultural products with a 13% market share of South-Korean imports (after USA and before China, Australia and Brazil).

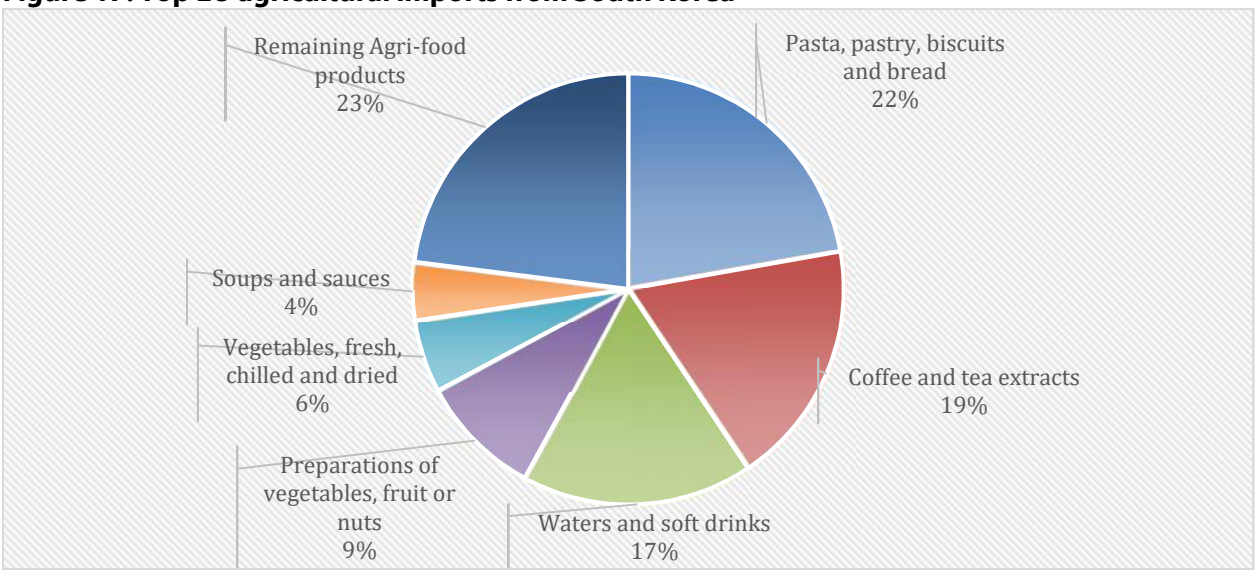
Figure 16: Top EU agricultural exports to South Korea (%)



Source: DG Trade, 2017

The main EU export products to Korea are pork (23% of EU agri-food exports to Korea), chocolate (6%), spirits and liquors (6%) and cheese (5%) as shown in **Figure 16**. **Figure 17** displays the main EU import products from Korea are pasta, biscuits and bread (22% of EU agri-food imports from Korea), coffee and tea (18%), water and soft drinks (17%).

Figure 17: Top EU agricultural imports from South Korea



Source: DG Trade, 2017

The agreements are contributing to increased trade in both directions, with increased EU exports and increased imports of products from South Korea. Increased imports have little impact on domestic EU production because they reflect mainly a replacement of imports from other third countries or an increase in EU consumption (European Commission, 2017).

2.2.4.4 The trade concern on BSE

In addition to maintaining protection for a group of sensitive products such as beverages, fisheries and dairy among others, **South Korea has banned some EU bovine and ovine products** since the outbreak of BSE in the EU in 1997. In response to the BSE, the EU implemented a new regulatory framework to internally improve food safety, ensure a high level of consumer protection, and restore, and maintain confidence in the EU food supply. The EU food law has separated risk assessment from risk management and the European Food Safety Authority (EFSA) has been instituted. The EFSA is responsible for providing support and scientific advice to decision-makers in the EU and in MS. All EU member states (except for Bulgaria and Romania) now have a negligible or controlled BSE risk on bovine products. The World Trade Organisation agreement on the application of SPS considers that WTO members applying the OIE standards meet the obligations under the WTO Agreement. According to the WTO SPS agreement the BSE status of the EU does not justify a third country import ban of EU bovine products.

Since June 2004, the EU has raised concerns at the WTO about unjustified import restrictions on meat exports due to concerns about BSE giving the measures adopted and the results achieved. Measures have been applied both to products intended for consumption within the EU MS and to those destined for export. The system of geographical assessment used in the European Communities had successfully identified countries in which the disease was still present. The European Union called on other countries to remove import bans, which exceeded OIE recommendations. Many products, such as semen, embryos and dairy products, could be traded with predefined guarantees. WTO Members were urged to take into consideration OIE recommendations for international trade and to stop discriminating among Members with similar BSE conditions.

In October 2004 several WTO Members, but not all, reviewed their bans on EU beef and small bovine ruminant products and replaced them with specific requirements in accordance with OIE standards. Consequently, the EU invited the remaining WTO Members to replace their import bans with specific import requirements in accordance with OIE standards. Between 2011 and 2013, Philippines and Thailand aligned their requirements with the OIE. Meanwhile, the EU recalled again China, Japan and South Korea to bring their requirements into line with the international standards and the SPS Agreement. While, China asked for further information from the EU in order to complete its risk analysis and recalled cooperation with the EU, Japan and Korea expressed willingness to continue discussions on this issue in bilateral meetings. The main issue raised by Korea concerned the negative perception of the EU on internal consumption due to the BSE disease in comparison with other EU competitors such as Australia, Canada or USA.

To date, although progress has been made in the negotiation with China, Japan and the USA, problems still persist with South Korea and other WTO members, namely, Malaysia and South Africa.

2.2.4.5 Livestock disease management in Korea

The rapid intensification of production over the past two decades has substantially increased the risk of occurrence and spread of disease in Korea. Since the mid-2000s, Korea has experienced serious reoccurrences of highly infectious diseases, such as avian influenza, FMD, brucellosis, bovine tuberculosis and classical swine fever. In particular, FMD causes considerable financial damage. The

government adopted in 2011 a policy of nationwide vaccination for all cloven-hoofed animals but still the FMD has still re-occurred every year since 2014(OECD, 2017 b).

The regulation has been significantly tightened for livestock operations including both stringent criteria and on legal liability of farmers and large financial penalties. Mandatory training for those involved in breeding and handling livestock was introduced, with most training costs covered by the government. At the same time there is financial compensation under the disease control and prevention programs as well as subsidised livestock insurance.

The main institutions involved in livestock disease issues are: the Ministry of Agriculture, Food, and Rural Affairs (MAFRA), responsible for the delivery of animal health services; the Central Animal Disease Control Council, which is a non-permanent body deliberating on major policies related to animal disease control; the Animal and Plant Quarantine Agency (QIA), which is an executive veterinary agency implementing disease control policies with the responsibility of veterinary research; the Livestock Health Control Association (LHCA) a public veterinary institution, performing duties of clinical examination, testing, sanitary inspections of livestock products, disinfection, and education and public relations for the prevention of livestock diseases. The Central Animal Disease Surveillance Council operates as QIA's consultative platform.

Box 5: Avian Influenza

Avian Influenza (AI) is a highly contagious viral disease affecting several species of food-producing birds (chickens, turkeys, quails, guinea fowl, etc.), as well as pet birds and wild birds. Occasionally mammals, including humans, may contract avian influenza (OIE web site).

There are two categories of AI, according to the severity of the disease in poultry:

- Low Pathogenic Avian Influenza (LPAI) strains do not cause serious disease in birds;

- Highly Pathogenic Avian Influenza (HPAI) strains have more severe symptoms and can cause potentially high mortality rates among birds. HPAI strains are easily transmitted and can cause major epidemics in poultry and other birds (European Commission, 2006).

The first strain of HPAI (Asian H5N1) was reported in South East Asia in 2003. However, this virus was diagnosed in humans in Hong Kong as early as 1997. Since 2003, due to the continuous circulation of various strains (H5N1, H5N2, H5N8, H7N8, etc.), outbreaks of avian influenza are of global concern both for public health issues and for consequences on livelihoods and international trade in many countries.

The epidemiology of the disease was characterized by two main global panzootics. The first wave started in 2004, peaked in 2006, and progressively declined up to 2012. This wave affected 65 countries. A second panzootic wave started in 2013, with a maximal activity in 2015, and is currently on-going, affecting 68 countries (OIE, 2018).

Currently (March 2018) six different variants of HPAI virus have been detected in four continents (five Asian countries, Italy, The Netherlands, South Africa, USA and Mexico; www.wattagnet.com).

In case of poultry trade from a country infected with AI, OIE (World Organisation for Animal Health)[37] recommends that "risk analysis to be used by importing countries in order to protect their territory from pathogens must be comprehensive and conducted in accordance with OIE standards and should respect their obligations under the sanitary and phytosanitary (SPS agreement of the World Trade Organization (WTO). […] These measures are science-based and should not result in unjustified trade barriers; they include zoning provisions and the testing of the animal populations of origin" (OIE, 2017).

[37] The OIE is the WTO reference organisation for standards relating to animal health and zoonosis.

The OIE trade recommendations (contained in Chapter 10.4 of the OIE Terrestrial Animal Health Code)[38] provide the conditions to be met by a country, zone[39] or compartment[40] to be considered either AI Free or HPAI Free (Article 10.4.3. and 10.4.4., respectively).

A country, zone or compartment may be considered free from AI (Article 10.4.3.) when shows that the infection with AI virus (either LPAI and HPAI) has not been present for the past 12 months, based on surveillance system in accordance with the OIE Code (from Articles 10.4.27. to 10.4.33 of the OIE Terrestrial Animal Health Code). If infection has occurred in poultry in a previously free country, zone or compartment, AI free status can be regained:

1. In the case of infections with HPAI viruses, three months after a stamping-out policy (including disinfection of all affected establishments) is applied, providing that the surveillance system has been carried out during that three-month period.

2. In the case of infections with LPAI viruses, poultry may be kept for slaughter for human consumption subject to conditions specified in Article 10.4.19[41] or a stamping-out policy may be applied; in either case, three months after the disinfection of all affected establishments, providing that the surveillance system has been carried out during that three-month period.

For establishing that a country, zone, or compartment is HPAI free Article 10.4.4 provides two scenarios:

1. it has been shown that HPAI infection in poultry has not been present for the past 12 months, although its status with respect to LPAI viruses may be unknown; or

2. when, based on the surveillance system, it does not meet the criteria for freedom from AI but any AI virus detected has not been identified as HPAI virus.

OIE members may make self-declarations as to their disease status, which may be published by the OIE; however, such publication does not imply endorsement of the claim.

38 *http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_avian_influenza_viruses.htm*.

39 Zone/region means a clearly defined part of a territory containing an animal subpopulation with a distinct health status with respect to a specific disease for which required surveillance, control and biosecurity measures have been applied for the purpose of international trade (Glossary of OIE *Terrestrial Animal Health Code*).

40 Compartment means an animal subpopulation contained in one or more establishments under a common biosecurity management system with a distinct health status with respect to a specific disease or specific diseases for which required surveillance, control and biosecurity measures have been applied for the purpose of international trade (Glossary of OIE *Terrestrial Animal Health Code*).

41 Veterinary Authorities should require the presentation of an international veterinary certificate attesting that the entire consignment of fresh meat comes from poultry:
- which have been kept in a country, zone or compartment free from infection with HPAI viruses in poultry since they were hatched or for at least the past 21 days;
- which have been slaughtered in an approved abattoir in a country, zone or compartment free from infection with HPAI viruses in poultry and have been subjected to ante- and post-mortem inspections in accordance with Chapter 6.2. and have been found free of any signs suggesting avian influenza.

2.2.5. Case study 4: EU/China on import restriction on Poultry Meat

KEY FINDINGS

- China does not recognize the EU's regionalisation measures to combat AI.
- EU considers China's import policy overly restrictive.
- China continues to perceive the risk of HPAI as high and therefore puts special attention to prevention and control measures.
- There is a nationwide suspension of Chinese imports of US-origin poultry and poultry products. Bilateral discussions (EU-China, USA-China) are carried out to find a solution.
- The USA-China relations are affected by political issues and the distrust of the USA about the Chinese sanitary security system. Such political tensions are not present in the EU-China relations.

On December 2001 China became the 143rd member of World Trade Organization (WTO). After accession China became the 2nd largest economy in GDP terms (after the USA), with a share of 15.1% (IMF projection on 2017)[42], the top exporter in good (17% of the world trade in 2016) and the 3rd largest merchandise importer (12%, after USA and EU)[43]. In 2016 China was the EU's second largest trading partner both for imports and exports side[44].

After the accession to the WTO, as China faced lower trade barriers for its exports, Chinese food-safety issues gained attention in the world. In response to respond to the increasing demands from importing countries and the domestic market to update and strengthening its food safety regulations, in 2009 China approved the first Chinese Food Safety Law, then revised in 2013 and 2015. The current Food Safety Law (FSL) entered into effect on 1st October 2015 (Prevost, 2012; Sun, 2016). The main determinants of the successive revisions were the transition to a market economy after 1979, with the subsequent loosening of the controlling power of government on food production factories, and the entry into the WTO (Sun, 2016). In the new FSL the Chinese FDA (Food and Drug Administration) was established, responsible for overall official control of food safety, working in cooperation and coordination with the General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ) for the official control of imported and exported food (Sun, 2016). The more stringent Chinese food safety regime has two important implications from a trade point of view. On the one hand, the new regime increases the credibility and acceptance of Chinese products on foreign markets, while on the other the new regime "*may create considerable barriers to the Chinese market for foreign products*" (Prevost, 2012, p. 42).

2.2.5.1 The EU – China relations

Official relations between EU and China were established in 1975. However only in 1995 was a fast track developed for EU-China relation (Men, 2007). Strategic guidance for the relations between the EU and China are provided by the "EU-China 2020 Strategic Agenda for Cooperation"[45], the highest-level joint communication, in which the two sides fully implement the Strategic Agenda for Cooperation on a bilateral basis under the umbrella of the Annual EU-China Summit.

Currently, the EU Strategy on China is based on the Joint Communication on "Elements for a new EU Strategy on China" (European Commission, 2016a) and on the "Council conclusions EU Strategy on

42 http://statisticstimes.com/economy/countries-by-projected-gdp.php.
43 http://ec.europa.eu/eurostat/statistics-explained/index.php/China-EU_-_international_trade_in_goods_statistics.
44 *Ibidem*
45 https://eeas.europa.eu/sites/eeas/files/20131123.pdf.

China" (Council of the European Union, 2016) reflecting the fundamental premises of the EU's engagement with the search for reciprocal benefit in both political and economic terms.

In the 2016 New strategy on China, the EU states that it could consider broader ambitions such as a deep and comprehensive Free Trade Agreement (FTA) when conditions are right (European Commission, 2016a, p. 8). According to a study of CEPS (2016), China is the logical sequel in EU international strategy based on FTAs with dynamic East Asian economies. Such an FTA would have largely positive economic and bilateral trade impacts.[46]

With regard to international cooperation on product safety, the EU works with China on a bilateral and trilateral (together with USA) basis. The EU-China formal cooperation was established in 2006, then upgraded in 2008 and 2010. With effect from 2008, the "*Joint Statement on the Extension of the Memorandum of Understanding on Administrative Co-operation arrangements between DG SANCO and AQSIQ*"[47] has deepened the political dialogue of the two sides aiming at fruitful cooperation in the area of consumer safety and enhanced the cooperation on SPS questions related to agricultural and aquatic products. The objectives of the bilateral cooperation, stated in Annex 2, are the establishment of SPS consultation and communication channel, the exchange of information, discussion and cooperation in resolving SPS issues emerging in the trade between the two sides. According to these objectives, regular meetings are organized. On a trilateral basis the focus is on non-food products.

2.2.5.2 EU-China Trade relations

In 2016, China represented the 1st country of origin of EU total imports, with a share of 20.1%, and the 2nd country of destination of EU total exports, after USA, with a share of 9.7%.

Table 10: Top 10 EU trading partners 2016

	IMPORTS				EXPORTS				TOTAL TRADE		
	Partner	Value Mio €	% World		Partner	Value Mio €	% World		Partner	Value Mio €	% World
	World	1712713	100		World	1744239	100		World	3456952	100
1	China	344911	20.1	1	USA	363456	20.8	1	USA	613975	17.8
2	USA	250519	14.6	2	China	169686	9.7	2	China	514597	14.9
3	Switzerland	121707	7.1	3	Switzerland	142148	8.2	3	Switzerland	263855	7.6
4	Russia	118893	6.9	4	Turkey	77890	4.5	4	Russia	191185	5.5
5	Turkey	66763	3.9	5	Russia	72292	4.1	5	Turkey	144653	4.2
6	Japan	66622	3.9	6	Japan	58014	3.3	6	Japan	124636	3.6
7	Norway	63315	3.7	7	Norway	48311	2.8	7	Norway	111626	3.2
8	South Korea	41643	2.4	8	United Arab Emirates	45760	2.6	8	South Korea	85743	2.5
9	India	39324	2.3	9	South Korea	44100	2.5	9	India	77054	2.2
10	Vietnam	33087	1.9	10	India	37730	2.2	10	Canada	64343	1.9

Source: DG Trade, 2017

At the same time, the EU represented the 1st country of origin of Chinese total imports, with a share of 13.1%, and the 2nd country of destination of Chinese total exports, after USA, with a share of 16.1%.

[46] China signed and implemented 14 FTAs and other 9 FTAs are under negotiations (*Ministry of Commerce, PRC*).

[47] *https://ec.europa.eu/info/sites/info/files/extension_memorandum.pdf*.

Table 11: Top Ten China trading partners

	IMPORTS				EXPORTS				TOTAL TRADE		
	Partner	Value Mio €	% World		Partner	Value Mio €	% World		Partner	Value Mio €	% World
	World	1,435,956	100		World	1,930,251	100.0		World	3,366,207	100.0
1	EU 28	188,379	13.1	1	USA	352,077	18.2	1	EU 28	498,766	14.8
2	South Korea	143,813	10.0	2	EU 28	310,387	16.1	2	USA	474,638	14.1
3	Japan	131,470	9.2	3	Hong Kong	265,604	13.8	3	Hong Kong	280,977	8.3
4	Taiwan	126,549	8.8	4	Japan	117,100	6.1	4	Japan	248,569	7.4
5	USA	122,561	8.5	5	South Korea	86,562	4.5	5	South Korea	230,376	6.8
6	Australia	63,355	4.4	6	Vietnam	56,049	2.9	6	Taiwan	163,665	4.9
7	Malaysia	44,308	3.1	7	India	53,695	2.8	7	Australia	97,740	2.9
8	Brazil	41,022	2.9	8	Singapore	42,865	2.2	8	Vietnam	89,645	2.7
9	Switzerland	36,220	2.5	9	Taiwan	37,116	1.9	9	Malaysia	79,927	2.4
10	Thailand	34,937	2.4	10	Malaysia	35,619	1.8	10	Thailand	69,535	2.1

Source: DG Trade, 2017

Whereas the global EU trade balance with China is in deficit (-175 EUR billion in 2016), the **agri-food trade shows a surplus** of over 6 EUR billion. China is the 2nd destination of EU agri-food exports (with a share of 8.7% after USA) and the 4th source of origin of EU agri-food imports (4.5% after Brazil, USA and Argentina) (DG Agri, 2017).

In 2016, EU imports of agricultural products from China accounted for EUR 5 billion, 1.5% of the total imports from this country; agricultural exports to China accounted for EUR 11.4 billion, 6.7% of total exports. The imports are mainly consist of agricultural food and feed products while foodstuffs, beverages and tobacco dominate imports.

Table 12: EU trade with China

		IMPORTS				EXPORTS			
		Value Mio EUR				Value Mio EUR			
		2013	2014	2015	2016	2013	2014	2015	2016
	Total	280,151	302,518	350,846	344,911	148,115	164,623	170,357	169,686
I	Live animals; animal products	2,008	2,011	2,217	2,272	2,198	2,440	3,390	4,776
II	Vegetable products	1,932	1,971	2,281	2,277	370	602	1,296	599
III	Animal or vegetable fats and oils	73	76	93	73	525	208	278	264
IV	Foodstuffs, beverages, tobacco	1,590	1,622	1,690	1,703	2,727	3,018	3,941	4,666
V	Mineral products	667	662	869	862	3,297	3,419	3,305	4,925
VI	Products of the chemical or allied industries	12,018	12,944	14,718	14,512	13,691	14,737	16,742	17,596
VII	Plastics, rubber and articles thereof	9,650	10,917	12,367	12,554	6,120	6,763	6,894	7,107

VIII	Raw hides and skins, and saddlery	6,086	6,405	7,073	6,708	2,185	1,905	2,184	1,885
IX	Wood, charcoal and cork and articles thereof	2,232	2,463	2,781	2,641	802	949	969	1,197
X	Pulp of wood, paper and paperboard	2,538	2,769	3,115	3,082	2,852	2,690	3,029	3,241
XI	Textiles and textile articles	34,431	37,026	39,555	37,535	2,605	2,855	3,172	3,251
XII	Footwear, hats and other headgear	9,547	10,290	11,516	11,015	313	352	413	428
XIII	Articles of stone, glass and ceramics	4,000	4,530	4,956	4,943	984	1,060	1,078	1,183
XIV	Pearls, precious metals and articles thereof	2,223	2,154	2,039	2,137	1,408	4,602	10,182	1,680
XV	Base metals and articles thereof	17,268	20,415	23,456	22,250	11,745	10,920	10,509	10,043
XVI	Machinery and appliances	133,320	140,723	169,773	166,032	48,995	52,237	50,706	51,560
XVII	Transport equipment	7,092	7,507	7,763	9,549	35,796	43,253	38,222	40,267
XVIII	Optical and photographic instruments, etc.	8,210	9,055	10,871	11,234	8,668	9,267	10,283	11,226
XIX	Arms and ammunition	45	47	55	53	4	5	8	10
XX	Miscellaneous manufactured articles	24,197	27,674	32,347	32,269	1,218	1,391	1,581	1,728
XXI	Works of art and antiques	43	46	38	36	102	108	84	101
XXII	Not classified	981	1,208	1,274	1,173	1,510	1,845	2,089	1,952
	AMA / NAMA Product Groups	**2013**	**2014**	**2015**	**2016**	**2013**	**2014**	**2015**	**2016**
	Total	280,151	302,518	350,846	344,911	148,115	164,623	170,357	169,686
	Agricultural products (WTO AoA)	4,604	4,660	5,198	5,091	7,286	7,438	10,318	11,378
	Fishery products	1,504	1,511	1,613	1,747	343	396	421	445
	Industrial products	274,043	296,347	344,035	338,073	140,486	156,788	159,619	157,863

Source: DG Trade, 2017

The simple average MFN tariff applied to agricultural products is 15.5% for China and 11.1% for the EU (2016), just below the bound tariffs (respectively, 15.7% and 11.9%). Due to food security concerns and the protection of domestic farmers, **tariffs applied in agriculture are higher than in non-agricultural products** (9.0% in China and 4.2% in the EU). In China, only 1.5% of agricultural imports

are duty free representing 7.2% of HS six-digit subheadings in MFN, compared to 44.5% of EU agricultural imports accounting for 31.7% of HS six-digit subheadings in MFN. On average, the MFN applied duties on animal products and, mostly, dairy products are higher in the EU (respectively, 15.7% and 35.4%) than in China (14.2% and 12.3%). For the other agri-food products China has higher MFN applied duties. As regards bilateral relations, EU exports of agricultural products face in China a simple average MFN of 15.2%, which reduces to 9.2 in weighted terms. Chinese exports of agricultural products face in the EU a simple average MFN of 11.9%, which reduces to 7.3 in weighted terms (ITC-UNCTAD-WTO, 2016)

In 2016 the EU exports of fresh, chilled and frozen poultry to China amounted to about EUR 42 million, equal to 0.4% of total EU agri-food exports to China. EU imports from China of the same product were zero, due to the ban on poultry product arising from the SPS concern (DG Agri, 2017).

Table 13: EU Agri-food trade with China

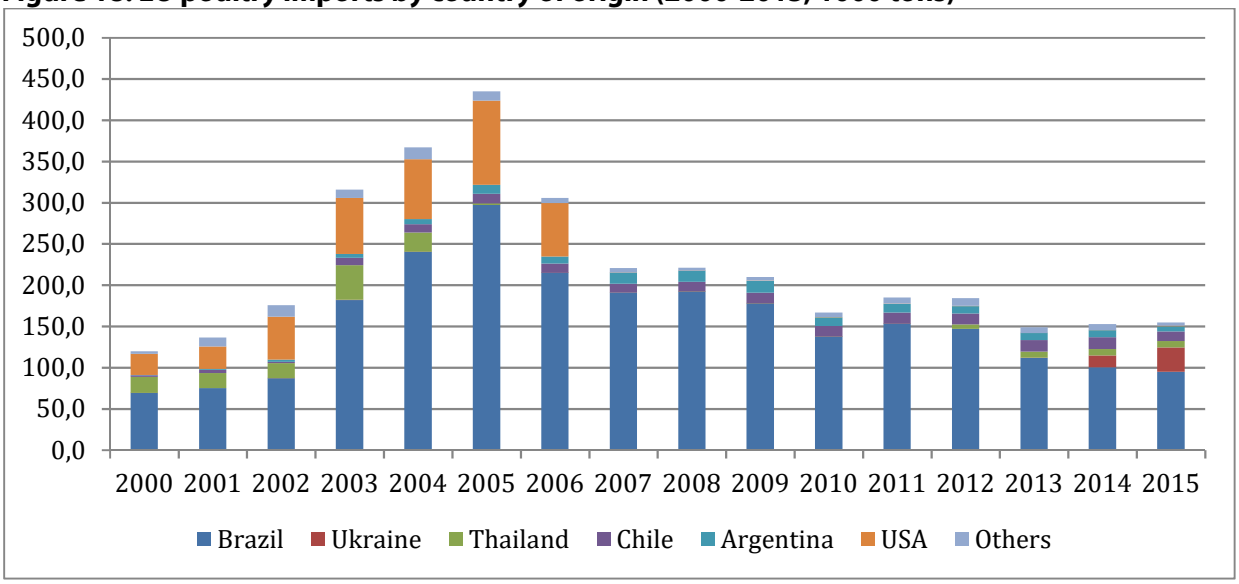
	EU Agri-food exports to China 2012-2016						
	Value Mio EUR					**%**	
	2012	**2013**	**2014**	**2015**	**2016**	**Share in all Agri 2016**	**Change 2015-2016**
Agri-food	6071	7286	7438	10318	11382	100.0	10.3
Agricultural food and feed products	2751	3376	3470	5357	6099	53.6	13.9
- Commodities	580	1085	1007	1699	1030	9.0	-39.4
- Other primary	1184	1416	1592	2503	3771	33.1	50.7
-- Fresh, chilled and frozen Poultry,	16	22	23	41	42	0.4	2.4
- Processed (incl. wine)	987	875	882	1155	1298	11.4	12.4
Food preparations and beverages	1677	1914	2215	2912	3537	31.1	21.5
- Food preparations	982	1283	1565	2023	2509	22.0	24.0
- Beverages	696	631	650	829	1028	9.0	15.6
Non-edible	1642	1997	1753	2049	1745	15.3	-14.8
	EU agri-food imports from China 2012-2016						
	Value Mio EUR					**%**	
	2012	**2013**	**2014**	**2015**	**2016**	**Share in all Agri 2016**	**Change 2015-2016**
Agri-food	4523	4604	4660	5198	5090	100.0	-2.1
Agricultural food and feed products	3180	3164	3138	3566	3450	67.8	-3.3
- Commodity	742	743	797	897	881	17.3	-1.8
- Other primary	1717	1774	1773	1994	1934	38.0	-3.0
-- Fresh, chilled and frozen Poultry,		0	0	1	0	0.0	-100.0
- Processed (incl. wine)	721	647	568	675	636	12.5	-5.8
Food preparations and beverages	506	550	563	635	669	13.1	2.1
- Food preparations	464	514	526	615	629	12.4	2.3
- Beverages	42	36	37	40	40	0.8	0.0
Non-edible	837	890	959	976	970	19.1	-0.6

Source: EC, DG Agri, 2017

The main EU-28 supplier of poultry and poultry products is Brazil[48]. Total EU imports increased up to 2005 and then decreased, probably due to the accession of New Member States and the increase in intra-EU trade (Ghodsi and Stehrer, 2017). The second largest supplier is Ukraine. In recent years imports from Ukraine have increased thanks to the introduction of Tariff Rate Quotas (TRQs) provided by the EU in late April 2014 as part of EU autonomous trade preferences accorded in the EU-Ukraine Association Agreement (Movchan, Kosse, Giucci, 2015; Audran, 2017). Because of AI outbreaks, the EU has banned imports from Thailand since 2004. In 2012 the EU reopened its market to the Thailand thus becoming, in 2015, the forth country of origin of EU imports after Chile.

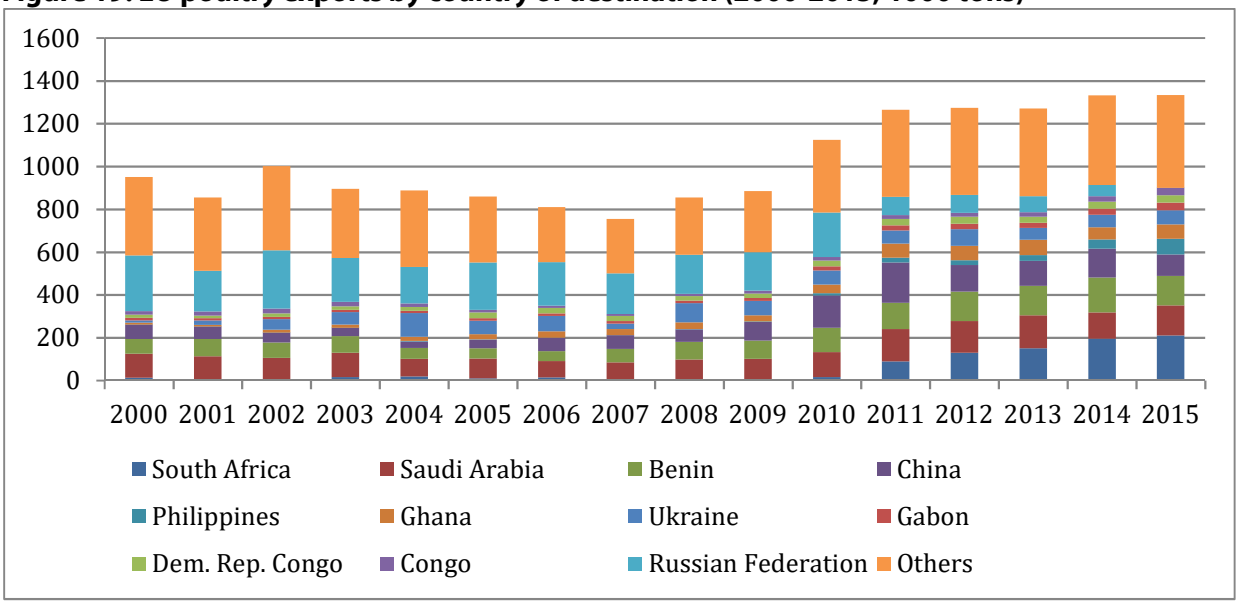
The USA, which until 2006 has represented the second largest supplier of EU poultry and poultry products, is no longer a EU supplier because the EU refuses to accept imports of USA poultry processed with certain pathogen-reduction treatments (PRTs) (Audran, 2017; Johnson, 2015).

Figure 18: EU poultry imports by country of origin (2000-2015; 1000 tons)



Source: our calculation from UN Comtrade

Figure 19: EU poultry exports by country of destination (2000-2015; 1000 tons)



Source: our calculation from UN Comtrade

[48] Trade refers to 0114 of SITC Rev. 2 code "*Poultry, dead and edible, offal, fresh, chilled or frozen*".

In 2015, the main country of destination of EU exports of poultry and poultry products was South Africa, followed by Saudi Arabia and Benin. Thanks to the EU-South African Trade and Development Cooperation Agreement (TDCA), since 2012 EU exports of chicken meat have entered South Africa duty free (Audrin, 2017). Exports are less concentrated than imports, a large share being held by "Others". Until 2014 an important destination market of was Russian Federation. Due to the embargo on many EU agri-food products, exports to Russia were absent in 2015.

2.2.5.3 Trade concerns

Between November 2014 and February 2015 some EU Member States had outbreaks of HPAI. Immediately they took all the stringent measures required by the EU legislation, in line with international standards of the OIE, on the control of the AI (regionalization), in order to guarantee safe trade from areas that remained free from the disease.

After the outbreaks, several trading partner placed a ban on poultry imports from countries affected by HPAI. The EU raised the issue of a general Specific Trade Concern in March 2015 because of the **non-recognition of regionalization**. After that, many countries, such as Japan, Malaysia, Singapore, South-Africa, The Philippines, Turkey, and Ukraine lifted (or partially lifted) their country-wide ban quite quickly, recognizing the EU's regionalisation measures put in place (European Commission, 2016b).

As a consequence of the HPAI in the EU in 2017, 17 WTO Member applied regionalization, 20 WTO Member imposed a country-wide ban and one WTO Member temporarily restricted trade to the entire EU (Maeir, 2017).

However, China continues to impose a country-wide ban on poultry trade on a EU Member State whenever there is a notification of HPAI, thus immediately blocking the export of poultry and poultry product from that Member State. China is thus not recognizing pest- or disease- free areas as provided for under Article 6 of the WTO SPS Agreement.

Currently, **China banned imports of poultry and poultry products** from Spain, the United Kingdom, Poland and France, among its major importing countries (FAS USDA, 2018).

The EU has expressed Specific Concern regarding Chinese import restrictions many times (for the first time in March 2016 and then in June and October 2016, July and November 2017), considering China's over-restrictive policy. The EU requested China to clarify its procedures to recognize regionalization, given that China implemented an internal regionalization policy due to domestic HPAI outbreaks. China explained that domestic zoning had been implemented for LPAI rather than HPAI and affirmed that its measures were consistent with international practices and SPS Agreement.

The same ban is faced by the USA; China maintains a nationwide suspension of imports of US-origin poultry and poultry products, remaining unwilling to adopt regionalization measures (USTR, 2018a).

The EU and USA carried out bilateral discussions to find a rapid solution while calling on China to respect WTO regionalization obligations. China encourages the EU and USA to continue bilateral discussion with the relevant Chinese authorities to find a rapid solution. At the same time, China states that it continues to perceive the risk of HPAI as high and therefore poses special attention to the prevention and control of AI risks as major producers and consumers of poultry products, as the disease is still present in some EU and USA States.

The EU stated that it had provided China with all the necessary evidence to demonstrate that it applied the stamping-out policy prescribed in the OIE Code, proving the existence of HPAI free-areas and that such area were likely to remain disease-free. The EU considers that China's solution not to accept zoning disregarded the panel report DS 430. This panel report (then almost fully upheld by the

Appellate Body)[49] found that the Indian import ban on various US agricultural products, primarily poultry, because of concerns related to AI 1) were not based on an international standard, 2) were not based on a risk assessment, 3) arbitrarily and unjustifiably discriminated against USA products in favour of Indian products, 4) were significantly more trade-restrictive than required to achieve India's appropriate level of protection, 5) did not recognize the concept of disease-free areas and areas of low disease prevalence and they were not adapted to the SPS characteristics of USA exporting regions. The USA recognizes this victory as a signal to other WTO Members that any AI restriction has to be grounded in science, has to take into account the limited geographical impact from outbreaks, and that it should not be a disguised protectionism (USTR, 2018b, p. 21).

The EU banned Chinese imports of poultry meat from May 1996 through February 2000 and then from March 2002 to July 2008 due to the outbreaks of AI in China. China did not challenge the consistency of the SPS measures applied by the EU. However, in the dispute raised against the EU (DS 492)[50] in 2015, regarding the EU's decision to transform its tariffs commitments on certain poultry products into tariff-rate quotas (TRQs), China argued that the EU should have taken into consideration the presence of these SPS measures that have affected the imports of poultry products from China in the allocation of TRQ shares among supplying countries. The EU initiated two distinct tariff renegotiation exercises (the First Modification Package started in 2006, the second in 2009) based on the share of imports into the EU that different Members held over the preceding three-years (2003-2005 for the first modification package and 2006-2008 for the second). In 2008 the imports from China resumed and increased significantly over the period 2009-2011, while the negotiations under the Second Modification Package were on-going, ultimately accounting for more than 50% of the EU imports under the two tariff lines to modify in the second Modification Package. Most of the new TQRs are allocated to Brazil and Thailand. The panel found that the EU should have taken into consideration the China's ability to export poultry products to the EU in reassessing the allocation of the TRQs. The EU was asked to bring its measures into line with its obligation under GATT 1994.

As regard the China-USA relations, it is worth recalling that in July 2009 a panel was established on the of China against the US ban on using the fund of the **Section 727 of the Agriculture Appropriations Act of 2009** to establish or implement a rule allowing poultry products from China to be imported into the United States, thus impeding China's exports to the USA[51] (DS 392). In order to obtain permission to export poultry and poultry products to the USA an equivalence regime of the country's inspection system with the USA system is adopted on a country-by-country basis. On the basis of documentation and an on-site audit, a country applying for exports may be considered eligible. Although China's inspection system for slaughtered poultry[52] was believed preliminarily equivalent to USA system, the Congress blocked imports from China based on concerns about contaminated food from China[53]. The panel found that the USA measure under 727 Section was inconsistent with the SPS Agreement because it was not based on a risk assessment and was maintained without sufficient scientific evidence. Moreover, the distinction in the appropriate levels of protection for poultry products resulted in discrimination against China in respect of other WTO members. Finally, the panel found that the USA

[49] India – Measures Concerning the Importation of Certain Agricultural Products, AB-2015-2, Report of the Appellate Body (*WT/DS430/AB/R*, 4 June 2015).

[50] For more information see *https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds492_e.htm*.

[51] United States — Certain Measures Affecting Imports of Poultry from China, Report of the Panel (*WT/DS392/R*), 29 September 2010).

[52] The positive recognition of system of equivalence would have allowed China to be added to a list of countries eligible to export poultry products in USA, processed in certified establishments in China coming from poultry slaughtered in the USA or in other certified establishments (Charlier, 2012, p.2). For more details on the US Country of Origin Labeling related to processed Chicken from China, see Schueppert, 2014.

[53] For more information on the Chinese-US poultry dispute see Johnson and Becker, 2010.

treated like products from China in a less favourable manner than those from other Members (Charlier, 2012). Meantime, Section 727 had expired and no further action was required.

Considering that the USA defended the need to have a specific-based risk assessment scientific-based in another trade dispute (specifically, the Hormone case against the EU), the "singular" position of the USA on the poultry dispute with China has been noted (Charlier, 2012).

However, it seems that in the China-USA WTO relations the disputes on the poultry sector are the results of political tensions between the two economies (ICTSD, 2010). In December 2010, two weeks after USA imposed safeguard duties on Chinese-made tyres, China applied **anti-dumping penalties on imports of US chicken products** on individual US companies ranging from 43.1% to 80.5%[54]. Although in August 2013 the WTO found that China had unfairly imposed antidumping tariffs that restricted US poultry exports, China refused to remove these duties. On 30 August 2016, China decided to continue to impose anti-subsidy duties on imports of US broiler chicken products until 2022[55]. As a consequence of the anti-dumping and countervailing duties and the HPAI restriction in 2014/15 on USA imports, shipments from the USA were reduced and then stopped. By 2010 Brazil emerged as the major Chinese trading partner for broiler meats, reaching a market share of 90% in 2016 (FAS USDA, 2018).

If USA-China relations are mainly affected by political issues and the distrust of the USA about the Chinese sanitary security system (Charlier, 2012), in EU-China relations heavy political tensions do not emerge. The literature mainly focuses on the poultry disputes with China from the point of view of trade restrictions imposed by the USA and EU, highlighting increasing "murky protectionism"[56] following the current global crisis (Chen, 2010) and the different approach used by the USA, more politically influenced, and the EU, more scientifically-based, in respect to China imports.

As regards the SPS measures put in place by China, Prevost (2012) highlights that in the dispute on poultry, as well as in other of China's SPS measures, the EU and other WTO members, have worked to find a "constructive cooperation" to find a solution, rather than challenging SPS restrictions, recognizing the China's efforts to reform its policy and bring it into line with the SPS Agreement.

2.2.6. Case study 5: EU/ Brazil on Import restriction on fruit & vegetables

KEY FINDINGS

- The EU is not recognized as a single entity by Brazil.
- Brazilian procedures are long and cumbersome.
- Further liberalization should primarily aim to achieve reciprocity in procedures rather than single issues.

In order to introduce this series of case studies on fruit and vegetables we first recall the **imports procedures imposed by the EU on plants and plant products**. Procedures have been harmonized and are published in a single directive (Council Regulation, 2000).

Unlike veterinary products, there is only one model of certificate for all plant products in accordance with international regulations laid out by the International Plant Protection Convention of the Food and Agriculture Organization of the United Nations. Moreover, "*Identity and plant health checks*

[54] The antidumping tariffs have hit chicken feet and wings which, according to Chinese authorities, are being dumped on the Chinese market below cost (ICTSD, 2010).

[55] http://www.poultrytimes.com/poultry_today/article_588a5e98-6ebb-11e6-879a-933ea58e8416.html.

[56] The term "*musky protectionism*" refers to the "abuses of legitimate discretion […] to discriminate against foreign goods, workers, companies and investors" or "abuses of health and safety regulations and clauses in stimulus packages that confine spending to domestic producers" (Chen, 2010, p. 170).

(excluding the documentary check) may be carried out at the 'place of destination' with the agreement of the plant health authorities responsible for the point of entry and the point of destination. Phytosanitary certificates are issued by inspectors, who attest to specific requirements of EU legislation by making additional declarations in the relevant boxes" (https://ec.europa.eu/food/plant/plant_health_biosecurity/non_eu_trade/inspections_en).

2.2.6.1 Overview of trade in fruits and vegetables between the EU and Brazil

Agricultural production in the two countries is very dissimilar because of technological, political, cultural, geographical and climatic conditions. Brazil is the **largest exporter of agri-food products to the EU in terms of value**. Brazil and the EU have a strong bilateral trade relationship. In terms of value, the EU ranks first as a supplier of Brazilian imports overall and second (after China) as a destination for Brazilian exports (European Commission, 2016c).

Brazil's exports to the EU consist of primary agricultural and non-agricultural products as well as manufactured goods. Imports from the EU are, basically, manufactures and services.

Table 14: Top 10 EU Member States' trade in vegetables (chapter 07) between the EU and Brazil in 2017

Country	Import Value to the EU (Mio EURO)	Import Qty to the EU ('000 tons)	Country	Export Value from the EU (Mio EURO)	Export Qty from the EU ('000 tons)
EU28	6.56	8.39	EU28	59.24	81.67
United Kingdom	2.19	2.31	Spain	32.78	31.05
Netherlands	1.65	1.96	Netherlands	9.95	33.49
Portugal	1.54	2.74	Belgium	9.66	10.94
Spain	0.38	0.42	Portugal	3.16	3.75
Italy	0.36	0.48	Poland	1.71	1.34
Germany	0.11	0.06	Italy	0.69	0.70
France	0.11	0.12	Hungary	0.55	0.14
Hungary	0.10	0.12	Germany	0.55	0.20
Belgium	0.07	0.08	France	0.14	0.05

Source: Eurostat Comext

Table 15: Top 10 EU Member States' trade in fruit (chapter 08) between the EU and Brazil in 2017

Country	Import Value to the EU (Mio EURO)	Import Qty to the EU ('000 tons)	Country	Export Value from the EU (Mio EURO)	Export Qty from the EU ('000 tons)
EU28	689.52	622.17	EU28	153.32	151.99
Netherlands	301.61	286.30	Spain	70.68	68.85
United Kingdom	154.40	144.70	Portugal	50.97	57.10
Spain	100.33	100.49	Italy	28.56	23.36
Portugal	52.03	33.00	France	1.98	2.08
Germany	20.59	9.94	Poland	0.50	0.30
France	19.47	11.90	Germany	0.19	0.01
Italy	15.12	13.14	Belgium	0.18	0.14
Ireland	11.89	11.14	Netherlands	0.16	0.07
Belgium	4.52	2.30	Austria	0.04	0.00

Source: Eurostat Comext

2.2.6.2 EU-Brazil Trade relations

Brazil and the EU have been involved for 20 years in the long-lasting EU-Mercosur FTA negotiations. Current trade relations between the EU and Mercosur are based on an inter-regional Framework Cooperation Agreement[57] since 1999. The EU has also signed a bilateral cooperation agreement with single Mercosur countries, which also deals with trade-related matters. The EU-Mercosur negotiations were re-launched in May 2010 before negotiations were paused in 2012. Another round of negotiations started in October 2016. The current negotiations cover issues including tariffs, TBT, SPS, services, government procurement, intellectual property, sustainable development and Small and Medium Enterprises (SMEs).

According to the European Commission (European Commission, 2016c), Brazilian markets are highly protected both with tariff and non-tariff barriers. However, the WTO tariff statistics report Brazilian maximum MFN ad-valorem duties of 10% for both fruit and vegetables (Chapters 07 and 08) with an average of respectively 8.7% and 9.9% while the same figures are 15.2% [8.5%] and 20.8% [5.9%] for the EU. However, the Brazilian regulatory environment is unstable and unpredictable. Therefore, the EU encourages Brazil to reduce tariff and non-tariff barriers, and to promote a stable and more open regulatory environment for European investors and traders.

2.2.6.3 Key issues in non-tariff measures restraining trade in F&V between Brazil and the EU

In 2015 thanks to a structured dialogue between the EU and Brazil, progress was made in helping EU exports to Brazil for dairy products, beef, fish, honey and several plants and plant products (European Commission, 2016c). However, SPS barriers still remain. Brazil maintains long and complex approval procedures; this applies to costly pest risk analysis for plant products. In addition, Brazil often fails to apply international standards on regionalization for plant and animal pests and diseases and delays pre-listing of EU establishment exporting to Brazil.

According to MADB, the first trade barrier was applied in 2009 and there are still open and active barriers.

Table 16: Trade barriers relevant for EU exporters in supplying the Brazilian market

Title	Measure	Creation date
Backlog of market access applications (undue delays by Brazil)	Other SPS import restrictions	01/04/2009
Plants and plant products subject to pest risk analysis (PRAs)	Risk analyses (including PRAs - Pest Risk Analyses) Long approval procedures Other SPS import restrictions	08/05/2014

Source: Market Access Database (MADB)

2.2.6.4 Procedures to export fruit & vegetables to Brazil

The Ministry of Agriculture, Livestock, and Food Supply (MAPA) and the Ministry of Health (MS) - through its National Agency of Sanitary Surveillance (ANVISA) - are the primary regulators of agricultural products. MAPA oversees and enforces a large number of regulations pertaining to production, marketing, import and export of animal origin products, fresh fruit and vegetables, alcoholic and non-alcoholic beverages, juices, grains, seeds, and animal feed (including pet food). The MAPA has introduced six official categories from 0 to 5 into which plants and plant products are placed according to their likelihood of carrying and introducing pests and diseases. The **first category (0)**

[57] Available at: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM:r14013 [last accessed 30/03/2018]

refers to processed plant products that do not require any type of phytosanitary control because of their degree of processing for example oils and ready-cooked fruit. In the **second category (1)** industrialised plant products for consumption, direct use or transformation which may not directly be infested with pests but which may carry storage pests are included (e.g. processed wood and bark and wooden instruments). Semi-processed plant products intended for consumption direct use are included in category 2. These products may carry pests. Natural plant products intended for consumption, direct use or transformation, such as fresh fruit and vegetables are in **category 3**, while seeds, plants and other material intended for propagation or reproduction are in **category 4**. Finally, the last one includes any product of plant origin or other origin, which may bear a phytosanitary risk.

Import requirements depend on the categories. **The only category that does not require phytosanitary control by the MAPA is category 0**. All the others require a physical inspection carried out by the local officials of the Supervisory Board of International Agriculture and Cattle Raising (VIGIAGRO) under the MAPA and a prior registration of the importer with VIGIAGRO. In some cases, an import authorisation is needed.

Furthermore, for commodities of groups 2 and 3 a Phytosanitary Certificate (PC), a previous authorisation from the Service for Agricultural Inspection (SEFAG) of the MAPA (only in case of ingredients for animal fodder), an Automatic or Non-Automatic Import Licence, a copy of the Commercial Invoice and a copy of the Bill of Lading or Cargo Manifest are required. And it is possible to include or provides some other information depending on the commodity in the PC.

Commodities falling under risk categories 0 and 1 are exempt from the requirement of a PRA, while for all other commodities Brazil uses the principle that what is not authorized is prohibited. Thus, an importer must find out if its product is authorized. A website maintained by the Brazilian Department of Agriculture notifies what products/countries are authorized access to Brazilian markets[58].

Brazil does not consider the EU countries as single entity. Indeed, each MS is treated separately, meaning that each MS has to apply for market access for its own domestic industry and the PRA procedure can be applied product by product. Of course, this procedure obligates MS to make a choice for which products the procedure is needed. For example Spain, or to a lesser extent Italy, benefit from authorisation for a large set of fruit and vegetables while products from France or Germany are largely prohibited.

2.2.7. Case study 6: EU/India on restrictions on imports of plants and plant products relating to fumigation treatments and table olives standards

KEY FINDINGS

- The EU and India have been discussing a potential FTA since 2017.
- Fruit and vegetables do not represent a large share of trade.
- The main issue in F&V concerns fumigation treatment.
- India has recently changed its table olive standards to harmonize them with the Codex Alimentarius.

India has concluded several preferential trade agreements at various levels of trade integration with countries belonging to its Asian traditional trade partners as well as other countries like Chile or the Mercosur. India benefits from trade preferences under the European Generalised System of Preferences. In June 2007 a discussion for a comprehensive FTA started.

[58] http://www.agricultura.gov.br/assuntos/importacao-e-exportacao/importacao/consulta-de-produtos-de-importacao-autorizada

2.2.7.1 Overview of trade in fruit and vegetables between the EU and India

The **EU is India's number one trading partner**. EU represented 13.5% of India's global trade in 2015-16, well ahead of China (10.8%), the USA (9.3%), the United Arab Emirates (7.7%) and Saudi Arabia (4.3%).

India was the EU's 9th largest trading partner in 2016, representing 2.2% of the EU's global trade and ranked between South Korea (2.5%) and Canada (1.9%).

The EU's exports to India essentially consist of engineering goods, gems and jewellery, other manufactured goods and chemicals, while the EU's imports from India are essentially textiles and clothing, chemicals and engineering goods.

Finally, trade in services almost tripled in the past decade, increasing from €10.5billion in 2005 to €28.1 billion in 2015.

Trade in fruit and vegetables is only a small part of trade between the EU and India. While the EU sells much more vegetables to India than it buys from it, the same does not apply to fruit. Fruit exports could therefore represent potential gains for European fruit growers (see **Tables 18 and 19**).

Table 17: Top 10 EU Member States' trade in vegetables (chapter 07) between the EU and India in 2017

Country	Import Value to the EU (Mio EURO)	Import Qty to the EU ('000 tons)	Country	Export Value from the EU (Moi EURO)	Export Qty from the EU ('000 tons)
EU28	154.21	126.14	EU28	124.93	494.93
United Kingdom	46.92	35.02	Romania	46.23	213.40
Germany	23.13	11.81	Lithuania	32.61	126.17
France	20.80	20.42	France	28.00	110.76
Belgium	16.63	14.00	Germany	10.37	28.31
Spain	13.39	16.52	Bulgaria	2.76	10.93
Netherlands	8.48	7.96	Netherlands	1.43	0.74
Italy	5.74	6.14	Spain	1.27	0.75
Poland	3.45	2.48	Estonia	0.70	2.35
Sweden	3.06	1.36	Hungary	0.61	0.14

Source: Eurostat Comext

Table 18: Top 10 EU Member States' trade in fruit (chapter 08) between the EU and India in 2017

Country	Import Value to the EU (Mo EURO)	Import Qty to the EU ('000 tons)	Country	Export Value from the EU (Mo EURO)	Export Qty from the EU ('000 tons)
EU28	444.84	151.28	EU28	45.37	49.52
Netherlands	183.86	76.77	Italy	22.08	22.90
Germany	79.09	19.77	Belgium	7.39	10.51
United Kingdom	66.49	28.19	Greece	3.60	2.88
France	26.05	4.04	Netherlands	3.59	3.21
Spain	24.88	3.53	Poland	3.01	4.70
Belgium	24.53	4.86	France	2.73	2.89
Greece	9.10	1.10	Spain	2.54	2.34
Italy	6.97	1.99	Germany	0.21	0.04
Poland	6.20	2.20	Croatia	0.19	0.04

Source: Eurostat Comext

2.2.7.2 Import procedures for plants and plant products

The import of plants and plant products is mainly governed by the Plant Quarantine Order of 2003 and managed the Department of Agriculture and Cooperation (DAC).

Imports to India must be accompanied by an import permit delivered by the DAC via electronic application to the Plant Quarantine Information System (PQIS). As a prerequisite for the issue of an import permit, the post-entry quarantine facilities of the applicant must be inspected and approved. Furthermore, the implementation of a pest risk analysis (PRA) is compulsory for all plants and plant products.

Upon arrival in India, a plant health certificate must accompany plants and plant products. Importers must apply for a quarantine and clearance certificate, which will be issued after fumigation or any other appropriate treatment that has been carried out and recorded in the corresponding release order. For this purpose, the submission of **a fumigation certificate issued by a licensed fumigation provider in the country of origin may be necessary.** The main issue is that methyl bromide (MB) fumigation has been banned by the EU (and various other India's trade partners). MB is addressed in the Montreal Protocol on Substances that Deplete the Ozone Layer and by the International Plant Protection Organisation (IPPC), and should not be used. Until 2017, India accepted that the fumigation was performed on arrival. But in June 2017, New Delhi decided to implement its policy of disallowing import of certain farm items such as pulses, cashew nuts and tree wood that were not fumigated with MB in the country of origin. However, on protests by partner countries, including Canada, Delhi gave a six-month exemption. Imports could be fumigated at Indian ports on payment of a penalty.

Table 19: Sanitary and Phytosanitary Issues

Title	Measure	Creation Date
Restrictions on imports of plants and plant products relating to fumigation treatments.	Treatments (e.g. methyl bromide, cold treatment) Plant health reasons In its Plant Quarantine Order 2003, India requires, for most plants and plant products, treatment with methyl bromide (MB) prior to upon arrival in India, and provides already for a number of alternative treatments. The use of MB in the European Union is forbidden. In 2017, India suggested that EU Member States to reviewed the pests and measures included in the Order 2003 for any given commodity, and that evidence was provided that the alternatives to mitigate the pests in the territory of the Member States were at least as efficient as MB. Several Member States have made such proposals and are now awaiting approval from India.	31/08/2014

Source: Market Access Database (MADB)

In January 2018, the country's plant quarantine department informed agricultural counsellors and trade commissioners from several exporting countries that it did not intend to extend the permission to fumigate at Indian ports beyond March 31, 2018. It argued that the exemption, which had been extended to exporters of pulses for more than a decade, was leading to a depletion of India's ozone layer.

As India is urged to acknowledge other treatments that would offer the same level of protection, Indian authorities for countries not utilizing MB have presented a few options.

Countries using alternate fumigants need to submit technical efficacy data to the Indian authorities proving that the fumigant is effective in eradicating pests. If they are satisfied with the results, the DAC will allow the use of the said fumigant.

The Indian plant quarantine Department has decided to allow the Indian authorities to conduct a detailed study of other systems from cultivation to export. If the entire system/process gives the team the confidence that it will not allow introduction of pests, insects, etc., the DAC will allow such alternative method to MB fumigation to be used for products exported to India.

The last option is the pre-inspection of cargoes shipping products to India.

All options require that the exporting country take the initiative to approach the Indian authorities and propose a solution. It is anticipated that until a permanent solution is found, there could be significant disruption to trade.

2.2.7.3 The special case of olive standards

European Union olive standards are defined and managed by the International Olive Council (IOC). The IOC is the world's only international intergovernmental organisation in the field of olive oil and table olives. It was set up in Madrid, Spain, in 1959, under the auspices of the United Nations. It used to be known as the International Olive Oil Council or IOOC until 2006, when its name was changed. The Council is a decisive player in contributing to the sustainable and responsible development of olive growing and it serves as a world forum for discussing policymaking issues and tackling present and future challenges. Its current members include the leading international producers and exporters of olive oil and table olives. IOC producer Members account for 98% of world olive production, located primarily in the Mediterranean region. The EU is a member of the IOC but not India.

In particular, the IOC is responsible for setting and updating trade standards on a continuing basis and harmonising them with international standards for olives and olive oil in close collaboration with the Codex Alimentarius (hereafter Codex). *'The IOC also puts forward proposals to revise the Codex Alimentarius food standards for olive oils and olive-pomace oils and for table olives to approximate them to the IOC trade standards. It is extremely important that the Codex standard is in line with the IOC standard because the former is used by the World Trade Organisation (WTO) in the Agreements on Sanitary and Phytosanitary Measures and on Technical Barriers to Trade'* (IOC website). The Codex norm for table olives is the CODEX STAN 66-1981.

In India the quality parameters defined for the table olives category under the Food Safety and Standard Regulation (FSSR) 2011 were not in conformity with the Codex standards. This had been a matter of concern for olive importers. The existing issues both with respect to food additives and the quality parameters for the table olive category have been taken up by the Food Safety and Standards Authority of India (FSSAI). FSSAI posted a draft of notifications stating the revision in standards on November 2016, inviting comments and suggestions from stakeholders. These comments and suggestions have been reviewed and the final version was released in May 2017.

Although FSSAI has operationalized these new standards, full implementation will occur following a 180-day period after the publication date in the Official Gazette of the final regulations, thereby giving stakeholders time to adjust.

The November standards are in addition to a March 2016 draft, which India notified to the World Trade Organization (WTO). FSSAI expects that full enforcement will occur as from July 1, 2017.

Highlights of the notification include[59]:

- Definition of the types of table olives (green, olives changing colour, and black olives),
- Definition of the types of processed olives (natural olives, salad olives, and olives with capers),
- Detail of essential composition and quality factors,
- Requirement that product contaminants, toxins, and residues, must comply with Food Safety and Standards (Contaminants, toxins, and residues), Regulations, 2011,
- Reference for labelling requirements to Food Safety and Standards (Packaging and Labelling), Regulations, 2011.

2.2.8 Case study 7: EU / Philippines on Import restriction of fruit & vegetables

KEY FINDINGS

- A permit is needed for each shipment and the paperwork is burdensome.
- Obtaining a license means a one-month delay, on average.
- Further liberalization should target shortening procedures and simplifying paperwork.

The EU and Philippines FTA negotiations officially started on 22 December 2015. Since then, two rounds of negotiations followed. Bilateral negotiations with the Philippines are the fifth to be launched between the EU and a member of the Association of Southeast Asian Nations (ASEAN) after Singapore (2010), Malaysia (2010), Vietnam (2012) and Thailand (2013).

In 2012, the European Union and the Philippines signed a Partnership and Cooperation Agreement (PCA) ratified by the Philippines Senate on 2018/01/22 and entering into force on 1st of March 2018. The Agreement, signed in 2012, will provide a new and enhanced legal framework, enabling the European Union and the Philippines to strengthen their bilateral relationship, especially on political, social and economic matters, including human rights.

The purpose of the EU is to conclude an FTA that covers a broader range of issues including tariffs, NTMs, trade in services and investment, intellectual property rights (IPR), public procurement, competition and sustainable development.

2.2.8.1 Overview of trade in fruit and vegetables between the EU and Philippines

The Philippines is to conclude an FTA EU's sixth largest trade partner among ASEAN countries and ranks 42nd worldwide, while the EU is the Philippines' fourth largest trading partner. In 2015, the EU exported €6.2 billion euros of goods to the Philippines mainly from the Netherlands and Germany. The same year EU imports from the Philippines amounted to €6.8 billion.

Agricultural imports from EU countries reached 319.79 million US dollars representing 17.6% of the total imports. Germany was the top trading partner of the country in terms of agricultural imports accounting for US$ 70.05 million and 21.9% of the total agricultural imports from the EU.

[59] For more details, the notification is available on the website of FSSAI at www.fssai.gov.in/

Table 20: Top 10 EU members' trade of vegetables (chapter 07) between the EU and Philippines in 2017

Country	Import Value to the EU (Mo EURO)	Import Qty to the EU ('000 tons)	Country	Export Value from the EU (Mo EURO)	Export Qty from the EU ('000 tons)
EU28	117.90	54.91	EU28	2.67	1.36
Netherlands	43.92	21.61	Italy	1.25	0.53
United Kingdom	22.97	10.33	Bulgaria	0.93	0.62
Germany	16.14	6.92	Romania	0.17	0.08
France	11.33	5.15	France	0.13	0.05
Belgium	11.26	5.27	Belgium	0.07	0.05
Spain	4.92	2.17	Poland	0.05	0.03
Sweden	2.34	1.00	United Kingdom	0.02	0.00
Italy	1.47	0.85	Germany	0.02	0.00
Czech Republic	1.03	0.48	Spain	0.01	0.00
Portugal	0.62	0.29	Austria	0.00	0.00

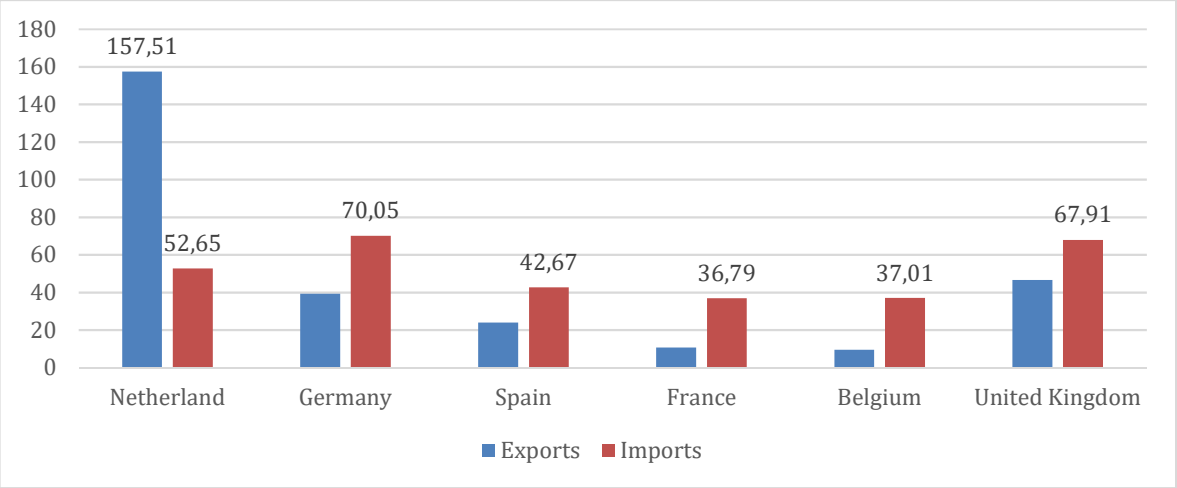
Source: Eurostat Comext

Table 21: Top 10 EU Member States' trade in fruit (chapter 08) between the EU and Philippines in 2017

Country	Import Value to the EU (Mo EURO)	Import Qty to the EU ('000 tons)	Country	Export Value from the EU (Mo EURO)	Export Qty from the EU ('000 tons)
EU28	117.90	54.91	EU28	2.67	1.36
Netherlands	43.92	21.61	Italy	1.25	0.53
United Kingdom	22.97	10.33	Bulgaria	0.93	0.62
Germany	16.14	6.92	Romania	0.17	0.08
France	11.33	5.15	France	0.13	0.05
Belgium	11.26	5.27	Belgium	0.07	0.05
Spain	4.92	2.17	Poland	0.05	0.03
Sweden	2.34	1.00	United Kingdom	0.02	0.00
Italy	1.47	0.85	Germany	0.02	0.00
Czech Republic	1.03	0.48	Spain	0.01	0.00
Portugal	0.62	0.29	Austria	0.00	0.00

Source: Eurostat Comext

Figure 20: Philippines Agricultural exports and imports in US$ million (2nd quarter 2016-2017)



Source: *https://psa.gov.ph/content/highlights-foreign-trade-statistics-agricultural-commodities-philippines-second-quarter-2017 accessed 27/02/2018*.

The Philippines import mainly milled rice and maize but also import and export fruit and vegetables, and import beef and meat products. **The major import commodities from the EU were: meat and edible meat offals** (US$ 120.46 million); dairy products, eggs, natural honey, and other edible products of animal origin (US$ 53.42 million); residues and waste from the food industries; prepared animal fodder (US$ 37.91 million); preparation of vegetables, fruit, nuts and other plant parts (US$ 23.39 million); and beverages, spirits and vinegar, (US$ 15.38 million).

2.2.8.3 Import procedures of plant and plant products into the Philippines

"The health and phytosanitary regulations and procedures applied on imported agriculture and food products are broadly similar for all types of products. Under Philippine import laws, it is the responsibility of the importer to ensure that any product entering the country's customs territory is in full compliance with Philippine health and phytosanitary regulations. The enforcing authorities will check for compliance by inspecting the goods and relevant import/export documentation and decide on whether the goods may enter the Philippines. In cases of non-compliance, the goods may be required to be treated before being released or they may be rejected and ordered destroyed or disposed of outside the Philippines. It is therefore very important that importers and exporters ensure that compliance is achieved before the goods are shipped to the Philippines." (FAS USDA, 2017a).

Quarantine procedure activities facilitate and govern imports and exports of plant products. Key quarantine issues include restriction removal or transfer, inspection verification and procedures relative to release or discharge. All these activities allow it to be checked that plant and plant products are free from pests and diseases. Imports are classified as free, regulated, prohibited or banned. In case of commodities classified as regulated, a clearance permit from competent agencies is needed (see **Annex V**).

The SPS system in the Philippines has the following structure: 1) all food products need to be registered; 2) all exporters and importers need to be licensed with the relevant SPS competent authorities; and 3) permits are needed for each import and export shipment. Importers and exporters need multiple licences from the Bureau of Customs (BOC) and SPS agencies.

The Philippines Department of Agriculture requires importers to obtain an SPS permit prior to shipment for any agricultural product and transmit the permit to the exporter. This requirement in

addition to other costs complicates the timing of exports, and prevents the transhipment of products to the Philippines originally intended for other markets. It also prevents an exporter from reselling products if the importer refuses to accept delivery or abandons the shipment. Since all traders need licences and permits for each shipment, paperwork is burdensome. Obtaining a licence in the Philippines requires, on average, between 7 and 69 days at different agencies.

The Philippines apply pest risk analysis (PRA) on plants, plant products or other regulated commodities that is performed by the National Plant Protection Organization (NPPO). Usually, the PRAs are conducted following a process of mutual data exchange between the NPPOs in the countries of origin and destination. The presence of pests in the country of origin and existing phytosanitary measures determine the conditions for entering commodities. However, most shipments of plants and plant products require an import permit from the Bureau of Plant Industry (BPI) under the Department of Agriculture. In the case of genetically modified organisms (GMOs), the National Committee on Bio-Safety of the Philippines (NCBP), which operates under the Department of Science and Technology (DOST), must additionally approve the import. Process products do not require a Phytosanitary Certificate (PC). However, for those products and for some countries of origin, e.g. the United States, other documents may be required instead.

Moreover, at the port of entry, shipments of plants and plant products, which are to be accompanied by a PC, must be absolutely free from soil and immediately inspected. If products are infested with pests or other plant diseases, and cannot be phytosanitised by any available treatment, they may be destroyed at the importer's costs.

2.2.8.4 Key SPS issues restraining trade in F&V between Philippines and the EU

According to Cadot et al. (2015) the Philippines price-based ad-valorem equivalents SPS measures were 16.5% for vegetables and 7.3% for fruit and respectively 14.9% and 9.3% for customs formalities (including pre-shipment inspections).

The key SPS issues are **market access procedures** for animal products as well as fruit and vegetables.

According to the French Department of Agriculture, Philippines' market access for French apples has been closed since the end of 2014 without precise justification. For the Philippines NPPO is conditional upon pest risk analysis. In 2016, France submitted the required PRA for apple exports according to the MADB Brief. In addition, Austria, Belgium, and Poland expressed interest in obtaining accreditation (products concerned: apples, pears, onions and potatoes).

Table 22: Sanitary and Phytosanitary Issues with Philippines

Title	Measure	Creation Date
Market access for animal products as well as for fruits and vegetables (MADB no. 12822)	For fruit and vegetables, three Member States have submitted the required pest risk analysis (PRA) for products namely apples, pears and potatoes. Yet, the experience of aspiring exporters indicates that importing food remains very cumbersome and unpredictable, with unclear audit and reporting procedures and frequent attempts to change the playing field. One such attempt is a recent EO (23) following the expiry of Philippines WTO rice waiver, proposing to increase tariffs for dairy and meat (among others MDM from 5% to 40%) in the years to come. Impact: EU agri-food exports to the Philippines were €1.02 billion in 2016, with strong growth (potential) of meat, wines and spirits and dairy.	01/01/2014

Source: Market Access Database (MADB)

2.3. Geographical Indications (GIs) and International Trade: EU Trade Agreements with South Korea and Canada (CETA)

KEY FINDINGS

- The EU agreement with South Korea and the CETA with Canada represent two milestones regarding the inclusion of specific provisions for GIs in international trade agreements.
- They are also the result of the difficulty of negotiating at multilateral level.
- The benefits of GI protection depend on asymmetric information, product innovation and welfare improvement considerations.
- Empirical evidence indicates positive export effects both at firm and country level, but also negative import effects in countries of GI producers.
- The EU-Canada agreement represent a way forward in the battle against imitation and forgery.

2.3.1 Introduction

Historically, few topics have proven to be so controversial in international trade agreements as the intellectual property rights (IPR) protection of geographical indications (GIs). The adoption of Trade Related Aspects of Intellectual Property (TRIPS) in 1994, together with the Uruguay Round Agreement on agriculture, did not resolve the disagreement between the European Union and "Anglo-American" countries.[60] Countries worldwide continue to quarrel as to the nature, scope, and enforcement of GI protection nationally and internationally. This conflict has been the subject of bilateral talks for more than 20 years, as well as trade disputes within the World Trade Organization (WTO).

More recently, the failure to establish multilateral trading rules within the Doha Development Round of the WTO triggered a new wave of international trade arrangements negotiated on a bilateral basis. The EU agreement with South Korea (2010), and the more recent "Comprehensive Economic and Trade Agreement" (CETA) with Canada, are two important examples where for the first time specific provisions for GIs were included in the final agreements.[61]

A GI is an indication/label that is used to characterize a good, with the aim of communicating to the consumer that the good has a particular quality, reputation, or some other characteristic linked to its origin. To link GIs to the area of origin, many GIs use the name of the town, region or country where the goods originate. The most famous example of a GI is *Champagne*, denoting a wine that originates from the Champagne region in France (Matthews, 2014); the most famous GIs from Italy, *Prosciutto di Parma* and *Parmigiano Reggiano*, include the name of the City of Parma, or the district area of Parma and Reggio Emilia, two provinces where there is the highest concentration of Parmigiano producers.

From an EU perspective, GIs are a way of protecting foodstuffs, wines and spirits, where part of their value arises both from their geographical origin and the guarantee that the product has been produced following specific rules, on which all producers are agreed when the name and designation of origin is registered.

The core reason for the disagreement over GIs in the international market is, in one sense, implicitly related to the EU's comparative dis-advantage in producing agricultural commodities. As highlighted

[60] In short, while TRIPS established a strong IPR protection for wines and spirits in Art. 23, IPR protection for the rest of the products, including agricultural products and foodstuffs, as defined in Art. 22, is significantly weaker.

[61] The US in its FTA agreement with Asian countries, the so-called **Trans-Pacific Partnership (TPP)**, has promoted its view on how GIs should be protected, a view that clearly contrasts with that of the EU. Ironically, some countries that signed the TPP, especially Mexico, South Korea, Japan and Vietnam, have already signed or are negotiating trade agreements with the EU, where specific provision for protecting GIs is, indeed, included (see Matthew, 2016).

by Matthews (2014), the EU recognizes that is does not have a comparative advantage in producing basic agricultural goods but possesses a long culinary heritage that has over time created a number of premium products which are valued by consumers in the marketplace. The problem is that these product names are currently protected on the EU market but not elsewhere, and the EU wants to extend protection for these GI names on international markets.

The aim of this chapter is to discuss the trade-related issues over GIs, first, by reviewing the actual theoretical and empirical literature on GIs and trade, and second, by focusing on the specific GIs provisions in the FTA agreements signed by the EU with South Korea and Canada, with a view to drawing implications about the possible trade effects of such trade deals. To this end, the next section briefly reviews the relevant background of the EU's GI regulation considering also the results of the WTO's trade dispute with the United States. Next, the key conceptual and empirical evidence linking the EU's GI policy to international trade issues will be summarized. Finally the key provisions on GIs in the new FTA with South Korea and Canada will be addressed with a view to emphasizing similarity, differences and potential trade opportunities for the EU.

2.3.2 Background

The nature of the Transatlantic disagreement over GIs has both economic and legal origins. From an economic point of view, it is the result of two main orders of considerations (Josling, 2006). A first issue is related to the possible pro- or anti-competitive effect of GIs. On the one hand, the idea of including the origin of the product on a label is a crucial element for correcting consumer information asymmetries. To the extent to which that information refers in a reasonably consistent way to a consumer preference attribute then it brings economic value. Thus, using a GI as a proxy for information about the consumer attribute of a good may have an economic justification (Lence et al. 2007; Moschini and Menapace, 2014). On the other hand, if the link between quality and origin is not so reliable, then the information may bias choice and instead provide a marketing advantage to one group of producers by restricting competition. Note that the last issue raises problems at both national and territorial level (see Deconinck and Swinnen, 2014 Landi and Stefani, 2015) and, of course, at international level (Josling, 2006; Marette et al. 2008). GI labels may entail trade distortions or impede the entry of producers who cannot comply with specific requirements. The "asymmetric information" argument and the extent to which GIs induced a pro- or anti-competitive effect, can be investigated and solved empirically, but only on a case-by-case basis.

A second issue that determines the desirability or otherwise, of GI protection relates to the question of whether it encourages or discourages technical change and/or the development of new products (Josling, 2006). If recognizing the links between origin and quality encourages the improvement of product differentiation, it is likely to be desirable and welfare-improving in a Dixit-Stiglitz (1977) world where consumers have a "love for varieties". In addition, as argued by Harvey (2004), GIs could represent a strategy to induce a process of product differentiation in a sector typically characterized by homogeneous or under-differentiated products. However, if linking quality attributes to land and territory only provides gains to landowners, or that operate in a particular location, it tends to reduce competition from potential newcomers, a standard argument raised by GI detractors in US and other "Anglo-American" countries.

Box 6: US – EU WTO Dispute on GIs and 2005 WTO Panel decision

Controversies between the EU and the United States over protection of GIs led the WTO Dispute Settlement Body to establish a panel to determine whether Council Regulation No. 2081/92, the EU law regulating GIs, violated the TRIPS Agreement (World Trade Organization, 2005).

The US challenge to the EU regulation was based on two main points:

A) discrimination against foreign nationals and foreign products with respect to geographical indication protection;

B) failure to protect foreign trademarks.

Both points represented a violation of the WTO principle on "national treatment" that requires members to provide at least equal treatment to domestic and foreign nationals regarding intellectual property rights.

In particular, in a 1999 request for consultations the United States raised concerns about EU Regulation No 2081/92 which does not ''*provide sufficient protection to pre-existing trademarks that are similar or identical to a geographical indication*'' and was inconsistent with the EU's obligations under the TRIPS Agreement (World Trade Organization, 2005). Later on, in 2003, the United States filed an additional request for consultations concerning the protection of trademarks and GIs for agricultural products and foodstuffs, contending that Regulation (EC) No 2081/92 limited the GIs that the EU would protect and limited access to GI procedures and protections by nationals of other WTO members.

In April 2005, the WTO panel ruled that Council Regulation (EC) No 2081/92 was inconsistent with the TRIPS and the 1994 GATT Agreement in several respects. Among other decisions, the panel determined that EU regulations were inconsistent ''*with respect to the equivalence and reciprocity conditions, as applicable to the availability of protection for GIs*'' and that the EU could not deny GI protection to third-country products from countries whose GI protection systems were not equivalent to the EU system (USTR, 2005; World Trade Organization, 2005). In other words, foreign countries should be guaranteed the same access that EU producers have to the EU system for protecting GIs.

The panel also determined that the EU Regulation failed to protect pre-existing trademarks from confusing uses of GIs and that the EU could not require third country government participation in the processes of verification and transmission of applications, verification and transmission of objections, and inspection structures and declarations (World Trade Organization, 2005). Given that these inconsistencies ''nullified or impaired benefits accruing to the United States,'' the panel recommended that Council Regulation No. 2081/92 be brought into conformity with the TRIPS Agreement and the GATT 1994.

Sources: based on Marette et al. (2008); USTR (2005); and WTO (2005).

Box 7: 2006 Amendments to Council Regulation (EC) No 2081/1992 and the new EU GI Policy

In response to the WTO panel decision, the EU published Council Regulation (EC) No. 510/2006 on March 20, 2006 (Council of the European Union, 2006b). The new regulation, which came into force on March 31, 2006, more clearly defined EU systems for recognition and registration of third-country GIs, allowed individuals and groups to apply for registration of a third-country GI in the EU without participation of the third-country government, and provided greater protection for pre-existing trademarks.

Article 2.1 of Regulation (EC) No 510/2006 requires that agricultural products or foodstuffs "*possess a specific quality, reputation, or other characteristics attributable to that geographical origin*" (Council of the European Union, 2006b). Part 2 of Article 11 states that *"in respect of geographical indications or designations of origin relating to a geographical area in a third country, verification of compliance with the specifications, before placing the product on the market, shall be ensured by one or more public authorities designated by the third country and/or one or more product certification bodies*" that "*shall comply with, and from 1 May 2010 be accredited in accordance with European Standard*". Note that, under this new framework, some third-country applicants (especially in developing countries) may have difficulty finding qualified certification.

A key point of the new EC Regulation No 510/2006, is that now a foreign producer has a chance of registering a PDO or PGI in the EU.[62] Once an application has been filed, the Commission has up to 12 months to scrutinize each application. If the Commission determines that the conditions of the regulation have been met, the application is published in the Official Journal of the European Union, and interested parties have 6 months in which to file an objection.

Sources: base on Marette et al. (2008); Council of the European Union (2006b).

From a legal point of view the GI question is even more complex. As an effect of heterogeneity among farmers, retailers, and consumers from different countries, GI-regulating systems vary greatly among countries. In particular, the EU has a stringent definition of GIs, allowing supply control to promote rural development and income support for farmers. By contrast, the US position is that its trademark laws, including certification marks, adequately protects GIs, and there is thus no need for special regulations.

Disagreements over the EU's GI regulatory system led the United States (and other countries, such as Australia and Canada) to file a complaint with the WTO against the EU in 1999 (see Josling, 2006; Marette et al. 2008). Two main arguments were developed by the United States against that the EU's Regulation. On the one hand, it discriminated against non-EU GIs by failing to provide the national treatment principle, namely the absence of equal treatment between foreigners and EU producers for GI application and registration to the European system. On the other hand, it did not provide sufficient protection to pre-existing US trademarks (nor those of other countries) that conflicted with EU-registered GIs.

In March 2005, the WTO released the panel report regarding the European GI system (see **Box 6**). The panel's conclusions induced the EU to change its rules affecting how international GIs are treated within the EU territory.[63] The new regulation allows the EU's GI regulatory system to recognize and protect foreign GIs and allows foreign producers to apply directly for registration of GI products in the EU (see **Box 7**). However, from 2006 to February 2018 the number of GIs registered in the EU by third

[62] As of February 2018, the were 45 foreign GIs (PDO/PGI) registered or pending for a decision in the EU DOOR system. The countries involved (and the number of GIs) is as follows: Andorra (1), Armenia (1), Cambodia (1), China (10), Ciprus (9), Colombia (1), India (1), Indonesia (1), Thailand (4), Turkey (14) and Vietnam (1).

[63] See EC regulation No 510/2006.

countries (only 45), is nowhere near comparable to more than 1.500 GIs registered by the 28 EU Member States (excluding wine and spirits). Thus, the first impression is that, though the new EU GI regulation approved in 2006 appears to be in compliance with the WTO rule on national treatment, offering foreign countries symmetry in GI registration and protection, from the figures above it appears clear that the protection of GIs worldwide, **still remains by and large a specific EU problem**.

However, how the EU regulation is implemented as an effect of the 2005 WTO panel decision, has been important for the recent development of trade agreements concerning IPRs on high-quality products with South Korea and Canada. This is because, the new EU GI policy appears to be more in compliance with national treatment of non-EU producers and, if properly implemented, provides a useful model for protecting property rights, linking agricultural products to geographical areas, and signalling quality for qualified products from any origin.

2.3.3. The economicS of GIs trade effects

In recent decades, the economics of GI has attracted growing interest. Much of the literature has investigated the extent to which, and under what specific market arrangement, certification and labelling tools can address market failures due to asymmetric information (e.g. Marette and Crespi, 2003; Zago and Pick, 2004; Langinier and Babcock, 2008; Moschini et al., 2008), and the related consumers' and producers' welfare effect under different market arrangements (Mérel and Sexton, 2012; Desquilbet and Monier-Dilhan, 2015; Lence et al., 2007; Menapace and Moschini, 2014; Yu and Bouamra-Mechemache, 2016).

Until recently, analysis of GI trade effects, with a few notable exceptions (e.g. Josling, 2006; Marette et al. 2008; Chambolle and Giraud-Heraud 2005),[64] has mainly focused on the legal issues of intellectual property protection. More recently, some papers have started to investigate the GI trade issue more formally, from both a theoretical and empirical point of view (see, Sorgho and Larue 2014, 2018; Agostino and Trivieri 2014; Duvaleix-Treguer et al. 2015; Raimondi et al. 2018).

2.3.3.4 Theoretical considerations

A good starting point is the analysis of Marette and Crespi (2003). Using the EU GI regulation, as a representative example, they stressed that signalling may lead to a stringent coordination among producers to reduce quantity (or increase price). However, the main issue is to understand the extent to which the signalling effect (more information) offsets the collusion effect (less competition). They first showed that producers' collusion might be necessary to signal quality via third-party certification. Secondly, they showed that, under a perfect information environment, a stable cartel that provides information about product quality might improve overall welfare even if producers collude to reduce competition. This is because the provided information effect outweighs the competition restriction effect. However, Zago and Pick (2004) question the desirability of GIs by showing that, with an exogenously determined supply of quality, the welfare implications of a credible certification system based on GIs are ambiguous.

Moschini et al. (2008) emphasized that the economic analysis of GIs should be conducted in an institutional framework of competitive markets, contrary to standard trademarks, which are owned and used by a single firm. Under this setting, they argue that GIs are essentially public goods, and showed that some policies that subsidize the GI certification of quality would increase welfare, mainly in the

[64] Bureau, Marette and Schiavina (1998) showed that opening the domestic market to foreign products that are perceived to be of lower quality than domestic products, may lead to market inefficiencies (e.g., adverse selection), which in turn may offset some of the benefits of trade liberalization. For a more general analytical discussion about the (possible) protectionist effects of quality standard, see Marette (2015), Swinnen at al. (2015) and Olper (2017).

form of increased consumer surplus. Instead, GIs could benefit producers only when the production of the high-quality good draws on scarce factors owned by producers.

Other contributions addressing the welfare effects of GIs focused on which kind of collusion schemes, necessary for addressing the fixed costs of certification, is superior from a welfare point of view. For example, Mérel (2009) showed that when producers as a group are allowed to control supply, an input quota policy (e.g. on land) is superior to an output quota policy, because it has a lower deadweight loss.[65]

None of above contributions, however, consider *directly* the potential implications stemming from a situation where the level of competition in the domestic market is affected by international competition due to trade liberalization. As argued by Marette et al. (2008), the globalization wave of recent decades has increased the need for quality signals because consumers are now progressively less aware of the origin and quality of products in the marketplace. Hence, the increase in competition coming from the international market increase the firms' incentive toward quality signalling with the aim of differentiating their domestic production to the eyes of (un-informed) consumers. One motivation of the proliferation of GIs starting from the mid '90, as well as other kind of product standards, may indeed also be driven by the increased international competition (Marette et al. 2008). However, they also stressed that as an effect of international competitive pressure, if the fixed costs of quality certification and innovation are particularly high, then there may be market concentration and a reduction in the varieties on the domestic market. They cite the model of Shaked and Sutton (1987), which predicts that the increase in market size due to trade liberalization, translate into an increase in the level of concentration, and a subsequent reduction in the number of product varieties, an effect that reduce consumer welfare.

The idea that GIs may function as a non-tariff barrier was formally put forward by Chambolle and Graud-Héraud (2005). The authors argued that GIs combine both quantity restriction and a sort of quality costs subsidy. They obtained this result, within a model of strategic trade policy, with two firms located in home and foreign country competing on the home market, showing that a domestic firm - as an effect of GI certification - may be positioned itself as a higher quality producer.

A similar effect can be found in models with monopolistic competition and firm heterogeneity, such as the trade model of Melitz (2003). For example, Abel-Koch (2013) developed a simple monopolistic competition trade model with firm heterogeneity, where technical standards and certification requirements such as GIs raise fixed costs of market access for both domestic producers and foreign exporters. In this setting, certification requirements force the least efficient firms to exit and shift profits to the most efficient firms. Certification requirements work similarly to non-tariff barriers to trade by shifting profits both within and across countries. The model predicts that the implementation of anti-competitive regulations can never be a social optimum because the potentially positive effect of certification on the aggregate profits of home firms is always dominated by its negative effect on consumer surplus, due to the loss of the home available varieties.[66] Clearly, this conclusion could be reversed under the condition such that the certification of origin is implemented to reduce a consumption externality – i.e. information asymmetry – whenever the increase in consumer surplus

[65] The Mérel (2009) paper is also a reaction to the findings of Lence at al. (2007) results, showing that allowing producers to collude on output, inputs, or to adopt cost-enhancing production requirements (as in many EU GIs) may have positive social welfare effects, whenever those schemes enable producers to account for the fixed costs of developing the differentiated GI products (see Mérel 2009, for a discussion).

[66] Interestingly, in this model the introduction of a quality standard can also induce profit-shifting across countries when firms in the two countries are characterized by differences in the size distribution. Indeed, when the ratio of winners to losers from the introduction of NTMs is higher in Home than in Foreign country, on aggregate, profits are shifted from Foreign to Home firms.

attributable to the externality reduction, more than offsets the decrease in the number of home available varieties.

Summarizing, the trade impacts of a GI are mainly a direct consequence of the suitability or otherwise of the domestic policy to provide the appropriate level of protection and information (Josling, 2006). Specifically, if consumers are over-protected, the level of imports in the domestic market will be lower than the optimal level, just as the level of exports from domestic producers will be too high. On the other hand, if consumers are under-protected by the GI policy, the level of imports of low quality goods will be too high domestically, but the level of exports from domestic producers too low, because the lack of information will adversely hit sales of the product with the geographically linked quality attribute (Josling, 2006).

In general, determining the optimal level of GI protection from a conceptual point of view is difficult, because results largely depend on the underlying model assumptions, such as the type of competition (perfect vs. imperfect competition) and on how the fixed costs of GI certification affect the domestic vs. foreign firm profits. Because these factors tend to be country- and specific-sector, the only way to gain some insight is to move the discussion onto empirical evidence.

2.3.3.2 Empirical evidence

Moving to the empirical evidence on GI trade effects, the literature to date is scant. Indeed, just and handful of papers quantitatively investigated the extent to which the EU's GI policy affected international trade and, more importantly, only two papers focused simultaneously on both the export and import side of the story.

The first paper that evaluated the trade effect of GI's was by Sorgho and Larue (2014), who applied the odd ratio gravity specification of Head and Mayer (2000). Using a cross-section of 27 EU countries and working with aggregated agri-food trade data, the authors showed that GIs promote trade *only* when both the importing and exporting countries are GI producers. This result is mainly attributed by the author to consumer information. A potential limitation of the result lies in the aggregation level of the analysis. Indeed, considering only the overall agri-food trade, much sectorial information and heterogeneity of the GI trade effects are lost, rendering the final result potentially prone to aggregation bias.

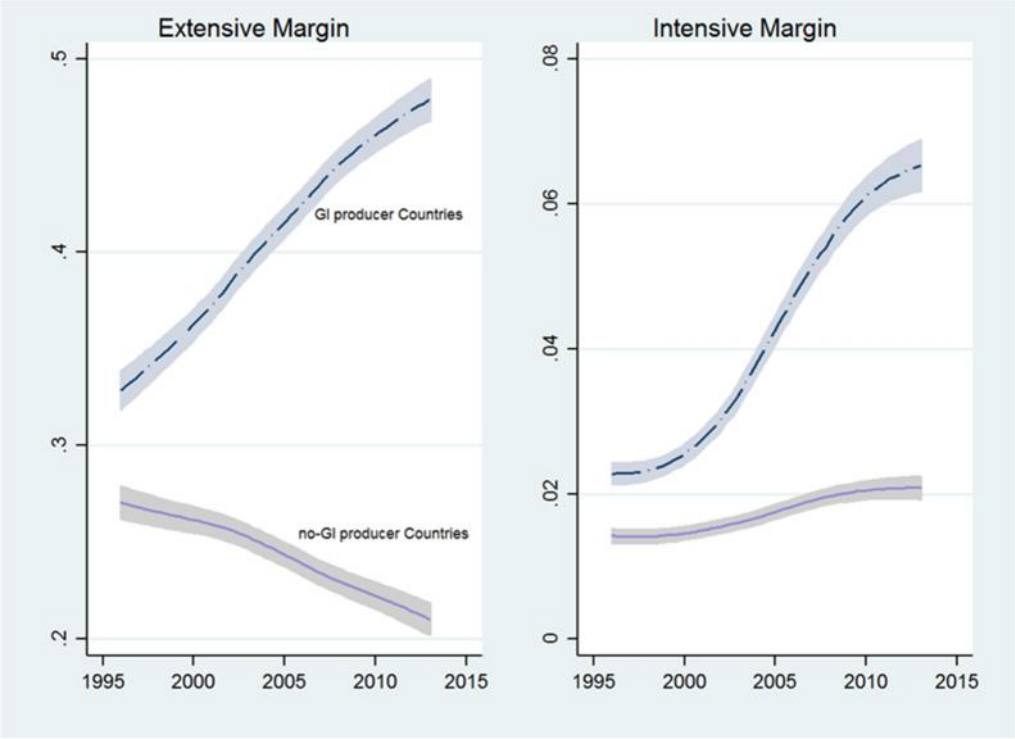
A significant step forward, was the paper by Agostino and Trivieri (2014). By focusing on wine exports from France, Italy and Spain, they were able to show that high quality wines produced in specific regions (GIs wine) performed better abroad, both through extensive (probability to trade) and intensive (trade volume) trade margins. This is an important result especially because it is obtained by using a theory-driven specification of the gravity equation in a panel data context (see Baier and Bergstrand 2009). However, the downside is that by focusing only on wine exports the paper is less informative about the issue of international trade in GIs. Indeed, wine and spirits are among the few GIs that have received special protection on international markets as an effect of the TRIPs agreement.

The first paper that investigated the GI trade effect using firm-level data was by Duvaleix-Treguer et al. (2015). Using French customs data matched with firm-level data of PDO cheese producers, they were able to show that GI certification increased firms' exports through both the extensive and intensive trade margins, but not export unit values. In addition, they showed that this export premium depends on the degree of competition in the export market. For cheese and cream products with a large atomized number of producers, the impact of labelling on export is more significant than for products with monopolistic competition. All these results mainly hold on the EU markets. Finally, by comparing GI-certified firms to their non-certified counterparts, the former perform better than the latter in their

non-labelled products in the EU market, suggesting that firms producing GIs gain in reputation also with respect to other (non-GI) products.

Sorgho and Larue (2018) extended their 2014 paper by developing a theoretical framework to heterogeneity in consumer preferences regarding country of origin (domestic versus foreign) and the implicit quality signals from GI labels. Using disaggregated data within the EU, their main findings showed that GI products have an ambiguous effect on international trade. The authors interpreted these findings by arguing that the GI trade impact depends on the importance of the product for consumers, i.e. the intensity and reputation of the GI-product considered. However, a potential shortcoming of this interpretation is that, by working on all the GIs produced in the EU, irrespective of their importance, they also included many products that are commercialized and known by only local (or national) consumers, and that are not really of importance in the international markets. Indeed, it should be pointed out that, as shown by AND-International (2012), the overall sales value of EU certified GIs (excluding wine) in 2010, was equal to around €15.8 billion, of which, 78% was sold on the domestic market, 16% exported within the EU market, and only 6% exported to the extra-EU market (mainly US, Switzerland, Canada and Japan). Because in 2010, the external EU trade amounted to about €57 billion, this means that GIs represented just 2% of the total value of extra-EU food exports. Hence, when analysing the GI trade effect, focusing on minor GI products that are sold only on local or regional markets, is less significant, and perhaps also misleading.

Figure 21: Intra-EU Exports of GIs vs. non-GIs producer countries



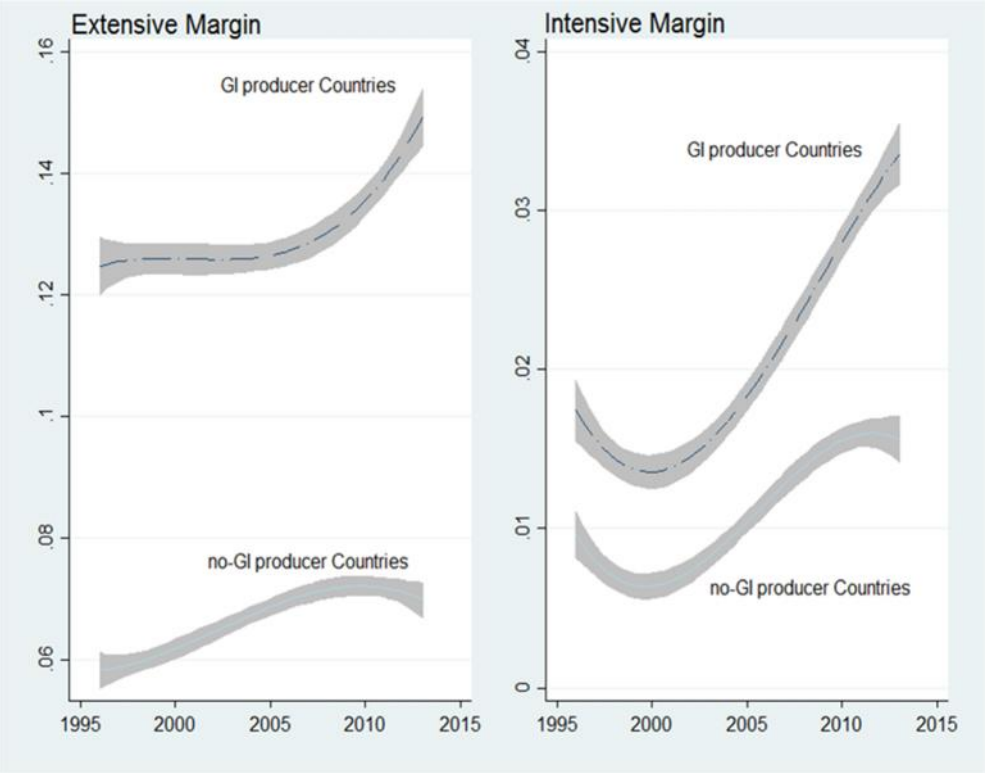
Source: Raimondi et al. (2018)

Notes: The figures show the evolution of the fraction of tariff lines covered by exports (Extensive margin) and the volume of exports (Intensive margin) relative to intra-EU trade transactions, calculated across EU GI and EU non-GI countries-product pair, with their 95% confidence interval.

This consideration is reinforced by the list of EU GIs in the two FTA discussed below. In fact, of the 1500 GIs notified to the EU certification body, only around 60 were included in the final list of the EU-South Korea FTA and 145 in the CETA, simply because these are probably the GIs that quantitatively really matter from an economic point of view in the (extra-EU) international market.

One of the most comprehensive analyses of the impact of GIs on trade so far, is that by Raimondi et al. (2018). Though they do not work with data at the firm level, unlike Duvaleix-Treguer et al. (2015) the authors take advantage of an extensive new dataset classifying all the EU GI products at the Harmonized System (HS) 6-digit level. In this way, they are able to investigate the aggregate and dis-aggregated GI trade effects, both within the EU and for external EU (bilateral) trade patterns, and focus on GI products with real value in both the domestic (intra-EU) and extra-EU international market.[67] Using these new data Raimondi et al. (2018) find that GIs affect trade flows differently depending on whether they are present in the exporting or the importing country. The presence of GIs in the exporting country systematically increases trade.

Figure 22: Extra-EU Exports of GIs vs. non-GIs producer countries



Source: Raimondi et al. (2018)

Notes: The figures show the evolution of the fraction of tariff lines covered by exports (Extensive margin) and the volume of exports (Intensive margin) relative to extra-EU trade transactions, calculated across EU GI ad EU no-GI countries-product pair, with their 95%

This export-promoting effect of GIs is relevant to both trade within the EU and with non-EU trading partners, and works through extensive and intensive trade margins. Figures 21 and 22 illustrate this effect for both the EU and foreign markets. As clearly shown, in the last 20 years the export performance in the agri-food sector for countries and products with GIs significantly outperformed that of countries and products without GI labels. And the enhanced export performance occurs through two mechanisms: it increases the number of products exported and the number of destination countries served (extensive margin), and it also increases the volume of exports (intensive margin).

GIs positively affect export unit values, consistent with the idea that GIs induce quality upgrading.

[67] Raimondi et al. (2018) focused their attention on six HS 2-digit products: Meat (HS 02), Dairy (HS 04), Vegetables (HS 07), Fruit (HS 08), Oils (HS 15) and Fish preparations (HS 16). These agri-food categories represent about 80% of the GI production value, and almost all the export value of GIs.

However, the effects are different when GIs are registered only in the importing country. In this case, GIs seem to reduce trade, especially for the volume of trade of those products to that destination (intensive margin).

Importantly, Raimondi et al. (2018) show that all these findings apply to both trade within the EU and when external EU trade is considered. Hence, these results suggest that **EU GI products have had success in international markets**, a success that is thus likely to improve further with the implementation of new FTAs discussed in the next section. However, it also suggests that **imports into the EU have been hampered by GIs**.

In summary, while GIs have stimulated exports for countries and products with GIs (such as many products in the EU), they are also reducing imports for countries with GIs (such as for many products in the EU). Hence, the **impact of GIs on trade is mixed** according to this study.

2.3.4 GI provisions in the new generation of FTA: the case of South Korea and Canada

The difficulty of negotiating additional GI provisions at multilateral WTO level, and the stumbling block of the Doha Agenda, pushed the EU to follow an alternative strategy, through a new generation of bilateral trade agreements. In such a context, indeed, it is easier to promote what can be called TRIP-plus provisions while negotiating wider comprehensive trade talk because the EU (like the US) enjoy great bargaining power. From this perspective, it may be useful to start with the **general objectives** set by the EU Directorate General for Agriculture and Rural Development (DG Agri) in relation to Geographical indications. DG Agri declared a list of goals that the new generation of FTAs with the EU should reach (Matthews, 2014).

1. A list of EU names to be protected directly and indefinitely;
2. An extension of the Art. 23 of the TRIPS to products other than wines and spirits;
3. To allow the coexistence of GIs with prior trademarks if they were registered in good faith;
4. The phase-out of previous uses of names originating in the EU;
5. To obtain administrative protection;
6. The avoidance of full reliance on mere individual applications for protection;
7. Ensuring future cooperation through the establishment of a designated working group.

The seven points above, were clearly part of a maximalist approach and were nuanced by the acknowledgement of the fact that the level of protection achieved will depend on the particular characteristics of the third country involved in the deal, its legal system and its economic interests on the GI matter. Another element that the EU should not forget is that there are previous FTAs with third countries, mainly the US that could reduce the degree of freedom at the negotiating table.

2.3.4.1 EU - South Korea FTA

The FTA between the EU and South Korea, signed in 2010 and entered into force in 2011, was the **first agreement of the new generation of FTAs, including a TRIPS-plus provision**.[68] No EU FTA agreement before went so far in terms of eliminating trade barriers, particularly trade tariffs for

[68] The first bilateral agreement where the EU introduced a specific GI protection system was the one with the Cariforum States, signed in 2008. This was followed by the FTA agreements with South Korea (2010), Colombia (2012), Peru (2012), and six Central American countries, Panama, Guatemala, Costa Rica, El Salvador, Honduras and Nicaragua (2012), and Singapore (2014). Importantly, the degree of GI protection in each of these agreements, though normally higher than in the TRIPS, is different, mainly as a consequence of previous FTAs already signed by these countries with the US.

industrial and agricultural products. The majority of import duties had been removed in 2011. The remaining ones – with the exception of a limited number of agricultural products – were removed after five years on 1 July 2016. Importantly, the FTA also addresses non-tariff barriers to trade, specifically in the automotive, pharmaceutical, medical devices and electronics sectors, as well as on SPS standards on agricultural products.

Both the EU and South Korea have an interest in reinforcing IPR protection, though Korea was also constrained as an effect of a previous agreement with the US. The FTA dedicated a specific chapter on IPR protection (Chapter 10), whose Articles from 10.18 to 10.26 concern geographical indications.

In synthesis, the two countries agreed on the following key points. First, to **extend the GI protection of agricultural products and foodstuffs, beyond wines and spirits**; secondly, South Korea (the EU) undertook to protect the geographical indications of the EU (Korea) listed in Annex 10-A (the **EU GIs list has 60 products, while the South Korea's 63**); thirdly, South Korea agreed to establish a register to protect GIs; fourthly, South Korea accepted the **coexistence between geographical indications and prior trademarks**; finally, in addition, they established a joint working group to exchange information, and to discuss the inclusion of new geographic indications in the future.

The protection of the EU GIs that are included in the list is quite substantial within this FTA, and match closely the EU perspective. As discussed in Fanjul (2017), this high level of protection could harm prior third party rights, i.e. trademark holders, and some observers raised the possibility that the GI provisions of the FTA in some respects could be even against the TRIPS itself. However, since all the products in that list may have to face an opposition procedure before their protection, there will be no infringement of the TRIPS (Engelhardt, 2015).

Others raised the issue of the possible infringement of the TRIPS with respect to the generic term exception of Art. 24 but its counter argument is that the vast majority of European GIs protected are compound names, so there will be no such claw back of generic terms (Matthews, 2014). Instead, as argued by Fanjul (2017), there will be an improvement in the interpretation of the TRIPS that balance both rights better than before.

As regards the relation between prior trademarks and geographical indications it is held that trademark applications corresponding to a protected GI in the list should be refused to "like products" after the date of implementation of the agreement or recognition of a new GI in the territory (Art. 10.23). However, there is a grandfathering clause that establishes that previously registered trademarks cannot be invalidated or revoked and should continue to be used by their holders (Art. 10.21).

Thus, the agreement assures a level of protection for GI that appears significantly better for European interests than that included in the previous FTA between the EU and Cariforum, and similar to that signed with Colombia in 2012. This is **an important achievement from the EU point of view**, because the agreement with South Korea, the first with an Asian country, opens the door to EU GIs in one of the fastest growing areas of the world, and to similar agreements with other important Asian countries, notably the one with Japan under negotiation, and clearly with China. Indeed, though until very recently no explicit mention has been made of China – the region's largest and most dynamic economy – as a possible candidate for an FTA with the EU, things are currently changing rapidly.

Considering now the potential trade effect of the EU-South Korea FTA, with reference to the GI products, it is clear that the high level of protection achieved will spur the EU exports of GIs in a highly dynamic market. For example, as a consequence of this trade liberalization effort, (overall) EU exports

to South Korea increased by 55%, from €30.6 billion in the 12-month period before the FTA took effect, to €47.3 billion in the four years of the FTA (EC Commission, 2017).[69]

Focusing on agricultural products, the FTA has provided the biggest market liberalization in years for EU agricultural exports. Before the agreement, only 2% of EU agricultural exports entered South Korea duty-free. The FTA fully eliminates duties for nearly all EU agricultural exports: wine is duty-free from the start, whisky in year three, and there are valuable duty-free quotas for products like cheese. Certain EU pork exports will have duty-free access from year five, whereas for the most sensitive products (e.g. frozen pork) a ten-year transition period is envisaged. Hence, given this quite long transition period for tariff reduction in agricultural products and foodstuffs, the achievement of the EU potential exports to South Korea will take some time.

2.3.4.2 EU – Canada FTA (CETA)

The FTA agreement with Canada is for several reasons **a sort of milestone**. First, because it is the first agreement undertaken with another highly industrialized country and it is expected that it will boost growth on both sides of the Atlantic. Second, and more importantly for our purpose, focusing on GIs the CETA agreement is of particular importance especially because **it is the first with a common law country**, which bases the protection of goods and products, through a **trademark system** based on "the first in time first in right" principle (Fanjul 2017). Thus, the enhanced protection over EU GIs within CETA could have a considerable effect in agriculture trade, a sector where both sides have great economic and political interests.

To understand the underlying reason for this agreement, and especially the provisions related to GIs, it could be important to point out that in every FTA, the parties involved make concessions with a view to gaining additional market access, especially in areas considered strategic. This means that Canada, in granting to the EU the inclusion of specific GI provisions, obtained some additional market access gains in other areas of the deal.[70]

The GI provisions of the CETA are reported in the Article 20, subsection C of the Agreement. First, it establishes the definitions of Geographical Indications, along the lines of Art. 22 of the TRIPS, though limited to agricultural products and foodstuffs.[71] The protection granted to EU GIs refers to products listed in Annex 20-C. The bulk of products included are mainly related to processed meat, cheeses, and oils, but there are also less important GIs, such as essential oils, gums and resins. The European list counts 145 GIs, hence a number significantly higher than South Korea's list discussed above. One reason for this longer list, could simply be the result of the Canada's economic size: being a large country it already imports several more GI products from the EU. Moving to the Canadian list, it remains empty for the moment, a fact that has been interpreted as Canada's sort of message to highlight its low commitment to the GI provisions of the deal (see Fanjul 2017).

[69] Specifically, the annual increase in exports was more than 15% in the first year of FTA implementation, 8%-9% in the second and third years and 14% in the fourth year.

[70] Otherwise, it is difficult to understand why Canada government, traditionally against the extension of protection of the TRIPS Art.23 to the rest of agricultural products, later on in the CETA accepted something of very similar.

[71] There is no mention of wines and spirits, because the parties signed on this product a previous bilateral agreement in 2004 (see Fanjul 2017).

Box 8: The case of Consorzio Prosciutto di Parma vs. Maple Leaf

The case that involved the Prosciutto di Parma Consortium versus the Maple Leaf Foods (a Canadian Food firm), is for several reasons useful to understand the different positions concerning GIs and the important role played by the EU - Canada FTA.

Maple Leaf, a Canadian food firm, is the holder of a trademark "Parma Ham", a trademark that has a lot of value because Maple leaf invested money and marketing expenditure for several years to consolidate the brand. On the other hand, there are the interests of the producers of the "true" Parma ham in the Italian province of Parma who, until recently, could not sell their Parma ham in Canada. The situation has been for several reasons paradoxically because, using the words of the EU Agricultural commissioner: "it is simply not acceptable that the EU cannot sell its genuine Parma ham in Canada because the trademark "Parma Ham" has been reserved for a ham produced in Canada".

The term Parma was initially registered in 1971 for several meats in Canada, including Ham (prosciutto in Italian). Later on in 1977, Maple Leaf acquired the trademark. Next, the Italian Prosciutto di Parma Consortium tried to register a trademark in Canada, but several objections were raised given the conflict with the previous trademark "Parma ham" owned by Maple Leaf.

The Consortium had no other choice than to try to have the Canadian trademark removed arguing that it was deceptively misdescriptive and lacked distinctiveness (Fanjul 2017). The federal Court of Canada rejected both arguments. Next, the EU threatened to charge the final decision with having erected an unfair trade barrier, if coexistence was not at least granted. As a reaction, Canada gave the Consortium an official trademark, the Ducal Crown under the Canadian Trademark Act section 9. This was also troublesome because in principle, such trademarks could only be granted to public authorities as Maple Leaf Food effectively argued (Gangjee, 2007).

With the conclusion of CETA, now the agreement lists "Prosciutto di Parma" as a name — for a product class of dry-cured meat from Italy — that cannot be used by any other producer in Canada. In practical terms, CETA's position on Parma ham is beneficial to Italy and the European Union, as it will likely facilitate access to the Canadian market. However, according to CETA, Canadian trademarks that are not GIs may still use the names, Asiago, Fontina, Gorgonzola, Münster, Feta and, indeed, Parma ham, if accompanied by the qualifiers "imitation," "style," "kind" or the like (Awad and Cadogan, 2017).

Sources: based on Fanjul (2017), Awad and Cadogan (2017) and Canadian Federal Court of Appeal (2012 FC 416 (Apr. 12, 2012).

The level of GIs protection, defined in the **Article 20.19, is clearly narrower than the protection granted by the European Union**. This is because the CETA only protects against the use of GIs for the products that fall within the list (i.e. 145 GIs versus 1500 EU GIs). However, the level of GIs protection basically extends the Article 22 of TRIPS to incorporate the level of protection embedded in Article 23 of TRIPS, until now granted to only wine and spirits. More specifically, it forbids the use of those protected signs for products not originating in the place indicated, or even when they were produced there but did not follow the specifications or set of procedures the specific GI. In addition, the use of descriptors such as kind, style, imitation or the like terms, accompanying a GI name is also prohibited as is the use of translations of those protected GIs. However there are exceptions. This represents a clawback of EU GI names. A clawback of GI names is a retraction of identical product names used in the course of trade that are not authorized by the original right holder of the GI. In CETA, a few well-known product names can still be commercially used on products in Canada, if they are distinguishable by the qualifiers "imitation," "style," "kind" or the like. (Awad and Cadogan 2017).

The protection achieved within the CETA on GI could be considered a European victory because it was a European objective in the Doha round and in every trade agreement since the new generation of FTAs began in the second half of 2000's. However, this success in some sense was partially watered-down, because **Canada only undertook to enforce the GI provisions on its borders and not within Canada itself**. This could be an issue because it means that those who decide at the border whether a product coming from the international market is in compliance with CETA rules, will be the Canadian administrative staff. And, *a priori*, it is difficult to know what incentive they really have to apply rigid protection rules. In addition, as discussed in Awad and Cadogan (2017), the use of border measures to prevent the export and import of products with names that are similar to CETA-protected GIs, may be eventually challenged in courts and under dispute resolution measures in other FTAs, and specifically under the NAFTA with the US.

The agreement ruled on the relation between trademarks and GIs: for the GIs listed in the Annex 20-A, there is a supremacy over trademarks that consists of, or contain, protected GIs. Clearly, as discussed above, there are many exceptions and grandfathering clauses in the protection of GIs over trademarks (see O'Connor, 2015). However, in the end what the agreement really produces is the clawback of all of the generic terms included in the lists of protected GIs that its legitimated users could not use before because either they were considered generic or because they were already registered as Canadian trademarks. Thus, thanks to this provision many European producers can now start promoting and marketing their products in Canada with the proper term, like for example, the producers of Prosciutto di Parma (Fanjul 2017).

A final point concerns to the possibility in the near future of expanding the list of 145 EU GIs. The Article 20.22 from this perspective is a little bit confusing. While it seems to recognize the possibility of amending and extending the list, it also states that none of them shall be in principle European GIs, thereby apparently introducing constraints in the EU's ability to protect additional GIs (see O'Connor, 2015). However, as noted by Fanjul (2017), this should not be a real problem, especially because the subset of EU protected GIs had already been negotiated between the European members, clearly focusing also on their trade importance.

3. CONCLUSIONS AND RECOMMENDATIONS

3.1. The role of standards and their governance in agri-food trade

This report focused on the role of public standards (government regulations, such as SPS and TBT regulations) in international trade and the costs and benefits of harmonization of public standards among trade partners. The analysis - based on an in-depth literature review and a series of new case studies documented that **agri-food production and trade are increasingly regulated through stringent standards** on quality, safety, environmental and ethical aspects. These standards are imposed by governments (**public standards**) but also by **private companies** and third parties (such as NGOs) and have spread geographically through trade and foreign direct investments (FDI). Interestingly, while the use of standards has been criticized for hampering trade, the emergence and spread of standards across the world has coincided with the growth of global trade in agricultural products. Moreover, the growth has been the most pronounced for those products where standards are most important, such as fruit, vegetables, seafood, meat and dairy products (Maertens & Swinnen 2014).

An important issue that emerges from the conceptual analyses is that **standards almost always affect trade**. However, the impact can be **positive or negative** depending on the nature of the standard, the product, the (international) markets and institutions, etc. Standards can enhance trade by reducing asymmetric information (e.g. by guaranteeing certain safety and quality attributes), by reducing externalities (e.g. guaranteeing the absence or limits of undesirable environmental or social externalities), by reducing transaction costs in trade, etc. All these effects of standards will typically enhance trade and welfare. However, standards can also be used to protect domestic producers against imports, especially when traditional protectionist instruments such as tariffs have been reduced as a consequence of trade agreements and agricultural policy reforms. Sometimes it is difficult to disentangle both effects, and, not surprisingly, vested interests have an incentive to distort information on the impacts. This makes conceptual analysis and empirical studies on the impact of standards complex, and makes it difficult to identify the "optimal standard" from a social welfare perspective. It is also likely that the "optimal standard" may differ between countries, due to differences in economic development, comparative advantage, consumer preferences, institutions and infrastructure, etc. These differences add another layer of complexity to the discussions on the costs and benefits, and therefore the desirability of harmonization of standards.

That said, agri-food trade has continued to grow and it is increasingly governed by a wide variety of standards. This makes the issue of international harmonization and coordination of standards ever more pertinent in recent years. Historically, the WTO has played a pivotal role in working towards international coordination of regulations and standards. Yet, despite major advances in the development of global standards and common conformity assessment under the institutions recognized in the **WTO international trade rules on standards and regulations (TBT and SPS agreements)**, domestic and import regulations continue to differ from country to country.

Standards have transformed the structure and organization of global and local value chains (McCullough et al. 2008, Swinnen 2007). Compliance with increasingly complex and stringent food standards require tighter vertical coordination within value chains. It may also have implications for the position and investment of farms in value chains, competition at various stages in the value chain, and the welfare of farmers and consumers.

As a final caveat, it should be noted that **harmonization and regulatory rapprochement of standards does not necessarily only have benefits**. Complete harmonization can be costly in terms of deviating from a country's social optimum.

3.2. The current state of regulatory rapprochement

This report contained several **case studies** on regulatory rapprochement and specific trade concerns between the EU and trading partner countries. Because of the **difficulty and complexity of identifying general effects** (which are likely to depend on specific standards, countries, products, market conditions etc.), it is actually crucial to focus in detail on a series of case studies. The case studies documented both cases of progress **in harmonization** and **in removal of trade-constraining practices**, as well as cases of continued (unnecessary) problems of standards and their implementation for trade.

Our report provided evidence on progress and problems in regulatory rapprochement of standards, both in the form of harmonization (such as the case of MRLs) and in the form of mutual recognition (such as the case of GIs) for the EU and its trading partners.

An indication of the problems that standards and their implementation pose for trade, as perceived by (potential) trading partners is the number of "specific trade concerns" (STCs) that WTO members can submit. The **number of STCs is continuously growing**. The EU plays a dominant role in STCs, both on the receiving end (with 20% of STCs directed at EU policies) and at the giving end (with 20% of STCs submitted by the EU about its trading partners' policies). Other countries that are in the top 4 on both sides are the United States and China. Other active countries include Brazil, Mexico, Canada and Australia. Small developing countries are much less active, presumably because of the high (political or economic) costs of submitting such STCs.

The STC issues raised by the EU often concern a criticism of a long administrative times involved in imports and lack of transparency in bureaucratic procedures in many trade partners, mainly LDCs.

Although a large number of STCs are raised at the WTO SPS committee, there are many areas of trade concerns where **substantial progress in harmonization and/or mutual recognition** has been made. For example, more than half of the issues raised by the EU have been positively solved in a reasonable time, showing the positive impact of increased collaboration between countries on specific issues. At the same time, resolving a single issue does not mean that the solution can automatically be generalised to similar cases.

Indeed, although all developed countries share the same idea in terms of reaching a high level of food safety for consumer protection, the **perception of risk and the standard-setting methods are different**. While, for example, the EU tends to rely more on a precautionary approach such as in the case of Genetically Modified Food, hormones in beef and antibiotics in animal production, other countries like the US employ the principle of scientific evidence. In order to prevent future unnecessary conflicts, the scientific community has a crucial role to play in providing the latest evidence with respect to new agricultural and food technologies. In some cases, an absence of harmonization is justified through assessment of national dietary exposure assessments, especially in cases where nutritional models are very different.

Although the case studies documented progress in harmonization and in removal of trade-constraining practices, they also provide evidence of continued (unnecessary) problems of standards and their implementation for trade with regard to the following issues:

- ***Procedures**:* The case studies on Mexico, Philippines and Brazil were good examples of how STCs by the EU ultimately resulted in changes and enhanced trade. These are cases where bilateral negotiation, reciprocal knowledge and technical support from the EU has helped in the direction of substantial progress. Nevertheless, the checking procedures can be extremely long and burdensome and would need the establishment of clearer rules. In particular, although many issues do not pose particular difficulties in order to be solved, they do require greater efforts in the fields of scientific cooperation, collaboration between risk assessment bodies, harmonization of official controls, improved traceability and improvement in early warning systems for emerging hazards.
- ***MLRs and zero tolerance:*** MRLs sometimes act like unintended trade barriers due to misaligned regulatory systems. This is the case, for example, for the EU and aligned countries that fix the MRL at a default level of 0.01 while the US and aligned countries require zero tolerance. As we saw in chapter 3.2 if we consider the same MRLs for these substances, the number of non-harmonized substances would decrease radically as well as the distance between countries. A cooperative effort in this regard would enhance the degree of harmonization by a great extent, reducing transaction costs for suppliers without jeopardizing food safety.
- ***Regionalization**:* The regionalization principle is not without its shortcomings. After all, it is only applied by 17 out of 20 WTO members and it features in many disputes and STCs both on animal zoonosis and F&V. The lack of implementation of the regionalization principle affects trade in large countries such as the EU and the US when a sanitary problem occurs in such countries but is confined to a specific region. As an example, many countries such as South-Korea restrict trade in EU meat products due to the BSE outbreaks of 1997, not recognizing progress made and the existence of disease-free areas or, such as China, which limits trade in poultry due to avian flu. At the same time, in the countries where the EU is not considered as a single entity, as we have seen in the case study about pig exports to Mexico and fruit and vegetable exports to Brazil, the burden of negotiations with importing countries are placed upon single EU MS whose efforts are proportionate to their economic interests. This explains why only Danish producers can export pig meat to Morocco while Italian and Spanish producers benefit from authorization for F&V while products from France and Germany are largely prohibited.

3.3. FTAs as a lab: insights from the case of GIs

In recent years Regional Trade Agreements have replaced multilateral agreements as the main arena for major trade negotiations, and also as the main area for discussions on potential harmonization of standards. This is particularly important for the EU as the EU has been at the forefront of this evolution with the largest number of FTAs in the world.

The EU, being the world's biggest trading bloc, can expand its regulatory influence through trade agreements. In 2015, the European Commission set out a new trade strategy for the European Union through a Communication known as "*Trade for all*". In the EU vision, FTAs can serve as a laboratory for global trade liberalization that could be joined in the future by other interested countries when they are ready to meet the established level of ambition.

A relevant example in this regard is the **case of treatment of GIs both in the EU agreement with South Korea and in the CETA with Canada** (see section 3.4). They represent two milestones on the inclusion of GIs in specific provisions in international trade agreements and also testify to the growing difficulty of negotiating at the WTO multilateral level. Even though the two agreements are different, in the sense that the level of GIs protection reflects the different positions of South Korea and Canada vis-à-vis GIs, they both represent a step forward towards increased protection of GIs. A key empirical question is to what extent the EU-Canada agreement will represent a way forward in the battle against

imitation and forgery of EU agri-food products. Generally speaking, it is difficult to answer this question with the available information, with a lot depending on the actual implementation of the treaty, particularly on the Canadian side.

Finally, it is important to bear in mind that achieving more protection for EU GIs in bilateral trade, when dealing with countries such as Canada or the US -that traditionally protect goods on a trademark basis - means negotiating additional EU market access concessions in other areas of interest for the third country, within or outside the agri-food sector. This consideration could be important for future negotiations, as benefits and costs of GI protections – as well as on are negotiating issues - are not symmetric between the EU partners.

3.4. Main actions for the future

The report highlighted the fact that, although more than half of the STCs raised found a solution in reasonable time, some issues are very difficult to solve in the areas of plant health, animal health and food safety when there is no agreement on scientific evidence of potential impacts as documented in the cases of citrus black spot, GMOs, hormones in beef or antibiotics use in animal production. This calls for a crucial role of the scientific community in providing the latest evidence with regard to new agricultural and food technologies in order to avoid unnecessary conflicts.

Besides scientific cooperation, greater efforts are required to ensure **collaboration between risk assessment bodies**, harmonization of official controls, improved traceability and improvement in early warning systems for emerging hazards. International bodies are playing an active role in this direction: one example in this report is the case of olive standards and the role of the International Olive Council (IOC). Other instances that involve the EU are the OECD calculator, the OECD seed scheme, the Food Safety Cooperation Forum, the FAO Committee on Commodity problems, the International organization of Vine and Wine (OIV). Examples outside the EU are the APEC Wine Regulatory Forum and the NAFTA Technical Working Group on pesticides that addresses pesticides issues arising in the context of trade liberalization mong the NAFTA countries.

Modernization of the Codex is also needed through harmonization in methodologies and data. In principle MRLs of pesticide residues seem a good example where harmonization should be desirable and possible since the toxicity of a substance is universal. Yet, at the same time the legitimate heterogeneity is the cause of hurdles which less privileged countries have to face. Muaz (2005) cited **six hurdles which LDCs face to meet SPS requirements**: (i) the serious lack of knowledge about SPS requirements and regulations, (ii) the absence of quality control laboratories in the region to monitor hazards, mainly chemical residues, (iii) the high cost of infrastructure needed to meet SPS conditions, (iv) the absence of modern packing and grading facilities, (v) the lack of inspections to control domestic production and of qualified workers, (vi) the non-existence of responsible local legal bodies.

The renewed role of the Codex could be to incentivize developed countries to help stakeholders of the supply chain in developing countries to implement the necessary changes in order to meet their client requirements. The EU can surely play a leading role at the political and technical level, by contributing to increasing the **institutional capacity in developing countries** with regard to standard setting and compliance. An example is the establishment of the Produce Safety Network (PSN) in the US; this was built to support the efforts of farmers, state regulators, and other key stakeholders, to implement the 2018 Produce Safety Rule as a part of the USFDA Food Safety Modernization Act (FSMA) (Faour-Klingbeil & Todd; 2018).

There is also a role for **EU Member States to increase cooperation among themselves**. As an example, when Italy or Spain succeed in negotiating access for their fresh fruits or vegetables into Brazil, it should serve as a basis for negotiation (or even create a precedent) for other Member States.

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ANNEX I

Similarity Indicators

Given the widespread diffusion of standards worldwide, and in particular in developed countries, classical indicators used in the literature to measure the sectoral coverage of standards become problematic. This is because often every tariff line product often has many NTM standards in place. To overcome this measurability issue and in order to obtain a measure taking account also of the number of NTMs by sector, Gourdon et al. (2014) proposed to compute a prevalence score using the following approach:

$$N_i = \frac{\sum_{j \in i} N_j * IMP_j}{IMP_i}$$

where *i* is the specific HS 4-digit sector whose prevalence score we want to compute, and the subsectors *j* are, in our case, the HS-6 sectors associated with the HS industry *i*. N_j is the number of NTMs covering HS-6 product *j*, and IMP is the value of general imports from all the partners in the world to the country in question (e.g. the EU or US). The majority of products subject to more than one regulatory measure, the score N_i gives the average number of *NTMs* affecting imports in sector *i*.

The simplest way to take into account sanitary, phytosanitary and technical requirements is just considering the presence/non-presence of standards.

Simple quantitative measures found in the literature are the "coverage" and "frequency" ratios (de Frahan and Vancauteren, 2006; Disdier et al., 2008; Fontagné et al., 2005 and Moenius, 2004) or their ad valorem equivalent (Carrere & De Melo, 2009; WTO, 2012). Another method consists in evaluating the level of stringency of standards and regulations by the scale addressed by the issue concerned in the regulation (Otsuki et al, 2001a; Otsuki et al, 2001b). In this case regulations and requirements provide numerical elements that can be ranked.

More sophisticated indicators have been elaborated in the literature with the objective of obtaining more precise measures of the level of similarity of regulations potentially affecting trade.

A first example of similarity indicators is that of Achterbosch et al. (2009) which used an index of regulatory heterogeneity to analyse the impact of differences in MRL standards on the fresh fruit trade between Chile and the European Union. Vigani et al. (2011) used two different indicators to test the differences or the dissimilarity in GMO regulations, the first one is the absolute deviation of the GMO index across country pairs, a bilateral measure; the second refers to the Jaffe indicator (1986) known as similarity measure.

$$GMOw_{ij} = \left(\frac{\sum_{m=1}^{M} f_{im} \, f_{jm}}{\left(\sum_{m=1}^{M} f_{im}^2\right)^{1/2} \left(\sum_{m=1}^{M} f_{jm}^2\right)^{1/2}} \right)$$

where f_{im} and f_{jm} are the ratios between the regulatory component score attributed to country *i* and *j* on the highest score assigned to the component m. It ranges between 0 indicating completely different regulations and 1 indicating identical regulation.

Winchester et al. (2012) also used the heterogeneity index of MRL standards for their study of the agricultural food trade between the European Union and nine other countries. They found that imposing stricter MRL standards could reduce the trade volume. However, this index falls short of capturing the differences in MRL standards if their levels are similar but number is different.

$$H_j = \sum_{i=1}^{N} \frac{|x_i - x_{ij}|}{m\ x_i - m\ x_i}$$

where x_i is the observation on requirement *i* and max(x_i) and min(x_i) are, respectively, the maximum and minimum value for requirement *i* across all countries considered. The HIT is calculated on a bilateral basis by comparing import requirements for each trading pair.

Drogue and DeMaria (2012) used a Pearson's coefficient correlation index to capture the difference of MRL standards for apples and the distance between countries. This index is computed as follows:

$$SIM_{ij}^{k} = 1Z\left(\frac{1}{n}\ \ {}_{p=1}^{n}\left(\frac{x_{ip}^{k}\ Z\bar{x}_i^{k}}{\pm_i^{k}}\right)\left(\frac{x_{jp}^{k}\ Z\bar{x}_j^{k}}{\pm_j^{k}}\right)\right)$$

where *n* is the total number of pesticides registered, x_{ii}^{k} is the MRL of the exporting country *i* for pesticide *p* and product *k*, $\bar{x}_i^{k}$is the sample mean for country i and product k $\sigma_i^{k}$and σ_j^{k} are the sample standard deviations for product k in country *i* and *j* respectively.

Li and Beghin (2012) proposed an index to measure the stringency of a country in terms of MRLs for a given product where the reference term is the codex, the higher the score the more stringent the regulation.

$$S_{ii} = \frac{1}{K_{(i)}}\left(\sum_{k(j)=1}^{K(j)} \frac{M_{C\ \ ,jl\,(j)} - M_{ii\ (j)}}{M_{C\ \ ,jl\,(j)}}\right)$$

where $M_{ii\ (j)}$ is the MRL adopted by country j for product k and targeting pesticide n(k), $M_{C\ \ ,jl\,(j)}$ is the MRL set by the codex. This score is different from that of Winchester et al (2012) in that the score measure the discrepancy between domestic regulation and Codex as opposed to the difference in MRL between trading partners. Following Li and Beghin, DeMaria and Drogue (2017) compare the regulation in the baby food sector between EU and its main trading partners. The severity index is computed as follows:

$$\text{severity}_{E\ -R(}^{k} = \frac{1}{N}\left(\sum_{p=1}^{N} I\left(M_{E}^{k} < M_{R(}^{k}\right) \square \exp\left(\frac{MRL_{R(}^{k} - MRL_{E}^{k}}{MRL_{M}^{k}}\right)\right)$$

Another method to measure the stringency of a regulation is that proposed by Ferro et al (2015) in which the restrictiveness of the regulation is captured as follows:

$$rest_{ii} = \frac{1}{N_a} \sum_{n(a)=1}^{N(a)} \frac{max_i\{MRL_{ia}\} - MRL_{ia}}{max_i\{MRL_{ia}\} - min_i\{MRL_{ia}\}}$$

where $max_i\{MRL_{ia}\}$ is the maximum MRL for product p, pesticide a, and year t across all importing countries and $min_i\{MRL_{ia}\}$ is the minimum MRL for product p, pesticide a, and year t across all importing countries and MRL_{ia} is country i's MRL for pesticide a, for product p in year t. This index will be between zero and one, zero being the least restrictive and one the most restrictive. This index includes all pesticides regulated in the world for that specific product and this contrasting with Li and Beghin (2012) who analyse only those product-pesticide pairs regulated by Codex.

Another indicator used to approximate the relative complexity of phytosanitary requirements is that of DeMaria et al. (2017) used to examine markets for fresh apples.

$$PS_{ij} = \frac{1}{N}\left[\sum_{t=1}^{N} \exp\left(\frac{Phyto_{ij} - minPhyto_N}{maxPhyto_N - minPhyto_N}\right)\right]$$

where *i* denotes the exporting country and *j* importing country, $Phyto_{ij}$ is the grade of the requirement imposed by country *j* to country i in the dimension N; $maxPhyto_N$ is the highest grade in the dimension N; $Phyto_{ij}$ is the grade of the requirement imposed by country j in exporting dimension N; $minPhyto_N$ is the lowest grade in the dimension N. This indicator ranges between 1 which indicates the absence of any specific requirements and $e \approx 2.72$ which corresponds to the case of a ban.

Indexes for the quantification of NTMs

The quantification of NTM and the assessment of their effects are often entangled (Beghin and Xiong, 2016).

The WTO tracks all NTMs notified by Member's States. The most common ways used to measure metrics based on NTM notifications are the frequency index and the coverage ratio. The first measure the percentage of imports subject to one or more notification, the second the percentage of trade values subject to NTMs. These two measures provide an overview of the pervasiveness and frequency of NTMs in importing countries. However, as reported by UNCTAD data (http://unctad.org/en/Pages/DITC/Trade-Analysis/Non-Tariff-Measures.aspx) US (EU) frequency index and coverage ratio present average values of 62% and 75% (94% and 92%) respectively, that become 100% if we measure only the agricultural sector.

Thus, to measure the US-EU SPS similarity, in the specific field of meat and dairy sectors, we cannot use these typical measures, because every tariff line product has many SPSs in place. Moreover, a product could be subject to a sanitary standard through a single measure as well as different groups of SPS measures. The use of a single dummy that states the presence/absence of the SPS measure reduces the relevance dimension of the measure, as the greater the number of SPSs applied to the same product, the more regulated the commerce of that product is, especially if measures are from different kind of SPSs.

Thus, to overcome this measurability issue and in order to obtain a measure taking account of the number of SPSs by sector, we follow the Gourdon (2014) approach by measuring the prevalence of SPSs, P_SPS. The index measures the average number of SPSs (N), affecting an imported product M:

$$P\_S_i = \frac{\sum_{j \in i} N_j \cdot M_j}{\sum_{j \in i} M_j} \quad (1)$$

where M is a dummy equal to 1 if there are imports of good j.

To weight the average number of SPSs on the relevance of product imports, we build a second index derived from the previous prevalence score, where the value of imported products is used to weight the number of SPS present at HS 6-digit level. Thus, the (import-weighted) prevalence score becomes:

$$I\_S_i = \frac{\sum_{j \in i} N_j \cdot IMP_j}{IMP_i} \quad (2)$$

where i is the specific sector whose prevalence score we want to compute (at HS-2 digit or HS-4 digit), and the subsectors j are, in our case, the HS-6 sectors associated with the HS industry i. N_j N_j is the number of SPSs covering HS-6 product j, and IMP is the value of imports from all the partners in the world to the country in question (e.g. the EU or US). Being the majority of products being subject to more than one regulatory measure, the score S_i SPS_i gives the (weighted) average number of SPSs affecting imports in sector i. One drawback of this index arises from the possible endogeneity of the weights, as volume of the imports can depend on NTMs. The use of trade values of past periods softens the endogeneity problem.

Finally, in order to measure the SPS similarity/reciprocity between the US and EU we calculate another prevalence index, the IP_SPS2, by using the bilateral trade between the US and EU instead of country world imports.

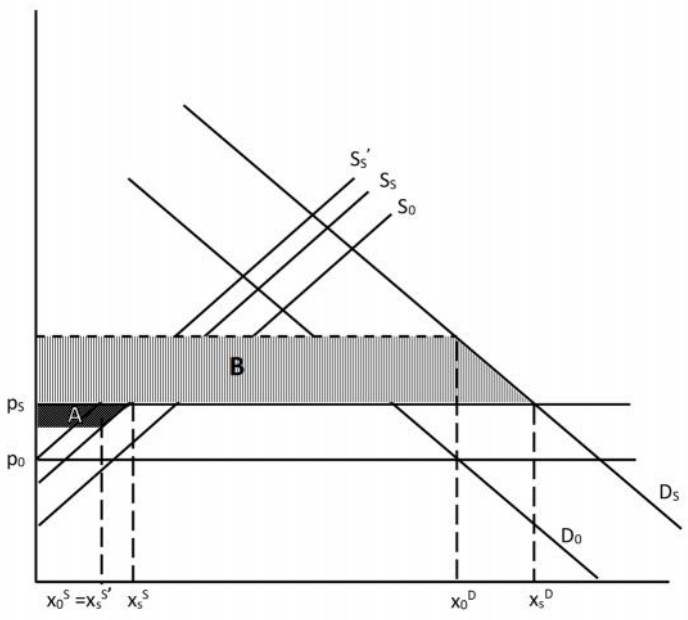
ANNEX II

Trade effects of standards

In the context of a small, open economy, the introduction of a standard causes a shift of the domestic supply curve from S_0 to S_S and of domestic demand from D_0 to D_S. The import price increases from P_0 to P_S, where the difference is caused by the implementation costs of the standard for foreign producers. The (vertical) difference between P_0 and P_S is larger than between S_0 and S_S, representing the case that the implementation costs for domestic producers are smaller than for foreign producers. Domestic consumption increases from x_0^D to x_S^D and domestic production increases from x_0^S to x_S^S. The benefits of the standard for domestic producers are represented by area A. The benefits for domestic consumers are represented by area B.

While consumers and producers benefit, imports also increase: from $x_0^D - x_0^S$ to $x_S^D - x_S^S$. Hence in this case the standard and the associated consumption increase lead to both an increase in domestic production and an increase in imports. Hence this standard is a "catalyst" for trade, despite the fact that domestic producers benefit. The catalyst-effect of the standard would be even larger when the implementation costs would be identical for domestic and foreign consumers. In this case the domestic supply function would shift from S_0 to S_S' and domestic production would remain at $x_0^S = x_S^{S'}$. Imports would increase from $x_0^D - x_0^S$ to $x_S^D - x_0^S$.

Figure - 1: Efficiency, Equity and Trade Effects of Standards in a Small Open Economy



Source: Swinnen 2016

The trade impact of standards is not only conceptually complex; it is also difficult to measure empirically. Within the empirical strand of the literature on standards and trade, Beghin et al (2015) distinguish between two broad fields in terms of methodology: one using so-called gravity models to study the impact of the divergence of regulation between different regions or countries and one using more micro-level approaches.

The **gravity equation approach** has been used extensively and successfully to explain bilateral trade between two countries. Trade is assumed to be proportional to economic activity (GDP, or the output of exporting industry), decreasing in trade costs between the two countries (transport/distance, linguistic and cultural, taxes, red tape, other). Trade costs comprise distance, remoteness, barriers, and other transaction costs with varying degrees of sophistication (Feenstra 2004).

However, the results of the gravity estimations should be interpreted with care. In general, the gravity literature on the impact of NTMs shows mixed evidence depending on the direction of trade flows, the type of industries, the nature of standards, and the methodology used in the analysis (for an excellent overview see the meta-analysis conducted by Li & Beghin 2012). Some authors find that standards are a significant source of trade restrictiveness for middle- and low-income countries (e.g., Anders & Caswell 2009, Bao & Qiu 2012, Disdier & Marette 2010, Hoekman & Nicita 2011, Jongwanich 2009, Otsuki et al. 2001, Tran et al. 2012). Whereas others indicate that standards or their harmonization either have no impact on developing country exports (Czubala et al. 2009, Demaria & Drogue 2017, Fontagné et al. 2005, Xiong & Beghin 2012) or are trade expanding (Chevassus-Lozza et al. 2008, Henry de Frahan & Vancauteren 2006).

The type of NTM policy instrument that is evaluated matters as well. Heterogeneity in GMO regulations also seems to matter in maximum residue level (MRL) regulations on pesticides (Vigani et al. 2012). Heterogeneity in other food safety NTMs does not impact trade in the analysis of Winchester et al. (2012). Consistent with these mixed findings, Melo et al. (2014) and Shepherd and Wilson (2013) conclude that the direction and magnitude of effects on trade are sector-specific and specific for different standards. Mixed effects even tend to occur over time: Song and Chen (2010) show that China's agricultural exports were impacted negatively by foreign standards in the short run, but that these were ultimately beneficial for trade in the long run. With respect specifically to the harmonization of standards, Curzi et al. (2018) find that the lack of harmonization has important consequences for trade; they demonstrate that EU standards, which are found to be the most stringent in the world, negatively affect imports from developing countries and benefit EU exports, regardless of the level of development and the standards set by its trading partners.

Gravity equations have obvious drawbacks. First, gravity equation techniques estimate the trade effect of trade costs including NTMs, not their welfare impact. This approach ignores potential external effects or market imperfections and thus ignores potential welfare improvements brought by regulations that internalize negative externalities but restrict trade. Hence, the impact of NTMs on trade flows is not informative as to the impact of NTMs on domestic or international welfare in the presence of external effects (Baldwin 2000, Disdier & Marette 2010).

Second, the direction of the effect of the NTM variable on trade flows is constrained to be impeding in many gravity estimations. For example, Kee et al. (2009) econometrically estimate the trade impacts of various NTMs, including TBTs, for a large number of sectors and countries. Then they recover the ad valorem tax equivalent (AVE) of these NTMs by using the corresponding own price elasticities of import demand estimated in Kee et al. (2008). However, despite this sophisticated approach, this econometric estimation constrains the NTMs to be trade reducing, and not a trade facilitation device that could enhance excess demand. Beghin et al. (2015) use the same data set to estimate unconstrained AVEs of the TBT component of the data set. They find that 39% of the product lines affected by TBT-like NTMs exhibit negative AVEs, equivalent to a net-trade expansion induced by these measures.

Third, careful measurement of the effects of NTMs requires decomposing trade cost (the price wedge between export source and import destination) into components of transportation cost, taxes, tariffs, NTMs, and other transaction costs such as language barriers. Earlier investigations (e.g., Otsuki et al. 2001 on aflatoxin MRLs) did not include tariffs but used fixed effects to account for them. As tariffs have

been changing over time, this is not the best solution. This approach has prevailed in many gravity papers, unfortunately. Tariff data are now widely available. Improvements in measurement of distance and cost of transportation have recently occurred in gravity equation estimation, and these more recent investigations can better identify the NTM component of trade cost relative to the impact of transportation cost or other trade costs in domestic markets (Hoekman & Nicita 2011). Future research should decompose the export supply and import demand effect of the standards, rather than focusing only on net trade. Such an approach is better suited for welfare analysis (Xiong & Beghin 2014).

Fourth, many gravity equation–based analyses of NTMs cover multiple commodities/sectors, countries, and NTM regulations. Such approach provides a gross assessment and can address general hypotheses such as the effect of these NTMs or their harmonization on net bilateral trade. The number of observations required for econometric estimation often limits the ability to look at specific cases (a policy affecting a commodity). Pooling commodities, countries, and policies greatly facilitates the minimum data requirements for econometrics, but what is gained in generality and degree of freedom gets lost in the lack of relevant policy prescriptions. In a few cases, the gravity equation has been used to look at specific policy issues such as aflatoxin, the GMO policy, and antibiotic residues in the EU context (Disdier & Marette 2010, Otsuki et al. 2001, Vigani et al. 2012, Xiong & Beghin 2012).

Finally, the final-demand approach underlying most gravity specifications is questionable for intermediate demand, especially in agricultural markets. Agricultural goods are often the first input in a long value-added chain toward a final good. Some recent NTM investigations attempt to capture the intermediate nature of trade in agricultural goods like seeds or animal products (Ghazalian et al. 2012, Jayasinghe et al. 2010).

Another approach is to use **micro-econometric data and analysis**. Studies that follow this approach use firm-level data. Econometric methods are used to analyse how an increase in or an adoption of standards influences the export performance and productivity of individual companies. The use of micro firm-level data to analyse the trade implications of standards is in line with the emphasis in the recent literature on firm heterogeneity in explaining international trade (Helpman et al. 2008, Melitz 2003). For example, Chen et al. (2008) find, using the World Bank TBT survey database, that public quality standards in destination markets are positively correlated with the average export volume and with the export scope of firms in developing countries.

ANNEX III

SPS in US and EU: meat and dairy sectors

With regard to **meat products**, as previously observed, the average number of SPS measures active at 6-digit level is very similar in the two countries. Using the prevalence score index (P_SPS) described above and aggregated at HS 2-digit, the EU shows 39 and the US 38 SPS measures active, on average, for each product of the meat chapter 2 (see Table 1). The import-weighted measurement of the prevalence score index (IP_SPS), obtained using the world imports of the country, reports an higher number of SPS measure active in the EU than in the US (46 vs 31). Differently, weighting the prevalence score index with the bilateral import between countries, instead of the country world import, the IP_SPS2 shows some relevant odds. The IP_SPS2 index in the EU meat sector passes from 46 to 14, while in the US it increases from 31 to 43, reversing the country's importance in SPSs.

Table 1: Number of SPS measures active on US and EU in the meat sector (year 2014)

	EU					US				
	SPS	%	P_SPS	IP_SPS	IP_SPS2	SPS	%	P_SPS	IP_SPS	IP_SPS2
02.01 Meat of bovine animals, fresh or chilled	60	2.33	20	10	11	98	3.94	33	29	32
02.02 Meat of bovine animals, frozen	80	3.10	27	30	30	94	3.78	31	31	31
02.03 Meat of swine, fresh, chilled or frozen	220	8.53	37	59	59	208	8.35	35	33	49
02.04 Meat of sheep or goats, fresh, chilled or frozen	270	10.47	30	32	-	306	12.29	34	32	31
02.05 Meat of horses, asses, mules or hinnies, fresh, chilled or frozen	20	0.78	20	20	20	38	1.53	38	38	38
02.06 Edible offal of bovine animals, swine, sheep, goats, horses, asses, mules or hinnies, fresh, chilled or frozen	158	6.13	18	22	27	339	13.61	38	35	34
02.07 Meat and edible offal, of the poultry of heading 0105, fresh, chilled or frozen	1210	46.94	64	97	66	805	32.33	42	38	39
02.08 Other meat and edible meat offal, fresh, chilled or frozen	130	5.04	22	44	50	233	9.36	39	36	36
02.09 Pig fat, free of lean meat, and poultry fat, not rendered or otherwise extracted, fresh, chilled, frozen, salted, in brine, dried or smoked	40	1.55	20	30	26	73	2.93	37	31	29
02.10 Meat and edible meat offal, salted, in brine, dried or smoked; edible flours and meals of meat or meat offal	390	15.13	49	123	100	296	11.89	37	30	31
02 CHAPTER 2 - MEAT AND EDIBLE MEAT OFFAL	2,578		39	46	14	2,490		38	31	43

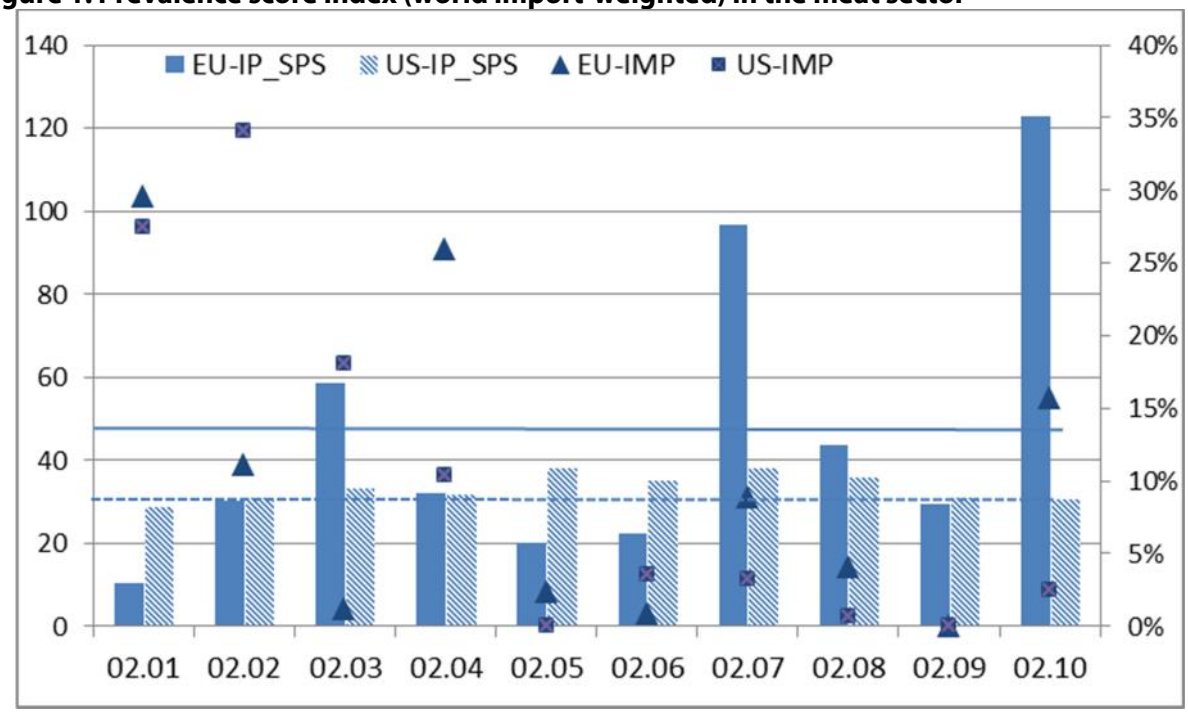
Sources: Authors' elaboration using WITS -UNCTAD database. Notes: P_SPS refers to the average number of SPSs, IP_SPS refers to the average number of SPSs weighted over the world imports of the country; IP_SPS2 refers to the average number of SPSs weighted over the EU/US imports.

In the EU meat chapter, the P_SPS index shows variability among the 4-digit sectors, ranging from the minimum of 18 measures in the edible offal sector (HS 0206) to the maximum of 64 measures in poultry (HS 0207). By contrast, in the US the P_SPS index is much more constant among sectors, mostly close to the 2-digit average.

The import-weighted index IP_SPS, measured at HS 4-digit level, shows an increase in variability among product groups, evident especially in the EU. Figure 3 summarises this variability and highlights the level of (dis)similarity existing between EU and US in the amount of SPS measures active inside the sector. In the Figure each bar shows the IP_SPS of the country at the 4-digit, while the horizontal lines (continuous for EU and dashed for US) draw the average level of IP_SPS measured at HS 2-digit level. Finally, the two symbols (triangle and square) show the HS 4-digit world import share inside the HS 2-digit sector of the two countries. From the figure it emerges that inside the swine (0203) and poultry

meat (0207), as well as the 'processed' meat (0210), the SPS measure active on the EU are from two to three times larger than in the US. By contrast, the US IP_SPS index is almost three time higher than that of the EU for bovine meat products (HS 0201).[72]

Figure 1: Prevalence score index (world import-weighted) in the meat sector

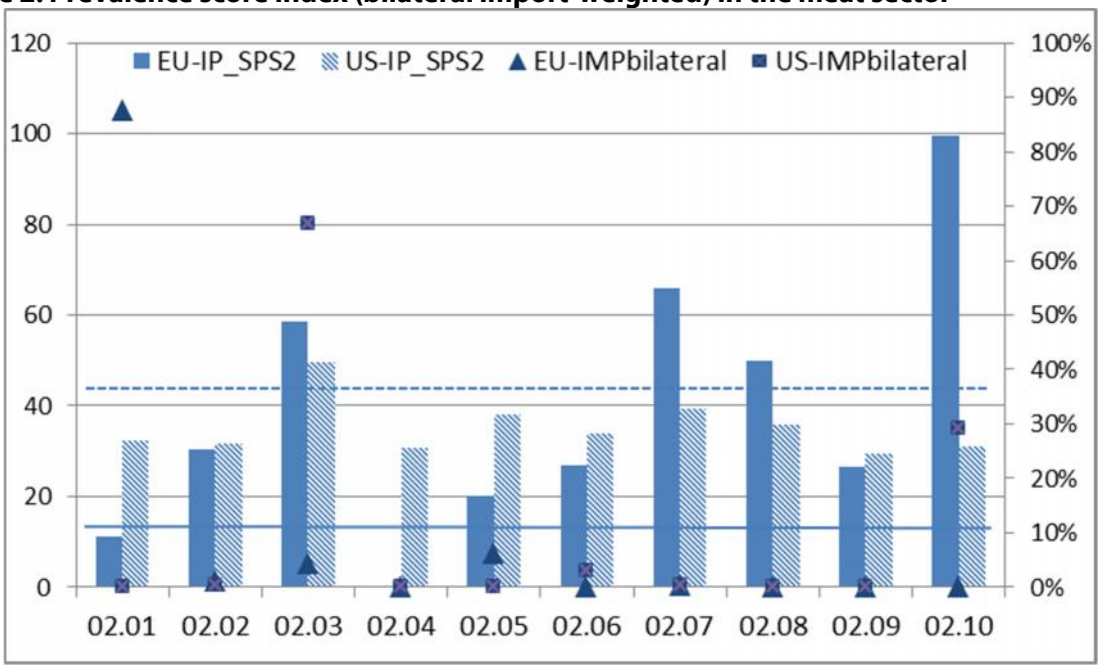


Sources: Authors' elaboration using WITS -UNCTAD database (year 2014).
Notes: the horizontal lines (continuous for EU and dashed for US) draw the average level of IP_SPS measured at HS 2-digit level (left vertical axis). The two symbols, triangle and square, show the HS 4-digit world import share inside the HS 2-digit sector of the two countries (right vertical axis).

By weighting the prevalence score index with the bilateral import between countries, small differences appear between the two indexes measured at 4-digit level, although considerable differences and (dis)similarity emerged at a more aggregated sector level (see Table 1 and Figure 3). The small variation observed between IP_SPS and IP_SPS2 at 4-digit level tells us that, albeit with differences in values, the 6-digit imports share inside the 4-digit group is almost the same when measured using world import or bilateral imports. Thus, when aggregated at 4-digit, the level of (dis)similarity measured with the two indexes does not change. By contrast, the strong variation of indexes observed at 2-digit level highlights the presence of a group of products with a small number of SPSs that is strongly relevant in imports from the US. In the EU, this group is that of bovine meat (HS 0201), with an average number of 20measures (P_SPS) of and an import share that reaches 88% of total meat imports from the US.

[72] Note that the HS-0201 group of product represents the 30% of meat imports in both countries.

Figure 2: Prevalence score index (bilateral import-weighted) in the meat sector



Sources: Authors' elaboration using WITS -UNCTAD database (year 2014).
Notes: the horizontal lines (continuous for EU and dashed for US) draw the average level of IP_SPS measured at HS 2-digit level (left vertical axis). The two symbols, triangle and square, show the HS 4-digit world import share inside the HS 2-digit sector of the two countries (right vertical axis).

The **dairy sector** shows much differences in SPSs between EU and US, but only by considering the weighted indexes. Indeed, the P_SPS index, with average number of SPS equal 53 and 58 in EU and US respectively, presents similarity in SPS between the two countries. By contrast, by weighting the index on trade strong differences emerge. The IP_SPS index becomes 144 for the EU and 94 for the US (see Table 2), with evident dissimilarity between countries, as the (weighted) average number of SPSs active results to be 50% higher in the EU than in the US.

Table 2: Number of SPS measures active on US and EU in the dairy sector (year 2014

	EU					US				
	SPS	%	P_SPS	IP_SPS	IP_SPS2	SPS	%	P_SPS	IP_SPS	IP_SPS2
04.01 Milk and cream, not concentrated nor containing added sugar or other sweetening matter	140	8.23	35	48	29	169	9.16	42	45	46
04.02 Milk and cream, concentrated or containing added sugar or other sweetening matter	240	14.10	48	42	42	310	16.81	62	62	65
04.03 Buttermilk, curdled milk and cream, yogurt, kephir and other fermented or acidified milk and cream, whether or not concentrated or containing added sugar or other sweetening matter or flavoured or containing added fruit, nuts or cocoa	300	17.63	150	128	121	92	4.99	46	46	46
04.04 Whey, whether or not concentrated or containing added sugar or other sweetening matter; products consisting of natural milk constituents, whether or not containing added sugar or other sweetening matter, not elsewhere specified or included	300	17.63	150	237	238	65	3.52	33	31	33
04.05 Butter and other fats and oils derived from milk; dairy spreads	100	5.88	33	41	41	105	5.69	35	34	35
04.06 Cheese and curd	440	25.85	88	298	307	655	35.52	131	147	146
04.07 Birds' eggs, in shell, fresh, preserved or cooked	84	4.94	17	12	9	208	11.28	42	42	33
04.08 Birds' eggs, not in shell, and egg yolks, fresh, dried, cooked by steaming or by boiling in water, moulded, frozen or otherwise preserved, whether or not containing added sugar or other sweetening matter	78	4.58	20	18	19	169	9.16	42	38	43
04.09 Natural honey	10	0.59	10	10	10	34	1.84	34	34	34
04.10 Edible products of animal origin, not elsewhere specified or included	10	0.59	10	10	10	37	2.01	37	37	37
04 CHAPTER 4 - DAIRY PRODUCE; BIRDS' EGGS; NATURAL HONEY; EDIBLE PRODUCTS OF ANIMAL ORIGIN, NOT ELSEWHERE SPECIFIED OR INCLUDED	1,702		53	144	80	1,844		58	94	137

Sources: Authors' elaboration using WITS-UNCTAD database. Notes: P_SPS refers to the average number of SPSs, IP_SPS refers to the average number of SPSs weighted over the world imports of the country; IP_SPS2 refers to the average number of SPSs weighted over the EU/US imports.

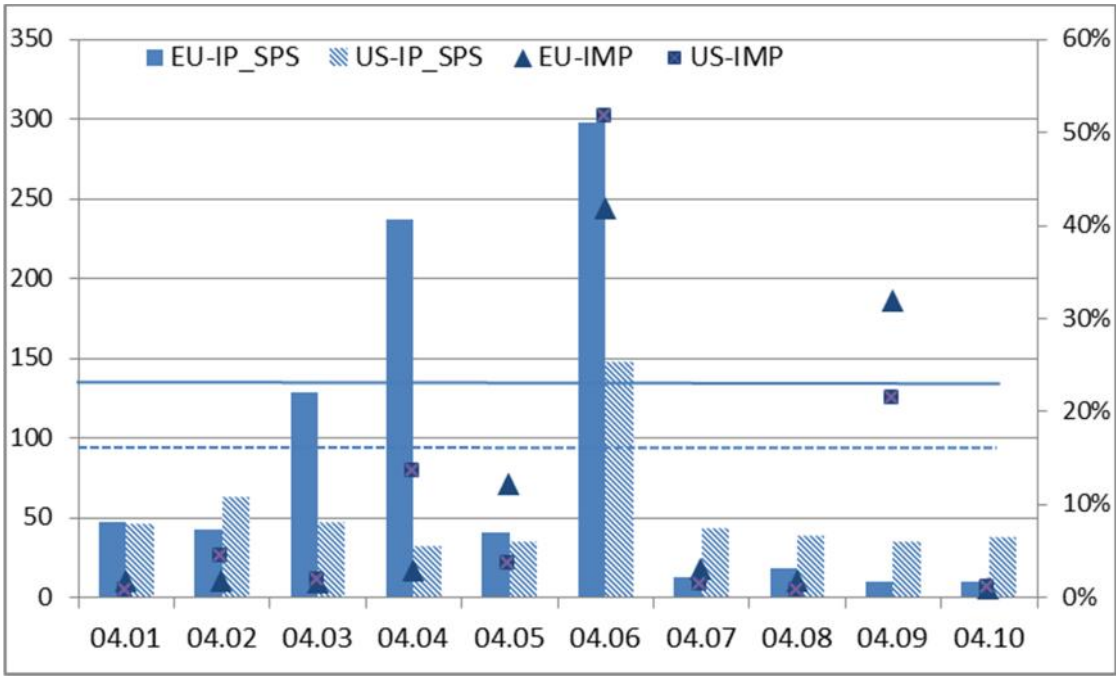
By contrast, the SPS index weighted over the bilateral imports (IP_SPS2) describes different (dis)similarities between EU and US, resulting in a (weighted) prevalence ratio now larger in the US than in the EU.

In the EU, three groups of products report an average number of SPSs higher than the average P_SPS index measured at HS 2-digit level (see **Table 2**). In particular, two of these have an average index that is three times the sector average (buttermilk, cream, yogurt - HS 0403; whey and other products consisting of natural milk constituents -HS 0404) while the third, cheese and curd - HS 0406, results to be 1.6 times larger.

Differently, the US concentrate the 35% of dairy's SPSs on the only 'cheese and curd' group of products (HS 0406). These products show the highest average number of SPSs active, and the only P_SPS index above the HS 2-digit average value. The dissimilarities existing between EU and US, measured using the prevalence score P_SPS, are mainly concentrated into those three groups, showing the highest use of SPSs in dairy intermediate products (HS 0403 and 0404) in the EU, and the highest for cheese and curd (HS 0406) in the US.

Figure 3 summarizes the average indexes weighted over the country world imports. Measured with the IP_SPS index, the differences existing between EU and US remain mainly related to the three previous groups of products, but now the EU is always above the US correspondent number of SPSs. Specifically, in the HS0206 group this new results is driven by the large number of measures active inside the 'other cheese' product - HS 040690 (330 in the EU, 151 in the US). The imports of 'other cheese' weight the 90% of the 'cheese and curd' group in both EU and US. Moreover, the cheese imports (0406) constitute between the 40% and the 50% of dairy world imports in EU and US. This fact explains value of the IP_SPS larger than P_SPS measured at 2-digit level.

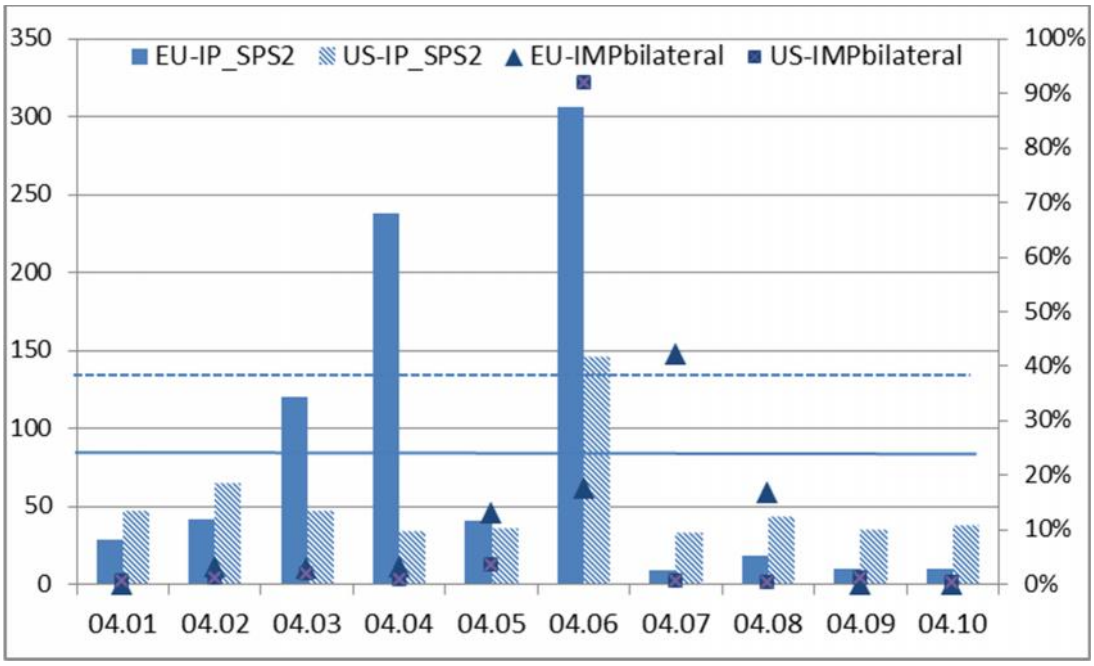
Figure 3: Prevalence score index (world import weighted) in the dairy sector



Sources: Authors' elaboration using WITS -UNCTAD database (year 2014).
Notes: the horizontal lines (continuous for EU and dashed for US) draw the average level of IP_SPS measured at HS 2-digit level (left vertical axis). The two symbols, triangle and square, show the HS 4-digit world import share inside the HS 2-digit sector of the two countries (right vertical axis).

The IP_SPS2 index is reported on **Table 2** and summarized in **Figure 4** to highlight the (dis)similarity in SPSs between EU and US. The differences between the two countries-index analysed at the 4-digit level are almost the same using the two weighted index. By contrast, the import relevance of product coming from the EU/US changes the average prevalence score also on the dairy sector. Specifically, as US imports of 'other cheese' (040690) are over the 80% of total dairy imports from the EU, while EU imports from the US mainly products with low number of SPSs (e.g. birds' eggs in shell: 40% of imports, and 17 of P_SPS) the resulting IP_SPS2 in the HS04 dairy sector is higher in the US than in EU.

Figure 4: Prevalence score index (bilateral import weighted) in the dairy sector



Sources: Authors' elaboration using WITS -UNCTAD database (year 2014).
Notes: the horizontal lines (continuous for EU and dashed for US) draw the average level of IP_SPS measured at HS 2-digit level (left vertical axis). The two symbols, triangle and square, show the HS 4-digit world import share inside the HS 2-digit sector of the two countries (right vertical axis).

ANNEX IV

Table 1: : Philippines' imports requirements by products (F&V)

Product	By Importer (for products for which the rules depend on who the importer is)	By Purpose (for products for which the rules depend on the purpose of the import)	Regulating Agency	Permit(s) required from Regulating Agency	Link to information on Permits from Regulating Agency
Food			Food and Drug Administration	Valid License to Operate as Food Importer and Valid Certificate of Product Registration	Regulated Imports 2015 04 06 Supporting Documents\Food and Drugs Administration (Dept. of Health)\Summary Sheet\FDA Summary Worksheet.xlsx
Fruits- Dried, with additional ingredients			Food and Drug Administration	Valid License to Operate as Food Importer and Valid Certificate of Product Registration	Regulated Imports 2015 04 06 Supporting Documents\Food and Drugs Administration (Dept. of Health)\Summary Sheet\FDA Summary Worksheet.xlsx
Fruits- Dried, without additional ingredients			Bureau of Plant Industry	Sanitary and Phytosanitary (SPS) Import Clearance	Regulated Imports 2015 04 06 Supporting Documents\Bureau of Plant Industry (Dept. of Agriculture)\Summary Sheet\BPI Summary Worksheet.xlsx
Fruits- Fresh			Bureau of Plant Industry	Sanitary and Phytosanitary (SPS) Import Clearance	Regulated Imports 2015 04 06 Supporting Documents\Bureau of Plant Industry (Dept. of Agriculture)\Summary Sheet\BPI Summary Worksheet.xlsx
Fruits- Frozen, with additional ingredients			Food and Drug Administration	Valid License to Operate as Food Importer and Valid Certificate of Product Registration	Regulated Imports 2015 04 06 Supporting Documents\Food and Drugs Administration (Dept. of Health)\Summary Sheet\FDA Summary Worksheet.xlsx

Fruits-Frozen, without additional ingredients			Bureau of Plant Industry	Sanitary and Phytosanitary (SPS) Import Clearance	Regulated Imports 2015 04 06 Supporting Documents\Bureau of Plant Industry (Dept. of Agriculture)\Summary Sheet\BPI Summary Worksheet.xlsx
Fruits-Processed Products			Food and Drug Administration	Valid License to Operate as Food Importer and Valid Certificate of Product Registration	Regulated Imports 2015 04 06 Supporting Documents\Food and Drugs Administration (Dept. of Health)\Summary Sheet\FDA Summary Worksheet.xlsx
Processed Fruits			Food and Drug Administration	Valid License to Operate as Food Importer and Valid Certificate of Product Registration	Regulated Imports 2015 04 06 Supporting Documents\Food and Drugs Administration (Dept. of Health)\Summary Sheet\FDA Summary Worksheet.xlsx
Processed Vegetables			Food and Drug Administration	Valid License to Operate as Food Importer and Valid Certificate of Product Registration	Regulated Imports 2015 04 06 Supporting Documents\Food and Drugs Administration (Dept. of Health)\Summary Sheet\FDA Summary Worksheet.xlsx
Vegetables-Dried, with additional ingredients			Food and Drug Administration	Valid License to Operate as Food Importer and Valid Certificate of Product Registration	Regulated Imports 2015 04 06 Supporting Documents\Food and Drugs Administration (Dept. of Health)\Summary Sheet\FDA Summary Worksheet.xlsx
Vegetables-Dried, without additional ingredients			Bureau of Plant Industry	Sanitary and Phytosanitary (SPS) Import Clearance	Regulated Imports 2015 04 06 Supporting Documents\Bureau of Plant Industry (Dept. of Agriculture)\Summary Sheet\BPI Summary Worksheet.xlsx
Vegetables-Fresh			Bureau of Plant Industry	Sanitary and Phytosanitary (SPS) Import Clearance	Regulated Imports 2015 04 06 Supporting Documents\Bureau of Plant Industry (Dept. of Agriculture)\Summary

					Sheet\BPI Summary Worksheet.xlsx
Vegetables-Frozen, with additional ingredients			Food and Drug Administration	Valid License to Operate as Food Importer and Valid Certificate of Product Registration	Regulated Imports 2015 04 06 Supporting Documents\Food and Drugs Administration (Dept. of Health)\Summary Sheet\FDA Summary Worksheet.xlsx
Vegetables-Frozen, without additional ingredients			Bureau of Plant Industry	Sanitary and Phytosanitary (SPS) Import Clearance	Regulated Imports 2015 04 06 Supporting Documents\Bureau of Plant Industry (Dept. of Agriculture)\Summary Sheet\BPI Summary Worksheet.xlsx
Vegetables-Processed Products			Food and Drug Administration	Valid License to Operate as Food Importer and Valid Certificate of Product Registration	Regulated Imports 2015 04 06 Supporting Documents\Food and Drugs Administration (Dept. of Health)\Summary Sheet\FDA Summary Worksheet.xlsx

Note: All food requires an import permit. If the specific type of food is not found in this list, the importer should comply with the requirements of FDA.

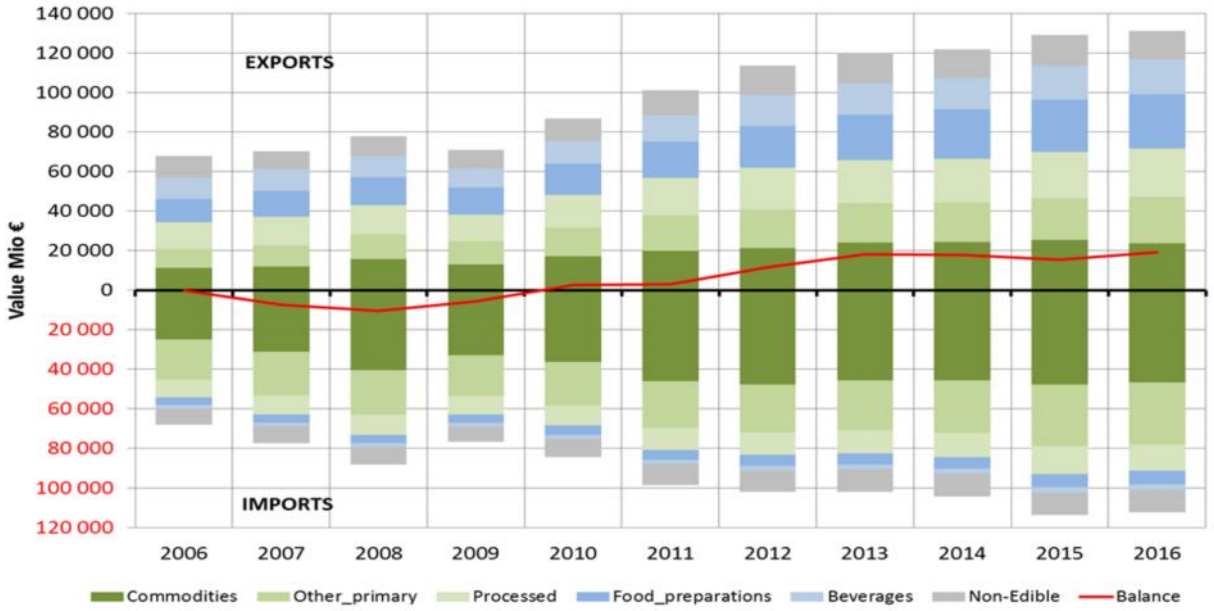
Source: Philippines BPI

ANNEX V

Importance of EU agri-food trade

Thanks to the CAP reform and the EU trade policy, the EU has become the world's top exporter of agri-food products. Since 2006, both EU agri-food exports and imports from third countries have doubled in value. In 2016, the annual value of EU agri-food exports reached EUR 130.7 billion, while the EU agri-food imports reached EUR 112 billion, with positive trade balance (Fig.1).

Figure 1: EU agri-food trade path, Eurostat 2017

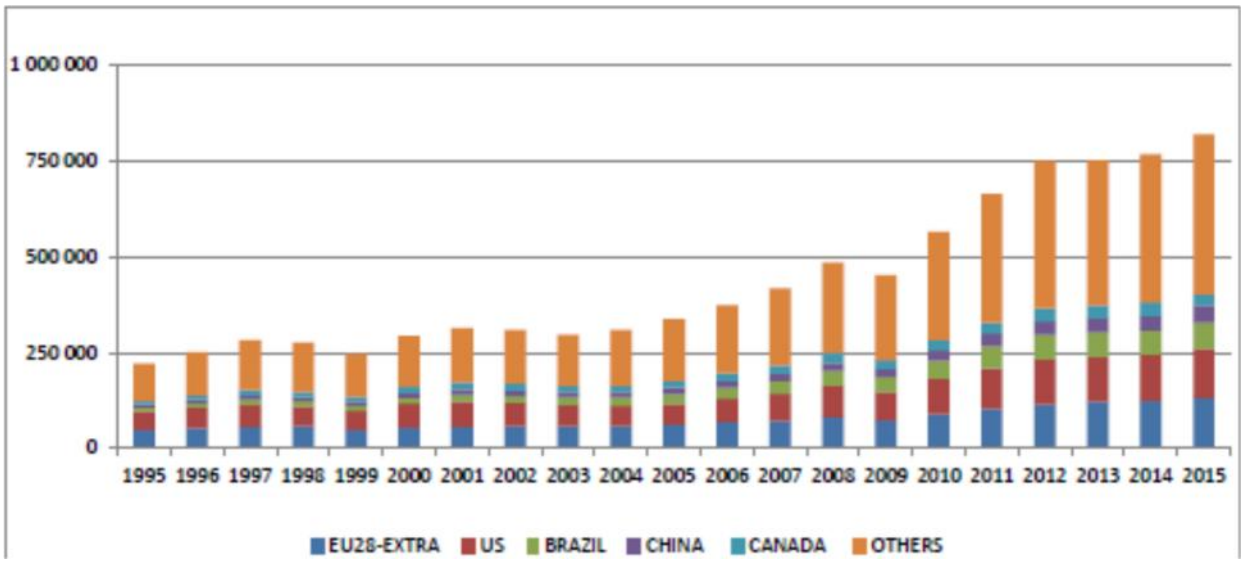


Source: COMEXT

In 2012 the EU became the world's number one exporter, ahead of the USA. Agricultural exports from Brazil, China and Canada have increased faster over 1995-2015. The annual growth rate of EU agricultural export is 3.6 % in comparison with 2.7 % of the USA. This performance could be associated mainly to EU agricultural and trade policies, as well as to structural change and technological progress in the agri-food sector. Furthermore, as a study commissioned by the European Commission shows (EC, 2016), EU bilateral trade agreements have contributed to increase EU exports and imports (**Figure 2**).

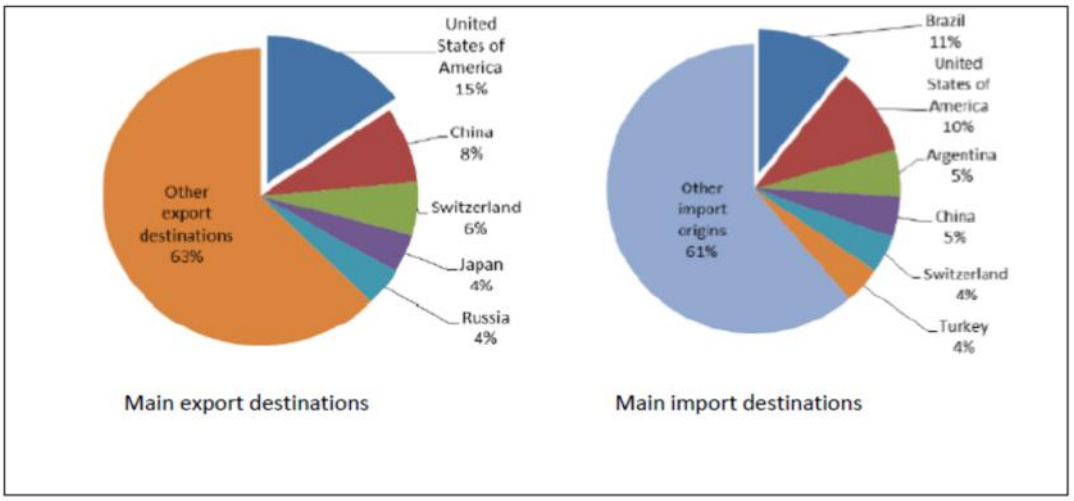
The EU is also the world top importer of agri-food products, the other 5 main importers being the USA, Russia, Japan, China, and Canada. The EU imports in 2016 came from Brazil, USA, Argentina and China, followed by Switzerland, Turkey, Indonesia, Ukraine and the Ivory Coast. On the export side the USA, China, Switzerland, Japan and Russia (**Figure 3**).

Figure 2: Top world agri-food exporters over 1995-2015



Source: COMEXT

Figure 3: EU main agri-food trade partners, share in the value of exports/imports, 2016



Source: COMEXT

ANNEX VI

Here we shows the distance on not harmonized substances for selected products and countries:

Table 1: Distance on not harmonized substances by countries on Apple

Active Substances	Country	Exponential	Indicator
2.4-D	CHINA	2.226	1
ABAMECTIN	CHINA	1.396	1
AMITRAZ	CHINA	0.000	0
AZINPHOS-M	CHINA	0.000	0
AZOCYCLOTIN	CHINA	0.223	0
BETA-CYFLUTHRIN	CHINA	0.223	0
BETA-CYPERMETHRIN	CHINA	0.368	0
BIFENAZATE	CHINA	2.043	1
BIFENTHRIN	CHINA	0.513	0
CAPTAN	CHINA	0.607	0
CARBENDAZIM	CHINA	0.000	0
CHLORANTRANILIPROLE	CHINA	0.050	0
CHLOROTHALONIL	CHINA	1.649	1
COPPER-8-OXYQUINOLATE	CHINA	1.822	1
CYFLUTHRIN	CHINA	0.223	0
CYPERMETHRIN	CHINA	0.368	0
DELTAMETHRIN	CHINA	1.649	1
DICOFOL	CHINA	0.000	0
DIFENOCONAZOLE	CHINA	1.455	1
DIFLUBENZURON	CHINA	1.822	1
DIMETHOATE	CHINA	0.000	0
DINOCAP	CHINA	0.000	0
DIPHENYLAMINE	CHINA	0.000	0
DIQUAT	CHINA	0.018	0
DITHIANON	CHINA	0.513	0
DODINE	CHINA	0.011	0
ENDOSULFAN	CHINA	0.000	0
EPOXICONAZOLE	CHINA	0.000	0
ESFENVALERATE	CHINA	0.000	0
ETHEPHON	CHINA	0.001	0
ETOFENPROX	CHINA	1.492	1
FENARIMOL	CHINA	0.135	0
FENBUCONAZOLE	CHINA	2.226	1
FENBUTATIN-OXIDE	CHINA	0.223	0
FENVALERATE	CHINA	0.000	0
FLONICAMID	CHINA	0.097	0
FLUFENOXURON	CHINA	0.368	0
FOLPET	CHINA	0.000	0
FOSETYL	CHINA	1.822	1
FOSETYL-AL	CHINA	1.822	1
GLYPHOSATE	CHINA	0.018	0
HEXYTHIAZOX	CHINA	1.649	1
IMAZALIL	CHINA	0.223	0
IPRODIONE	CHINA	1.181	1
LAMBDA-CYHALOTHRIN	CHINA	0.368	0

Active Substances	Country	Exponential	Indicator
MALATHION	CHINA	0.000	0
METHOMYL	CHINA	0.000	0
METHOXYFENOZIDE	CHINA	0.607	0
MYCLOBUTANIL	CHINA	1.181	1
NAPHTHYLACETIC-ACID	CHINA	1.396	1
NOVALURON	CHINA	0.607	0
PARAQUAT	CHINA	0.223	0
PARATHION	CHINA	2.226	1
PERMETHRIN	CHINA	0.000	0
PHOSMET	CHINA	0.007	0
PIRIMICARB	CHINA	0.368	0
PROCHLORAZ	CHINA	0.000	0
PROPICONAZOLE	CHINA	1.396	1
PROPINEB	CHINA	0.000	0
PYRAFLUFEN-E	CHINA	0.607	0
PYRIDABEN	CHINA	0.050	0
PYRIMETHANIL	CHINA	1.705	1
SPINOSAD	CHINA	1.948	1
SPIROTETRAMAT	CHINA	1.350	1
TEBUCONAZOLE	CHINA	0.003	0
THIABENDAZOLE	CHINA	1.492	1
THIACLOPRID	CHINA	0.264	0
THIOPHANATE-M	CHINA	0.007	0
TRIADIMEFON	CHINA	0.018	0
TRIADIMENOL	CHINA	0.607	0
TRIFLUMURON	CHINA	2.226	1
ZIRAM	CHINA	0.000	0
1-NAPHTHALENEACETAMIDE	JAPAN	1.396	1
2.2-DPA(DALAPON)	JAPAN	0.368	0
2.4-D	JAPAN	2.226	1
2.4-DP	JAPAN	0.000	0
ABAMECTIN	JAPAN	1.396	1
ACEQUINOCYL	JAPAN	0.002	0
ACETAMIPRID	JAPAN	0.223	0
ACIBENZOLAR-S-M	JAPAN	2.460	1
ACRINATHRIN	JAPAN	0.018	0
ALDICARB	JAPAN	1.649	1
ALPHA-CYPERMETHRIN	JAPAN	0.368	0
AL-PHOSPHIDE	JAPAN	2.226	1
AMITRAZ	JAPAN	0.000	0
ASULAM	JAPAN	2.226	1
ATRAZINE	JAPAN	1.822	1
AZINPHOS-M	JAPAN	2.226	1
BENFLURALIN	JAPAN	1.649	1
BENOMYL	JAPAN	0.000	0
BENTAZONE	JAPAN	1.396	1
BETA-CYFLUTHRIN	JAPAN	0.018	0
BETA-CYPERMETHRIN	JAPAN	0.368	0
BIFENAZATE	JAPAN	0.156	0

Active Substances	Country	Exponential	Indicator
BIFENTHRIN	JAPAN	0.097	0
BUPIRIMATE	JAPAN	0.050	0
CAPTAN	JAPAN	1.649	1
CARBENDAZIM	JAPAN	0.000	0
CARBOXIN	JAPAN	2.226	1
CHLORANTRANILIPROLE	JAPAN	0.368	0
CHLORIDAZON	JAPAN	2.460	1
CHLOROBENZILATE	JAPAN	1.649	1
CHLORSULFURON	JAPAN	2.226	1
CHLORTOLURON	JAPAN	2.226	1
CHROMAFENOZIDE	JAPAN	0.670	0
CINIDON-E	JAPAN	2.226	1
CLETHODIM	JAPAN	2.460	1
CLODINAFOP-ACID	JAPAN	1.649	1
CLOFENTEZINE	JAPAN	0.368	0
CLOPYRALID	JAPAN	2.664	1
CLOTHIANIDIN	JAPAN	0.223	0
COPPER-8-OXYQUINOLATE	JAPAN	1.822	1
CYANTRANILIPROLE	JAPAN	1.455	1
CYCLANILIDE	JAPAN	2.226	1
CYCLOXYDIM	JAPAN	1.649	1
CYFLUFENAMID	JAPAN	0.000	0
CYFLUMETOFEN	JAPAN	0.018	0
CYFLUTHRIN	JAPAN	0.018	0
CYHALOFOP-B	JAPAN	1.649	1
CYMOXANIL	JAPAN	2.226	1
CYPERMETHRIN	JAPAN	0.368	0
CYPRODINIL	JAPAN	0.223	0
CYROMAZINE	JAPAN	2.226	1
DAZOMET	JAPAN	0.018	0
DDT	JAPAN	0.050	0
DELTAMETHRIN	JAPAN	0.223	0
DICAMBA	JAPAN	2.460	1
DICLOFOP-M	JAPAN	2.226	1
DICOFOL	JAPAN	0.000	0
DIFLUBENZURON	JAPAN	2.226	1
DIMETHIPIN	JAPAN	1.221	1
DIMETHOATE	JAPAN	0.000	0
DINOCAP	JAPAN	0.000	0
DINOSEB	JAPAN	1.649	1
DIPHENYLAMINE	JAPAN	0.000	0
DIQUAT	JAPAN	0.607	0
DITHIANON	JAPAN	1.396	1
DODINE	JAPAN	0.011	0
EMAMECTIN-BENZOATE	JAPAN	1.649	1
ENDOSULFAN	JAPAN	0.000	0
EPOXICONAZOLE	JAPAN	2.226	1
ESFENVALERATE	JAPAN	0.000	0
ETHEPHON	JAPAN	0.001	0

Active Substances	Country	Exponential	Indicator
ETHOFUMESATE	JAPAN	1.948	1
ETHOPROPHOS	JAPAN	1.649	1
ETHOXYQUIN	JAPAN	2.226	1
ETOFENPROX	JAPAN	0.368	0
ETOXAZOLE	JAPAN	0.002	0
ETRIDIAZOLE	JAPAN	2.226	1
FENAMIPHOS	JAPAN	0.223	0
FENARIMOL	JAPAN	0.000	0
FENBUCONAZOLE	JAPAN	0.368	0
FENBUTATIN-OXIDE	JAPAN	0.223	0
FENOXYCARB	JAPAN	0.368	0
FENPYROXIMATE	JAPAN	0.513	0
FENTIN	JAPAN	0.223	0
FENTIN-ACETATE	JAPAN	0.223	0
FENTIN-HYDROXIDE	JAPAN	0.223	0
FENVALERATE	JAPAN	0.000	0
FLONICAMID	JAPAN	0.097	0
FLUAZINAM	JAPAN	0.513	0
FLUBENDIAMIDE	JAPAN	0.779	0
FLUFENACET	JAPAN	2.226	1
FLUFENOXURON	JAPAN	0.368	0
FLUMIOXAZIN	JAPAN	0.018	0
FLUOPYRAM	JAPAN	0.513	0
FLUPYRADIFURONE	JAPAN	0.472	0
FLUQUINCONAZOLE	JAPAN	1.649	1
FLUTRIAFOL	JAPAN	1.284	1
FOLPET	JAPAN	0.000	0
FOSTHIAZATE	JAPAN	1.649	1
GLUFOSINATE-AMMONIUM	JAPAN	0.368	0
GLYPHOSATE	JAPAN	0.368	0
GLYPHOSATE-TRIMESIUM	JAPAN	0.368	0
HYMEXAZOL	JAPAN	0.000	0
IMAZALIL	JAPAN	0.223	0
IMAZAMOX	JAPAN	2.226	1
IPRODIONE	JAPAN	0.513	0
ISOPYRAZAM	JAPAN	2.680	1
ISOXAFLUTOLE	JAPAN	1.649	1
KRESOXIM-M	JAPAN	0.000	0
LAMBDA-CYHALOTHRIN	JAPAN	0.050	0
LENACIL	JAPAN	0.135	0
LINURON	JAPAN	0.050	0
LUFENURON	JAPAN	0.670	0
MAGNESIUM-PHOSPHIDE	JAPAN	2.226	1
MALATHION	JAPAN	0.000	0
MCPA	JAPAN	0.368	0
MCPB	JAPAN	0.050	0
MCPP	JAPAN	2.226	1
MCPP-P	JAPAN	2.226	1
MEPIQUAT-CHLORIDE	JAPAN	0.000	0

Active Substances	Country	Exponential	Indicator
METAFLUMIZONE	JAPAN	2.226	1
METALAXYL	JAPAN	2.226	1
METALAXYL-M	JAPAN	2.226	1
METALDEHYDE	JAPAN	2.226	1
METAM-AMMONIUM	JAPAN	0.018	0
METAMITRON	JAPAN	2.460	1
METAM-POTASSIUM	JAPAN	0.018	0
METCONAZOLE	JAPAN	1.649	1
METHAM-SODIUM	JAPAN	0.018	0
METHIDATHION	JAPAN	0.000	0
METHIOCARB	JAPAN	1.649	1
METHOMYL	JAPAN	0.000	0
METHOPRENE	JAPAN	1.649	1
METOLACHLOR	JAPAN	0.368	0
METRIBUZIN	JAPAN	0.135	0
MILBEMECTIN	JAPAN	0.000	0
MILBEMECTIN-A3(METHYL)	JAPAN	0.000	0
MILBEMECTIN-A4(ETHYL)	JAPAN	0.000	0
M-ISOTHIOCYANATE	JAPAN	0.018	0
MYCLOBUTANIL	JAPAN	1.181	1
NAPHTHYLACETIC-ACID	JAPAN	0.097	0
NOVALURON	JAPAN	0.607	0
OMETHOATE	JAPAN	0.000	0
ORTHO-PHENYL-PHENOL	JAPAN	2.226	1
OXADIAZON	JAPAN	2.226	1
OXYFLUORFEN	JAPAN	1.649	1
PARAQUAT	JAPAN	0.223	0
PARATHION	JAPAN	0.007	0
PENCYCURON	JAPAN	2.226	1
PENDIMETHALIN	JAPAN	0.368	0
PENTHIOPYRAD	JAPAN	0.050	0
PERMETHRIN	JAPAN	0.000	0
PHOSMET	JAPAN	0.000	0
PINOXADEN	JAPAN	1.649	1
PIRIMICARB	JAPAN	0.368	0
PROHEXADIONE	JAPAN	0.000	0
PROHEXADIONE-CALCIUM	JAPAN	0.000	0
PROPACHLOR	JAPAN	1.649	1
PROPAQUIZAFOP	JAPAN	2.226	1
PROPICONAZOLE	JAPAN	1.948	1
PROPINEB	JAPAN	0.000	0
PROPOXUR	JAPAN	0.000	0
PROPOXYCARBAZONE-SODIUM	JAPAN	1.649	1
PROPYZAMIDE	JAPAN	1.649	1
PYRACLOSTROBIN	JAPAN	0.368	0
PYRIDABEN	JAPAN	0.368	0
PYRIDATE	JAPAN	2.226	1
PYRIMETHANIL	JAPAN	1.069	1
QUINOXYFEN	JAPAN	2.226	1

Active Substances	Country	Exponential	Indicator
SETHOXYDIM	JAPAN	0.000	0
S-METOLACHLOR	JAPAN	0.368	0
SPINETORAM	JAPAN	0.223	0
SPINOSAD	JAPAN	0.513	0
SPIRODICLOFEN	JAPAN	0.223	0
SPIROMESIFEN	JAPAN	0.000	0
SPIROTETRAMAT	JAPAN	1.350	1
TAU-FLUVALINATE	JAPAN	0.513	0
TEBUCONAZOLE	JAPAN	0.097	0
TEBUFENPYRAD	JAPAN	0.223	0
TEFLUTHRIN	JAPAN	2.226	1
TEPRALOXYDIM	JAPAN	1.649	1
TETRACONAZOLE	JAPAN	0.513	0
THIABENDAZOLE	JAPAN	1.492	1
THIACLOPRID	JAPAN	0.003	0
THIODICARB	JAPAN	0.000	0
THIOPHANATE-M	JAPAN	0.007	0
TRIADIMEFON	JAPAN	0.223	0
TRIADIMENOL	JAPAN	0.223	0
TRIASULFURON	JAPAN	2.226	1
TRICLOPYR	JAPAN	2.014	1
TRICYCLAZOLE	JAPAN	1.822	1
TRIFLOXYSTROBIN	JAPAN	0.037	0
TRIFLUMIZOLE	JAPAN	0.670	0
TRIFLUMURON	JAPAN	2.612	1
TRIFLUSULFURON-M	JAPAN	1.649	1
ZETA-CYPERMETHRIN	JAPAN	0.368	0
ZINC-PHOSPHIDE	JAPAN	2.226	1
ZIRAM	JAPAN	0.000	0
ZOXAMIDE	JAPAN	1.649	1
ABAMECTIN	MEXICO	1.396	1
AZINPHOS-M	MEXICO	0.000	0
BENOMYL	MEXICO	0.000	0
CAPTAFOL	MEXICO	0.000	0
CAPTAN	MEXICO	0.223	0
CLOFENTEZINE	MEXICO	0.368	0
DICOFOL	MEXICO	0.000	0
DIMETHOATE	MEXICO	0.000	0
DINOCAP	MEXICO	0.018	0
ENDOSULFAN	MEXICO	0.000	0
ESFENVALERATE	MEXICO	0.000	0
FENVALERATE	MEXICO	0.000	0
FOLPET	MEXICO	0.000	0
FOSETYL	MEXICO	2.379	1
FOSETYL-AL	MEXICO	2.379	1
GLYPHOSATE	MEXICO	0.368	0
KRESOXIM-M	MEXICO	0.018	0
MALATHION	MEXICO	0.000	0
MANCOZEB	MEXICO	0.670	0

Active Substances	Country	Exponential	Indicator
METHIDATHION	MEXICO	0.513	0
METHOMYL	MEXICO	0.000	0
METIRAM	MEXICO	1.822	1
MYCLOBUTANIL	MEXICO	1.181	1
PARAQUAT	MEXICO	0.223	0
PHOSMET	MEXICO	0.000	0
PYRIDABEN	MEXICO	0.819	0
PYRIPROXYFEN	MEXICO	0.050	0
SETHOXYDIM	MEXICO	0.368	0
SPINOSAD	MEXICO	0.003	0
THIABENDAZOLE	MEXICO	0.368	0
THIACLOPRID	MEXICO	2.226	1
THIOPHANATE-M	MEXICO	0.000	0
TRIADIMEFON	MEXICO	0.018	0
TRIFLOXYSTROBIN	MEXICO	0.002	0
ZIRAM	MEXICO	0.000	0
ABAMECTIN	USA	1.396	1
ACEQUINOCYL	USA	0.050	0
ACETAMIPRID	USA	0.779	0
ACIBENZOLAR-S-M	USA	2.014	1
ALPHA-CYPERMETHRIN	USA	2.586	1
BETA-CYFLUTHRIN	USA	0.223	0
BIFENTHRIN	USA	0.513	0
BOSCALID	USA	0.607	0
CAPTAN	USA	0.223	0
CHLORANTRANILIPROLE	USA	0.247	0
CLETHODIM	USA	0.368	0
CLOPYRALID	USA	2.460	1
CLOTHIANIDIN	USA	0.223	0
CYANTRANILIPROLE	USA	0.417	0
CYFLUFENAMID	USA	0.819	0
CYFLUMETOFEN	USA	1.284	1
CYFLUTHRIN	USA	0.223	0
CYPRODINIL	USA	1.162	1
DIFENOCONAZOLE	USA	0.005	0
DINOCAP	USA	0.018	0
DIPHENYLAMINE	USA	0.000	0
DITHIANON	USA	0.513	0
DODINE	USA	0.011	0
D-PHENOTHRIN	USA	1.649	1
EMAMECTIN-BENZOATE	USA	0.779	0
ESFENVALERATE	USA	0.000	0
ETHEPHON	USA	0.001	0
ETOFENPROX	USA	0.018	0
ETOXAZOLE	USA	0.156	0
FENAZAQUIN	USA	0.368	0
FENBUCONAZOLE	USA	1.221	1
FENBUTATIN-OXIDE	USA	0.002	0
FLONICAMID	USA	1.396	1

Active Substances	Country	Exponential	Indicator
FLUAZINAM	USA	0.003	0
FLUBENDIAMIDE	USA	0.417	0
FLUOPYRAM	USA	0.717	0
FLUPYRADIFURONE	USA	0.472	0
FLUROXYPYR-1-METHYLHEPTYL-EST.	USA	1.822	1
FLUXAPYROXAD	USA	1.118	1
FOLPET	USA	0.000	0
FOSETYL-AL	USA	2.379	1
GLUFOSINATE-AMMONIUM	USA	1.649	1
GLYPHOSATE	USA	0.368	0
HEXYTHIAZOX	USA	1.822	1
INDOXACARB	USA	0.368	0
KRESOXIM-M	USA	0.223	0
LAMBDA-CYHALOTHRIN	USA	0.135	0
MALATHION	USA	0.000	0
MANCOZEB	USA	2.411	1
METAFLUMIZONE	USA	1.221	1
METALAXYL	USA	2.226	1
METHOMYL	USA	0.000	0
METIRAM	USA	2.460	1
MYCLOBUTANIL	USA	1.181	1
NOVALURON	USA	0.607	0
ORTHO-PHENYL-PHENOL	USA	0.000	0
OXYFLUORFEN	USA	1.649	1
PARAQUAT	USA	0.223	0
PENDIMETHALIN	USA	0.368	0
PHOSMET	USA	0.000	0
PROHEXADIONE-CALCIUM	USA	0.000	0
PROPYZAMIDE	USA	0.018	0
PYRACLOSTROBIN	USA	0.135	0
PYRAFLUFEN-E	USA	1.649	1
PYRIDABEN	USA	0.607	0
SETHOXYDIM	USA	0.368	0
SODIUM-ORTHO-PHENYL-PHENOL	USA	0.000	0
SPINOSAD	USA	1.396	1
SPIROTETRAMAT	USA	1.350	1
SULFOXAFLOR (ISOCLAST)	USA	0.779	0
TEBUCONAZOLE	USA	2.301	1
THIAMETHOXAM	USA	1.396	1
THIOPHANATE-M	USA	0.050	0
TRIFLOXYSTROBIN	USA	1.331	1
ZETA-CYPERMETHRIN	USA	0.368	0
ZIRAM	USA	0.000	0

Table 2: Distance on not harmonized substances by countries on Grapes: Wine

Active substance	Country	Exponential	Indicator
AMETOCTRADIN	ARGENTINA	1.181	1
BOSCALID	ARGENTINA	1.350	1
CAPTAN	ARGENTINA	0.000	0
CYPRODINIL	ARGENTINA	1.396	1
DIFENOCONAZOLE	ARGENTINA	2.226	1
EMAMECTIN-BENZOATE	ARGENTINA	0.135	0
FLUDIOXONIL	ARGENTINA	2.117	1
FLUMIOXAZIN	ARGENTINA	1.822	1
FOLPET	ARGENTINA	2.460	1
GLYPHOSATE	ARGENTINA	1.822	1
IPRODIONE	ARGENTINA	1.649	1
LINURON	ARGENTINA	0.050	0
MEPTYLDINOCAP	ARGENTINA	2.460	1
METRAFENONE	ARGENTINA	2.356	1
MYCLOBUTANIL	ARGENTINA	1.649	1
PARAQUAT-CHLORIDE	ARGENTINA	0.223	0
SPINETORAM	ARGENTINA	1.492	1
SPIROTETRAMAT	ARGENTINA	2.340	1
2.2-DPA(DALAPON)	AUSTRALIA	0.000	0
2.4-D	AUSTRALIA	1.649	1
ACEQUINOCYL	AUSTRALIA	0.013	0
ACETAMIPRID	AUSTRALIA	1.350	1
AMITROLE	AUSTRALIA	2.226	1
AZINPHOS-M	AUSTRALIA	0.000	0
AZOXYSTROBIN	AUSTRALIA	1.396	1
BENALAXYL	AUSTRALIA	0.513	0
BUPROFEZIN	AUSTRALIA	0.223	0
CAPTAN	AUSTRALIA	0.000	0
CARBENDAZIM	AUSTRALIA	1.492	1
CHLORANTRANILIPROLE	AUSTRALIA	0.223	0
CHLORMEQUAT	AUSTRALIA	0.000	0
CHLOROTHALONIL	AUSTRALIA	0.097	0
CHLORPYRIFOS	AUSTRALIA	0.368	0
CLOTHIANIDIN	AUSTRALIA	2.642	1
CYCLOXYDIM	AUSTRALIA	1.492	1
CYFLUTHRIN	AUSTRALIA	0.097	0
CYPERMETHRIN	AUSTRALIA	0.050	0
DDT	AUSTRALIA	0.000	0
DELTAMETHRIN	AUSTRALIA	2.117	1
DICOFOL	AUSTRALIA	0.000	0
DIFENOCONAZOLE	AUSTRALIA	0.717	0
DIMETHOATE	AUSTRALIA	0.018	0
DITHIANON	AUSTRALIA	1.396	1
DITHIOCARBAMATES	AUSTRALIA	0.368	0
EMAMECTIN-BENZOATE	AUSTRALIA	2.612	1
ETHEPHON	AUSTRALIA	0.018	0
FENAMIPHOS	AUSTRALIA	0.513	0
FENARIMOL	AUSTRALIA	1.948	1

Active substance	Country	Exponential	Indicator
FENBUTATIN-OXIDE	AUSTRALIA	1.649	1
FENHEXAMID	AUSTRALIA	1.396	1
FENPYRAZAMINE	AUSTRALIA	2.673	1
FENPYROXIMATE	AUSTRALIA	1.649	1
FENVALERATE	AUSTRALIA	1.948	1
FLUAZINAM	AUSTRALIA	2.673	1
FLUBENDIAMIDE	AUSTRALIA	1.350	1
FLUDIOXONIL	AUSTRALIA	1.649	1
FLUMIOXAZIN	AUSTRALIA	2.226	1
FLUOPYRAM	AUSTRALIA	0.717	0
FLUPYRADIFURONE	AUSTRALIA	0.064	0
GLUFOSINATE-AMMONIUM	AUSTRALIA	1.396	1
GLYPHOSATE	AUSTRALIA	2.460	1
ISOXABEN	AUSTRALIA	2.226	1
KRESOXIM-M	AUSTRALIA	0.607	0
MALATHION	AUSTRALIA	0.000	0
MANCOZEB	AUSTRALIA	0.368	0
METAFLUMIZONE	AUSTRALIA	1.221	1
METALDEHYDE	AUSTRALIA	0.000	0
METHAM-SODIUM	AUSTRALIA	0.000	0
METHIDATHION	AUSTRALIA	0.000	0
METHIOCARB	AUSTRALIA	0.513	0
METHOMYL	AUSTRALIA	0.050	0
METHOXYFENOZIDE	AUSTRALIA	0.368	0
METHYL-BROMIDE	AUSTRALIA	2.711	1
METIRAM	AUSTRALIA	0.368	0
METRAFENONE	AUSTRALIA	1.429	1
OMETHOATE	AUSTRALIA	0.000	0
ORTHO-PHENYL-PHENOL	AUSTRALIA	0.368	0
OXYFLUORFEN	AUSTRALIA	1.649	1
PARAQUAT	AUSTRALIA	0.223	0
PENCONAZOLE	AUSTRALIA	1.649	1
PHOSMET	AUSTRALIA	0.000	0
PHOSPHONIC-ACID	AUSTRALIA	1.649	1
PROPICONAZOLE	AUSTRALIA	0.097	0
PROPINEB	AUSTRALIA	0.000	0
PYRIDABEN	AUSTRALIA	0.018	0
PYRIOFENONE	AUSTRALIA	0.223	0
PYRIPROXYFEN	AUSTRALIA	0.000	0
QUINOXYFEN	AUSTRALIA	0.368	0
QUIZALOFOP-P-T	AUSTRALIA	1.822	1
SPIRODICLOFEN	AUSTRALIA	0.000	0
SPIROXAMINE	AUSTRALIA	0.050	0
TEBUCONAZOLE	AUSTRALIA	0.018	0
TEBUFENOZIDE	AUSTRALIA	1.396	1
THIABENDAZOLE	AUSTRALIA	1.492	1
THIAMETHOXAM	AUSTRALIA	1.649	1
THIODICARB	AUSTRALIA	2.226	1
THIOPHANATE-M	AUSTRALIA	0.513	0

Active substance	Country	Exponential	Indicator
THIRAM	AUSTRALIA	0.097	0
TRIADIMEFON	AUSTRALIA	1.649	1
TRIADIMENOL	AUSTRALIA	2.117	1
TRIFLUMIZOLE	AUSTRALIA	1.181	1
ZIRAM	AUSTRALIA	0.000	0
ZOXAMIDE	AUSTRALIA	1.492	1
ACEQUINOCYL	CHILE	0.013	0
ACETAMIPRID	CHILE	1.350	1
ALDICARB	CHILE	0.000	0
ALPHA-CYPERMETHRIN	CHILE	1.822	1
AZINPHOS-M	CHILE	0.000	0
AZOXYSTROBIN	CHILE	1.396	1
BENOMYL	CHILE	0.007	0
BENTAZONE	CHILE	0.097	0
CAPTAN	CHILE	0.000	0
CARBENDAZIM	CHILE	0.007	0
CHLOROTHALONIL	CHILE	2.301	1
CHLORPYRIFOS-M	CHILE	0.018	0
CLETHODIM	CHILE	0.368	0
CLOFENTEZINE	CHILE	0.368	0
CLOTHIANIDIN	CHILE	1.154	1
CYPERMETHRIN	CHILE	1.822	1
DIFENOCONAZOLE	CHILE	2.629	1
DIMETHOMORPH	CHILE	1.396	1
ENDOSULFAN	CHILE	0.000	0
ESFENVALERATE	CHILE	1.948	1
ETHEPHON	CHILE	1.649	1
FENAMIPHOS	CHILE	1.396	1
FENPYROXIMATE	CHILE	1.649	1
FLUBENDIAMIDE	CHILE	2.705	1
FLUDIOXONIL	CHILE	1.649	1
FLUFENOXURON	CHILE	1.916	1
FOLPET	CHILE	1.649	1
FORMETANATE	CHILE	1.649	1
GLUFOSINATE-AMMONIUM	CHILE	1.396	1
IPRODIONE	CHILE	1.649	1
MALATHION	CHILE	0.000	0
METHIDATHION	CHILE	0.000	0
METHOMYL	CHILE	1.492	1
MILBEMECTIN	CHILE	0.223	0
PARAQUAT	CHILE	1.649	1
PERMETHRIN	CHILE	0.000	0
PHOSMET	CHILE	0.000	0
PROPICONAZOLE	CHILE	2.301	1
PROPINEB	CHILE	0.018	0
PYRIDABEN	CHILE	0.607	0
PYRIMETHANIL	CHILE	1.221	1
QUINOXYFEN	CHILE	0.368	0
TAU-FLUVALINATE	CHILE	2.460	1

Active substance	Country	Exponential	Indicator
TEBUCONAZOLE	CHILE	0.368	0
TEBUFENOZIDE	CHILE	1.396	1
THIAMETHOXAM	CHILE	0.779	0
THIRAM	CHILE	0.513	0
ZETA-CYPERMETHRIN	CHILE	1.822	1
ZIRAM	CHILE	0.000	0
ACETAMIPRID	SOUTH-AFRICA	0.368	0
AL-PHOSPHIDE	SOUTH-AFRICA	2.226	1
FLUQUINCONAZOLE	SOUTH-AFRICA	1.822	1
FURFURAL	SOUTH-AFRICA	2.460	1
INDOXACARB	SOUTH-AFRICA	1.284	1
MAGNESIUM-PHOSPHIDE	SOUTH-AFRICA	2.226	1
MEPTYLDINOCAP	SOUTH-AFRICA	1.649	1
METHYL-BROMIDE	SOUTH-AFRICA	0.064	0
METRAFENONE	SOUTH-AFRICA	2.531	1
2.4-D	USA	1.649	1
ACEQUINOCYL	USA	0.013	0
ACETAMIPRID	USA	1.350	1
ALPHA-CYPERMETHRIN	USA	2.460	1
AMETOCTRADIN	USA	1.396	1
AMISULBROM	USA	1.221	1
AZOXYSTROBIN	USA	1.396	1
BENALAXYL-M	USA	0.000	0
BETA-CYFLUTHRIN	USA	0.097	0
BIFENAZATE	USA	0.931	0
BUPROFEZIN	USA	0.223	0
CAPTAN	USA	0.000	0
CARBON-DISULPHIDE	USA	2.664	1
CHLORANTRANILIPROLE	USA	0.223	0
CHLORPYRIFOS	USA	2.664	1
CLOTHIANIDIN	USA	1.154	1
CYAZOFAMID	USA	1.284	1
CYFLUTHRIN	USA	0.097	0
CYMOXANIL	USA	1.649	1
DELTAMETHRIN	USA	2.117	1
DIFENOCONAZOLE	USA	0.717	0
DINOCAP	USA	0.018	0
D-PHENOTHRIN	USA	1.649	1
EMAMECTIN-BENZOATE	USA	1.492	1
FAMOXADONE	USA	0.779	0
FENAMIDONE	USA	0.513	0
FENAMIPHOS	USA	0.097	0
FENBUTATIN-OXIDE	USA	0.223	0
FENHEXAMID	USA	2.082	1
FENPYROXIMATE	USA	1.649	1
FLUBENDIAMIDE	USA	1.350	1
FLUDIOXONIL	USA	1.649	1
FLUFENOXURON	USA	1.916	1
FLUMIOXAZIN	USA	1.822	1

Active substance	Country	Exponential	Indicator
FLUOPYRAM	USA	0.717	0
FLUPYRADIFURONE	USA	0.064	0
FOLPET	USA	0.223	0
FOSETYL-AL	USA	2.460	1
GLUFOSINATE-AMMONIUM	USA	1.948	1
GLYPHOSATE	USA	1.822	1
IPRODIONE	USA	0.135	0
ISOXABEN	USA	2.226	1
LAMBDA-CYHALOTHRIN	USA	2.586	1
MALATHION	USA	0.000	0
MANCOZEB	USA	2.014	1
MANDIPROPAMID	USA	1.350	1
MEPANIPYRIM	USA	1.284	1
MEPIQUAT-CHLORIDE	USA	0.000	0
MEPTYLDINOCAP	USA	2.226	1
METAFLUMIZONE	USA	1.221	1
METALAXYL	USA	0.368	0
METRAFENONE	USA	1.429	1
OXYFLUORFEN	USA	1.649	1
PARAQUAT	USA	0.223	0
PENDIMETHALIN	USA	0.368	0
PHOSMET	USA	0.000	0
PYRAFLUFEN-E	USA	1.649	1
PYRIDABEN	USA	0.368	0
PYRIOFENONE	USA	0.607	0
PYRIPROXYFEN	USA	0.000	0
QUINOXYFEN	USA	0.368	0
SETHOXYDIM	USA	0.368	0
SPIRODICLOFEN	USA	0.000	0
SPIROTETRAMAT	USA	1.419	1
SPIROXAMINE	USA	0.368	0
TEBUCONAZOLE	USA	0.018	0
TETRACONAZOLE	USA	1.822	1
THIAMETHOXAM	USA	1.649	1
THIOPHANATE-M	USA	0.513	0
TRIFLOXYSTROBIN	USA	1.396	1
TRIFLUMIZOLE	USA	1.181	1
ZETA-CYPERMETHRIN	USA	0.050	0
ZINC-PHOSPHIDE	USA	2.226	1
ZIRAM	USA	0.000	0

Table 3: Distance on not harmonized substances by countries on Oranges

Active substance	Country	Exponential	Indicator
ABAMECTIN	BRAZIL	1.948	1
ACETAMIPRID	BRAZIL	1.560	1
ACRINATHRIN	BRAZIL	2.226	1
ALDICARB	BRAZIL	0.000	0
ALPHA-CYPERMETHRIN	BRAZIL	2.460	1
AMITRAZ	BRAZIL	0.000	0
AZOCYCLOTIN	BRAZIL	0.000	0
AZOXYSTROBIN	BRAZIL	2.629	1
BENZALKONIUM-CHLORIDE	BRAZIL	0.000	0
BETA-CYFLUTHRIN	BRAZIL	0.018	0
BETA-CYPERMETHRIN	BRAZIL	2.340	1
BIFENTHRIN	BRAZIL	1.350	1
BUPROFEZIN	BRAZIL	2.014	1
CAPTAN	BRAZIL	0.000	0
CARBENDAZIM	BRAZIL	0.000	0
CHLORANTRANILIPROLE	BRAZIL	2.043	1
CHLORPYRIFOS	BRAZIL	0.003	0
CLOFENTEZINE	BRAZIL	1.822	1
CLOTHIANIDIN	BRAZIL	0.018	0
CYFLUMETOFEN	BRAZIL	1.948	1
CYHEXATIN	BRAZIL	0.223	0
CYPERMETHRIN	BRAZIL	2.586	1
DELTAMETHRIN	BRAZIL	0.368	0
DIFENOCONAZOLE	BRAZIL	1.181	1
DIFLUBENZURON	BRAZIL	2.226	1
DIMETHOATE	BRAZIL	0.000	0
DINOCAP	BRAZIL	0.223	0
DITHIOCARBAMATES	BRAZIL	1.822	1
ESFENVALERATE	BRAZIL	0.223	0
ETOFENPROX	BRAZIL	2.226	1
ETOXAZOLE	BRAZIL	1.649	1
FENBUTATIN-OXIDE	BRAZIL	1.822	1
FENPROPATHRIN	BRAZIL	1.649	1
FLUFENOXURON	BRAZIL	1.396	1
FLUMIOXAZIN	BRAZIL	0.223	0
FOLPET	BRAZIL	0.000	0
FOSETYL	BRAZIL	2.700	1
GLYPHOSATE	BRAZIL	1.822	1
GLYPHOSATE-TRIMESIUM	BRAZIL	2.460	1
LAMBDA-CYHALOTHRIN	BRAZIL	0.018	0
LUFENURON	BRAZIL	1.649	1
MALATHION	BRAZIL	0.368	0
MANCOZEB	BRAZIL	1.822	1
METAFLUMIZONE	BRAZIL	0.000	0
METHIDATHION	BRAZIL	0.000	0
METIRAM	BRAZIL	1.822	1
MILBEMECTIN	BRAZIL	1.649	1
PARAQUAT-CHLORIDE	BRAZIL	0.223	0

Active substance	Country	Exponential	Indicator
PHOSMET	BRAZIL	0.050	0
PROPINEB	BRAZIL	0.000	0
PYRACLOSTROBIN	BRAZIL	2.117	1
PYRIDABEN	BRAZIL	1.822	1
PYRIMETHANIL	BRAZIL	2.117	1
PYRIPROXYFEN	BRAZIL	0.513	0
QUIZALOFOP-P-T	BRAZIL	2.226	1
SPINOSAD	BRAZIL	2.629	1
SPIRODICLOFEN	BRAZIL	2.560	1
TEBUCONAZOLE	BRAZIL	0.011	0
TEBUFENOZIDE	BRAZIL	2.117	1
THIABENDAZOLE	BRAZIL	0.368	0
THIAMETHOXAM	BRAZIL	0.003	0
THIOPHANATE-M	BRAZIL	1.181	1
THIRAM	BRAZIL	0.000	0
TRIFLOXYSTROBIN	BRAZIL	1.822	1
TRIFLUMURON	BRAZIL	1.649	1
ZETA-CYPERMETHRIN	BRAZIL	2.705	1
2.4-DP-P	MOROCCO	2.301	1
ABAMECTIN	MOROCCO	1.396	1
ACETAMIPRID	MOROCCO	0.895	0
AMITRAZ	MOROCCO	0.000	0
CHLORANTRANILIPROLE	MOROCCO	1.331	1
DICOFOL	MOROCCO	0.000	0
FENPYROXIMATE	MOROCCO	1.822	1
GLUFOSINATE-AMMONIUM	MOROCCO	0.000	0
GUAZATINE	MOROCCO	0.000	0
MALATHION	MOROCCO	0.082	0
METHIDATHION	MOROCCO	0.000	0
NAPHTHYLACETIC-ACID	MOROCCO	1.181	1
ORTHO-PHENYL-PHENOL	MOROCCO	0.247	0
PROPINEB	MOROCCO	0.000	0
THIAMETHOXAM	MOROCCO	0.717	0
THIRAM	MOROCCO	0.000	0
ZIRAM	MOROCCO	0.000	0
2.4-D	USA	0.135	0
ABAMECTIN	USA	0.717	0
ACEQUINOCYL	USA	1.649	1
ACETAMIPRID	USA	0.895	0
ALDICARB	USA	0.000	0
ALPHA-CYPERMETHRIN	USA	0.018	0
BETA-CYFLUTHRIN	USA	0.000	0
BIFENTHRIN	USA	1.649	1
BUPROFEZIN	USA	0.223	0
CARBON-DISULPHIDE	USA	2.664	1
CHLORANTRANILIPROLE	USA	0.368	0
CHLORPYRIFOS	USA	0.097	0
CLOTHIANIDIN	USA	0.846	0
CYFLUTHRIN	USA	0.000	0

Active substance	Country	Exponential	Indicator
DIFLUBENZURON	USA	0.135	0
DIMETHOATE	USA	0.000	0
DIQUAT	USA	0.223	0
D-PHENOTHRIN	USA	1.649	1
ETOFENPROX	USA	0.018	0
FENBUTATIN-OXIDE	USA	0.050	0
FOSETYL-AL	USA	2.543	1
GLUFOSINATE-AMMONIUM	USA	0.135	0
HEXYTHIAZOX	USA	1.492	1
IMAZALIL	USA	0.368	0
IMIDACLOPRID	USA	1.350	1
LAMBDA-CYHALOTHRIN	USA	2.586	1
MALATHION	USA	0.050	0
METAFLUMIZONE	USA	1.221	1
METALAXYL	USA	0.368	0
METALDEHYDE	USA	0.015	0
METHOMYL	USA	0.000	0
METHOXYFENOZIDE	USA	0.607	0
NAPHTHYLACETIC-ACID	USA	0.513	0
OMETHOATE	USA	0.000	0
ORTHO-PHENYL-PHENOL	USA	0.368	0
PARAQUAT	USA	0.223	0
PENDIMETHALIN	USA	0.368	0
PHOSMET	USA	0.000	0
PROPICONAZOLE	USA	1.118	1
PYRIDABEN	USA	0.449	0
PYRIMETHANIL	USA	0.779	0
PYRIPROXYFEN	USA	1.181	1
SETHOXYDIM	USA	0.018	0
SODIUM-ORTHO-PHENYL-PHENOL	USA	0.368	0
SPINETORAM	USA	0.607	0
SPIROTETRAMAT	USA	1.492	1
TEBUCONAZOLE	USA	0.895	0
TEBUFENOZIDE	USA	1.822	1
THIABENDAZOLE	USA	0.368	0
THIAMETHOXAM	USA	0.189	0
TRIFLOXYSTROBIN	USA	0.819	0
ZETA-CYPERMETHRIN	USA	2.282	1

Table 4 : Distance on not harmonized substances by countries on Rice

Active substance	Country	Exponential	Indicator
BETA-CYFLUTHRIN	PHILIPPINES	0.135	0
CHLORANTRANILIPROLE	PHILIPPINES	0.018	0
CHLORPYRIFOS	PHILIPPINES	0.000	0
CYFLUTHRIN	PHILIPPINES	0.135	0
DIFENOCONAZOLE	PHILIPPINES	2.301	1
ETHOXYSULFURON	PHILIPPINES	0.018	0
FENOXAPROP-P-E	PHILIPPINES	1.649	1
IMIDACLOPRID	PHILIPPINES	1.396	1
LAMBDA-CYHALOTHRIN	PHILIPPINES	1.649	1
METHOMYL	PHILIPPINES	0.018	0
OXADIAZON	PHILIPPINES	1.822	1
PROPICONAZOLE	PHILIPPINES	2.543	1
TEBUCONAZOLE	PHILIPPINES	0.607	0
CHLORPYRIFOS	THAILAND	0.368	0
DDT	THAILAND	0.368	0
FENITROTHION	THAILAND	0.000	0
IMIDACLOPRID	THAILAND	2.629	1
METHYL-BROMIDE	THAILAND	2.664	1
PIRIMIPHOS-M	THAILAND	0.000	0
SULFURYL-FLUORIDE	THAILAND	0.368	0
THIRAM	THAILAND	1.649	1

Table 5 : Distance on not harmonized substances by countries on Tomatoes

Active substance	Country	Exponential	Indicator
2.4-D	CHINA	0.000	0
ABAMECTIN	CHINA	2.177	1
ACETAMIPRID	CHINA	0.368	0
ALDICARB	CHINA	0.607	0
AMITRAZ	CHINA	0.000	0
AZINPHOS-M	CHINA	0.000	0
BENALAXYL	CHINA	1.822	1
BETA-CYFLUTHRIN	CHINA	0.050	0
BIFENTHRIN	CHINA	0.513	0
BUPROFEZIN	CHINA	0.368	0
CARBENDAZIM	CHINA	0.000	0
CHLOROTHALONIL	CHINA	1.181	1
CLOFENTEZINE	CHINA	0.513	0
CYFLUTHRIN	CHINA	0.050	0
CYPRODINIL	CHINA	1.948	1
DELTAMETHRIN	CHINA	1.396	1
DIETHOFENCARB	CHINA	0.651	0
DIFENOCONAZOLE	CHINA	2.117	1
DIMETHOATE	CHINA	0.000	0
DINOCAP	CHINA	0.000	0
ESFENVALERATE	CHINA	0.368	0
ETHEPHON	CHINA	0.368	0
FENAMIPHOS	CHINA	1.649	1
FENBUTATIN-OXIDE	CHINA	1.649	1
FENVALERATE	CHINA	0.368	0

Active substance	Country	Exponential	Indicator
FLUOPICOLIDE	CHINA	2.460	1
FOLPET	CHINA	1.492	1
GLUFOSINATE-AMMONIUM	CHINA	0.018	0
HEXYTHIAZOX	CHINA	2.226	1
IMIDACLOPRID	CHINA	0.368	0
LAMBDA-CYHALOTHRIN	CHINA	0.368	0
MALATHION	CHINA	0.000	0
MANCOZEB	CHINA	0.513	0
METALAXYL	CHINA	0.223	0
METALAXYL-M	CHINA	0.223	0
NAPHTHYLACETIC-ACID	CHINA	0.513	0
NOVALURON	CHINA	2.664	1
PARAQUAT	CHINA	0.223	0
PARATHION	CHINA	2.226	1
PENCONAZOLE	CHINA	0.368	0
PERMETHRIN	CHINA	0.000	0
PROPAMOCARB	CHINA	1.649	1
PROPAMOCARB-HCL	CHINA	1.649	1
PROPINEB	CHINA	0.223	0
QUINTOZENE	CHINA	0.018	0
SPINOSAD	CHINA	0.651	0
SPIROTETRAMAT	CHINA	1.649	1
THIOPHANATE-M	CHINA	0.135	0
THIRAM	CHINA	0.000	0
ZOXAMIDE	CHINA	0.050	0
1-NAPHTHALENEACETAMIDE	MOROCCO	1.181	1
ABAMECTIN	MOROCCO	2.177	1
ACETAMIPRID	MOROCCO	2.226	1
BIFENTHRIN	MOROCCO	1.396	1
BOSCALID	MOROCCO	1.948	1
CAPTAN	MOROCCO	0.368	0
CHLOROTHALONIL	MOROCCO	1.948	1
CYPRODINIL	MOROCCO	1.396	1
CYROMAZINE	MOROCCO	0.513	0
DICOFOL	MOROCCO	0.000	0
DIFENOCONAZOLE	MOROCCO	2.460	1
ESFENVALERATE	MOROCCO	1.649	1
ETOXAZOLE	MOROCCO	0.651	0
FAMOXADONE	MOROCCO	1.649	1
FENAMIDONE	MOROCCO	1.649	1
FENAMIPHOS	MOROCCO	0.779	0
FENARIMOL	MOROCCO	0.000	0
FENHEXAMID	MOROCCO	1.649	1
FENVALERATE	MOROCCO	1.649	1
FLONICAMID	MOROCCO	1.492	1
FLUDIOXONIL	MOROCCO	2.301	1
FLUOPICOLIDE	MOROCCO	1.822	1
FOLPET	MOROCCO	1.822	1
INDOXACARB	MOROCCO	2.226	1
KRESOXIM-M	MOROCCO	1.181	1
MALATHION	MOROCCO	0.000	0

Active substance	Country	Exponential	Indicator
MANDIPROPAMID	MOROCCO	1.948	1
MEPANIPYRIM	MOROCCO	1.396	1
METAFLUMIZONE	MOROCCO	1.181	1
METHOMYL	MOROCCO	0.000	0
NAPHTHYLACETIC-ACID	MOROCCO	1.181	1
PIRIMICARB	MOROCCO	0.368	0
PROPAMOCARB	MOROCCO	0.223	0
PROPAMOCARB-HCL	MOROCCO	0.223	0
PROPINEB	MOROCCO	0.607	0
PYRACLOSTROBIN	MOROCCO	1.396	1
SPINOSAD	MOROCCO	0.651	0
SPIRODICLOFEN	MOROCCO	1.492	1
TEBUCONAZOLE	MOROCCO	0.895	0
TEBUFENPYRAD	MOROCCO	1.455	1
THIRAM	MOROCCO	0.000	0
TRIFLOXYSTROBIN	MOROCCO	1.331	1
ZIRAM	MOROCCO	0.000	0

The aim of this study is to provide an assessment of the application of the reciprocity principle in EU agri-food trade at global level. The report provides substantial evidence for progresses occurring at worldwide level in regulatory rapprochement. Scientific cooperation, collaboration between risk assessment bodies, harmonization of control procedures and early warning systems for emerging hazards can facilitate progress in this direction, reducing transaction costs and information asymmetries in agri-food trade.

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