



# **Non-tariff measures in agri-food trade between Chile and the EU: comparative trade effects**

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## Abstract

Sanitary and phytosanitary (SPS) and Technical Barriers to Trade (TBT) measures are in the agenda of the negotiations for the modernization of the Association Agreement (AA) between Chile and the EU. The impact of these measures on trade has been largely discussed in existing literature. In the frame of the existing AA, the present paper aims to contribute to the understanding of the impact of non-tariff measures and specially SPS and TBT in agri-food trade between the EU and Chile through a comparative analysis of trade between the EU and Chile main southern hemisphere competitors (Argentina, Brazil, Mexico, Peru and South Africa)<sup>1</sup>. The analysis focuses on the following sub-sectors of interest: fruits, vegetables, meat, fish and seafood, and dairy products. In order to address this question, we first carry-on interviews with the main private actors and political decision makers both in Chile and in the EU. Complementary to this, a gravity model allows to contribute with empirical evidence to test whether SPS and TBT provisions in EU trade agreements facilitate trade between the EU and its partners and whether these provisions contribute to reducing trade disputes between the EU and its partners. Our main findings are that the effect of these provisions vary for EU imports and exports and across agri-food subsectors. For EU imports, we find that SPS and TBT provisions in EU trade agreements have a positive impact in the traded value for meat and dairy products sub-sectors, no significant effect for the fruits and fish and seafood subsectors whereas the impact on the vegetables subsector appears to be negative. For EU exports, we find a positive effect of SPS and TBT provisions in EU trade agreements for the fruit sub-sector yet a negative impact for the vegetables. The other sub-sectors under study present no significant effect of EU trade agreement with deep SPS and TBT provisions.

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<sup>1</sup> The author is aware that Mexico is not in the Southern Hemisphere yet defines the countries under study as “Chilean southern hemisphere competitors” due to counter-seasonal exports.

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## List of Acronyms

AA:	Association Agreement
BSE:	Bovine Spongiform Encephalopathy
CEEC:	Central and Eastern European Countries
CIF:	Cost, Insurance and Freight
EPA:	Economic Partnership Agreement
ER:	Exchange Rate
EU:	European Union
FOB:	Free On Board
FRESHFEL:	European fresh fruit and vegetable chain
FTA:	Free Trade Agreements
GDP:	Gross Domestic Product
GI:	Geographic Indications
GM:	Gravity Model
HACCP:	Hazard Analysis Critical Control Points
HICP:	Harmonised Index of Consumer Prices
HS:	Harmonized System
LCU:	Local Currency Unit
OECD:	Organisation for Economic Co-operation and Development
MERCOSUR:	Mercado Común del Sur (Southern Common Market)
MRL:	Maximum Residue Limits
MRT:	Multilateral Resistance Term
NTB:	Non-Tariff Barriers
NTM:	Non-Tariff Measures
PABCO:	Planteles Animales Bajo Control Oficial (Animal Holdings Under Official Control)
PPML:	Poisson Pseudo-Maximum Likelihood
PRA:	Pest Risk Assessment
RTA:	Regional Trade Agreements
SADC:	Southern African Development Community
SAG:	Servicio Agrícola Ganadero (Agriculture and livestock service of Chile)
SPS:	Sanitary and Phytosanitary
STC:	Specific Trade Concern
SUBREI:	Subsecretaría de Relaciones Económicas Internacionales de Chile (Subsecretary of International Economic Affairs of Chile)
TRQ:	Tariff Rate Quotas
TBT:	Technical Barriers to Trade
UECBV:	Union Européenne du Commerce du Bétail et des Métiers de la Viande (European Livestock and Meat Trades Union)
UNCTAD:	United Nations Conference on Trade and Development
US:	United States
WTO:	World Trade Organisation

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## 1. Introduction

The impact of Non-Tariff Measures (NTM) in agri-food trade has been largely discussed in literature without a clear consensus. The main results show heterogeneity depending on the characteristics of both the exporter and importer country as well as the sub-sector or product under study. Moreover, analysing the extent of the effect of existing Regional Trade Agreements (RTA) between the trade parties is particularly important in the context of current ongoing negotiations of new agreements and modernisation of existing ones.

Currently, negotiations for modernizing the Association Agreement (AA) signed in 2002 between Chile and the European Union (EU) are undergoing. At the time the AA was signed, it was one of the most detailed in terms of non-tariff measures (NTM). In this sense, it sets provisions for sanitary and phytosanitary (SPS) measures that surpass rules agreed upon by the WTO (Henry de Frahan *et al.*, 2020).

More recent agreements between the EU and other countries of the American continent have included chapters regarding SPS measures and Technical Barriers to Trade (TBT) that surpass the specifications of the EU-Chile AA. As we will further analyse in the following chapters, the EU has signed a comprehensive trade agreement with Colombia and Peru that entered in force in 2011 and which Ecuador joined in 2017 with extensive SPS and TBT chapters. More recent EU agreements such as the modernisation of the trade agreement with Mexico and the MERCOSUR agreement, that are not yet in force, have gone even further regarding the specifications on NTM. In this sense, the inclusion of provisions on SPS measures in regional and bilateral trade agreements is motivated by a desire to remove barriers thus contributing to deeper economic integration through the harmonisation of each party's regulatory system and by means of technical assistance programmes (Murina and Nicita, 2017).

Trade in agri-food products between the EU and Chile has not yet reached its full potential (Grieger, 2018). In the framework of the ongoing negotiations for the modernization of the EU-Chile AA, Henry de Frahan *et al.* (2020) express that both the EU and Chile have room to grow in their bilateral agri-food trade. Yet, for this to happen the modernization of the AA should encompass the issues that have held back trade to date. Measures to be undertaken are greater liberalization of tariffs, in particular from the part of the EU; reduction in non-tariff barriers (NTB), especially SPS measures, from both partners; and a conciliation of differences between the two partners with respect to the specification of rules of origin and the protection of geographical indications.

Contributing to the debate, a study suggests that NTM, such as those related to Technical Barriers to Trade (TBT) and SPS, impeded trade flows between Chile and the EU for agricultural products, such as beef and fresh fruits and vegetables (Kjöllerström, 2006). Moreover, the European Commission (2017) manifested that the lack of sufficient discipline to address NTM for agri-food products represent a burden.

In this context, we investigate whether the EU-Chile Association Agreement facilitates trade between the two economies in agri-food sub-sectors relative to its main competitors and focus specifically on the effect of NTM measures.

We expect that NTM between Chile and the EU do not affect bilateral trade as much as between the main competitors of Chile and the EU thanks to their Association Agreement.

In order to address this research question, we set a two stages research. First, a qualitative analysis is conducted based on interviews with key stakeholders in both Chile and Brussels. Second, a gravity model allows to analyse the impact of NTM in agri-food trade between Chile and the EU as well as the extent to which the EU-Chile Association Agreement facilitates trades between the two parties compared to Chilean main southern hemisphere competitors.

For our research, we take into account the following subsectors of interest: fresh fruits, fresh vegetables, meats, fish products and dairy products sub-sectors. Based on a previous study (Henry de Frahan *et al.*, 2020), the main Chilean southern hemisphere competitors for counter seasonal exports of some agri-food products under study are Argentina, Brazil, Mexico, Peru and South-Africa<sup>2</sup>. We then run a gravity model for EU imports and exports per sub-sector of interest based on panel data from 2000 to 2019.

We find a heterogeneous impact of SPS, NTM and other NTM across sectors and for EU imports and exports. For EU imports, we find that SPS and TBT provisions in EU trade agreements have a positive impact in the traded value for meat and dairy products sub-sectors, no significant effect for the fruits and fish and seafood subsectors whereas the impact on the vegetables subsector appears to be negative. These trade agreements show a positive effect on overcoming TBT disputes for the vegetables sub-sector. Nonetheless, they present a negative effect in overcoming SPS and TBT issues for the meat sub-sector and a negative effect for the dairy sub-sector for TBT matters. For EU exports, we find a positive effect of SPS and TBT provisions in EU trade agreements for the fruit sub-sector yet a negative for the vegetables, the other sub-sectors under study present no significant effect. Trade agreements with further SPS and TBT provisions show a positive impact in overcoming SPS and TBT issues for the vegetable sub-sector as well as for TBT matters in the dairy products sub-sector. On the contrary, the effect is negative for dealing with SPS matters for the fish and seafood sub-sector. The other effects show no significant impact.

The present paper is structured as follows. First, we review the existing literature on the topic and analyse the conceptual background for defining NTM and specially SPS and TBT. We then address the impact on agri-food trade between the EU and Chile and its main southern hemisphere competitors. Second, we study the SPS and TBT measures in the framework of the AA and the presence of these measures in agri-food trade. Third, we run a Gravity Model for each of the sub-sector of interest for EU imports and exports. We finally discuss the results and conclude.

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<sup>2</sup> The author is aware that Mexico is not in the Southern Hemisphere yet defines the countries under study as “Chilean southern hemisphere competitors” due to counter-seasonal exports.

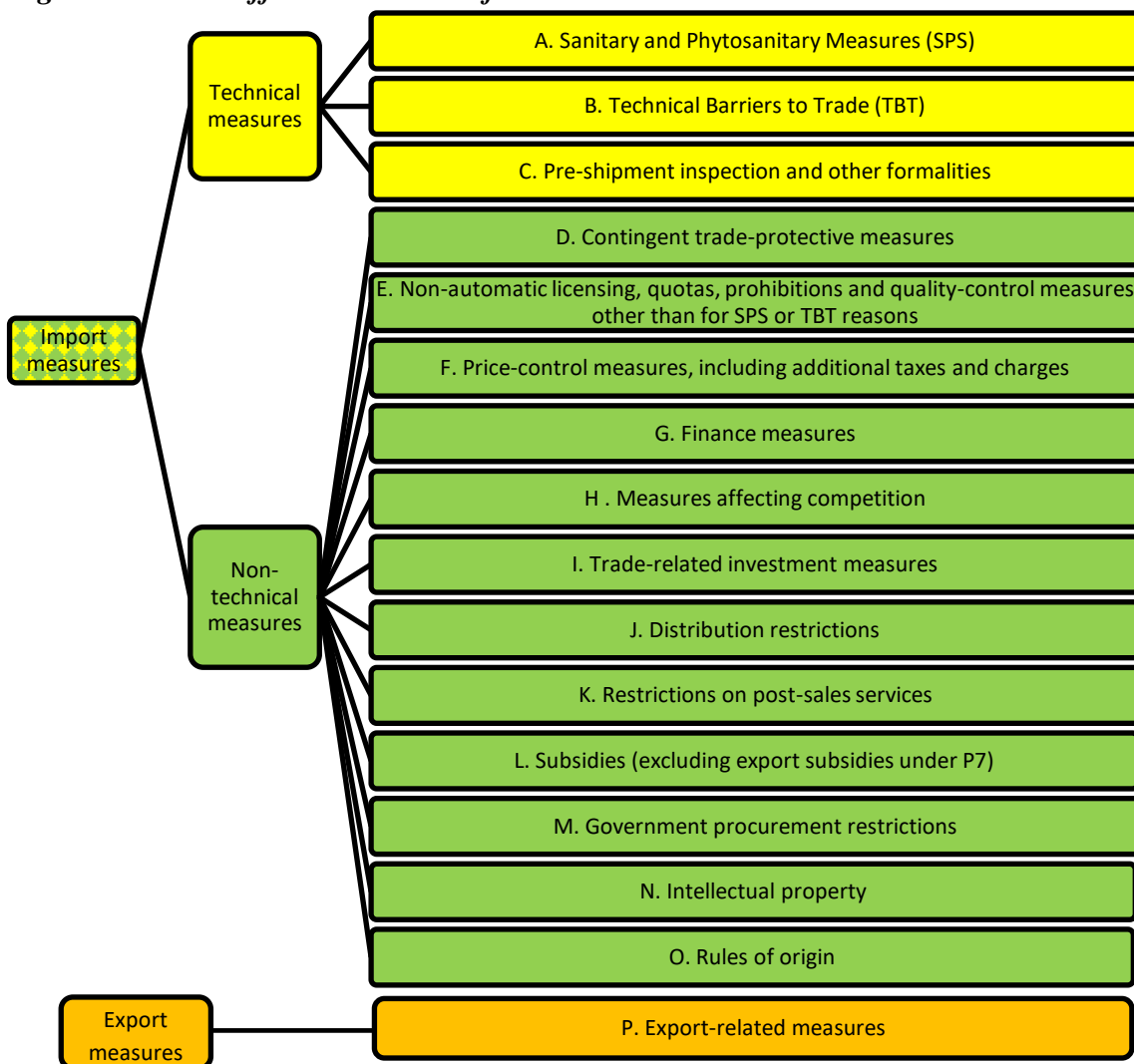
## 2. Literature review and conceptual background

### 2.1. Non-tariff measures

Non-tariff measures (NTM) are policy measures, other than ordinary customs tariffs, that can potentially have an economic effect on international trade in goods, changing quantities traded, or prices or both (UNCTAD, 2010). In some literature NTM were wrongly referred as Non-Tariff Barriers (NTB). The later ones are measures imposed by Governments to favour domestic over foreign suppliers and are therefore discriminatory measures (UNCTAD, 2013). The NTB are comprised within NTM, but NTM include a larger set of measures besides NTB.

To better identify and understand the extent of NTM, UNCTAD offers a classification in a tree structure (Figure 1). Measures are first divided between imports and exports measures. Within import measures, two sub-categories are defined: technical and non-technical measures. There are 16 measures in total, three under technical measures and 13 under non-technical measures.

*Figure 1. Non-tariff measures classification*



Source: UNCTAD secretariat

### **2.1.1. Sanitary and phytosanitary measures**

The WTO in the SPS Agreement defines SPS as any measure that is applied:

- to protect animals or plants from risks from pests and diseases
- to protect humans or animals from risks arising from additives, contaminants, toxins or other disease-causing organisms in foods, beverages and feed
- to protect humans or animals from risks from diseases carried by animal, plants or derived products; or from pests
- to prevent spread of pests

The Agreement basic principles are the following:

- Harmonization: SPS measures put in place by member countries should be based on international guidelines
- Equivalence: member countries should accept their trading partner SPS measures as equivalent of their own, even if they differ for the country in question or other countries.
- Assessment of risk: SPS measures should be founded on risk assessment based on scientific evidence and considering economic factors such as the potential damage of a pest or disease among others. The level of measures taken should aim to minimize negative trade effects.
- Regionalization: Members should adapt SPS measures to the characteristics of the area in which the product is originated and to which the product is destined, in particular when it comes to pest or disease-free areas.
- Transparency: all changes and current SPS measures should be properly informed.

In order to better understanding SPS measures, UNCTAD (2019) classified the measures into 8 categories presented in Box 1. A1 to A6 include the following technical regulations: prohibitions or restrictions of imports (A1), tolerance limits for residues and restricted use of substances (A2), labelling, marking and packaging requirements (A3), hygienic requirements (A4) and other requirement relating to production or post-production processes (A6). Conformity assessment related to these SPS measures is in the A8 section and other measures that are not included in the previous classification are included in the category A9.

**Box 1. Classification of SPS Measures from the International classification of non-tariff measures (UNCTAD, 2019 version)**

**A1. Prohibitions/restrictions of imports for SPS reasons**

- A11. Prohibitions for SPS reasons
- A12. Geographical restrictions on eligibility
- A13. Systems approach
- A14. Authorization requirement for SPS reasons for importing certain products
- A15. Authorization requirement for importers for SPS reasons
- A19. Prohibitions or restrictions of imports for SPS reasons, not elsewhere specified

**A2. Tolerance limits for residues and restricted use of substances**

- A21. Tolerance limits for residues of or contamination by certain (non-biological) substances
- A22. Restricted use of certain substances in foods and feeds and their contact materials

**A3. Labelling, marking and packaging requirements**

- A31. Labelling requirements
- A32. Marking requirements
- A33. Packaging requirements

**A4. Hygienic requirements related to SPS conditions**

- A41. Microbiological criteria of the final product
- A42. Hygienic practices during production related to SPS conditions
- A49. Hygienic requirements not elsewhere specified

**A5. Treatment for elimination of plant and animal pests and disease-causing organisms in the final product or prohibition of treatment**

- A51. Cold or hot treatment

A52. Irradiation

A53. Fumigation

A59. Treatments to eliminate plants and animal pests or disease-causing organisms in the final product not elsewhere specified or prohibition of treatment

**A6. Other requirements relating to production or post-production processes**

- A61. Plant-growth processes
- A62. Animal-raising or -catching processes
- A63. Food and feed processing
- A64. Storage and transport conditions
- A69. Other requirements relating to production or post-production processes not elsewhere specified

**A8. Conformity assessment related to SPS conditions**

- A81. Product registration and approval requirement
- A82. Testing requirements
- A83. Certification requirements
- A84. Inspection requirements
- A85. Traceability requirements
- A851. Origin of materials and parts
- A852. Processing history
- A853. Distribution and location of products after delivery
- A859. Traceability requirements not elsewhere specified
- A86. Quarantine requirements
- A89. Conformity assessment related to SPS conditions not elsewhere specified

**A9. SPS measures not elsewhere specified**

\*A7. was omitted by UNCTAD

### 2.1.2. Technical barriers to trade

Technical barriers to trade (TBT) are technical measures and standards that define special characteristics of a product or related processes and production methods that are not covered by the SPS provisions. The WTO Agreement on TBT which entered in force in 1995 sets the guidelines to implement these measures so that they do not create unnecessary obstacles to trade. To better understand the different types of TBT, the UNCTAD classified the measures as seen in Box 2.

#### **Box 2. Classification of TBT measures from the international classification of non-tariff measures (UNCTAD, 2019 version)**

##### **B1. Import authorization/licensing related to TBT**

B14. Authorization requirements for importing certain products

B15. Authorization requirements for imports

B19. Import authorization/licensing related to technical barriers to trade not elsewhere specified

##### **B2. Tolerance limits for residues and restricted use of substances**

B21. Tolerance limits for residues of or contamination by certain substances

B22. Restricted use of certain substances

##### **B3. Labelling, marking and packaging requirements**

B31. Labelling requirements

B32. Marking requirements

B33. Packaging requirements

##### **B4. Production or post-production requirements**

B41. TBT regulations on production processes

B42. TBT regulations on transport and storage

B49. Production or post-production requirements not elsewhere specified

##### **B6. Product identity requirements**

##### **B7. Product quality, safety or performance requirements**

##### **B8. Conformity assessment related to TBT**

B81. Product registration/approval requirements

B82. Testing requirements

B83. Certification requirements

B84. Inspection requirements

B85. Traceability requirements

B851. Origin of materials and parts

B852. Processing history

B853. Distribution and location of products after delivery

B859. Traceability requirements not elsewhere specified

B89. Conformity assessment related to TBT not elsewhere specified

##### **B9. TBT measures not elsewhere specified**

B11. to B13. and B5. were omitted by UNCTAD

## 2.2. Impact of non-tariff measures on trade

International trade is growing both in traded quantities and in complexity. As tariffs in agri-food products have been reduced following the Uruguay round, the importance of non-tariff measures (NTM) has been rising during the past decades. The effects of NTM on trade have been long analysed in existing literature resulting in mixed conclusions (Beghin *et al.*, 2015). Particularly the impact of NTM at firm-level, especially in developing countries, is under debate (Curzi *et al.*, 2020; Beghin *et al.*, 2015; Jaffee and Henson, 2005).

First, some authors find a restrictive impact of NTM on trade for middle- and low-income. Murina and Nicita (2017) find a trade-dampening effect from SPS measures in relation to exports from low-income countries to the EU. Moreover, preferential trade agreements (PTAs) with the European Union appear to facilitate low-income countries in overcoming some of the compliance costs related to SPS measures. However, this result is not always statistically significant and would therefore need further analysis. Anders and Caswell (2009) analyse the impact of the United States (US) regulation on seafood safety Hazard Analysis Critical Control Points (HACCP) that applies for both local production and imports. The overall result on US seafood imports shows a dampening effect. When comparing trade effects for developing versus developed countries at an aggregate level, developing countries as a group suffered a negative trade effect under HACCP. Exports from developed countries, again as a group, were increased under HACCP. However, country-specific estimates reveal considerable differences across countries regarding the short- and long-run post-HACCP trade effects. A clear majority of the larger seafood exporting countries gained increasing trade. In contrast, most smaller exporters experienced short- and long-run negative trade effects after the HACCP was adopted. Disdier *et al.* (2008) find that SPS measures significantly reduce exports from developing countries to OECD countries. Yet, these measures have not affected trade between OECD members. Results from Otsuki *et al.* (2001) would show that the implementation of the aflatoxin standard in the EU will have a negative impact on African exports of cereals, dried fruits and nuts to Europe. This is in contrast to While Xiong and Beghin (2012), who find no evidence of the EU Maximum Residue Limits (MRL) on aflatoxins having a significant negative trade impact on groundnut exports from Africa.

Second, other studies show no or mixed impact on developing country exports. Fontagné *et al.* (2005) find a predominance of negative impacts of SPS and TBT measures on trade of fresh and processed food, while in the case of manufacturing products an insignificant or even positive impact is observed. Curzi *et al.* (2020) study the impact of standards on Peruvian trade at a firm-level. They found regular SPSs to be trade enhancing, whereas relevant heterogeneous effects of NTMs are identified for firms of different size. In this sense, the larger the size of the firm the more exports are enhanced.

Third, other authors find NTM to be trade expanding. Chevassus-Lozza *et al.* (2008) analyse the impact of trade barriers on agri-food exports from Central and Eastern European Countries (CEECs) to the EU. They find that EU sanitary measures are generally met by the CEEC that joined the EU in 2004 and they do not constitute a barrier. Moreover, they state that the volume of trade is higher for products reached by sanitary measures than for other products. They conclude that sanitary standards seem to be met and consequently to stimulate trade. Nonetheless, one could beware of the endogeneity problem in the authors' conclusion. On the other hand, Henry de Frahan and Vancauteran (2006) find that harmonisation of food regulations fosters intra-EU trade.

All in all and as already stated, we find that the effects of NTM in agri-food trade vary across different sub-sectors and trade partners.

### **2.3. Methodology for analysing NTM in agri-food trade between the EU and Chile**

The Gravity Model (GM) is based on Newton's Law of Universal Gravitation and predicts international trade between two parties as proportional to the parties' sizes and inversely proportional to the trade frictions between them. It is often used to estimate the value impact of NTMs (UNCTAD, 2013). Santeramo (2020) uses the GM to analyse trade effects of SPS measures in Regional Trade Agreements. Melo *et al.* (2014) examine the impact of SPS regulations and standards in Chilean fresh fruit exports with a gravity equation. Tran *et al.* (2012) assess the impact on Canada, the EU15, Japan and US crustacean imports of tighter drug residue (chloramphenicol) regulations with a GM. Murina and Nicita (2017) use the gravity equation to address the effect of SPS measures on the agricultural exports from low-income countries. Disdier and Fontagne (2010) estimate a GM for quantifying the trade impact of EU measures on Genetically Modified Organisms in the perspective of the WTO complaints raised by the US, Canada and Argentina.

The gravity equation has been extensively used and successfully explains bilateral trade between two countries. However, the results of the gravity estimations need to be interpreted with care (Beghin *et al.*, 2015). In this sense and in order to address the research question two complementary approaches are undertaken. First, Chapter 3 will be based on primary data collection (semi-structured interviews) and secondary data (literature review and database analysis). And second, in Chapter 4 we will use a gravity model to assess whether the AA facilitates trade between the EU and Chile in agri-food products. Interpreting the gravity equation estimators will be complemented by the data retrieved in Chapter 3. The methodologies are further detailed in the beginning of the corresponding chapters.

### 3. The EU – Chile Association Agreement on agri-food trade: historical perspective analysis and current negotiations

In this section we will overview how the AA may have favoured access in trade between the EU and Chile. We will first quickly review the tariff liberalization. Then, in section 3.1. we focus on the specificities of the EU-Chile AA with respect to other trade agreements analysing first SPS and then TBT measures. Section 3.2. analyses the trends in EU agri-food trade with Chile and its main Southern hemisphere competitors. Finally, in section 3.3. we present the main results of the surveys with representatives of key stakeholders in Santiago and Brussels.

The tariff reduction process framed in the commitments of the AA was implemented gradually by both the EU and Chile. Given that the longest period for tariff reduction established by both parties was 10 years since the entry in force of the AA, the tariff liberalization process was completed in 2013. The balance of this tariff reduction is that 89.7% of Chilean products (a total of 8,547 products) have no tariff for entering the EU (Table 1). These products represent 91.8% of Chilean exports to the EU. Also, a preferential tariff and tariff quotas were established for 2.3 and 2.7%, respectively, of the EU imports from Chile. Finally, 5.3% of the products were excluded from tariff liberalization. Among the products excluded, we find some dairy products such as milk, cream, some yogurts and butter; bacon and pork fat; beef carcass or half carcass; frozen fruits (with more than 13% sugar); olive oil and some fruit juices (SUBREI, 2020).

*Table 1. Tariff liberalization for EU imports from Chile*

Category	Number of tariff items*	%	EU imports from Chile 2019 (million €)	%
<b>Tariff 0**</b>	8,547	89.7%	6,829	91.8%
<b>Preferential tariff***</b>	219	2.3%	479	6.4%
<b>Tariff quota</b>	258	2.7%	116	1.6%
<b>Excluded</b>	509	5.3%	12	0.2%
<b>Total</b>	9,533	100%	7,436	100%

Source: SUBREI (2020) based on SUBREI Market access division and EUROSTAT data

(\*) Based in Taric, 2018 (\*\*) fully liberalized, includes immediate and gradual liberalization (\*\*\*) products with lowered tariffs

As for the process of tariff liberalization of Chilean imports from the EU, 98% of the products have a zero tariff, representing 98.7% of EU exports to Chile (Table 2). Preferential tariff reached 0.4% of the products and tariff quotas, 0.05%. As for the products excluded from tariff liberalization, they represent 1.5% of the items and 0.8% of the value of EU exports to Chile. Among the excluded products we find milks and cream; wheat (except durum wheat); wheat flour; some oils such as soybean, peanut, palm, cotton, coconut and sesame; some fish products; gelatine; non-alcoholic preparations for beverages; among others (SUBREI, 2020).

**Table 2. Tariff liberalization for Chilean imports from the EU**

Category	Number of tariff items	%	EU exports to Chile 2019 (USD million)	%
<b>Tariff 0*</b>	8,390	98%	10,700	98.7%
<b>Preferential tariff</b>	37	0.4%	55	0.5%
<b>Tariff quota</b>	4	0.05%	0.08	0.0008%
<b>Excluded</b>	130	1.5%	91	0.8%
<b>Total</b>	8,561	100%	10,846	100%

Source: SUBREI (2020) based on SUBREI Market access division and *Banco Central de Chile* data  
 (\*) fully liberalized, includes immediate and gradual liberalization

The AA indeed generated a tariff liberalization in the process that concluded in 2013 with 89.7% of the EU imports from Chile and 98% of Chilean imports from the EU with a zero tariff. Nonetheless and, as we will study in the following part, Non-Tariff Measures play a significant role in market access and are constantly updated which leads to the need of an in-depth study of these measures.

### **3.1. The specificities of the 2002 EU-Chile association agreement with respect to other EU trade agreements in terms of market access to agri-food products**

#### **3.1.1. SPS review for EU regional trade agreements with Chile and its main Southern hemisphere competitors**

Quantifying SPS measures is challenging. They are indeed not always transparent, directly quantifiable, and easily modelled (Grant and Arita, 2017). In the following sections we will address the following sources of data: SPS measures included in Regional Trade Agreements (RTA), SPS notifications by country notified to the WTO and Specific Trade Concerns in EU bilateral trade relationships with Chile and its main southern competitors.

##### *3.1.1.1. SPS measures on RTA*

In this section we will analyse whether Regional Trade Agreements include a specification regarding SPS measures (Table 3). We will focus on the RTAs signed by the countries that will afterwards be included on our model: Chile-EU, EU-Colombia/Peru, EU-Mexico, EU-SADC which includes South Africa and EU-Mercosur which includes Argentina and Brazil. Incorporation of SPS chapters in RTAs upholds the relevance of these measures for trade of agri-food products. Generally, agreements specify that the signatory parties are committed to comply with the WTO-SPS Agreement. Some include specific related commitments, but few actually go beyond (Fulponi *et al.*, 2011).

**Table 3. SPS chapter analysis on RTAs based on Fulponi et al. (2011) and Santeramo (2020)**

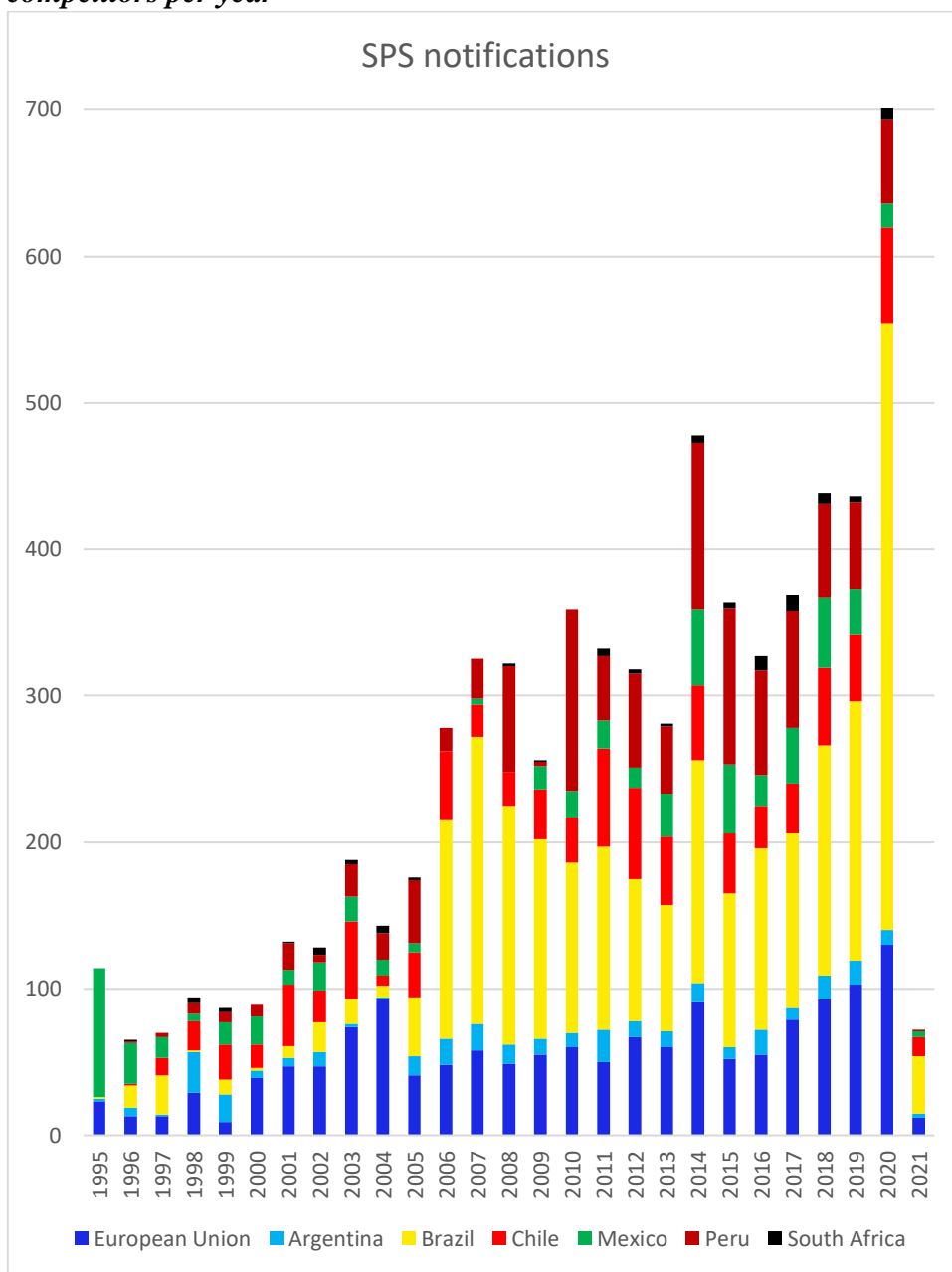
RTA	Year of entry into force	SPS chapter	Harmonisation	Equivalence	Regionalization	Assessment of risk	Transparency	Joint Committee	Mutual recognition
EU-Chile	2003	Yes	Plus WTO-SPS	Plus WTO-SPS	Plus WTO-SPS	Yes	Plus WTO-SPS	SPS issues	Yes
EU-Colombia/Peru	2011	Yes	Plus WTO-SPS	Plus WTO-SPS	Plus WTO-SPS	Plus WTO-SPS	Plus WTO-SPS	SPS issues	Yes
EU-MERCOSUR	Not yet	Yes	Plus WTO-SPS	Plus WTO-SPS	Plus WTO-SPS	Plus WTO-SPS	Plus WTO-SPS	SPS issues	Yes
EU-Mexico	2000	Limited	Yes	Yes	Yes	Yes	Yes	Yes but not specific on SPS	No
EU-Mexico (modernisation)	Not yet	Yes	Yes	Plus WTO-SPS	Plus WTO-SPS	Plus WTO-SPS	Plus WTO-SPS	SPS issues	Yes
EU – South Africa	2000	No	No	No	No	No	No	No	No
EU-SADC EPA	Not yet	Limited	Yes	Yes	Yes	Yes	Yes	SPS issues	No

Chile-EU agreement was one of the most complete ones regarding SPS measures by the time it was signed. In fact, for almost a decade, Chile was the only Latin American country able to negotiate deeper commitments on SPS matters with a developed country (Fulponi *et al.*, 2011). In this sense, the EU-Mexico trade agreement (1997) initially contained an SPS chapter but it did not contemplate measures that actually went beyond the WTO SPS Agreement. In the modernisation of the Trade part of the EU-Mexico Global Agreement (2018) deeper measures were incorporated as shown in Table 3. As for the EU-Colombia/Peru agreement (2011), it already contained more extensive SPS measures than the ones present in the WTO SPS Agreement. The recently signed agreement between the EU and MERCOSUR followed this trend and established specific commitments on the principles of harmonisation, equivalence, regionalization, risk assessment and transparency. Nonetheless, as it is not yet ratified by the EU member states it is not yet in force. The preferential trade agreement between the EU and South Africa (2000) did not incorporate any SPS chapter. The South African Government stressed that a smooth implementation of SPS measures was vital. In 2016 an Economic Partnership Agreement was signed between the EU and the Southern African Development Community (SADC) which includes South Africa. This document includes an SPS chapter reaffirming the commitments with the WTO SPS Agreement but it does not go significantly beyond. Indeed, for SADC the main objectives of cooperation are reaching food security and rural development, not competitiveness or trade. Consequently, in this agreement SPS measures aim to ensure agriculture production and promote rural employment (Fulponi *et al.*, 2011).

### 3.1.1.2. SPS notifications to the WTO

The SPS Agreement requires to the member countries to notify the WTO of new SPS regulations or modifications to existing ones. Figure 2 illustrates the number of SPS notifications per country and year. It clearly shows an increasing trend between 1995 and 2020. In general, this trend reflects the rising share of developing country notifications and not necessarily a rising number of notifications through time (Grant and Arita, 2017). Brazil is a clear example presenting an average of 13 notifications per year between 1995 and 2005 and an average of 131 between 2006 and 2016. The other Latin American countries under study did not present as many notifications. In the last decade, Peru notified an average of 70 regulations or modifications per year. During the same period, Chile presented 50 per year on average, Mexico 31 and Argentina 13. South Africa's notifications between 1995 and 2020 add up to 20 in the whole period. As for the EU, there is an increase between 1995 and 2004 followed by a new rise during the period between 2005 and 2020, outstripping 100 notifications per year in 2019 and 2020. Even if data regarding SPS notifications is available, comparisons between countries can hardly be performed given the heterogeneity of the regulations put in place by each member.

**Figure 2. SPS notifications for the EU, Chile, and its main Southern hemisphere competitors per year**



Source: own elaboration based on WTO database

As already mentioned, quantitative analysis with SPS measures is hard to address given the difficulty to have a consolidated database. In this sense, Grant and Arita (2017) observe a lack of consistency in reporting behaviour. Few information describing the type of measure exists which makes harder to understand how it affects trade and to which countries and products the measure applies. Open databases from the WTO in very limited cases contain the exporter countries affected by the measure. In all other cases, it leads researchers to assume that the measure affects all commercial counterparts which is usually not true since it actually depends on the importer’s risk assessment of the production and export risks of the trade partner. The authors therefore suggest using SPS

specific trade concerns as a targeted approach to understand bilateral revealed concerns of exporters regarding SPS measures maintained by their trade partners.

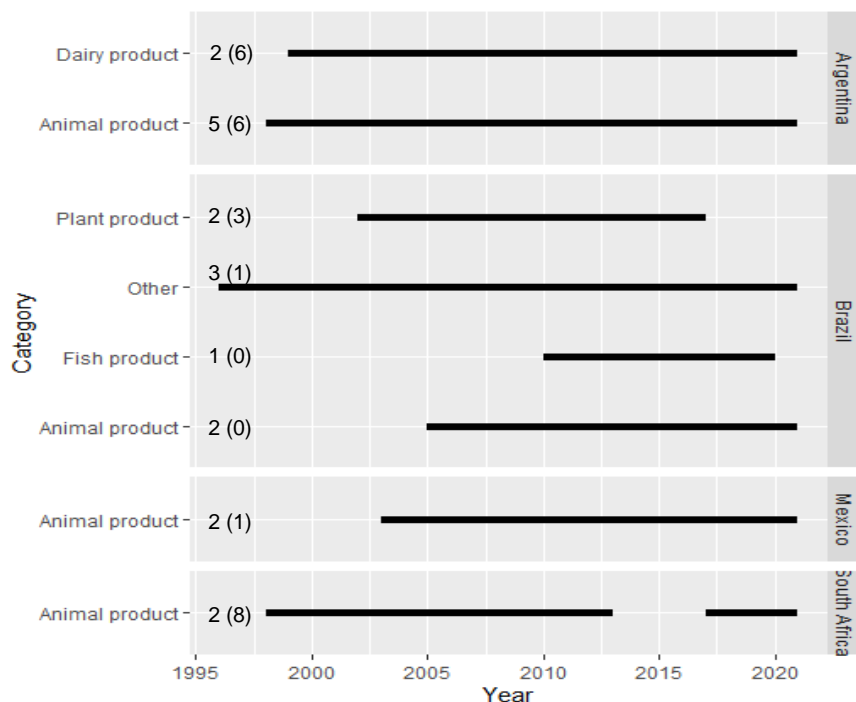
### *3.1.1.3. SPS Specific Trade Concerns*

Member countries can raise specific issues regarding SPS measures of their trade partners to the SPS Committee created by the SPS WTO Agreement. Specific trade concerns (STC) do not constitute a formal trade dispute in a legal sense (Grant and Arita, 2017). This space allows members to discuss and ideally solve ambiguities or potential inconsistencies in the implementation of importers SPS measures. The SPS Committee usually meets three times per year and allows to member countries to present new STCs or to rise again STCs that were previously addressed but remain unsolved.

The present study analyses EU bilateral trade with Chile and its main southern competitors. This specific scope allows deeply reviewing each STC for understanding the potential issues existing. Each STC was classified into one of the six product categories of interest: animal product, dairy product, fish products, fruit and vegetables, plant products and others. Moreover, each SPS issue was classified based on the UNCTAD classification of SPS (2019 version) at the first level of classification.

As seen in Figures 3 and 4 none STC raised or supported by the EU for SPS measures is maintained by Chile or Peru. STC with Chile's southern main competitors relate mostly to animal products. Many of them relate to measures for containing animal diseases such as Bovine Spongiform Encephalopathy (BSE), swine fever or avian influenza. Moreover, main concerns are related to prohibitions or restrictions of imports for SPS reasons (A1 category of the 2019 UNCTAD classification).

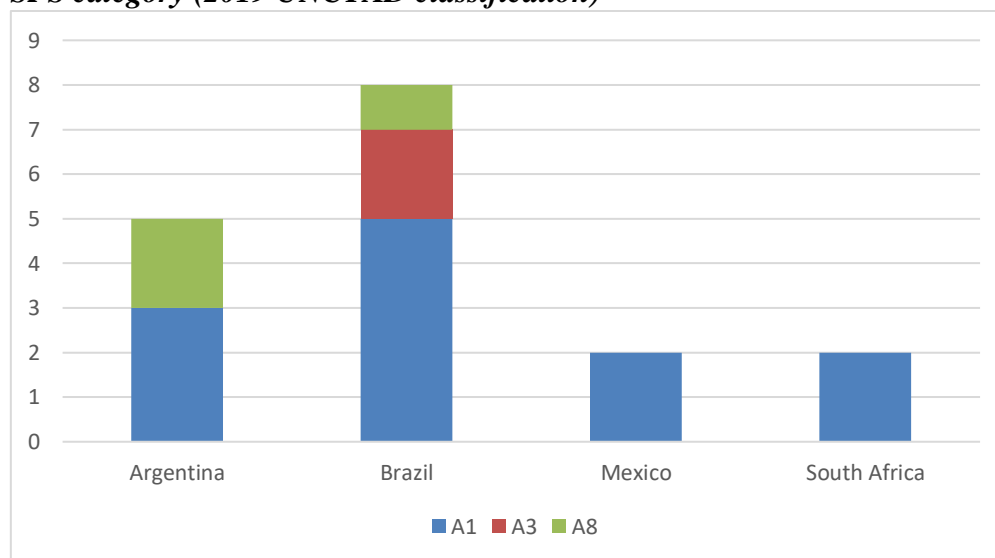
**Figure 3. Duration of SPS STC raised or supported by the EU per maintaining country and product category**



Note: numbers in the first column indicate number of STCs and (number of times the STC was subsequently raised)

Source: own categories and elaboration based on WTO database

**Figure 4. Number of STC raised or supported by the EU per maintaining country and SPS category (2019 UNCTAD classification)**

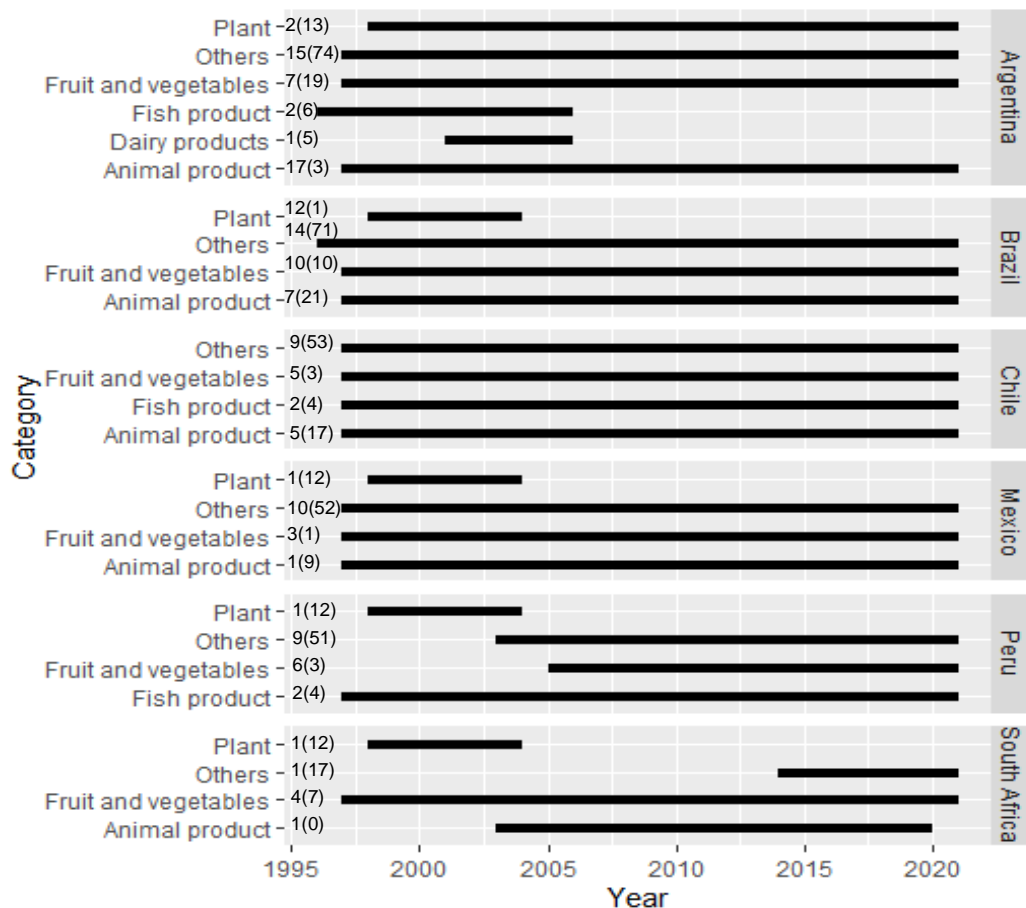


Source: own elaboration based on WTO database

As for STC raised or supported by Chile and its main southern competitors regarding EU SPS measures, Figures 5 and 6 show that most of STCs relate to the product category “others” which usually refers to general measures that affect all agri-food sub-sectors or, in some cases, specific products such as honey, coffee or cocoa. The second product

category in number of STC presented includes fruits and vegetables where the principal SPS measures relate to the maximum levels of residues and pest control which are included in the A2 category of the 2019 UNCTAD classification. STC for animal products are mostly raised or supported by Brazil, Chile and Argentina and are mainly related to measures aiming to withhold diseases such as BSE, food and mouth disease and salmonella in poultry meat. Different approaches were taken to contain these diseases which vary between measures classified in the categories A1 (prohibition or restrictions of imports), A6 (other requirements relating to production or post-production process) and A8 (conformity assessment). Finally, two SPS measures raised by Chile and Peru on fish product are related to restrictions in fishmeal products and were contained by SPS measures classified in the A6 category. Initially, many STCs were a consequence of SPS measures related to the transition from the European Community to the European Union in 1993 such as eliminating the criteria of protected areas within the Community territory, removing internal restrictions, having member states taking measures that are not yet approved by the EU institutions, among others. As for the most recent STC, main STC are related to the strengthening of measures setting Maximum Residue Levels (MRL) and the difficulty to meet these regulations in the COVID-19 context, illustrated by Figure 6 as the A2 category (tolerance limits for residues and restricted use of substances).

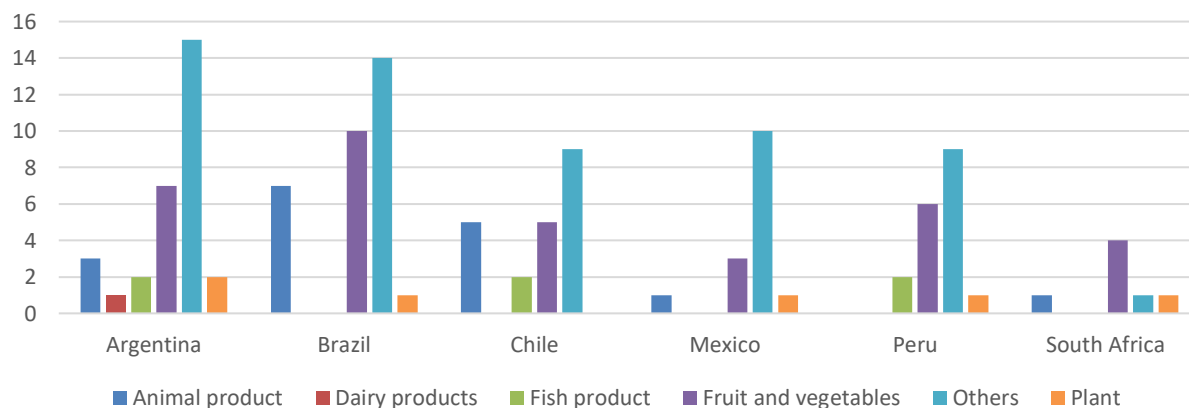
**Figure 5. Duration of SPS STC maintained by the EU per raising or supporting country and product category**



Note: numbers in the first column indicate number of STCs and (number of times the STC was subsequently raised)

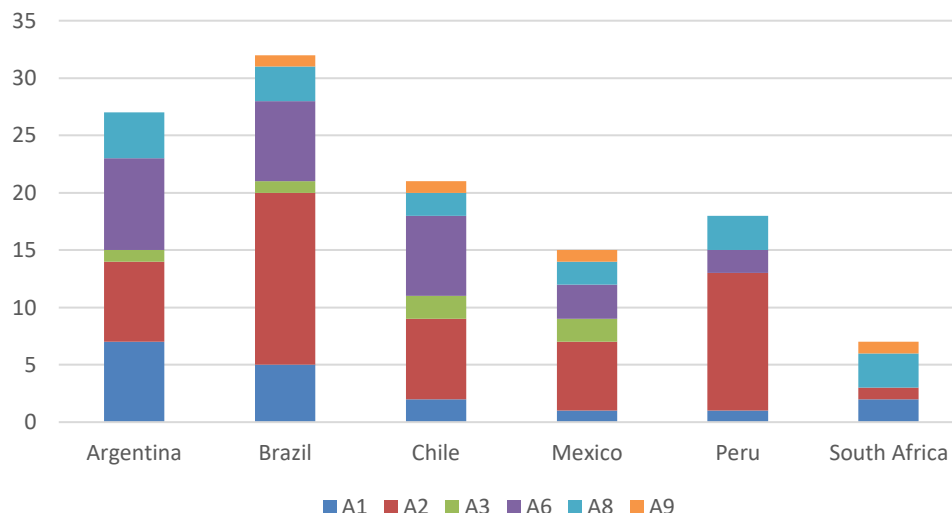
Source: own categories and elaboration based on WTO database

**Figure 6. STC maintained by the EU per raising or supporting country and product category**



Source: own categories and elaboration based on WTO database

**Figure 7. Number of STC for measures maintained by the EU per raising or supporting country and SPS category (2019 UNCTAD 2019 classification)**



Source: own elaboration based on WTO database

In addition, Figures 3 and 5 incidentally show that many STC are not yet reported as resolved or partially resolved. The WTO Committee has been working on a follow up of measures that remain open but based on the information available it is not possible to know whether the SPS measures addressed in the STCs are currently impeding trade or whether the problem was overcome but not reported.

### **3.1.2. TBT review for EU regional trade agreements with Chile and its main Southern hemisphere competitors**

#### *3.1.2.1. TBT measures in Regional Trade Agreements*

As presented in Table 4, the 2002 EU-Chile Association Agreement (AA) specifies provisions in TBT measures that go beyond the WTO TBT Agreement on this matter. The EU-Chile AA specifies an article which aims to promote bilateral cooperation to identify most appropriate mechanisms -including equivalence, transparency, regulatory cooperation, conformity assessment and mutual recognition- considering particular issues or sectors. On the same line, the EU-Colombia/Peru Agreement, that entered in force in 2011, also contains a chapter stating commitments for the implementation of TBT measures including transparency, border control and market surveillance, conformity assessment, technical assistance and capacity building. As for the other EU Regional Trade Agreements (RTA), the original agreement with Mexico contained an article for cooperation between the parties for technical regulations and conformity assessment which does not go beyond the WTO TBT Agreement specifications. In 2016, the modernisation of the EU-Mexico trade agreement incorporates a TBT chapter WTO Plus, but the agreement in principle is not yet in force. Following the same line, the EU-Mercosur trade agreement also contains WTO Plus regulations in TBT measures with extensive specifications for joint cooperation, conformity assessment and transparency, but the agreement is not yet entered into force. As for the EU-South Africa trade

agreement, no specific provisions are made for TBT measures are included in the original agreement, but some provisions are incorporated in the EU-SADC Economic Partnership Agreement (EPA) although only reaffirming the commitment with the WTO TBT Agreement and not going deeply beyond.

In sum, by the time the Chile-EU AA entered in force it was the only agreement among the ones under study in this analysis that established specific provisions for TBT measures that go beyond the WTO TBT Agreement. Nonetheless, most recent agreements, such as the EU-Colombia/Peru Agreement, the modernisation of the EU-Mexico Agreement and the EU-Mercosur Agreement, go beyond the specifications made for TBT measures in the EU-Chile AA. In this sense, the EU proposal for the TBT chapter of the modernisation of its AA with Chile aims to be as extensive as the more recent agreements with Colombia & Peru, Mexico, Mercosur. The textual proposal includes special articles regarding conformity assessment, transparency and technical discussions and consultations. Furthermore, it aims to promote bilateral cooperation and nominate a TBT Chapter coordinator for each party to work conjointly. Nonetheless, this is only a text proposed by the EU and the actual content of the final agreement will be the result from further negotiation of both parties.

**Table 4. TBT chapter analysis in RTAs**

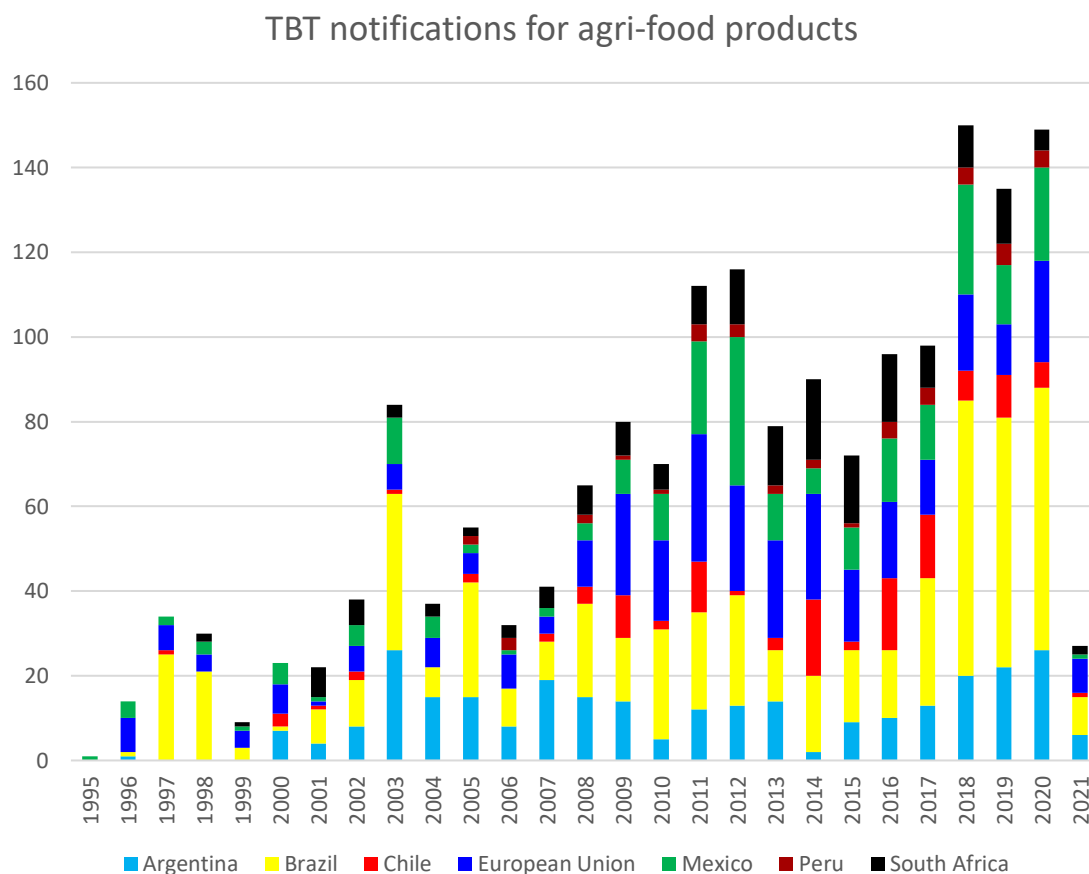
RTA	Year of entry into force	TBT chapter	Joint Committee
EU-Chile	2003	WTO Plus	TBT issues
EU-Colombia/Peru	2011	WTO Plus	TBT issues
EU-MERCOSUR	Not yet	WTO Plus	TBT issues
EU-Mexico	2000	No	Yes but no TBT specifications
EU-Mexico (modernisation)	Not yet	WTO Plus	TBT issues
EU-South Africa	2000	No	No
EU-SADC EPA	Not yet	Yes	TBT issues

### 3.1.2.2. TBT notifications to the WTO

The WTO Agreement on TBT, as well as the Agreement on SPS, requires that member countries notify to the WTO new technical regulations and the products affected. We analysed notifications on TBT measures from the EU, Chile and its main southern hemisphere competitors. To this date, these countries presented 7668 notifications from which we could identify 1759 (23%) as affecting agri-food products (HS 01 to 24). In some cases, few or no information regarding the product is available. As shown in Figure 8, there is an increasing trend in the number of TBT notifications that affect agri-food products between 1995 and February 2021 with a significant rise between 2018 and 2020. Brazil issued 559 TBT notifications with an average of 17 notifications per year between 1996 and 2017 and an average of 62 between 2018 and 2020, thus contributing to the

growing trend. As for the EU, between 1996 and 2008, an average of 6 TBT notifications per year were presented but between 2009 and 2020 the average number of notifications per year rose to 21 adding up to 333 during the whole period. Argentina and Mexico rose 284 and 241 TBT notifications respectively since 1995, with an average of 11 and 8 notifications per year respectively until 2017 and 23 and 21 between 2018 and 2020. Chile presented an average of 1 TBT notification per year between 1996 and 2008 and an average of 9 between 2009 and 2020, with a total of 120. South Africa and Peru presented between 1996 and 2020 an average of 7 and 2 TBT notifications per year, respectively.

**Figure 8. TBT notifications for agri-food products from the EU, Chile, and its main Southern hemisphere competitors per year**



Source: own elaboration based on WTO database

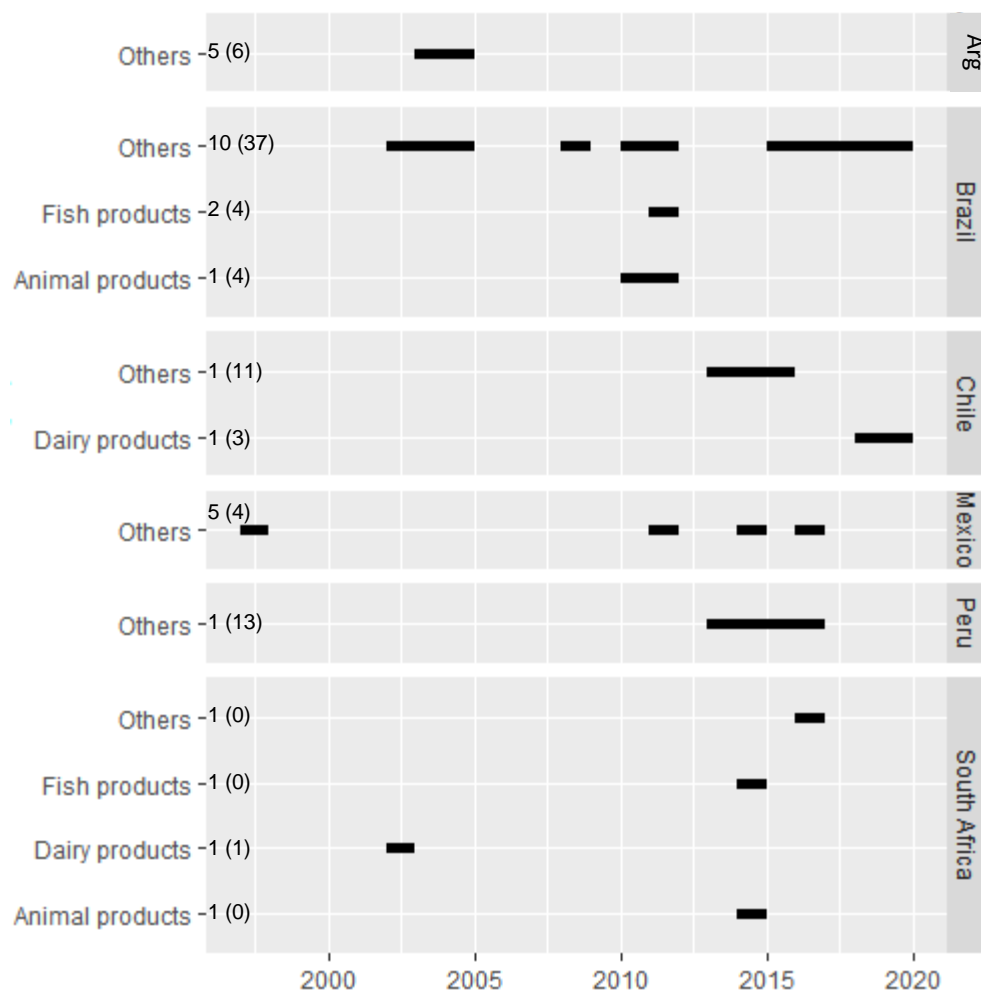
### 3.1.2.3. Specific Trade Concerns on TBT

The TBT Committee allows member countries of the WTO to raise Specific Trade Concerns (STC) regarding technical measures set by third countries. On one hand, the EU raised 30 STC on TBT measures maintained by Chile and its main southern hemisphere competitors. Two of them were issued on Chilean measures. On the other hand, 27 STC were raised by Chile and its main southern hemisphere competitors on TBT

measures maintained by the EU.<sup>3</sup> Unlike data regarding STC on SPS measures, the database on STC on TBT does not specify the date of resolution of the concern and, furthermore, all STC under the present analysis do not have a reported status. We classified the measures in four subsectors - animal products, dairy products, fish products and others - and in the TBT category based on the 2019 UNCTAD first level of classification.

As presented in Figures 9 and 10, the main affected products are classified as “others”. Among them, we find mostly wines and other alcoholic beverages, in second place processed food and, in some cases, tobacco products and olive oil, among others. When analysing all categories, as reported in Figure 11, main STC are related to TBT measures on labelling, marking and packaging requirements (B3 category) and, in second place, to product quality, safety or performance requirements (B7 category), and conformity assessment related to TBT (B8 category).

**Figure 9. Duration of STC raised or supported by the EU per maintaining country and product category**

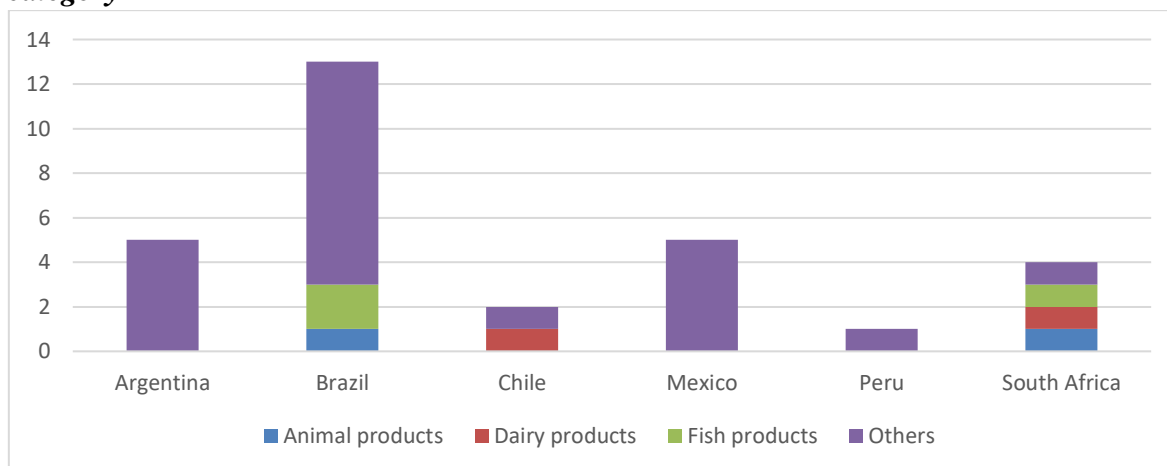


<sup>3</sup> In Figures 12, 13 and 14, total number of STC do not add up to 27 because many of these were raised by more than one country.

Note: numbers in the first column indicate number of STCs and (number of times the STC was subsequently raised)

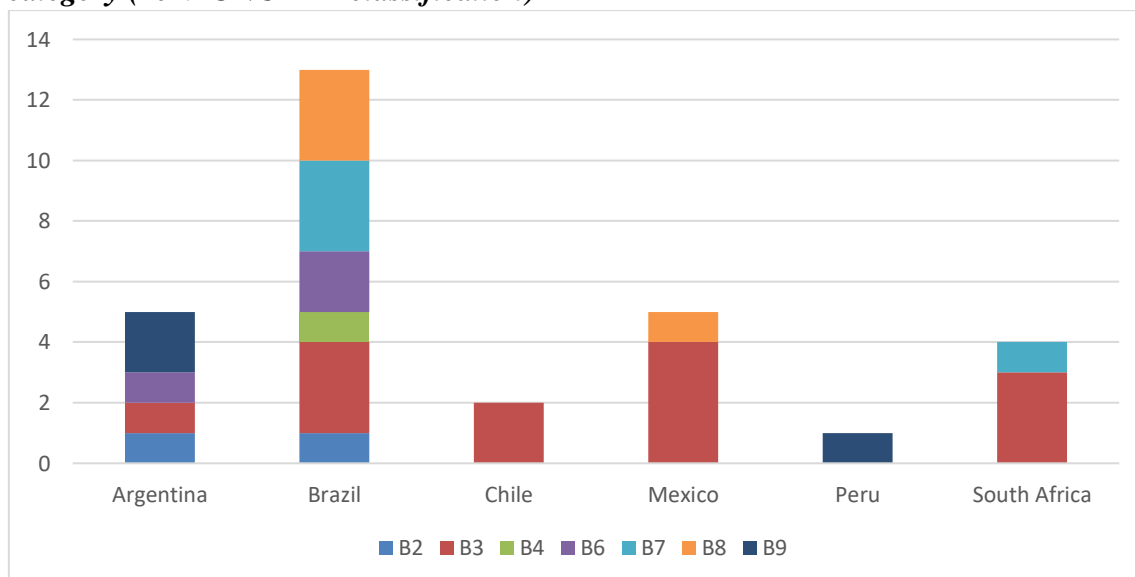
Source: own categories and elaboration based on WTO database

**Figure 10. STC raised or supported by the EU per maintaining country and product category**



Source: own categories and elaboration based on WTO database

**Figure 11. STC raised or supported by the EU per maintaining country and TBT category (2019 UNCTAD classification)**

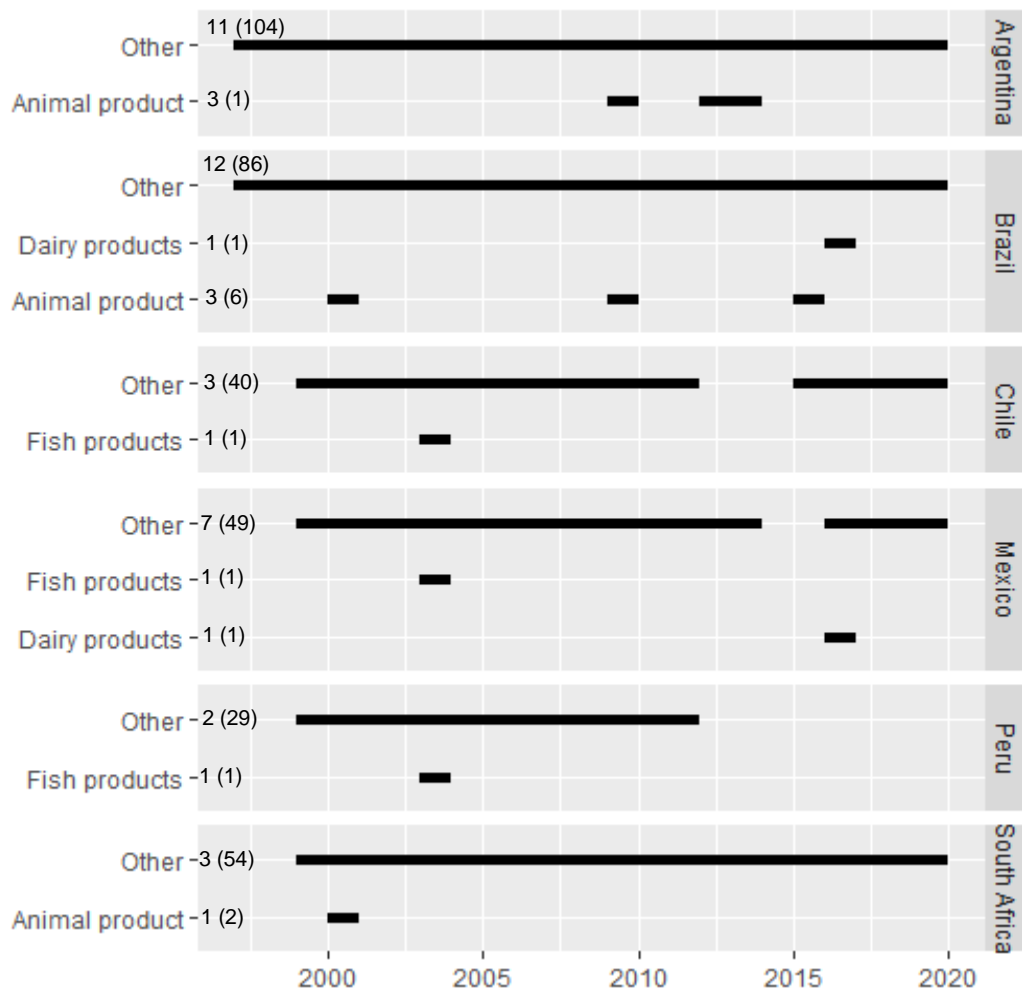


Source: own elaboration based on WTO database

As for TBT STC on agri-food products maintained or supported by the EU and raised by Chile and its main southern hemisphere competitors, the main affected subcategory is “others” (Figures 12 and 13). Among these, the most affected are wine and alcoholic beverages as well as organic or products containing genetically modified organisms (GMO), followed by palm oil. STC related to animal products are raised by Argentina, Brazil, and South Africa. These measures are mainly related to labelling for consumer information and animal welfare, and regulating the use of cloned animals. Only one STC is raised on fish products and one on dairy products. The first is raised by Chile, Mexico

and Peru, and refers to preserved sardines labelling. The second requires labelling on the country of origin and is raised by Brazil and Mexico. Finally, as seen in Figure 13, most of STC refers to TBT measures corresponding to labelling, marking and packaging requirements (B3 category). To a lesser extent, STC also refer to TBT measures in tolerance limits for residues and restricted use of substances (B2 category) and conformity assessment related to TBT (B8 category).

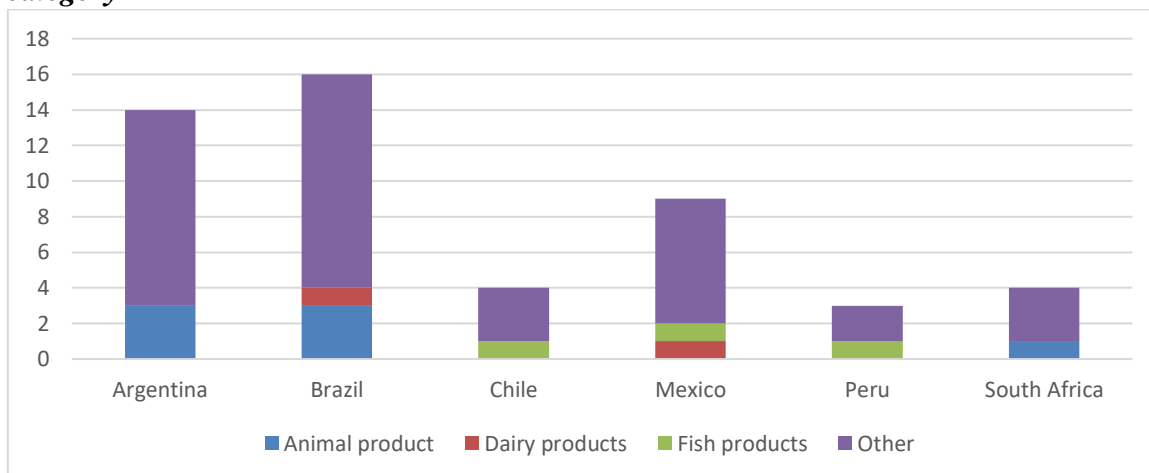
**Figure 12. Duration of TBT STC maintained by the EU per raising or supporting country and product category**



Note: numbers in the first column indicate number of STCs and (number of times the STC was subsequently raised)

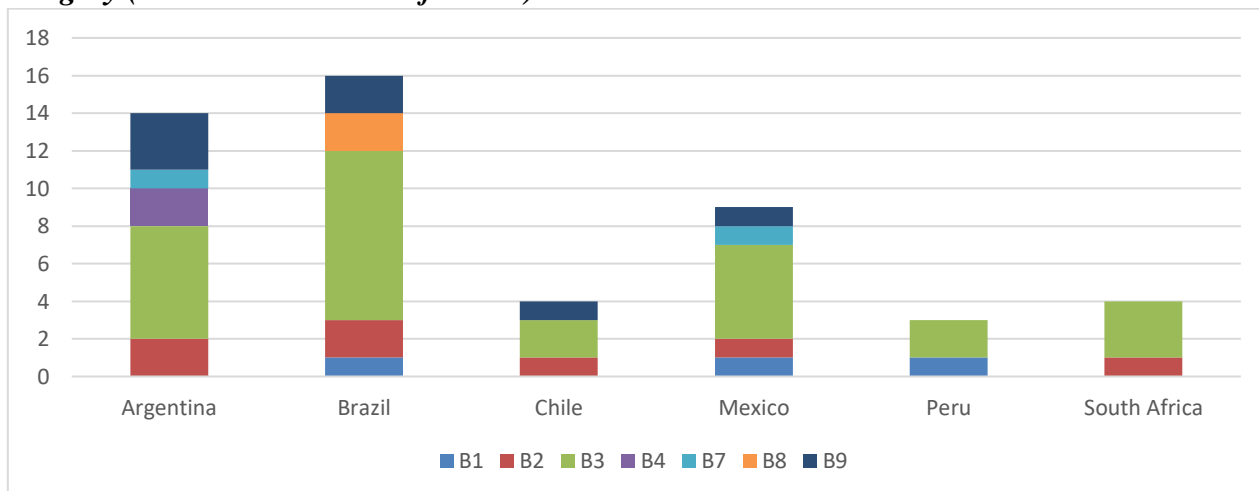
Source: own categories and elaboration based on WTO database

**Figure 13. STC maintained by the EU per raising or supporting country and product category**



Source: own categories and elaboration based on WTO database

**Figure 14. STC maintained by the EU per raising or supported country and TBT category (2019 UNCTAD classification)**



Source: own elaboration based on WTO database

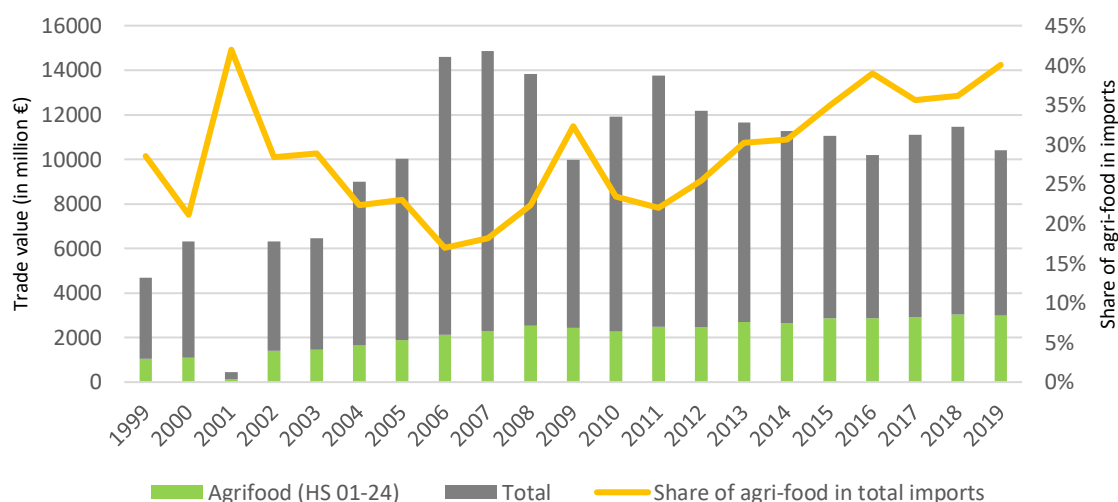
## 3.2. Trends in EU agri-food trade with Chile and its main Southern hemisphere competitors between 1999 and 2019

### 3.2.1. General trends in agri-food trade between the EU and Chile

#### 3.2.1.1. EU Imports from Chile

Two periods can be identified when analysing total EU imports from Chile. Just after the implementation of the Association Agreement (AA), total imports in nominal value increased from 4,913 million € in 2002 to 12,575 million € in 2007. Then, the import value decreased to 7,431 million € in 2019 (Figure 15). This relative stagnation since 2008 can be associated with many factors such as the Chilean trade diversion to the Asian markets, as well as macroeconomic cycle and slow economic recovery of the EU in the post-economic and financial crisis period (SUBREI, 2020). Regarding, EU agri-food imports from Chile, the value rises from 1,394 million € in 2002 to 2,974 million € in 2019. Yet, a slight decline is observed between 2008 and 2012. In this sense, Henry de Frahan *et al.* (2020, p. 5) identify “a first period from 2003 to 2008, during which the EU’s imports from Chile rose at an annual nominal rate of 11.2 per cent and a second period from 2008 to 2018, during which EU’s imports rose at a smaller annual nominal rate of 2.4 per cent, resulting in a recent weaker expansion in the EU’s imports of agricultural and food products from Chile.” All in all, the share of EU agri-food imports from Chile rises from 28% in 2002 to 40% in 2019 (Figure 15).

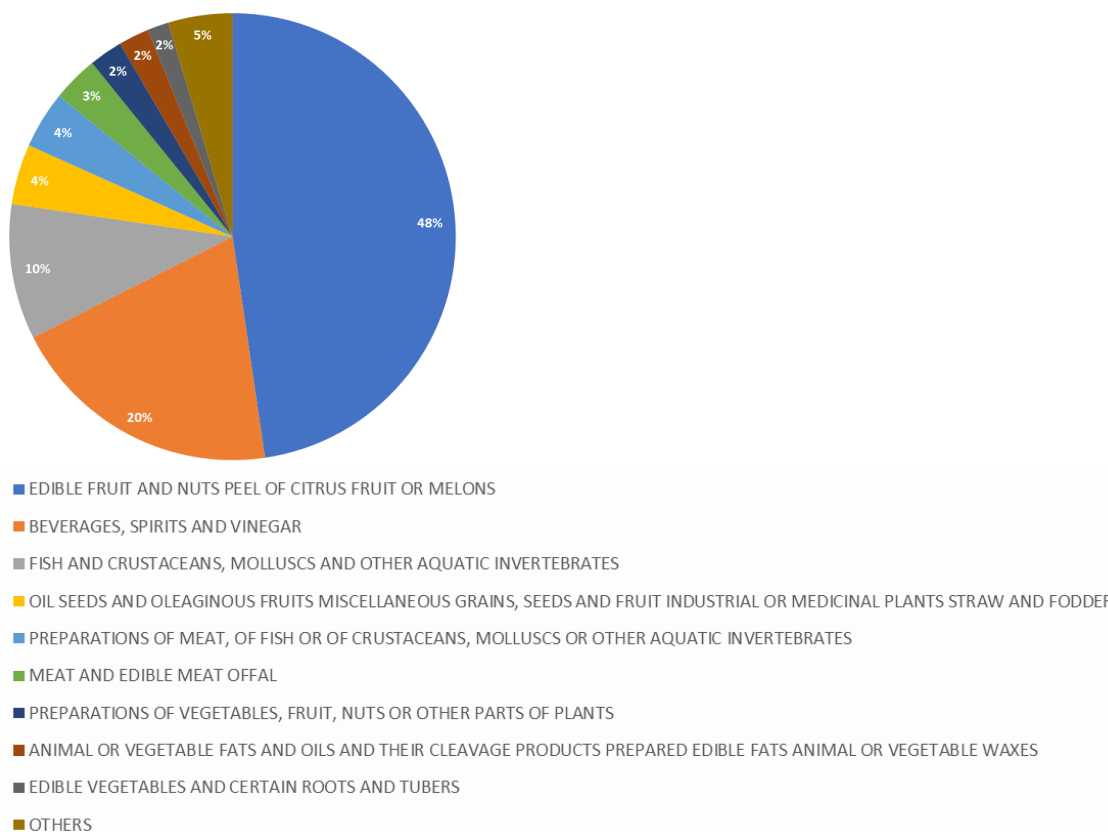
**Figure 15. EU28 nominal imports from Chile (in million €) and share of agri-food products in total imports (1999-2019)**



Source: Eurostat Comext

EU agri-food imports from Chile are concentrated in few categories. In 2019, edible fruit and nuts peel of citrus fruit or melons (HS07), beverages, spirits and vinegar (HS22), and fish and crustaceans, molluscs and other aquatic invertebrates (HS03) account for 77.3% of all agri-food imports (Figure 16).

**Figure 16. Main EU28 agri-food imports from Chile in 2019**



Source: Eurostat Comext

Regarding the sub-sectors identified as particularly interesting in the framework of this study, meat, dairy, and fishery products and some horticultural products seem to have stagnated since 2008 whereas edible fruits and nuts, preparations of vegetables, fruits and nuts, and beverages have steadily increased. The first group coincides with sub-sectors for which the EU has maintained high protection and the second group corresponds to sub-sectors where the protection has been kept at lower level (Henry de Frahan *et al.*, 2020).

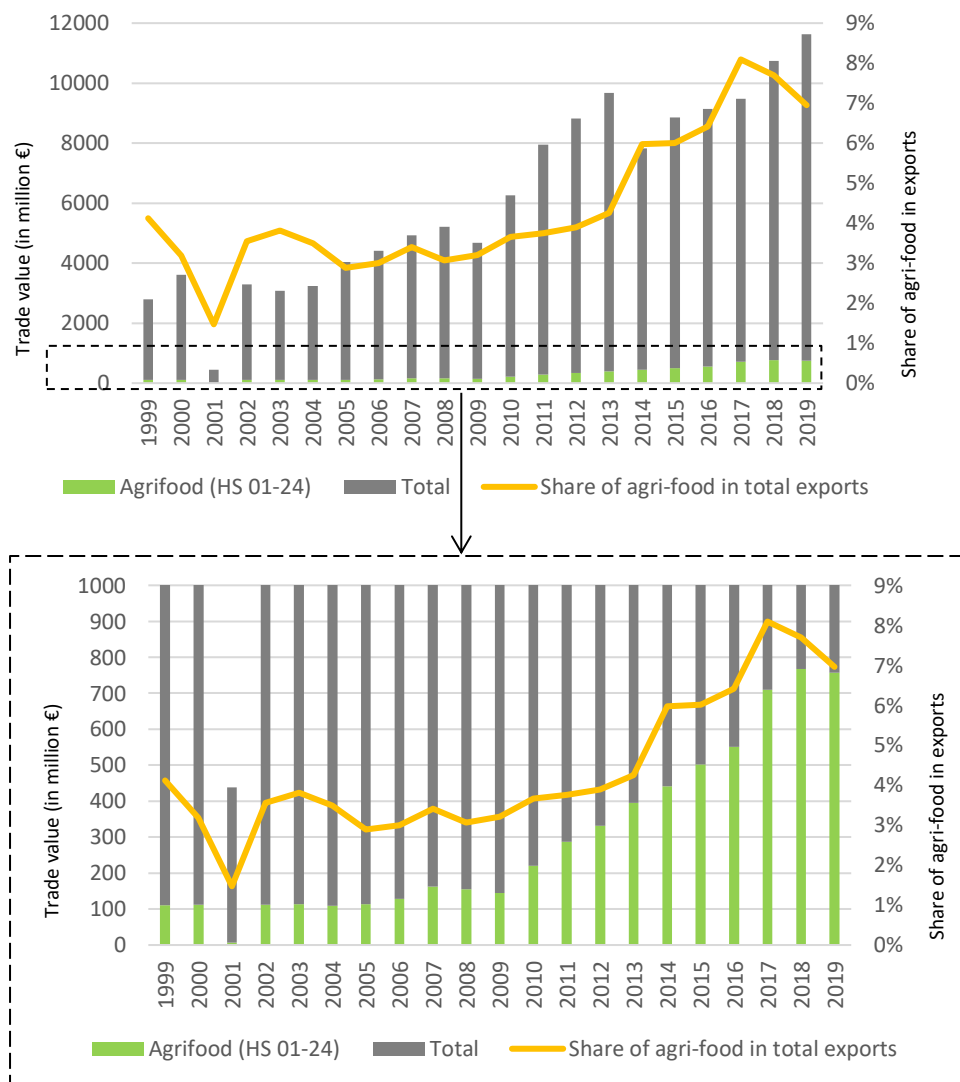
### 3.2.1.2. EU Exports to Chile

Regarding EU exports to Chile, there is a clear increasing trend in the total traded value of exports that rises from 3,172 million € in 2002 to 10,876 million € in 2019 (Figure 17). In this sense, SUBREI (2020) explains that Chilean imports from the EU have exhibited significant dynamism in the last two decades. According to SUBREI (2020) this is especially the case since the entry into force of the AA, with a liberalization of a significant part of imported goods. Yet, the effective tariff of Chilean imports for the EU decreased from 6.68% in 2002 to 0.87% in 2019 (SUBREI, 2020). Therefore, we understand that the tariffs were already consistently low and the increase in import could be a consequence of a shift in the Chilean consumer preferences towards EU products in combination with an increase in domestic income.

The share of EU agri-food exports to Chile rises from 3.55% in 2002 to 8.09% in 2017 with a slight decline to 6.96% in 2019 (Figure 3). In nominal value, EU exports increase

from 113 to 756 million € from 2002 to 2019. In this sense, Henry de Frahan *et al.* (2020) identify “a first period from 2003 to 2009, during which the EU’s exports to Chile rose at an annual nominal rate of 6.5 per cent, and a second period from 2009 to 2018, during which the EU’s exports rose at a larger annual nominal rate of 16.8 per cent, resulting in a recent much stronger expansion in the EU’s exports of agricultural and food products to Chile” (p. 5).

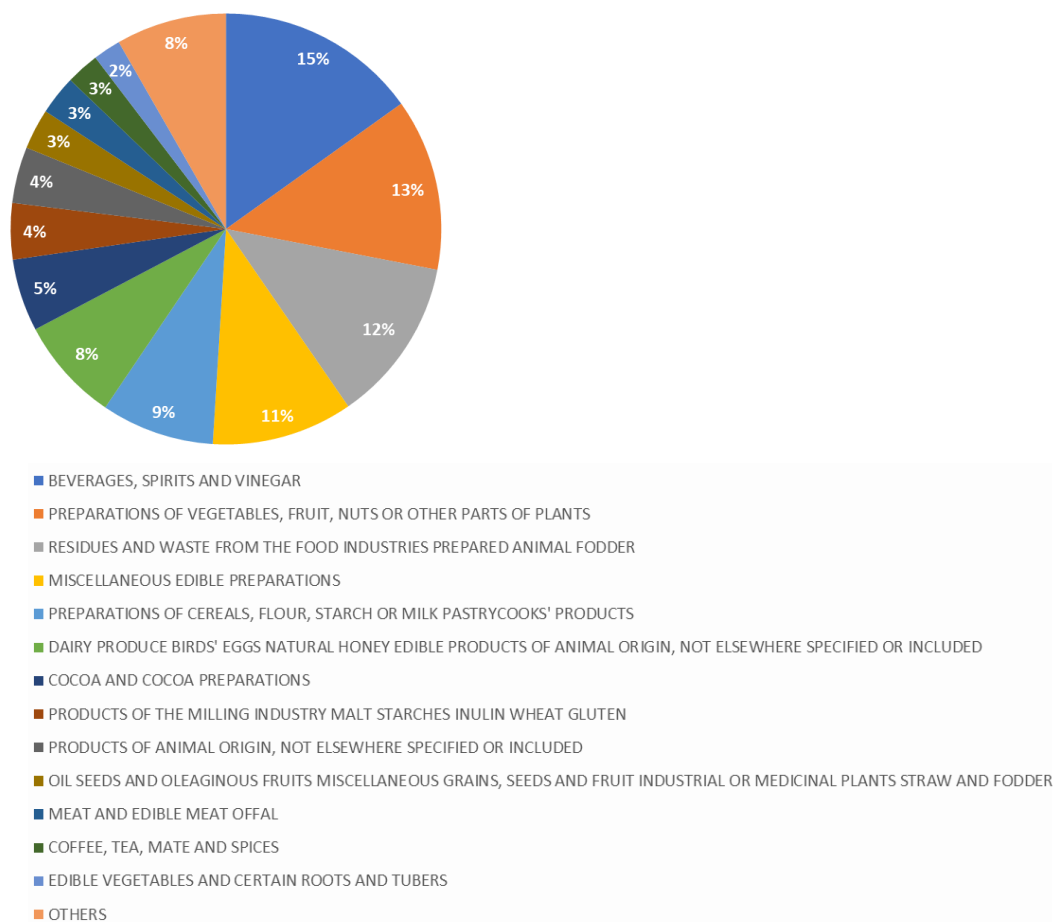
**Figure 17. EU28 nominal exports to Chile (in million €) and share of agri-food products in total imports (1999-2019)**



Source: Eurostat Comext

EU agri-food exports to Chile are more diversified than EU imports from Chile, yet six categories concentrate 67% of total agri-food exports in 2019 (Figure 18): beverage, spirits and vinegar (HS22), preparations of vegetables, fruit, nuts or other parts of plants (HS20), residues and waste from the food industries, prepared animal fodder (HS23), miscellaneous edible preparations (HS21), preparations of cereals, flour, starch or milk pastrycooks' products (HS19) and, dairy produce, birds' eggs, natural honey, edible products of animal origin, not elsewhere specified or included (HS04).

**Figure 18. Main EU28 agri-food exports to Chile in 2019**



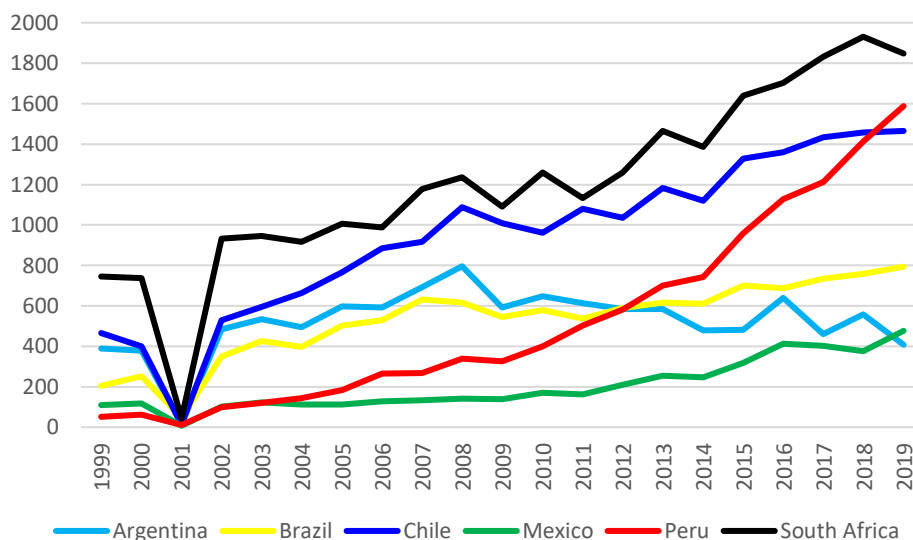
Source: Eurostat Comext

### 3.2.2. EU trade of fruits and vegetables with Chile and its main southern hemisphere competitors

#### 3.2.2.1. EU imports of fruits and vegetables

Fruits and vegetables (HS07-08) imported by the EU from Chile rises, in nominal values, from 529 million € in 2002 to 1,465 million € in 2019 surpassing Argentina, Brazil and Mexico. Yet, remaining in nominal values underneath the imports from South Africa (Figure 19) and, in 2019, from Peru. In relative terms, imports from Chile grow at a yearly average of 3.6% outperforming Argentina (-2.7%), Brazil (1.9%) and South Africa (2.7%). Yet, Mexico and Peru have growth at a bigger rate of 7.5% and 14.2% respectively (see Appendix I). Anyway, some products such as walnuts (08023290) present an average of annual growth in Chilean exports to the EU between 2003 and 2019 of 21.5% and hass avocados has an average annual increase of 24.4% in the same period (SUBREI based on *Banco Central de Chile* data, 2020).

**Figure 19. EU28 fruits and vegetables (HS07-08) imports from Chile and its main southern hemisphere competitors (nominal value in million €)**

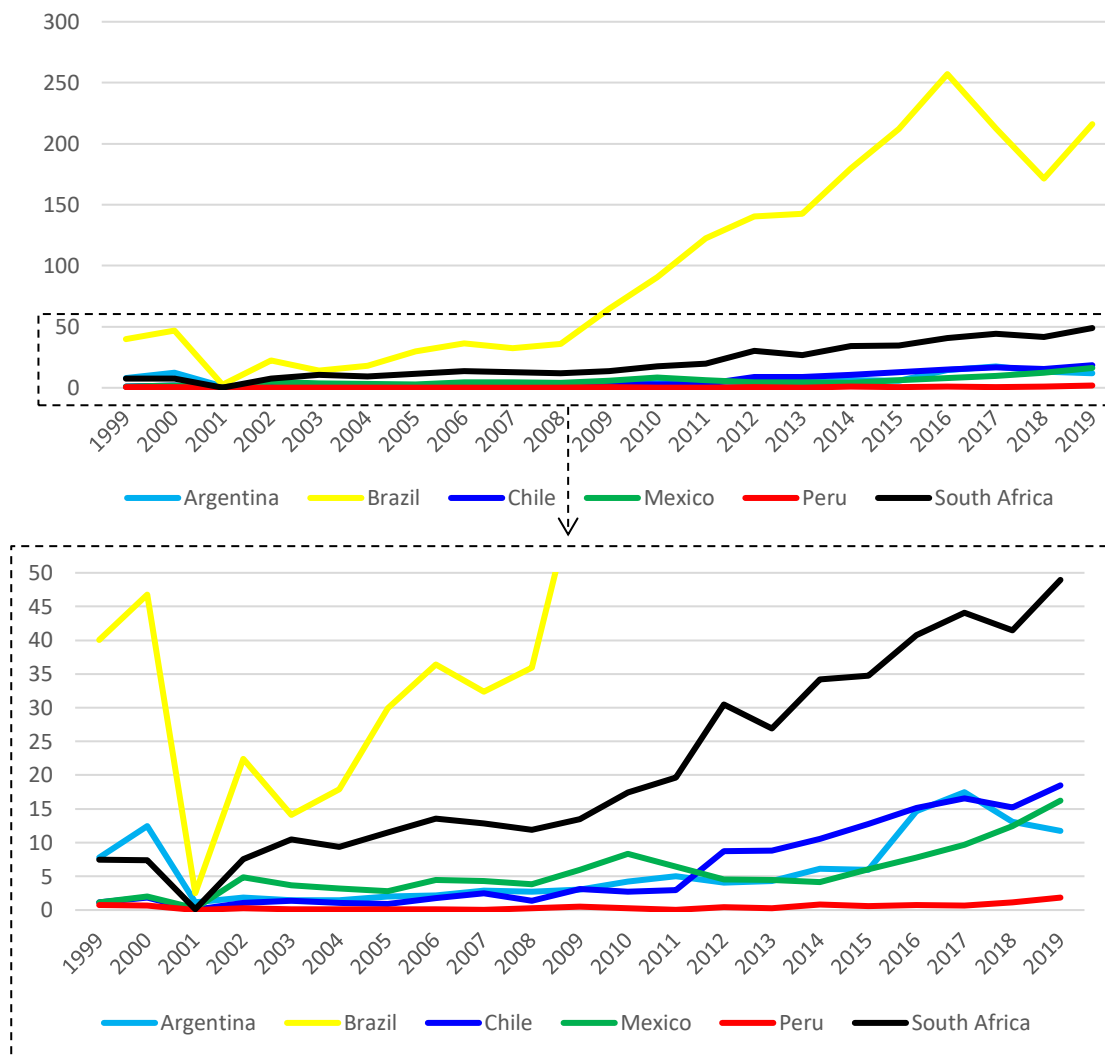


Source: Eurostat Comext

### 3.2.2.2. EU exports of fruits and vegetables

EU exports of fruits and vegetables to Chile grow at a rate of 17.9% between 2002 and 2019 outperforming trade to Chile’s southern hemisphere competitors. In nominal terms (Figure 20), exports have reached 18 million € in 2019, significantly underneath traded values to Brazil (216 million €) and South Africa (49 million €). Yet, Henry de Frahan *et al.* (2020) explain that virtually no imports of fresh fruits and vegetables (except for kiwi) from the EU have been permitted to land on Chilean market. For the European Fresh Produce Association (FRESHFEL) export potential does exist for EU fruits and vegetables from post-harvest storage to be sold in Chile during the Chilean off-season marketing period (Binard, 2016, in Henry de Frahan *et al.*, 2020). Yet, most of Chilean imports of apples, pears, quinces and stone fruits originate from the United States while none from the EU. FRESHFEL regrets the lack of transparency in the Chilean process of defining the conditions for importing fruits and vegetables from the EU, the lengthy procedures to go through this process and negotiate import conditions and the use of Spanish as the main means of communication between the parties (ECORYS-CASE, 2017).

**Figure 20. EU28 fruits and vegetables (HS07-08) exports to Chile and its main Southern hemisphere competitors (nominal value in million €)**



Source: Eurostat Comext

### 3.2.3. EU trade of meat with Chile and its main southern hemisphere competitors

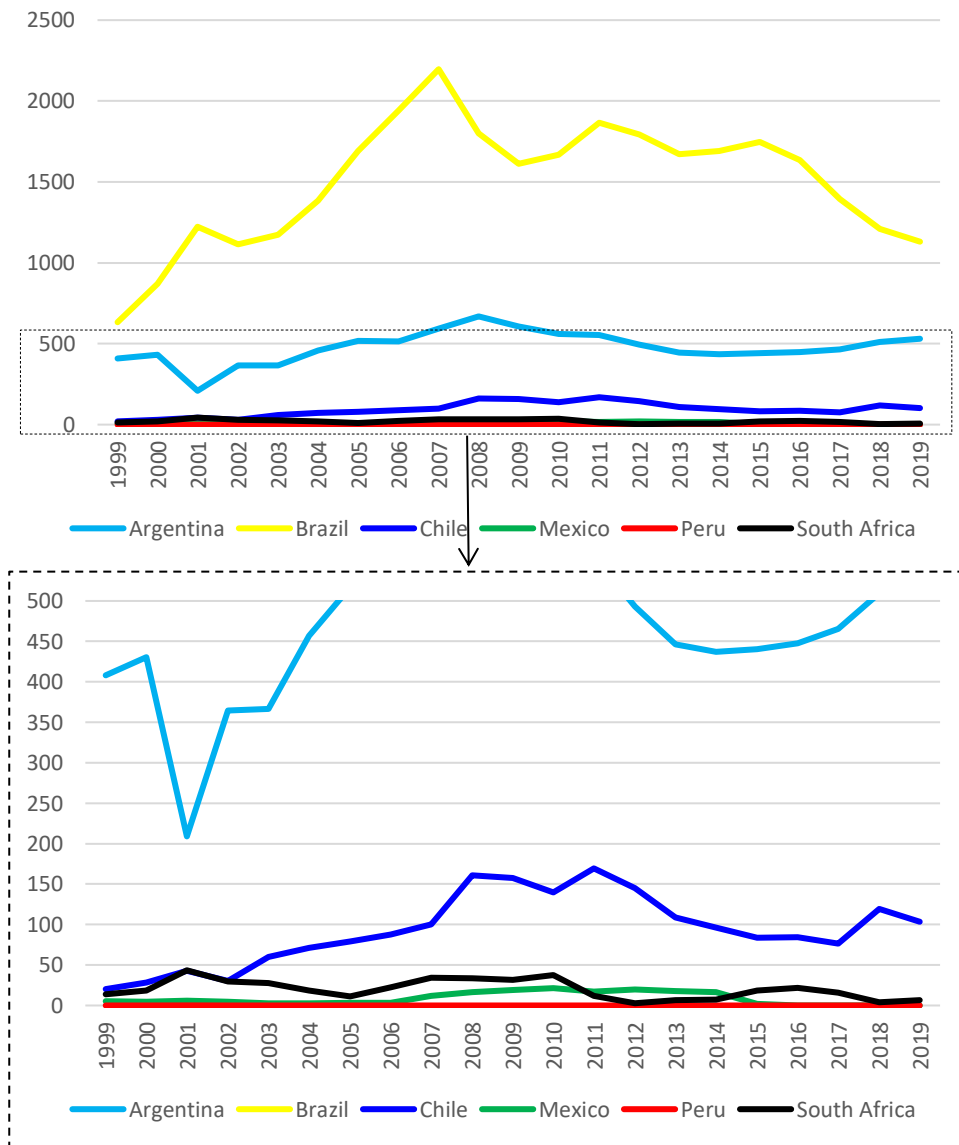
#### 3.2.3.1. EU imports of meat

Regarding EU imports of meat, the main markets among the countries under study are Brazil and Argentina with import values in 2019 of 1,131 and 530 million € respectively. Two periods can be identified in EU imports from Chile (Figure 21). First, between 2002 and 2008 import value rises from 30 to 161 million € accounting for a yearly growth of 20%. Second, between 2009 and 2019 the yearly rate turns to be negative at -7%.

In 2013, an inspection from the European Commission’s Food and Veterinary Office (European Commission, 2013) reported deficiencies in the Chilean programme certifying the EU eligible (PABCO – *Planteles Animales Bajo Control Oficial* – Animal Holdings Under Official Control) holdings. In this sense, the report states that the PABCO system, intended to guarantee that holdings for porcine and ovine animals, their meat and their

products fulfil the sanitary requirements and the good husbandry practices required. However, the weaknesses detected during the previous audit was confirmed for both the PABCO A system (specifically designed for bovine holdings and animals) and the bovine central database (SIPEC). The result was an auto-suspension of fresh beef exports to the EU which led to a fall in the bovine stock, also influenced by the pressure in land use for other products (e.g., dairy, cereals, fruits and forest) in some regions, particularly in the *Araucania* region (Henry de Frahan *et al.*, 2020).

**Figure 21. EU28 meat (HS02, 1601, 1602) imports from Chile and its main Southern hemisphere competitors (nominal value in million €)**

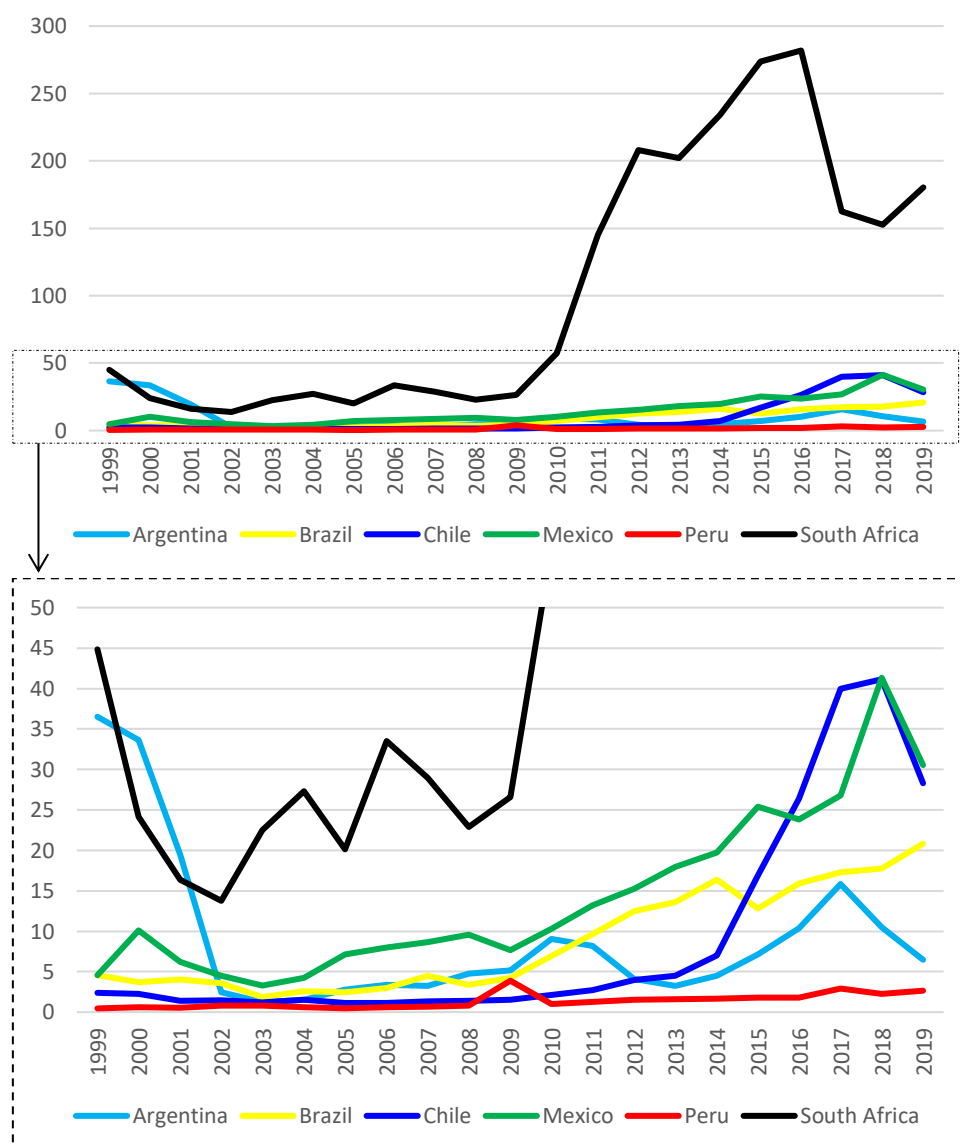


Source: Eurostat Comext

### 3.2.3.2. EU exports of meat

The main market of destination for EU meat exports among the countries under study is South Africa, especially after 2009 (Figure 22). Regarding EU exports to Chile, two periods can be clearly identified: the first from 2002 to 2013 and the second from 2014 to 2019 with yearly average growth of 9 and 28% respectively. The rise of EU meat exports is very significant in the second period reaching its peak of 41 million € value of exports in 2018. This can be a consequence of earlier Bovine Spongiform Encephalopathy (BSE) in the EU that caused beef exports to be prohibited until 2013. Nonetheless, even after the restriction was lifted and until recently, EU exporters could not reach the Chilean market due to specific requirements established in the Chilean legislation (Coronas-Balsera, Mériaux and Perucho, 2016, in Henry de Frahan *et al.*, 2020).

**Figure 22. EU28 meat (HS02, 1601, 1602) exports to Chile and its main Southern hemisphere competitors (nominal value in million €)**



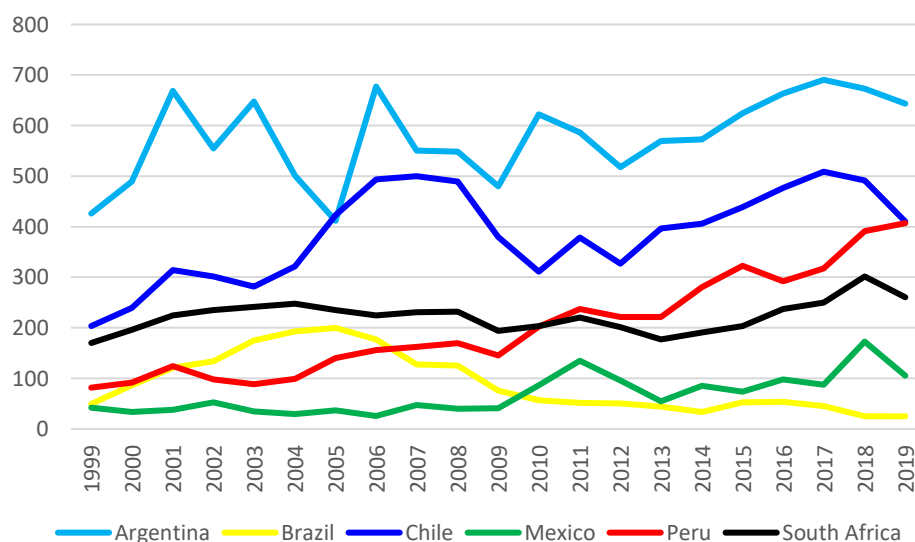
Source: Eurostat Comext

### 3.2.4. EU trade of fish, crustaceans and molluscs with Chile and its main southern hemisphere competitors

#### 3.2.4.1. EU imports of fish, crustaceans and molluscs

Among the countries under study, Argentina and Chile have been the main exporters of fish, crustaceans and molluscs (HS03, 1603-1605) to the EU between 1999 and 2019 (Figure 23). But they presented slight negative yearly growth: -0.6 and -0.1% respectively, between 2002 and 2019. Peru outperformed them both with a yearly growth of 6.7% in the same period.

**Figure 23. EU28 fish, crustacean and molluscs (HS03, 1603-1605) imports from Chile and its main Southern hemisphere competitors (nominal value in million €)**

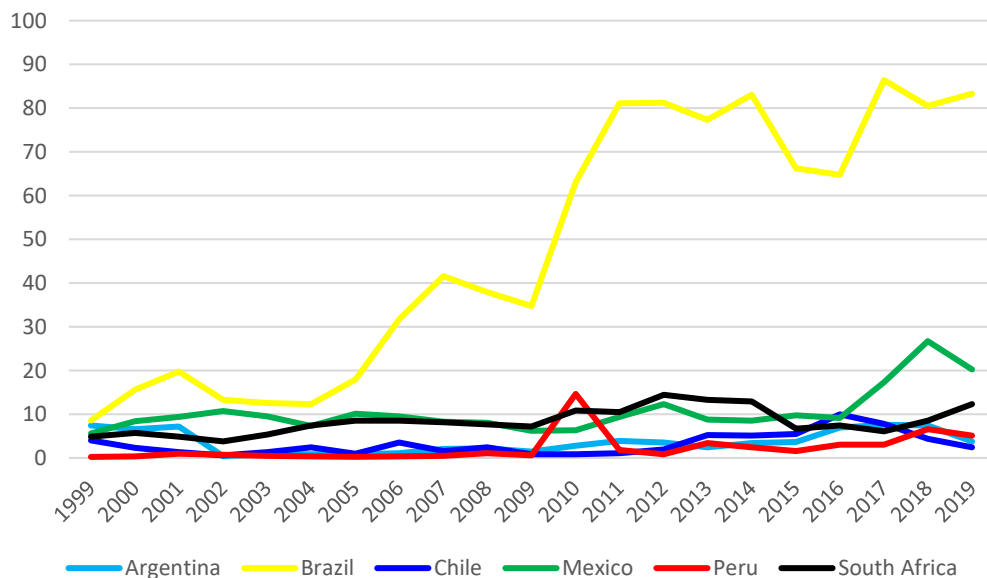


Source: Eurostat Comext

#### 3.2.4.2. EU exports of fish, molluscs and crustaceans

Despite the exports significant yearly growth between 2002 and 2019 of 15, 13, 10, and 9% in export value with Peru, Argentina, Brazil and Chile respectively, the fish, molluscs and crustaceans (HS03, 1603-1605) do not represent a major sub-sector of EU agri-food exports. Among these countries, the main destination is Brazil with a traded value in 2019 of 83 million € (Figure 24).

**Figure 24. EU28 fish, crustacean and molluscs (HS03, 1603-1605) exports to Chile and its main Southern hemisphere competitors (nominal value in million €)**



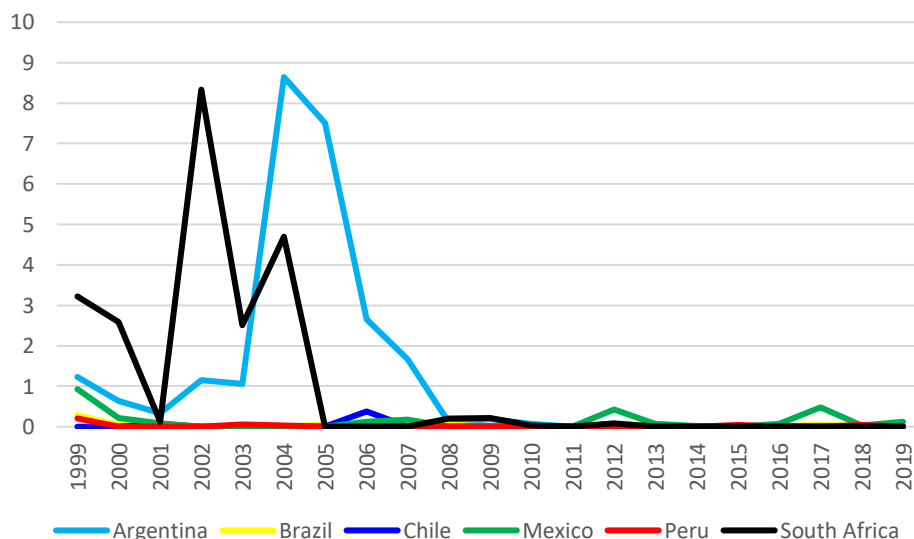
Source: Eurostat Comext

### 3.2.5. EU trade of dairy products with Chile and its main southern hemisphere competitors

#### 3.2.5.1. EU imports of dairy products

Imports of dairy products in the EU from Chile and its southern hemisphere competitors have not risen over the value of 1 million € per year after 2008 (Figure 25). Not only the dairy sub-sector is well developed in the EU but also, as already mentioned, some important trade restrictions remain for this sensitive sub-sector.

**Figure 25. EU28 dairy (HS0401-0406) imports from Chile and its main Southern hemisphere competitors (nominal value in million €)**

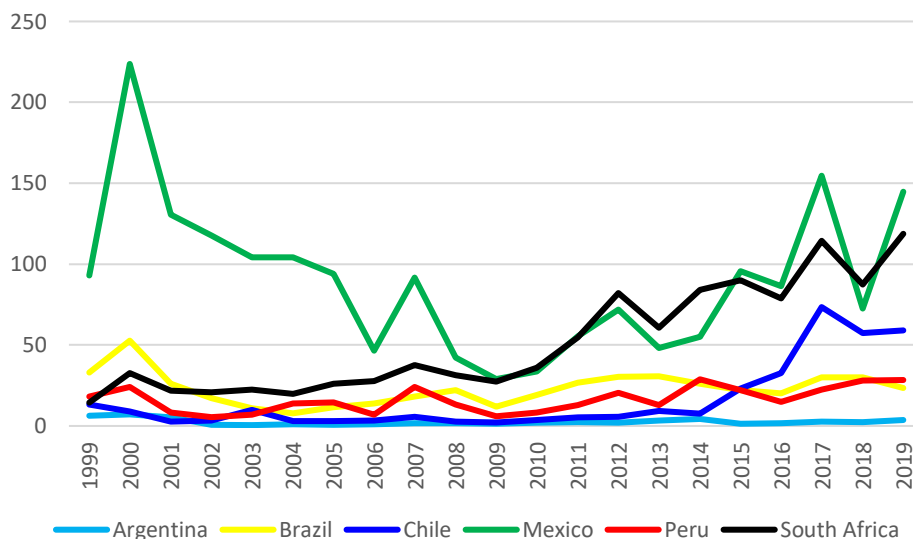


Source: Eurostat Comext

### 3.2.5.2. EU exports of dairy products

As shown in Figure 26, Mexico and South Africa are the main destination of EU dairy exports followed by Chile with exported values of 145, 119, and 59 million € in nominal values in 2019. Nonetheless, the yearly growth of exports to Chile of 15.8% since the signature of the Association Agreement in 2002 surpassed all of its southern hemisphere competitors (see Appendix I).

**Figure 26. EU28 dairy (HS0401-0406) exports to Chile and its main Southern hemisphere competitors (nominal value in million €)**



Source: Eurostat Comext

### 3.2.6. Partial conclusions

Chilean exports to the EU have risen significantly since the entry into force of the AA. In the same period, EU exports to Chile have had the most significant growth compared to its main southern hemisphere competitors: for the dairy sub-sector (15.8%), for the meat sub-sector (21.4%) and for the fruits and vegetables subsector (17.9%). Yet, several factors impact on the trade performance. In this sense, Henry de Frahan *et al.* (2020) explain that macroeconomic circumstances may explain the deceleration in bilateral trade. First, the global financial crisis of 2007-08 affected the Chilean trading capacity with the EU, especially for the exports. Moreover, the Euro crisis harmed the EU demand for imports. Second, the volatility of the exchange rate between the European currencies and the Chilean Pesos, could be translated by the oscillations in the total value of traded goods but, affecting to a lesser extent, agri-food products. On the other hand, after the AA was entry in force both parties signed many other trade agreements with third parties which could have led to trade diversion to these new markets. All in all, the entry into force of the AA undoubtedly and gradually improved market access for Chilean agri-food exports to the EU compared to the starting point (Henry de Frahan *et al.*, 2020) and vice versa.

Considering the countries under study, Chile remains among the main exporters to the EU, after South Africa and Peru, in the fruit and vegetables sub-sector and, after

Argentina and Peru, in the fish sub-sector. Regarding to the meat sub-sector, Brazil and Argentina are the main exporters to the EU which is probably linked to the comparative advantages of land availability yet, Chile remains in third position which could be related to competitive advantages compared to the other southern hemisphere competitors. Finally, the limited volume in dairy products exports to the EU is similar to both Chile and all its main southern hemisphere as a consequence of a strong EU production.

Regarding EU exports of dairy product, Chile remains in the third position after Mexico and South Africa. As for the fruits and vegetables sub-sector as well as the meat sub-sector, EU exports to Chile have been scarce both in nominal terms and compared to its southern hemisphere competitors. Linked to this, the EU exporters main concerns are related to SPS measures for fresh fruits and vegetables and TBT issues for meat (Henry de Frahan *et al.*, 2020). Finally, Chile is not an important destination for EU fish exports.

All in all, when considering EU trade values with Chile and comparing them with Chileans mean southern hemisphere competitors, we should take into account the significant difference of total population. In 2019, Chile accounts for almost 19 million inhabitants, Peru, 31 million; Argentina, 45 million; South Africa, 58 million; Mexico, 127 million and Brazil, 211 million.

### **3.3. Surveys with representatives of key stakeholders in Santiago and Brussels**

#### **3.3.1. Methodology: Semi-structured interviews**

The interviews are organized in two stages. First, from March to May 2021 a fieldtrip to Chile allowed to interview public actors from the Ministry of Agriculture and from the Ministry of International Relations; and private actors from the agri-food sub-sectors under study. Second, during June and July interviews were held in Brussels with the European representatives and main exporters of the sub-sector of interest.

Given the pandemic restrictions, interviews were held remotely both in Chile and in Belgium. In order to benefit the interviews development, the interviews in Chile were held in Spanish. As for the interviews in Belgium, they were held either in English or in Spanish. Afterward, they were transcribed and the parts that were of particular interest for the study were translated when needed. The interview guide is available in Appendix II.

#### **3.3.2. Main results from the interviews with representatives of key stakeholders in Santiago**

The Association Agreement (AA) with the European Union (EU) is one of the most significant and strategic free trade agreements for Chile, given its comprehensive character gathering under the same legal framework political, economic and cooperation commitments (Yáñez in SUBREI, 2020). In early 2000, it was a strategic move for the country to consolidate a market as important as the EU by signing an extensive agreement as it was the AA. At the time, Europe was the main market for Chilean products and the main investor in Chile (Valdés, personal communication, 2021). The EU-Chile AA was

important not only because of the trade volume but because it allows Chile to be positioned internationally. Moreover, Vega (personal communication, 2021) explains that the AA includes articles for promoting and maintaining the democracy and was required at that time by the Chilean negotiators in order to have a trigger clause for guaranteeing the democracy in Chile. In later negotiations the already existing agreement with the EU allowed Chile to position as a country that sells wine to the French consumers, fruit and meat to the Europeans, which means it complies with the European requirements. Furthermore, the AA was an obligation to force the internal modernization of Chilean institutions, both in the public and private sectors (Vega, personal communication 2021). In this sense, the agriculture and livestock service (known as SAG-Servicio Agrícola Ganadero) saw a great development and began to work more rigorously to meet the EU standards. Although costly, that leap was the great opportunity Chile had (Valdés, personal communication, 2021).

Given the importance of the agricultural and food sector in the Chilean exporting matrix as well as in the EU policy, the AA included extensive contents for agri-food trade conducing to a clear institutional change in the framework of trade relationship, such as the specification of a Sanitary and Phytosanitary (SPS) chapter (SUBREI, 2020). Vega (personal communication, 2021) explains that the EU is one of the tightest regulations in the world and non-tariff measures were a major issue. Hence, the incorporation of the SPS chapter in the agreement arose. By signing the EU-Chile association agreement, all activity is framed in Annex IV of the AA that regulates SPS measures matters (Umaña, personal communication, 2021).

As the agreement was implemented, it created challenges for certain sub-sectors and products within the agro-industrial sector. For certain sub-sectors it is not enough to lower the tariff to enter the EU market, there are regulatory aspects that must be complied with and that can present themselves as challenges (Cerdea, personal communication, 2021). Since the 1960s, Chile had a particular concern with sanitary issues. So, it reached the 1990s with experience in compliance with sanitary norms. Therefore, the adaptation was not particularly complicated in this sense (Vega, personal communication, 2021).

Among the institutional changes, the creation of an agency for food safety in Chile – a move that was not yet in the public arena - was achieved because of the signature of the AA. This also implied training human resources. The concept of food safety was introduced and awareness was raised in all actors in the productive chain (Valdés, personal communication, 2021).

Moreover, the EU requires certain types of laboratory analysis, for example microbiological which generated the need for the development of a laboratory analysis industry. This industry must be recognized by the EU thus certifying according to the European standards (Vega, personal communication, 2021).

### 3.3.2.1. *Chilean exports to the EU*

#### **a. Fruit and vegetable sector**

The fruit sub-sector predominates in Chilean agri-food exports. It is composed by large companies that have a high productive capacity with high-technological productive processes. Its high innovative capacity eases the adaptation to new measures (Valdés, personal communication, 2021). On the other hand, Valdés (personal communication, 2021) identifies the vegetable sub-sector as one of those that have had less development. She understands that it is due to the fact that production in Chile was at that time mainly for domestic consumption.

In general terms, the fruit sub-sector faces no major tariff impediments to access the EU market. However, there are some mechanisms such as the minimum entry prices that have caused in the past some inconveniences with apple exports. Even if it has been softened, it is an issue to which the industry is paying attention (Canala-Echeverría, personal communication, 2021).

In the fruit and vegetable sub-sector, the SPS measures refer mainly to safety issues. There are two closely linked processes: the prohibition of some substances and the reduction in the accepted levels of pesticides (Canala-Echeverría and López, personal communication, 2021). In particular, Maximum Residue Levels (MRL) are measures under constant review (Bahamonde, personal communication, 2021) and these measures are becoming more and more strict (Umaña, personal communication 2021). Linked to this, multiresidue is also under debate. In this sense, Valdés and Umaña (personal communications, 2021) agree that changes in the MRL in pesticide are the most complex regulations to adapt to. Even more, the main challenge for the exporters is the speed at which these changes occur and the small period for adjustment (Canala-Echeverría, personal communication, 2021). EU regulations are sometimes stricter than the *Codex Alimentarius* which makes it difficult for Chilean producers to comply with. One of the reasons is that Chile does not have a strong agro-chemical industry. On the contrary, it is a net importer of pesticides and agro-chemicals in general. This means that whenever an active ingredient is banned and, to replace it with a new active ingredient that has not yet entered Chile, it must go through a series of procedures (e.g., field test, laboratory test) for said substance to be authorized in the country. Currently, the Chilean authorities are undergoing a process of modernizing the pesticide registration system. The new modality implies recognizing the work done by third parties. That is, if a chemical is registered in the EU and meets all the standards, it is not reasonable to repeat all the studies for registering it in Chile but only the ones that are strictly related to the local production. For this to happen, the facilitation of the studies and results performed in the EU is a key aspect while keeping the necessary confidentiality. It is a matter that the exporters feel has not flowed with the needed speed of the case. That could be favoured by bilateral relations in the framework of the association agreement (Canala-Echeverría, personal communication, 2021).

The EU is an interesting market given the high prices. But what complicates the producers the most is the use of chemicals. Producers who want to continue exporting to the EU need to be dynamic and must always be at the forefront of new systems, especially in pest control (Umaña, personal communication 2021). Valdés (personal communication, 2021) explains that the complexity stands also in the different implementation of the precautionary principle. She anticipates that there is still a long path to continue studying and approaching positions. It is certainly also something that is being addressed in the modernization process today. Moreover, regarding the limits imposed by the EU, that are usually stricter than in the rest of the world, Canala-Echeverría and López (personal communication, 2021) state that the evaluation of the limits is based on danger (a subjective concept) and not on risk (an objective concept).

Another matter that is brought up by Asoex comes to the certification of origin. Currently, the approach is the self-certification. However, Canala-Echeverría (personal communication, 2021) warns that it could be risky because companies may not comply with this standard. He warns that industries could mix local and imported fruits and certify the industrialized product with a Chilean origin. He explains that if there is no verification of self-certification, this could lead to future conflicts, thus being harmful for the Chilean image.

All in all, Umaña (personal communication, 2021) states that fulfilling with MRL regulations is the main difficulty since the Service for Agriculture and Livestock (*Servicio Agrícola y Ganadero-SAG*) of the Chilean Ministry of Agriculture has good pest controls established. Yet, the exporters (Canala-Echeverría, personal communication, 2021) notice that the EU has started regulating certain pests. The EU has imposed a series of restrictions on citrus. In any case, these pests not being present in Chile, fruit and vegetable exports are not directly affected by the measure. But exporters warn that it is necessary to observe this new line of measures. On other matters, Umaña (personal communication, 2021) states that inspection on the fields, controls in the industry, and certifications work well: not many non-conformities in fruit and vegetable exports exist with the EU regulations. With regard to microbiological safety, the EU does not have regulations that hinder Chilean fruit exports (Adonis, personal communication, 2021).

For what it comes to Technical Barriers to Trade (TBT) measures, Adonis (personal communication, 2021) warns that the European Parliament and Council Directive 94/62/EC on packaging and packaging waste that prohibits the use of expanded polyethylene as packaging can constitute an TBT measure. In this matter, he observes that these measures are controversial. For instance, to meet these requirements an exporter may import the packaging from China. Paradoxically, the environmental costs associated with the transportation are not accounted for and the measure might be creating a bigger harm to the environment. All things considered, this complex matter should be analysed in depth.

A matter that is highly affecting the fruit and vegetable sub-sector is private standards. In this sense, Canala-Echeverría (personal communication, 2021) expresses that a sensitive

point comes regarding the demands of private European companies through the GlobalGAP certification which has set more demanding standards than the official norms. Moreover, he questions the lack of studies supporting the limitation in the use of agro-chemicals. Among the exporters, it is one of the issues that generates a great concern.

#### **b. Meat sector**

The EU is an attractive market given its high prices. Also, being an EU trade partner is a presentation letter when it comes to international trading. In this sense, the private sector understands that complying with the NTM imposed by the EU is strategic for maintaining this commercial relationship. Nonetheless, there is a higher cost associated to compliance with EU regulations. Therefore, NTM have an impact when it comes to deciding the marketing strategies. The constant update of regulations leads to the need of diversifying the export markets (Atlagich, personal communication, 2021).

In the meat production in Chile, the use of hormones is authorised. To meet the EU regulations that do not allow the use of these substances, the official certification for animal stock (in Spanish called *Planteles Animales Bajo Certificación Oficial* - PABCO) was created to guarantee the traceability from birth to slaughter for animals raised without the use of hormones. It was created specifically for the EU but it is currently used also for other markets. PABCO is a system to provide guarantees at farm level, to support the certification of livestock exports to the EU and markets with similar requirements. It establishes the activities, responsibilities and records that must be kept.

The SAG certifies and ensures that the product complies with the EU regulations. Umaña (personal communication, 2021) explains that the SAG has good relations with DG Santé of the European Commission and with the health authorities of the EU leading to a history of mutual trust. Chile delegates controls to the EU and, reciprocally, the EU delegates them to the SAG. Yet, this reliability is not blind. There are periodic control visits to verify the system. After these visits, observations are made to improve and correct the system. Sometimes, when a problem is detected in the products that arrive to the EU, the European authorities focus on these issues and generate a visit or a control. In one of these verification visits of the meat area system, the PABCO traceability system was reviewed by an EU team. There were non-conformities and issues to improve. In this situation, Umaña (personal communication, 2021) explains that the worst consequence would be that the EU closes the market and does not allow imports. But given the history of trust, trade was suspended until Chile fixed the deficiencies. Once the observations were fixed and the EU was satisfied, the market was allowed to reopen. Umaña (personal communication, 2021) states that there is always room for improvement but in general the PABCO system works; that is, it meets the EU requirements to export. This suspension affected the meat sub-sector because the EU is one of the markets with the highest prices. Nonetheless, it was an opportunity to look for new trade partners. That is when exporters began to focus on Asian countries and export markets began to be diversified.

As for the poultry sub-sector, two or three companies concentrate most of Chilean exports. Their industries present high technological features with a greater power to adapt to EU measures and to generate quality products according to the market they are addressed to (Valdés, personal communication, 2021). Nonetheless, in 2020 the poultry meat market with the EU was closed due to detections of salmonella. Several alerts had previously been reported by the Rapid Alert System for Food and Feed (RASFF) in avian products. The rapid management of the SAG implemented measures for closing the plants that exported to Europe to eradicate the problem and a later reopening was possible (Valdés, personal communication, 2021).

Umaña (personal communication, 2021) explains that the detections were serious enough to close the market. Given the joint work and the history in the framework of the agreement, the plants were delisted and their authorization to export was revoked but the EU market was not closed. If the market was closed, the procedures for reopening the commercial relationship would have been much more difficult. The SAG worked to address, correct and improve each of the inspectors' observations. Umaña (personal communication, 2021) highlights the bilateral cooperation that allowed to overcome the difficulties rapidly. In this sense, there was high exchange between professionals and technicians. Many video-conference meetings with the EU inspectors allowed to consult the inquiries that arose, in particular because it coincided with the boom in the use of video-calls. This quick exchange tool made it possible to arrange meetings where all parties involved were present. After a few months, a final report explained how each of the observations had been addressed. The EU normally should have performed a field visit but as a result of the pandemic it was not possible. They then reviewed the documents presented and requested videos to corroborate. Based on that, the EU authorities reauthorized to list the plants for export. Currently, to export poultry meat a previous notification must be presented and accompanied by certain protocols that were established to ensure that the products meet the requested conditions.

Moreover, Umaña explains that, in case of an outbreak, there is an evaluation of the impact. This evaluation allows a zoning which defines the affected and non-affected areas. Consequently, exports are only limited for the affected zones. This process is duly accompanied by the corresponding documents. It is currently the case with African swine fever in the EU. In this sense, Chile accepts EU exports that come from a specific zone where the outbreak is controlled or free. On the other hand, zoning in Chile was applied after the outbreak of avian fever. Then, exports to the EU were allowed when demonstrating that some regions in Chile were not affected.

Finally, with other meat products, no major challenges are identified because there is no major risk of an outbreak of pests. Generally, in Chile when an outbreak has occurred, it has been controlled quite quickly. In this sense, there are well-established protocols for the control of these outbreaks which are also reported to the EU. So, in the livestock sector, Chile has not had major problems apart from the control visits that may find some deficiency (Umaña, personal communication 2021).

### c. Fish and mollusc sector

Within the fish sub-sector, the salmon exports do not face particularly challenging EU regulations on SPS and TBT measures. Actually, the Asian and Russian markets have a tighter regulatory framework and, thus, more challenging to comply with. Moreover, the Chilean service for fishing and aquaculture (*Servicio Nacional de Pesca y Acuicultura-Sernapesca*) bases the national productive regulations and verifications on the European norms which facilitates compliance. The information is classified on manuals making easy the access for the private sector. When it comes to animal welfare, good practices based on EU regulations are promoted. Yet, they are not mandatory. The challenge for the salmon industry remains to comply with the private standards required by the European importers (Diaz, personal communication, 2021).

Regarding the mollusc sub-sector, a punctual problem was identified regarding the measurement of heavy metals in bivalve molluscs. The level established by the EU is lower than the one allowed by the *Codex Alimentarius*. The export was within the framework of the codex but did not meet the European standards thus leading to the partial loss of the merchandise (Vega, personal communication, 2021). This was seen by some actors of the private sector as a protectionist measure.

### d. Dairy sector

Iturrieta (personal communication, 2021) explains that there is no clear business opportunity in exporting dairy products to the EU, nor are there many interested enterprises. Chile finds better opportunities in exporting to markets such as the United Arab Emirates, the United States of America (USA), Peru, Mexico and Russia. Therefore, very few companies are certified for the EU. In this sense, Iturrieta (personal communication, 2021) states that the protocol for exporting to the EU was initially much more complex than the current one. Furthermore, the procedures in the protocol made references to EU regulations. This meant that dairy producers needed themselves to find the appropriate information in the EU regulations. Currently, the protocol for exporting to the EU focuses on identified gaps between the Chilean and EU regulations and only includes the requirements that are not met by complying to local regulations. Yet, Iturrieta states that it is very hard to pass the SAG inspections. In this sense, he understands that the protocol was simplified, but he expects further work and constant revision by the authorities to make it clearer thus facilitating compliance. The guideline in the protocol should be self-explanatory and specific, thus incorporating what corresponds to each EU regulation. Finally, Iturrieta (personal communication, 2021) requires for a translated version of the zoo-sanitary certificate which is currently only available in English.

All things considered, Iturrieta explains that since commercial opportunities with the EU are unclear, the NTM imposed by the EU are not particularly well identified by the sector. Therefore, the sub-sector does not have a specific problem with NTM with the EU. Even more, he states that some requirements are tighter in the Chilean than in the EU regulations, such as the temperature for milk transportation.

The dairy sub-sector is probably the one that has benefited the least from the association agreement (Valdés personal communication, 2021) and that can be most affected by the on-going negotiations in geographic indication regulations.

#### **e. Other sectors**

The wine sub-sector has adapted particularly well to the new measures, considering the Geographic Indication that were set in place by the original association agreement. The sub-sector could enter the EU market without tariffs which allowed Chilean wine to position successfully in the European market, particularly in the United Kingdom (UK).

In the honey sub-sector, the use of neonicotinoids was restricted because it affected the health of bees. Residues of this substance were found in honey and they could not thus enter the EU. On the other hand, in Germany a variety of corn was banned because it also affected bees. To face this situation, Chile decided to implement a registry with a satellite map to locate transgenic corn fields to assist honey producers in the location of their bees. Valdés (personal communication, 2021) sees this successful case in which Chilean institutions could easily adapt to overcome the challenges for meeting the European regulations.

#### **f. Other transversal issues**

Umaña (personal communication, 2021) explains that Chile has a requirement for fumigations with bromide, which is not allowed in the EU. This generates that some products, such as crops, cannot be exported. Thus, this is constituting an obstacle to trade that is purely sanitary. In this case, an alternative fumigation that gives the same guarantees as the bromide should be found. Through the Joint Management Committee, an agenda of controversial issues is organized to address problems such as this one. The parties prepare documentation and an attempt to reach an agreement that satisfies both parties is made. If a bilateral issue is not resolved, it is taken to the Joint Management Committee.

For what it comes to bilateral relationship, Chile differentiates from other competitors by offering “trust” (Rojas, personal communication, 2021). While Argentina hid the foot-and-mouth disease outbreak, the Chilean authorities have a policy of maximum transparency by always coming forward about their issues. Rojas (personal communication, 2021) explains that it is a key aspect for generating a very close relationship.

#### **g. Partial conclusions**

These partial conclusions aim to rethink the results of the interviews towards the construction and interpretation of the gravity model (Chapter 4). First and for each sub-sector of interest, we identify main SPS and TBT measures affecting Chilean exports to the EU. Second, we assess the importance of these SPS and TBT measures within the sub-sector. Third, we sum up to what extent the association agreement may have helped to deal with these SPS and TBT measures.

First, for the fruit and vegetable sub-sector, the main challenges regarding SPS measures include the changes produced in authorized pesticides and maximum residue levels. The main challenges regarding TBT measures comprise new EU measures with respect to the packaging material. As for other NTM affecting Chilean fruit exports, minimum import prices established by the EU particularly for apples have presented inconveniences for the Chilean exporters in the past. Minimum imports prices imposed by the EU are classified within the Chapter F of the UNCTAD classification of NTM (2019 version): price-control measures, including additional taxes and charges. Regarding future challenges, the exporters have identified the Certification of Origin (Chapter O - Rules of origin, UNCTAD classification of NTM) and the Pest Control (Chapter A - SPS, UNCTAD classification of NTM) to be in the agenda of EU import measures that may affect Chilean exports. Finally, private standards are a major concern for the Chilean exporters. We understand that private standards have an economic impact on international trade, changing traded value and/or quantities. However, these private standards are not *per se* policy measures as they are negotiated or imposed by private agents, not public entities. Therefore, we understand that they do not qualify as a NTM under the definition of the UNCTAD (2010). In this sense, private standards will not be analysed in dept in this study. But, we do understand that parallel research lines should account for their impact on trade.

Within the meat sub-sector, poultry exports face challenges for complying with the SPS measures regarding salmonella detections and avian fever which led to export restrictions. With regards to TBT measures, main challenges are associated to traceability on beef production.

Fish exports do not present difficulties to comply with the EU regulations on NTM. Yet, Chilean exports of bivalve molluscs presented a conflict on an SPS measure regarding measurement of heavy metals. The products complied with the *Codex alimentarius* requirements but not with the EU regulations. Exporters identify private standards to be the greatest compliance challenge. But, as already stated, these exceed the limits of this study.

Lastly, the dairy sub-sector does not have a specific problem with non-tariff measures imposed by the EU. In fact, because of limited commercial opportunities with the EU this sub-sector does not have particularly well identified EU NTM.

**Table 5. Main NTM impacting Chilean exports to the EU per sub-sector**

NTM	Fruits and vegetables	Meat products	Fish, crustaceans and mollusc	Dairy products
<b>Chapter A: SPS</b>	Authorized pesticides and Maximum Residue Level	Salmonella detections and avian fever.	Measurement of heavy metals	-
<b>Chapter B: TBT</b>	Packaging	Traceability		
<b>Chapter F: Control measures, including additional taxes and charges</b>	Minimum export prices			

Source: interviews with public and private representatives in Chile

Despite the challenges faced by exporters to meet EU regulations, the framework of the AA facilitated overcoming the difficulties. In this sense, the SPS and TBT Committees allow for a bilateral space for dispute solving without a need to go to the multilateral trade dispute solving mechanisms of the WTO. The existence of special Committees should allow controversy to be solved faster and more efficiently. On the other hand, the control delegation of the EU to the Chilean authorities facilitates procedures. Moreover, when it comes to overcoming outbreaks that lead to the restrictions of exports, many mechanisms dampen their potential negative trade effects. First, suspension of exports instead of closing the market facilitate the re-establishment of exports once the crisis is overcome. Second, mutual trust is strengthened in the framework of the AA and leads to allowing zoning when a sanitary problem arises, thus lowering potential negative trade effects. Finally, technical cooperation between the SAG, the private sector and the EU counterparts has proven to conduct to swift and effective resolutions.

### 3.3.2.2. *New lines of negotiation*

Regarding the ongoing negotiation of the modernization of the association agreement, the EU aims to include certain topics in the SPS chapter that Chile believes are misplaced. These topics include: 1- antimicrobial resistance; 2- animal welfare that was in the AA as an Appendix but not incorporated in the SPS chapter; 3- cooperation in international forums. Other matters include regulations on Geographic Indications (GI) as well as EU import tariffs and quotas that are currently still in place, and the recently new chapter suggested by the EU on Sustainable Food Systems. The later one has not been previously adopted in any other EU free trade agreements and brings to the table of negotiations questions on whether the accompanying measures constitute a new generation of NTM.

When it comes to actual trade negotiations, the Chilean official delegation is accompanied by representatives of the private sector that remain in an attached room for frequent consultations. Iturrieta (personal communication, 2021) explains that, based on his participation in these attached rooms, these consultation spaces are almost completely oriented to commercial problems, tariff reduction, and calendars for the release of import tariffs and quotas. Yet, these spaces lack the discussion and analysis of SPS measures.

Iturrieta further explains that when it came to the review of intellectual property for the negotiation on geographical indications, SUBREI organized a specific consultation room with specialists who could contribute to analyse the impact of new GI regulations on the cheese sub-sector. In that attached room, the private sector delivered documentation of production history in Chile, number of people employed, and potential impact if GI regulations would be implemented to the letter. In contrast, Iturrieta (personal communication, 2021) identifies a deficit of analysis and revision of SPS measures. Moreover, he would expect a more active participation of the SAG in these attached rooms, particularly regarding sanitary regulations. Although technicians from SAG work hand in hand with the private sector, when it comes to SPS measures there is fewer involvements of the private sector. Iturrieta expects the SAG to consult with the private sector what can or cannot be achieved.

Regarding the negotiation of the Association Agreement, Rojas (personal communication, 2021) highlights that a key differential from Chile to its main competitors rests in its negotiating speed capacity: Chile's negotiating team is small and very agile.

### *3.3.2.3. Future challenges*

According to Valdés (personal communication, 2021), the current challenges are mainly due to a lack of anticipation, which is what is being addressed today. In this sense, EU regulations are constantly being updated and the established deadline before the enforcement is sometimes not enough for the producers to adapt. Therefore, the anticipation to new regulations is nowadays a main concern. Many channels are potential sources of information for anticipating new EU regulations. Formally, the association agreement plans committees that meet semesterly or yearly. On one hand, these committees monitor issues that do not require quick solutions or more attention from the parties. In these committees, the most important and sensitive topics are discussed. On the other hand, the Chilean Ministry of Agriculture has a network of agricultural officials overseas who are in charge of having permanent contact with their counterparts and participate in EU parliamentary dialogues. These agricultural officials are thus able to foresee new trends in Non-Tariff Measures (NTM). Afterwards, their information reaches ODEPA that analyses it with SUBREI. Another channel for collecting information comes from periodic communications of EU official web pages.

More recently, an issue that has gained importance in the global pandemic context is electronic certification. Canala-Echeverría (personal communication, 2021) explains that there is a series of official documentation that accompanies shipments such as phytosanitary documents issued by the Ministry of Agriculture and certificates of origin, among others. In this respect, an aspect that would facilitate trade would be to switch all documents from paper to electronic format.

As already emphasised, the EU market is one of the markets that often updates regulations. Adonis (personal communication, 2021) explains that the attention should be drawn towards elements related to sustainability aspects. Future perspectives appear to

be turning towards the Green Deal and, probably, to the “farm to fork” strategy (Valdés, personal communication, 2021). In this sense, the EU has been emphatic in seeking that countries outside of the EU comply with the “Green Deal”. The fruit sub-sector is wondering whether the “Green Deal” will entail new lines of NTM or not (Adonis, personal communication, 2021). The EU has already included these topics in its international negotiation agenda. The challenge is to start preparing, so that industries are less affected in the future (Valdés, personal communication, 2021).

### **3.3.3. Main results from the interviews with representatives of key stakeholders in Brussels**

#### *3.3.3.1. Exports to the EU : the perception of the missions of Chile and Argentina to the EU*

##### **a. Mission of Chile to the EU**

Concha (personal communication, 2021) explains that given the high regulatory measures of the EU, the SPS and TBT provisions of the AA set the first stone finding the mutual recognition of certificates. For example, Chile managed to have a recognition of the equivalence of organic certification which facilitates trade thus providing an advantage for Chilean exporters (Camus, personal communication, 2021). Yet, it is a work in progress. In fact, the AA provides the legal framework for continuing working in these lines.

Concha highlights the role of the Committees for dealing with contingencies specially related to SPS and animal welfare matters. The AA provided an institutional architecture to deepen the relationship between both parties on these issues. This is an element that Chile wants to carry on in the modernization of the AA. In particular, the SPS Committee has been an example of what Chile values in the institutional arrangements because of its capacity of overcoming contingencies. The representatives are looking forward to deepening the relationship in order to find rapid validation of the counterparts’ regulations and control measures to reduce non-tariff barriers.

Moreover, whenever new regulations arise and exporters are not sure on how to comply with them, the framework of the AA facilitates spaces for further explanation and technical cooperation with the EU for the implementation of new measures. This framework has given Chile a competitive advantage for reaching the EU market compared to Chilean competitors (Concha, personal communication, 2021).

The SPS Committee also allows Chile to request a grace period to implement new measures or to request an explanation in case they find the measure to be trade restrictive. In fact, the SPS Committee has been able to provide information quickly when there was a problem with an authorisation of specific productive establishment (Concha, personal communication, 2021). Complementary to this, among technical cooperation instances, Chilean technicians were invited to participate in the “Better trained for safer food programme”. In that programme, they trained specifically for authorisation on pesticides use (Wauters, personal communication, 2021).

Camus also warns that EU exporters face challenges to reach the Chilean market because of the high sanitary and phytosanitary conditions in Chile. Yet, he explains that it would be more challenging if there was no AA in place. Moreover, the challenge faced by the EU exporters is that Chile cannot recognize the EU as a single market given that the sanitary and phytosanitary conditions across countries are significantly different (Wauters, personal communication, 2021).

On the Chilean side, the SPS chapter of the AA is working well as it is and no major changes are expected (Camus, personal communication, 2021). But on the EU side, there is an attempt to introduce provisions in line with the Green Deal in commercial relationships and this will certainly have an impact on trade (Concha, personal communication, 2021).

#### **b. Mission of Argentina to the EU**

Regarding the Argentinian agri-food exports to the EU, the most challenging measures to comply with are prohibition of certain pesticides, MRL, regulations on veterinary products, animal wellbeing measures, regulations regarding GMOs and biotechnology. In particular, the differences regarding the approval of pesticides and establishing MRL can lead to difficulties (Funes, personal communication, 2021). The Argentinian regulation as well as the Chilean is risk-based whereas the EU stands on the precautionary principle. In this sense, the Argentinian mission considers that international standards should be used as reference. Furthermore, even if the EU has a harmonized legislation, the enforcement authority is defined at a national scale which makes that the requisites sometimes vary from one country member to the other.

After finding black spot in citrus in early 2020, Argentina suspended citrus exports to the EU except for tangerines. Funes (personal communication, 2021) explains that the National Service of Health and Food Quality (SENASA) carried on specific controls and corrective actions to overcome the problem. This process was accompanied by technical cooperation with DG health. A final audit from the EU allowed to reopen the market in May 2021 with higher control.

Regarding the outbreaks of foot and mouth disease, Funes highlights the difference in the Argentinian reaction. During the 2000/2001 outbreak the strategy was not to declare the outbreak. This led to a strong loss of confidence from the trade counterparts. In the later outbreak in 2006, the government notified immediately the trade counterparts and took quickly enforced measures for containing the outbreak. This allowed a complete blocking of the affected and surrounding zones while the rest of the country was still allowed to export thus reducing the negative trade impact of the outbreak.

Regarding the agreement between de EU and Mercosur, Funes explains that it set deadlines for the obligations as well as consultation and notification processes. We understand that this can contribute to facilitate trade. As for the upcoming challenges for Argentina, the eye is set on the EU agenda which is going towards the Green Deal initiative and in particular “for farm to fork” and biodiversity programs.

### 3.3.3.2. *EU exports to Chile and its main southern hemisphere competitors*

#### **a. Fruit and vegetables sector**

In general, the EU export sector for fruits and vegetables experiences great challenges in opening new markets. In this sense, trade counterparts usually have a closed system leading to the need of a bilateral negotiation at a country level and usually for one product at a time thus leading to a strong burden for the negotiation team. This generates that only the most important markets and products are prioritized therefore trade access is limited (Santos-García Bernabe, personal communication, 2021).

Freshfel finds that the SPS chapter in the AA is soft and does not present strong binding provision that facilitate market access. They explain that SPS and TBT chapters need to include timelines for the resolution of the Pest Risk Analysis (PRA) and the protocol negotiations. Freshfel expects that the SPS chapter in trade agreements establishes concrete measures to, at least in the short term, ensure that negotiations on the protocol are as quick, transparent and inexpensive as possible for the sector.

The EU has already tried to present a conjoint request to open trade with Chile for many country members at the same time. In this case, Freshfel expects that this application should take the same time to be approved as if it was one single country application and not more. Yet, in reality, this does not happen. Shorten processes for the EU to negotiate several country members requests to open the market could be included as a provision in the SPS chapter of the AA. Yet in general, trade counterparts seem reluctant to recognise the EU as a single party (Santos-García Bernabe, personal communication, 2021).

When comparing trade with the other countries under study, Santos-García Bernabe explains that negotiation for accessing the Brazilian market is easier and the market is more open. Given the size of the Brazilian population it has also been a priority in the negotiation agenda. South Africa has also a relatively more open market thus access was easier. Mexico is a market in which fruits and vegetables exporters have a great interest in. But, access could not be completely reached yet. The same problem is found for reaching the Chilean and Peruvian markets. Finally, given that other markets are more interesting and bearing in mind that a trade-off exists when choosing to open a new market, there is not a particular interest in the Argentinian market.

Finally, Santos-García Bernabe explains that there are no significant challenges to comply with TBT measures for the fruit and vegetable sectors.

#### **b. Meat sector**

The main EU exports of meat to Chile is porcine meat. According to UECEBV there is also a particular interest in exporting beef and small ruminants' meat. For the former, the EU has not been able to access the Chilean market. In particular the sanitary status recognition has been requested by country members like Spain but not yet reached (Cucurella, personal communication, 2021).

UECBV sees no mechanisms in the AA facilitating market access of beef. They state having used all the tools available to facilitate market access without a positive result. They perceive that SPS have the last priority during trade agreements negotiation (Cucurella, personal communication, 2021). Alternatively, the member states have taken actions bilaterally. In this sense, countries negotiate bilateral protocols to overcome SPS barriers. Cucurella expresses that bilateral negotiations are not ideal but needed.

Finally and regarding an existing problem in different typification, Cucurella explains that different typification between the EU and Chile is a problem that can easily be solved and should not generate major impacts on trade.

### **c. Partial conclusions**

For EU exports to the countries under study, the main challenge remains being able to access the markets. The limitations are linked to the sanitary and phytosanitary protocols. This leads to long and expensive processes that are many times carried out bilaterally by the member countries and negotiated product by product. On the other side, no major TBT issues were brought to light. In this context, Freshfel suggests that more binding provisions in the SPS chapter of the trade agreements could facilitate market access, specially defining clear timelines and stronger provisions with concrete obligations.

## 4. Impact on trade of SPS and TBT measures for EU bilateral trade with Chile and its main Southern hemisphere competitors

### 4.1. Gravity model

The gravity equation is based on Newton's "Law of Universal Gravitation" adapted by Jan Tinbergen (1962) as follows:

$$X_{ij} = G \frac{M_i^{\beta_1} M_j^{\beta_2}}{dist_{ij}^{\beta_3}} \quad (1)$$

where  $X_{ij}$  is the trade from country  $i$  to country  $j$ ,  $G$  is a gravitational constant,  $M_i$  and  $M_j$  are the economic size of countries  $i$  and  $j$  respectively that are measured according to their GDP and  $dist$  is the distance between countries  $i$  and  $j$ .

The basic gravity model expresses bilateral trade volumes based on the size of the countries and the distance but does not account for other trade costs. In this sense, Anderson and van Wincoop (2003) introduced the following gravity model:

$$X_{ij} = \frac{Y_i Y_j}{Y_w} \left( \frac{t_{ij}}{P_i P_j} \right)^{1-\sigma} \quad (2)$$

Where  $Y_i$ ,  $Y_j$  and  $Y_w$  denote the GDP of the country  $i$ , the country  $j$  and the world respectively. The second term refers to the trade cost where  $t_{ij}$  denotes the bilateral trade costs,  $\sigma$  is the elasticity of substitution,  $P_i^{1-\sigma}$  is the outward Multilateral Resistance Term (MRT) and  $P_j^{1-\sigma}$  is the inward multilateral resistance term. In fact, how to measure multilateral trade resistance is extensively discussed in the literature. Anderson and van Wincoop (2003) compute the structural MRT with a nonlinear least-squares estimator. They explain that an alternative to account for multilateral resistance terms is introducing country-specific dummies. Nonetheless, this method is less efficient than the nonlinear least-squares estimators. A more recent approximation developed by Baier and Bergstrand (2009) is the use of a Taylor series expansion to approximate MRT while allowing asymmetric bilateral trade costs.

Another debate in the construction of the Gravity Model is whether to use nominal or real values. Few recent studies explicitly state whether they deflate trade flows or not. Adam and Cobham (2007) express that the literature measures trade in constant values yet, an early study (Rose and van Wincoop, 2000) specify the gravity equation with nominal values for both trade and GDP. Moreover, a recent publication (Shepherd *et al.*, 2016) explains that both trade flows and GDP should be in nominal terms because they are effectively deflated by the multilateral resistance terms which are special, but unobserved, price indices. Furthermore, it specifies that using other price indices could produce misleading results.

When we apply the natural logarithm on both sides of equation (2) and introduce time (t) and product (k) we get:

$$\ln X_{ijtk} = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln t_{ij} + \beta_4 \ln P_i + \beta_4 \ln P_j + \varepsilon_{ijtk} \quad (3)$$

Where  $\beta_3 = -\beta_4 = 1 - \sigma$  and  $\varepsilon_{ijtk}$  is the error term.

Typical variables taken into account for quantifying bilateral trade costs  $t_{ij}$  are:

- Distance between countries (*dist<sub>ij</sub>*)
- Whether the countries have a common border (*neighbour<sub>ij</sub>* – Dummy variable), share a common official language (*lang<sub>ij</sub>* – Dummy variable) or have colonial links (*col<sub>ij</sub>*)

Further on, authors have also included other variables that facilitate or impede bilateral trade such as population (*pop*) of the countries, the domestic production of the product k (*prod*), purchasing power parity exchange rate (ER), the existence of trade agreements between the countries (*FTA*), tariffs and Tariff Rate Quotas (TRQ) and NTM in place such as SPS and TBT.

We should note that, in order to apply the logarithmic function, variables need to be defined strictly positive. In this sense, zero trade values are a major challenge discussed in the existing literature. Bacchetta *et al.* (2012) find three main alternatives in existing literature. The first option is dropping the observations with zero trade value which, unless these observations are randomly distributed, can lead to missing important data for the model. Second, zero trade values can be replaced by a very small arbitrary value. The third option is estimating the model in levels. The aforementioned might lead to inconsistent estimates (Bacchetta *et al.*, 2012). Another approach we found is using a Tobit model. On the other hand, Santos Silva and Tenreyro (2006) show that, in the presence of heteroskedasticity, the Poisson Pseudo Maximum Likelihood (PPML) is a robust approach solving the zero trade problem. In a more recent study (Kareem *et al.*, 2016), the performance of different estimators is compared and the conclusion is that the Multinomial Poisson Maximum Likelihood (MPML) technique can lead to the most consistent estimators.

## 4.2. Empirical specification

The gravity model is specified to test: a-whether SPS and TBT provisions in EU trade agreements facilitate trade between the EU and its partners and, b-whether these provisions reduce trade disputes between the EU and its partners. We define the following empirical model for EU imports and exports that are run for each sub-sector of interest (fruit, vegetables, meat, fish and seafood, and dairy products):

$$\begin{aligned} \ln X_{ijkt} = & \alpha_{ij} + \alpha_t + \beta_0 + \beta_1 \ln GDP_{jt} + \beta_2 \ln pop_{jt} + \beta_3 tcost_{ijt} + \beta_4 share_{ikt} + \\ & + \beta_5 ER_{ijt} + \beta_6 FTApplus_{ijt} + \beta_7 SPS_{ijkt} + \beta_8 TBT_{ijkt} + \beta_9 oNTM_{ijkt} + \\ & \beta_{10} FTApplus_{ijt} * SPS_{ijkt} + \beta_{11} FTApplus_{ijt} * TBT_{ijkt} + \varepsilon_{ijkt} \end{aligned} \quad (4)$$

the dependent variable  $X_{ijkt}$  is the bilateral trade flow (in €) from the exporting country  $i$  to the importing country  $j$  at the time  $t$ . The parameter  $\alpha_{ij}$  controls for the exporter-importer country fixed effects. When the model is run for EU imports, this parameter controls for exporter fixed effects and reciprocally, when the model is run for EU exports, the parameter controls for importer fixed effects. The parameter  $\alpha_t$  accounts for the time effects. Typical gravity model control variables are included, such as the GDP in constant USD purchasing price parity and population of the importing country  $j$ , bilateral trade cost between the exporting and importing countries  $i$  and  $j$  at time  $t$  expressed as the ratio of CIF/FOB total trade where CIF is the Cost, Insurance and Freight price index and FOB is the Free On Board price index, export share of the subsector among all agri-food exports of the exporting country  $i$ , bilateral effective exchange rate (in LCU/€) of the importing country  $j$ .<sup>4</sup> The SPS and TBT variables are measured by the coverage ratio of STCs risen by the specific exporting country  $i$  for the measures implemented by the importing country  $j$ .

When the model is run for EU imports and controlling for time fixed effects, the variables GDP and pop are omitted due to collinearity. When the model is run for EU export and controlling for time fixed effects, the variable Share is omitted due to collinearity.

FTAplus is a dichotomous variable that accounts for the FTA between the exporting and importing countries  $i$  and  $j$  that incorporate additional commitments for basic SPS and TBT principles covered by the WTO SPS and TBT Agreements. The variable oNTM refers to other NTMs that are neither SPS, nor TBT measures, also measured by the coverage ratio as described below. The interaction term between SPS STC or TBT STC and FTAplus is defined to test whether the FTAplus reduces trade specific concerns thus enhancing trade flows between the trading partners. The error term  $\varepsilon$  is assumed to be normally distributed.

### 4.3. Data sources and descriptive statistics

The data for the gravity model was retrieved from available open sources such as Eurostat, the International Monetary Fund databases, the World Integrated Trade Solutions (WITS) database from the World Bank and the Gravity database from the French center for research and expertise on the world economy (CEPII). The detail of data sources can be found in Appendix III.

The sub-sectors  $k$  of interest for the present analysis are defined by the Harmonized Standard (HS) as follows: fruits in HS08, vegetables in HS07, meat in HS02 and HS1601-HS1602, fish and seafood in HS03 and HS1603-1605, and dairy products in HS0401-0406. The time  $t$  is between 2000 and 2019. For the EU data, we use the EU28.

Based on our literature review, the dichotomous variable FTAplus takes value 1 for Chile starting in 2003 and for Peru starting in 2011 and 0 otherwise. Both Mexico and South

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<sup>4</sup> CIF/FOB is sometimes smaller than 1 which is in theory not possible. This can be a consequence of mistakes in the different countries reports. In these cases, we computed an average of the previous and following value for  $tcost$ .

Africa have trade agreements with the EU but the commitments regarding SPS and TBT measures do not go beyond the WTO Agreements.

Finding a database on NTM for running a Gravity model has been identified as a challenge in existing literature either because of the limited coverage of country and years or because the format is not prepared for a panel data analysis specially including bilateral measures. The main sources of NTM are the following:

- WTO Integrated Trade Intelligence Portal (I-TIP) which refers to countries' notifications to the WTO. The main limitation is that this portal functions as a search tool but does not contribute to building a panel database with bilateral measures affecting specific products. In this sense, Ghodsi *et al.* (2017) warn that “a flaw of this rich dataset is that it is not fully available in a form necessary for econometric analysis, i.e., following a panel structure where NTMs are distinctly assigned to products according to a product classification such as the Harmonised System (HS)” (p.11).
- The UNCTAD Trade Analysis and Information System (TRAINS) database was the first comprehensive database on NTM. Furthermore, this database can be download in a panel data format.
- The World Bank World Integrated Trade Solution (WITS) NTM - View and Export Raw Data provides with primary information on non-tariff measures (NTMs). This database is collected and classified by UNCTAD and stored its TRAINS database.
- Specifically for STC on SPS and TBT measures, the WTO provides the search portal Information Management System (IMS).
- Other sources include the World Bank's Trade, Production and Protection (TPP) Database which provides information on a set of non-tariff barriers (NTB). Later, the CEPII published the NTM-MAP based on the UNCTAD TRAINS database. Also, the WTO published an Ad Valorem Equivalent (AVE) of NTM based on data in the TRAINS database. Nonetheless, the analysis is based in a reduced sample of NTMs data collected between 2012 and 2016.
- A recent database is developed by Ghodsi *et al.* (2017) for the Vienna Institute for International Economic Studies (wiiw). This database is a compilation of NTM notifications to the WTO (accessible via I-TIP-Goods) for more than 100 importers and over 5,000 products for the period 1995-2019 and is complemented with information provided in the Temporary Trade Barriers Database compiled by Chad Bown and published by the World Bank. An in depth work allow the authors to identify the products affected by each measure.

Regarding the available literature, Grant and Arita (2017, p.14) state that “the TRAINS database is widely used by researchers to study the trade effects of NTMs”. But they use the specific trade concerns raised formally in the SPS committee meetings of the WTO (p. 19) to analyse past and present SPS issues as revealed by agricultural exporting countries. On the other side, Crivelli and Groeschl (2016) use the IMS from the WTO for analysing the impact of SPS on market entry and trade flows in agri-food products.

Santeramo (2020, p. 20) uses the UNCTAD TRAINS database for evaluating the impact of the implementation of SPS measures and the entry into force of an RTA between trade partners in terms of trade levels. Curzi *et al.* (2020, p. 4) use three databases to study the effect of STCs and other NTM on agri-food exports from Peru: i. a firm-level Peruvian customs dataset; ii. the WTO database on STCs; and iii. a new dataset (built by the authors) on NTMs notified to the WTO compiled from the I-TIP.

After downloading and analysing the different sources of NTM data for the gravity model. Only the UNCTAD TRAINS and the wiiw NTM databases are prepared for econometric analysis. Nonetheless, the former is structured as an unbalanced panel data from 2010 to 2018 presenting the number of each NTM category affecting each HS 6-digit level product category by imposing country and trade partner. Data is not available for South Africa and missing for EU, year 2017, and for Chile, Argentina, Brazil, Mexico and Peru, years 2010 and 2011. The latter is structured in two files needing to be matched by a numeric ID for each NTM. The first file defines for each NTM the affected products at an HS 6-digit level. The second file defines, among others, the imposing country, the affected trading counterpart, the type of NTM including STC for SPS and TBT measures, the year of initiation, the year of entry in force and the year of end of the measure. The wiiw needs to be converted into a panel data structure. We further compared the UNCTAD TRAINS and wiiw NTM databases. Regarding the level of aggregation, both databases identify impacted products at an HS 6-digit level. As for the NTM types, the TRAINS database disaggregates it at a third level (one letter and two numbers) while wiiw NTM database only classifies them at a first level of aggregation (one letter: A=SPS/B=TBT/etc.). Based on the results of our interviews in which we find that some SPS and TBT measures are more challenging to comply with than other, it would be interesting to address the effect of different types of SPS and TBT. Nonetheless, given the limitations of the present study this could not be covered by the present research yet, we suggest it as a future line of research.

Based on the previously stated, for our analysis we use the wiiw NTM database (Ghodsi *et al.*, 2017). This allows us to have a balanced panel data without excluding South Africa from the analysis and covering the years 2000 to 2019.

More and more SPS and TBT measures which are imposed mainly multilaterally given the non-discrimination principle of the WTO. This does not allow to actually account for the measure that impact bilateral trade. On the other hand, STC are raised bilaterally on measures that actually present a challenge for compliance or are actually trade restrictive. We decided then to account for STC on SPS and TBT measures for our gravity model.

When it comes to the aggregation of NTM, literature (Disdier *et al.*, 2008; Henry de Frahan and Vancauteran, 2006; Kareem *et al.*, 2016) has used the coverage ratio to account for a trade weighted measure of different NTM. We compute the coverage ratio at the product category  $k$  for the pair of trading countries  $i$  and  $j$  at time  $t$  for each of the following measures: SPS, TBT and other NTM as follows (UNCTAD, 2013):

$$C_{ijkt} = \frac{\sum_h D_{ijht} \cdot V_{ijht}}{\sum_h V_{ijht}} \text{ for all } h \in k$$

where  $D$  is a dichotomous variable for the presence ( $D=1$ ) or absence ( $D=0$ ) of an STC on SPS measures, STC on TBT measures, and other NTM at the HS 4-digit level indicated by the subindex  $h$  and  $V$  is the corresponding traded value from exporter  $i$  to importer  $j$  for the product  $h$  at an HS 4-digit-level at a time  $t$ . The data is extracted from the wiiw NTM database, then aggregated at HS 4-digits level assuming that a measure reaching a product at a 6-digits level it reaches also the 4-digits level. An estimation on the overall coverage of NTM at HS 6-digits level within each sub-sector of interest shows a coverage of at least 85%.

The preliminary statistics (Appendix IV) show zero trade values for EU imports of meat and dairy products and EU exports of fruits which will be looked in depth in the following part. As for the NTM variables, we find no variance for the SPS variable in EU fish imports as well as no variance for SPS and other NTM in EU imports of dairy products. The first can be replaced by the coverage ratio of all SPS measures instead of accounting only for STC. As for the dairy product sub-sector, we exclude the SPS and oNTM variables from the model.

#### 4.4. Model estimation and statistic tests

To begin with, we run a restricted model in which the estimators of the interaction terms  $\beta_{10}$  and  $\beta_{11}$  are fixed to zero with both random and fixed effects. To avoid perfect collinearity, the specification is run on the one hand, controlling for time effects with nominal values of the dependent variable and, on the other hand, regressing real values and controlling for the EU specific variables (GDP and population for EU imports and share for EU exports). After checking the estimators' signs of the traditional gravity model variables and adjusting the specification if needed, we compute a Hausman test to check whether fixed effects or random effects are preferred. Moreover, we compute the Dickey Fuller test of stationarity. In all cases non stationarity is detected, then the model is corrected with an Arellano-Bond specification with the corresponding numbers of lagged variables. The Arellano-Bond specification uses generalized method of moments (GMM) estimators with lagged terms of the dependent variable and first difference of the regressors (Arellano and Bond, 1991).

Regarding the main challenges of the gravity models identified in the literature, we control for the multilateral resistance term with country specific dummies which can only account for the average multilateral resistance over the years. Trade values are computed in nominal terms when controlling for time effects, else in real terms deflated by the Harmonised Index of Consumer Prices (HICP). Finally, we deal with zero trade values with three methods: a-dropping the observation, b-changing the value by an arbitrarily small values, and c-using a poisson pseudo-maximum likelihood specification absorbing for country and time fixed effects which regresses the traded value and does not require to use the logarithm.

Based on the gravity model theory, we expect GDP and population of the importing country to affect positively and tcost to affect negatively on the traded value. The share of the subsector exports within all agri-food exports is expected to have a positive impact whereas the exchange rate should be positive for EU imports and negative for EU exports. As for the variables of interest, we expect FTApplus to have a positive impact on trade. Since SPS and TBT are measured by the STC coverage ratio, we expect that the estimator is negative. The interaction of the variables FTApplus and SPS on the one side, and FTApplus and TBT on the other side, are expected to be positive. Finally, based on the literature review and the interviews we do not have any expectations on the sign of oNTM variable.

Our models will allow us to identify, for each sub-sector of interest, the impact of SPS, TBT and other NTM still in place on the value of the bilateral trade flows between the EU and the selected countries, the benefits of the existence or not of a free trade agreement, the specific commitment in terms of SPS and TBT measures established within it, and whether the association agreement reduces trade arguments between the EU and the selected countries. The different specifications allow us to assess the model's robustness. Only the preferred results are reported in the present thesis.

#### 4.5. Estimation results, interpretation, and limitation

The tables 6 and 7 present the results of the Gravity Model for the preferred specification of EU imports and EU exports respectively.

**Table 6. Results of the gravity models for EU28 imports for the different sub-sectors of interest**

Specification	Fruits	Vegetables	Meat	Fish and seafood	Dairy products
	Arellano-Bond	Arellano-Bond	PPML <sup>(1)</sup>	Arellano-Bond	Arellano-Bond <sup>(2)</sup>
GDP (ln)	0.06	0.26		0.58	1.66
Pop (ln)	-2.40**			-4.77	1.53
tcost	0.11	0.05	0.50	-0.27	15.67***
Share	1.17*	-1.07	3.98**	2.40	2.01
ER	-0.00	-0.00*	0.00	-0.00	-0.05***
FTApplus	0.06	-0.13*	0.72***	1385.03	4.07***
SPS	0.00	-0.03	-0.23	1417.11	
TBT	0.08	0.04	-0.00	-0.09	-1.40**
oNTM	-0.15	-3.24*	-0.41	-0.13	
FTApplus*SPS	-0.08	-0.01	-2.30*	-1385.06	
FTApplus*TBT	-0.09	0.20*	-2.86*	0.92	-4.51***
L1.	0.43***	0.60***		0.83	0.11
L2.	0.43***	-0.14*			
Constant	32.11**	4.17	15.38***	-1365.47	-67.84

\* p<0.05; \*\* p<0.01; \*\*\* p<0.001

(1) We control for exporter and time fixed effects. GDP and pop are omitted due to collinearity.

(2) SPS and oTBT have no variance for dairy products and therefore are omitted from the model.

**Table 7. Results of the gravity models for EU28 exports for the different sub-sectors of interest**

Specification	Fruits PPML <sup>(1)</sup>	Vegetables Arellano-Bond	Meat Arellano-Bond	Fish and seafood Arellano-Bond	Dairy products Arellano-Bond
GDP (ln)		1.20***	1.22	2.47***	0.08
Pop (ln)		2.75	0.74	-5.56***	3.20
tcost	0.85	0.20	0.29	-0.42	0.14
Share	(omitted)	32.31	-1.56	39.62*	30.48*
ER	-0.00	0.00	0.00	0.00	0.00
FTAplus	0.96*	-0.56***	-0.45	-0.36	0.11
SPS	-0.19	0.41**	0.32	-1.06*	0.27*
TBT	0.68**	-0.63	-0.31	-0.21	-0.02
oNTM	-0.28	-0.00	-0.30	-0.24	0.01
FTAplus*SPS	-1.81	0.28*	-0.55	-276.42*	(omitted)
FTAplus*TBT	-0.45	1.06*	0.57	0.61	1.00***
L1.		0.45***	0.60	0.26**	0.40***
L2.		0.22**			
Constant	16.92***	-52.62**	-28.37	16.53	-32.43*

\* p&lt;0.05; \*\* p&lt;0.01; \*\*\* p&lt;0.001

(1) We control for importer and time fixed effects. Share is omitted due to collinearity.

As expected in both models GDP is positive but sometimes not significant. As for population, it takes sometimes negatives values. When analysing EU imports, the variable population varies only across time since it is only measured for the importing party and therefore is not comparing trade to importers of different size. The regressor tcost is expected to account for trade cost and have a negative impact on trade. Nonetheless, the variable is only significant for EU imports of dairy products but taking a positive value. The variable Share takes positives values when significant. The exchange rate (ER) affects negatively EU imports which results counter intuitive since a depreciation of a local currency against the Euro (*i.e.* an increase in the ER) should lead to higher EU imports from this country. In general, the signs of the estimators remained unchanged across different specifications thus reaffirming the robustness of the results.

As for the variables of interest, we find heterogeneous effects. First, for EU imports, we find FTAplus to have a positive impact in the traded value for meat and dairy products sub-sectors, no significant effect for the fruits and fish and seafood subsectors whereas the impact on the vegetables subsector appears to be negative. SPS do not present significant effect and TBT only presents a significant yet negative effect for EU imports of dairy products. Other NTM negatively affect the vegetable sub-sector but have no effect on the other sub-sectors under study. Finally, the interaction terms show a positive effect of FTAplus on overcoming TBT for the vegetables sub-sector yet a negative effect of the FTAplus on complying with SPS and TBT for the meat sub-sector and for the dairy sub-sector only for the later interaction.

When analysing the results for EU imports of meat, we bear in mind that among the countries under study we find Brazil and Argentina, major meat producers and exporters. In this sense, the negative sign of the two interaction terms (FTAplus\*SPS and FTAplus\*TBT) could be biased by a differentiated capacity of the above-mentioned countries to overcome trade disputes even if this is in part controlled by the Share variable.

Second, for EU exports, we find a positive effect of the FTApplus for the fruit sub-sector yet a negative for the vegetables, the other sub-sectors under study present no significant effect. The results show that SPS positively affect exports of vegetables and dairy products, yet these measures have a negative effect for the fish and seafood sub-sector and no significant effect for the fruits and meat sub-sector. On the other hand, TBT present a positive impact on EU exports for the fruits sub-sector and no significant effect for the other sectors under study. Other NTM show no significant impact. The interaction terms in our models show a positive impact of the FTA on complying with SPS and TBT for the vegetable sub-sector as well as for TBT in the dairy products sub-sector. On the contrary, the interaction of FTApplus and SPS has a negative effect on EU exports for the fish and seafood sub-sector. The other interactions show no significant effect.

The main limitation we find in our results are that the control variables differ from the expected outcomes. Also, we aggregate the NTM data from HS 6-digit level to HS 4-digit level assuming full coverage. Even if we tested for the coverage and it was at least 85% within each subsector, we could have overestimated the coverage ratios of SPS, TBT and other NTM variables. In order to overcome these limitations in future research, we propose to run the models with disaggregated data within the sub-sectors under study thus increasing the number of observations.

Regarding the quality of our data, we doubt whether accounting for *tcost* as the ratio of CIF price index and FOB price index is a good. In this sense, the sample showed that in various opportunities CIF index prices are lower than the FOB index prices which in theory is not correct. As stated previously, the *wiiw* shows no SPS *STC* on dairy products for EU imports yet, in our preliminary review, we did find an *STC* on SPS measures raised by Argentina.

## 5. Discussion

The present discussion will first review the results of our gravity model and contrast them with the existing literature. Secondly, we will review the main results of the interviews and revise them with the empirical evidence.

Santeramo (2020) finds that, in general, SPS measures and Regional Trade Agreements (RTA) favor imports. At a sub-sector level, he finds fruits trade to be negatively affected by multilateral SPS measures whereas we find no significant impact. In the same research, vegetable trade shows no significant impact to SPS measures which is in line with our results for EU imports. Santeramo (2020) also finds a positive impact of bilateral SPS measures as well as the interaction between SPS and RTA on meat trade whereas we find no significant effect and a negative effect respectively. Finally, he finds no statistically significant effect of SPS nor of the interaction of SPS and RTA on the fish sub-sector which is in line with our results for EU imports but not with EU exports in which we find a negative impacts. All in all, Santeramo (2020) finds different effects of SPS measures, RTA and the interaction term SPS\*RTA on trade value for the different sub-sectors which is also what the present study detects.

Kjöllerström (2006) suggests that NTM, such as those related to TBT and SPS, impeded trade flows between Chile and the EU for agricultural products, such as beef and fresh fruits and vegetables. But, the empirical evidence from the present research shows only a negative effect of TBT measures for EU imports of vegetables. Also, we find a positive effect of SPS measures in EU exports of vegetables and a positive effect of TBT in EU exports of fruits.

Considering our literature review, Fontagné *et al.* (2005) finds a predominance of negative effects of SPS and TBT on trade of fresh and processed food. We find indeed that TBT affect negatively the dairy imports to the EU yet overall, no significant impact for the other sectors. Regarding Curzi *et al.* (2020) findings of regular SPS to be trade enhancing for Peruvian exporters at a firm level, our evidence at country level for the southern hemisphere countries under study does not support those results.

From the interviews, the AA facilitates Chilean compliance with the EU regulations mainly due to the technical cooperation. Furthermore, the interviewees state that the AA reduces the negative effect on trade of disputes due to cooperation for overcoming contingencies. Nonetheless, we find no empirical evidence supporting those affirmations. In this sense, the experience of Argentina overcoming trade restrictions due to black spot in citrus shows specific cooperation with the EU while the agreement is not yet in force. Therefore, we understand that the technical cooperation the EU maintains with its trade counterparts might not be limited to commercial partners having agreements in forced.

The fruit and vegetables export sector in Chile express that the major challenge related to NTM with the EU is complying to changes in authorized pesticides and MRL. We find no significant impact of SPS measures in EU imports. In this sense, it can be interesting to analyse the impact of specific SPS measures given that, based on our qualitative

analysis, some represent a bigger burden than others. We propose this as a future line of research.

Based on the contingency solving capacity experienced after the salmonella outbreak in avian exports from Chile to the EU we could understand that the framework of the AA reduces trade issues. Nonetheless, the empirical evidence suggests otherwise. We keep in mind that this event occurred in 2019 and was overcome during the COVID-19 pandemic and this is therefore not included in our gravity model that analyses the period between 2000 and 2019.

The fish and seafood subsector does not present significant impact in trade of EU regulations on SPS, TBT nor other NTM. These results are in line with the perception of the exporters in Chile that stated no major difficulties in complying with these measures. Anyway, the sector presents concerns regarding the compliance with private standards. Given that this exceeds the limits of the present research, we open the topic for future lines of research.

Last, the dairy sub-sector expresses not having any specific problem with NTM imposed by the EU. This is in fact due to the limited commercial opportunities held in the EU market. As result of our analysis, we particularly find that the dairy sub-sector, being a strategic sector in EU agri-food production, is widely covered by SPS and TBT measures. Our model shows in fact a negative effect of TBT on EU imports of dairy products and a negative effect of the FTApplus on TBT dispute solving capacity.

For EU exports of fruits and vegetables, market access is restricted particularly linked to sanitary and phytosanitary provisions, but the sector does not find specific problems with TBT measures. The empirical evidence shows no significant effects of SPS on EU exports of fruit and a positive impact on the vegetables sub-sector. Regarding the impact of TBT, there is a positive effect on fruit exports and no significative effect on the vegetables sub-sector. The major challenge for the sector remains to access the markets in relation to SPS protocols.

For EU meat exports, our model confirms the results of our interviews: the AA does not favor trade nor contributes to reducing SPS or TBT disputes. We find no significant effects of SPS, TBT nor other NTM on EU export values.

Both the fruit and vegetable sub-sector and the meat sub-sector bring the light to the difficulties of the EU to be recognized as a single trade counterpart and not as individual country members. This leads to longer negotiations costly in time and money. Member states have been negotiating bilaterally the market access given that the procedures at an EU level have not been facilitated in general by the agreements in place. Deeper SPS commitments and established deadlines in trade agreements are requested to facilitate international market access by EU exporters.

## 6. Conclusions

In the framework of the ongoing negotiations for the modernization of the AA, the present research aims to contribute to the knowledge of the impact of NTM in agri-food trade between the EU and Chile compared to trade between the EU and the Chilean main southern hemisphere competitors. We analysed whether trade agreements that include in depth SPS and TBT provisions, such as the AA, hereafter FTApplus facilitate bilateral trade between the parties and if they contribute to reducing trade disputes. Empirical evidence shows heterogeneous impact across the agri-food subsectors under study: fruits, vegetables, meat, fish and seafood, and dairy products. Then, we cannot affirm that NTM between Chile and the EU do not affect bilateral trade as much as between the main competitors of Chile and the EU thanks to their Association Agreement.

For EU imports, we evidence that FTApplus have a positive impact in trade of meat and dairy products, no statistically significant effect for the fruits and fish and seafood sectors and a negative effect on the vegetables sub-sector. We find evidence of TBT reducing trade in the vegetables sub-sector and other NTM to negatively affect the dairy and seafood sub-sector. As for the rest of the effects of SPS, TBT and other NTM in the sub-sector under study appear to be statistically non-significant.

Despite the perception of the public and private sector in Chile that see technical cooperation in the framework of the AA as an efficient way to overcome contingencies in trade disputes, we find no empirical evidence of a positive impact in any sector. Moreover, we detect a negative interaction effect of FTApplus in the meat sub-sector both for SPS and TBT issues and a negative effect in the dairy sub-sector for overcoming TBT issues.

For EU exports, SPS measures present a positive effect on vegetables and dairy products exports, no significant effect on fruits and meat exports, and a negative effect on fish and seafood exports. TBT favours fruit exports but have no significant effect on the other sub-sectors. Finally, we find no significant effect of other NTM.

The fruits and vegetables exporting subsector has expressed difficulties for reaching the Chilean market due to sanitary and phytosanitary provisions. In this sense, we find a divergent effects. On the one hand there is a positive impact of the AA on fruit trade but no significant impact of the AA on reducing SPS or TBT trade disputes. On the other hand, we find a negative effect of the AA on vegetable exports yet a positive effect of the agreement for overcoming SPS and TBT issues. In line with the results of our interviews, there is no significant impact of the AA on meat exports nor reducing SPS and TBT disputes. The other sub-sectors under study do not show a significant effect of the AA. The AA has a positive effect in overcoming TBT disputes in the dairy products sub-sector yet a negative impact on SPS issues in the fish and seafood sub-sector.

All in all, we find heterogeneous effects across sub-sector and for EU imports and exports of the AA and SPS, TBT and other NTM in agri-food trade between the EU and Chile and its main southern hemisphere competitors. Also, the extent to which the AA

contributes to reducing trade disputes depends on the sub-sector and for EU imports and exports.

In the context of the modernization of the AA, more binding provisions could favour market access and trade. On the one hand, EU exports can be favoured by establishing specific commitments and deadlines for the PRA and protocol approval by the importer. Moreover, the recognition of the EU as one trade counterpart would favour the conjoint negotiation of member states thus reducing the cost and time for accessing markets. On the other hand, MRL and limitation in authorized pesticides appear to be the most challenging measures to overcome. An in depth technical and scientific cooperation with Chilean institutions could facilitate compliance with these measures. In this sense, a specific commitment from the EU for contributing to the processes needed to approve alternative pesticides could ease the burden of complying with new EU SPS regulations.

As for the upcoming changes, the EU is seeking to include provisions linked to the Green Deal and the Farm to Fork strategy in its international trade relationships. Contributing to sustainable food chains and combatting the loss of biodiversity appears to be in the EU international trade agenda. These will probably lead to new NTM in trade.

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### **Interviews in Santiago de Chile (March to May 2021)**

Adonis, Ricardo – Executive Secretary of the Food Safety Committee at *Asociación de Exportadores de Frutas de Chile* (ASOEX) and Development manager at *Fundación para el desarrollo frutícola* (FDF). Date of the interview: 13/5/21

Atlagich Izquierdo, Miljenko – Poultry production manager at Agrosuper. Date of the interview: 30/4/21

Bahamonde-Medina, Francisco Javier – former Agricultural *Attaché* at the Mission of Chile to the European Union, former National Director at *Servicio Agrícola y Ganadero*. Date of the interview: 9/4/21

Bombrun, Hélène – Advisor European Division at *Subsecretaría de Relaciones Económicas Internacionales* (SUBREI), previously ODEPA. Date of the interview: 9/4/21

Canala-Echeverría, Miguel – General Manager at *Asociación de Exportadores de Frutas de Chile* (ASOEX). Date of the interview: 13/5/21

Cerda, Andrea – Head Market Access Division at *Subsecretaría de Relaciones Económicas Internacionales* (SUBREI). Date of the interview: 9/4/21

Díaz Zamora, Rodrigo – Quality sub-manager at AquaChile. Date of the interview: 5/5/21

Garrido Medina, Ingrid Teresa – Advisor Market Access Division at *Subsecretaría de Relaciones Económicas Internacionales* (SUBREI). Date of the interview: 9/4/21

Iturrieta, Guillermo – Executive president at Exporlac (Dairy exporters association). Date of the interview: 22/4/21

Jimenez Beretta, Pablo – Advisor Europe Division at *Subsecretaría de Relaciones Económicas Internacionales* (SUBREI). Date of the interview: 9/4/21

Lopez, Jimena – Head of Fruit and Vegetable Department at *Asociación de Exportadores de Frutas de Chile* (ASOEX). Date of the interview: 13/5/21

Lorenzo, Francisco - Foreign Trade Manager at ChileCarne (meat exporters association). Date of the interview: 28/4/21

Maureira, Sergio – General Secretary at *Asociación de Exportadores de Frutas de Chile* (ASOEX). Date of the interview: 13/5/21

Rojas, Hernan – former director of livestock protection at *Servicio Agrícola y Ganadero* (SAG). Date of the interview: 26/4/21

Umaña, Felipe – *Servicio Agrícola y Ganadero* (SAG). Date of the interview: 16/4/21

Valdés, Paula Francisca – Bilateral Affairs Analyst at *Oficina de Estudios y Políticas Agrarias* (ODEPA). Date of the interview: 29/3/21

Vega Alarcón, Rodrigo - former Agricultural *Attaché* at the Mission of Chile to the European Union. Date of the interview: 14/4/21

### **Interviews in Brussels (June and July 2021)**

Camus, Mauricio – Agricultural *Attaché* at the Mission of Chile to the European Union.

Date of the interview: 28/7/21

Concha, Nicolás – Commercial *Attaché* at the Mission of Chile to the European Union.

Date of the interview: 28/7/21

Cucurella, Carolina - Senior Veterinary Advisor at UECBV the European Livestock and Meat Trading Union. Date of the interview: 28/7/21

Funes, Gastón María - Agricultural *Attaché* at the Mission of Argentina to the European Union. Date of the interview: 14/7/21

Maier, Karsten – Secretary general at UECBV the European Livestock and Meat Trading Union. Date of the interview: 28/7/21

Santos-García Bernabe, Natalia - Trade & Market Access Director at FRESHFEL. Date of the interview: 24/6/21

Wauters, Didier – Agricultural specialist at the Mission of Chile to the European Union.

Date of the interview: 28/7/21

## Appendix I – Yearly growth in EU trade with Chile and its main southern hemisphere competitors by sub-sector of interest (2002-2019)

For calculating yearly growth:

$$\ln V = \alpha + \beta t + \varepsilon$$

where V is the traded value deflated to 2002 prices with the EUROSTAT Harmonised Index of Consumer Prices (HICP), t is a temporal vector for the years and  $\beta$  is the yearly growth.

When trading values were equal to 0, they were replaced by 1.

*Table A.1.1. Yearly growth between 2002 and 2019 of EU imports from Chile and its main southern hemisphere competitors by sub-sector*

	Fruits and vegetables	Meat	Fish	Dairies
Argentina	-2.7%	-1.5%	-0.6%	-65.8%
Brazil	1.9%	-2.1%	-14.0%	-3.7%
Chile	3.6%	1.3%	-0.1%	3.9%
Mexico	7.5%	-19.8%	6.3%	36.5%
Peru	14.2%	14.6%	6.7%	-0.9%
South Africa	2.7%	-10.1%	-1.6%	-35.6%

*Table A.1.2. Yearly growth between 2002 and 2019 of EU exports to Chile and its main southern hemisphere competitors by sub-sector*

	Fruits and vegetables	Meat	Fish	Dairies
Argentina	12.2%	8.5%	12.6%	6.4%
Brazil	15.6%	12.8%	10.2%	3.9%
Chile	17.9%	21.4%	8.6%	15.8%
Mexico	5.0%	11.5%	2.3%	-0.9%
Peru	14.1%	7.3%	14.6%	5.4%
South Africa	9.4%	16.3%	1.1%	9.3%

## Appendix II – Interview guide

1. Introducing myself and the study
2. “Do you have any questions on the project?”
3. Kindly request to record the interview and taking notes during the interview.
4. Questions guide

### Public agencies

- Number of notifications about SPS and TBT to the WTO is growing each year. In this context, how do domestic and EU regulations need to be adapted in order to meet the Chile-EU requirements? For which product categories? To overcome which types of SPS or TBT regulations?
- How difficult is to adapt to the current and new regulations?
- Previous studies manifest that exporters present high sensitivity to the enforcement of EU’s SPS measures as a consequence of deficiencies in the Chilean export control system such as traceability and certification procedures. Has the government changed these in order to facilitate trade? For instance, how did the “PABCO vigente EU” programme to export fresh beef to the EU performed since it was set (in 2014)?
- There were limitations in Chilean imports of beef from the EU due to the earlier bovine spongiform encephalopathy (BSE) in 2013 as specific nomenclature and additional classification with criteria that differ to those applied in the EU were set. How did this situation was overcome not to impede trade? What about the recurrent foot and mouth disease, or other animal diseases or vegetal pests?
- What is the main source of information about NTM and in particular SPS measures for the Chilean producers and exporters?
- Is there an active participation of the private sector for defining and implementing SPS and TBT measures?
- Is there anything else you could mention regarding challenges, benefits or difficulties faced by your institution regarding NTM?

### Special question for the SPS committee:

- Which are the most challenging measures? For what types of SPS and TBT procedure and measures? For which specific products?
- How could compliance be facilitated? Is it improving or worsening during the last 10 years?
- Chile and the EU agreed in 2003 on a specific SPS chapter for their association agreement. Do you think that this agreement facilitates trade with the EU? In what procedures, terms, circumstances?
- As you know, Chile and the EU are again negotiating a modernisation of their association agreement. What improvement would like to see in the SPS chapter? For which procedures, SPS measures, specific products?

- WTO has a special space for country members to raise Specific Trade Concerns (STC). By analysing the SPS/TBT STC still in place I realised that only some of them raised or/and supported by Chile towards the EU were informed as resolved or partially resolved. Others, such as the SPS STC on novel food (2006, last raised on 2017) or one on maximum levels of pesticide (2003/04) and all the TBT STC are classified as “status-not reported”, could you please explain me why is that?
- I have also noted less bilateral STC between Chile and the EU than between the EU and Chile’s main southern hemisphere competitors such as Argentina, Brazil, Mexico, Peru and South Africa in the EU. Would you have a hypothesis on the reason for this?
- Could you tell me more about bilateral SPS issues for both ways that I should be aware of? For what types of SPS measures? For which specific traded products?

### **Private organisations**

- What types of SPS and TBT measures are harder or more challenging to implement? Easier to implement? How do you perceive the benefits of them?
- What is your main source of information about NTM and in particular SPS and TBT measures?
- Do producers and exporters usually choose the EU as a market before having the final product to comply to the EU SPS and TBT measures? Are there particular procedures to reach the EU as a market?
- Is there anything else you could mention regarding challenges, benefits or difficulties faced by your institution, association or company regarding NTM?
- Which types of SPS and TBT procedures and measures are the most present in trade with the EU? And which ones are the hardest to comply with? For what types of SPS and TBT procedure and measures? For which specific products? How could compliance be facilitated? Is it improving or worsening during the last 10 years?
- Chile and the EU agreed in 2003 on a specific SPS chapter for their association agreement. Do you think that this agreement facilitates trade with the EU? In what procedures, terms, circumstances?
- As you know, Chile and the EU are again negotiating a modernisation of their association agreement. What improvement would like to see in the SPS chapter? For which procedures, SPS measures, specific products?

### Specific questions for representatives of the fruit sub-sector:

- In previous studies, Chilean fruit exports manifest difficulties complying with EU quality standards and SPS measures in the past decade. Which are the most challenging measures?
- Exporters present high sensitivity to the enforcement of EU’s SPS measures as a consequence of deficiencies in the Chilean export control system such as

traceability and certification procedures. Has the government changed these in order to facilitate trade?

Specific questions for the meat sub-sector:

- Previous studies manifest that exporters present high sensitivity to the enforcement of EU's SPS measures as a consequence of deficiencies in the Chilean export control system such as traceability and certification procedures. Has the government changed these in order to facilitate trade? For instance, did the "PABCO vigente EU" programme to export fresh beef to the EU facilitate the conditions for meat exports since it was put in place?
- Other SPS and TBT issues for other types of meat?

Specific questions for the fish sub-sector:

- Analysing STC, I noted there is an issue with a TBT measure maintained by the EU on sardine product labelling and customer information. Could you tell me more about it? Do you have in mind other measures or compliance procedures imposed by the EU that led to a conflict for compliance in the fish sector?

Specific questions for the dairy sub-sector:

- The main Chilean export to the EU in the dairy sector has been whey? Do EU SPS and TBT measures and compliance procedures complexify the possibility of exporting other dairy products? What are the main challenges to comply with EU regulations in NTM for your sector?

5. "Thank you for your time!"

**Appendix III – Data sources**

Variable	Data type	Source	Link
$X_{ijkt}$	EU imports EU exports	Eurostat	<a href="https://ec.europa.eu/eurostat/web/main/data/database">https://ec.europa.eu/eurostat/web/main/data/database</a>
$GDP_{jt}$ $pop_{jt}$	GDP and population	Gravity database CEPII	<a href="http://www.cepii.fr/cepii/en/bdd_modele/presentation.asp?id=8">http://www.cepii.fr/cepii/en/bdd_modele/presentation.asp?id=8</a>
$tcost_{ijt}$	CIF and FOB price index	International Monetary Fund	<a href="https://data.imf.org/regular.aspx?key=61013712">https://data.imf.org/regular.aspx?key=61013712</a>
$share_{it}$	Subsector, agri-food and total exports per country	WITS from World Bank	<a href="http://wits.worldbank.org/WITS/WITS/AdvanceQuery/RawTradeData/QueryDefinition.aspx?Page=RawTradeData">http://wits.worldbank.org/WITS/WITS/AdvanceQuery/RawTradeData/QueryDefinition.aspx?Page=RawTradeData</a>
$ER_{ijt}$	Exchange rate	Eurostat	<a href="https://ec.europa.eu/eurostat/web/exchange-and-interest-rates/data">https://ec.europa.eu/eurostat/web/exchange-and-interest-rates/data</a>
deflator	HICP index	Eurostat	<a href="https://ec.europa.eu/eurostat/web/hicp/data/database">https://ec.europa.eu/eurostat/web/hicp/data/database</a>
$SPS_{ijt}$ $TBT_{ijt}$ $oNTM_{ijt}$	Non Tariff Measures	The Vienna Institute for International Economic Studies (wiiw)	<a href="https://wiiw.ac.at/wiiw-ntm-data-ds-2.html">https://wiiw.ac.at/wiiw-ntm-data-ds-2.html</a>

## Appendix IV– Descriptive statistics

**Table A.4.1. Descriptive statistics of variables included in the gravity models predicting EU imports**

Variable	Obs	Mean	Std. Dev.	Min	Max
EU real imports					
Fruits	120	6718894	4593616	269262	1.83e+07
Vegetables	120	686984.3	561098	32127.56	2151075
Meat	120	3954243	6349331	0	2.54e+07
Fish	120	2894001	2111634	237248.5	8854940
Dairy	120	4725.134	17450.56	0	107767.3
Gravity model variables					
GDP (ln)	120	23.54832	.145217	23.31221	23.81177
Pop (ln)	120	13.12091	.0170272	13.09802	13.15065
tcost	120	1.161642	.1522506	1.00671	1.82938
ER	120	124.1212	260.7534	.8953	786.35
FTAplus	120	.2166667	.4137009	0	1
Share					
Fruits	120	.1545064	.1241601	0	.3624247
Vegetables	120	.0598435	.0858547	0	.2897922
Meat	120	.0647529	.0675511	.0001194	.2564607
Fish	120	.0996605	.0956185	.0028671	.3339305
Dairy	120	.0123897	.0089837	0	.0368138
NTM variables					
Fruits					
SPS	120	.3394886	.4709009	0	1
TBT	120	.3916667	.4901695	0	1
oNTM	120	.7576897	.1961933	.184063	.9827205
Vegetables					
SPS	120	.125	.3321056	0	1
TBT	120	.3916667	.4901695	0	1
oNTM	120	.9899665	.0187753	.9221214	1
Meat					
SPS	120	.0149883	.0759528	0	.5020054
TBT	120	.4145583	.4705484	0	1
oNTM	120	.7784625	.3946763	0	1
Fish					
SPS	120	0	0	0	0
all SPS <sup>(1)</sup>	120	.9999698	.0001577	.998663	1
TBT	120	.2428272	.4116289	0	1
oNTM	120	.4388182	.4061147	0	.9987497
Dairy products					
SPS	120	0	0	0	0
TBT	120	.4333333	.4976134	0	1
oNTM	120	1	0	1	1

Note (1) This variable is calculated as the coverage ratio of all SPS measures instead of only accounting for STC.

**Table A.4.2. Correlation matrix of variables included in the gravity model for EU imports of fruits**

	Trade value	GDP(ln)	pop(ln)	tcost	Share	ER	FTAplus	SPS	TBT	oNTM
Trade value	1.0000									
GDP (ln)	0.3398	1.0000								
Pop (ln)	0.2124	0.6758	1.0000							
tcost	0.3450	-0.1711	-0.0792	1.0000						
Share	0.7240	0.2158	0.1209	0.3296	1.0000					
ER	0.3526	0.0350	0.0223	-0.2665	0.5916	1.0000				
FTAplus	0.3598	0.2530	0.1533	-0.3401	0.5692	0.7089	1.0000			
SPS	-0.1162	0.1444	0.1391	-0.3479	-0.6408	-0.3277	-0.2513	1.0000		
TBT	-0.3130	0.4020	0.2758	-0.3444	-0.3744	-0.3539	-0.0490	0.3370	1.0000	
oNTM	0.4843	0.0571	0.0531	0.2640	0.2215	0.2108	-0.0606	0.2398	-0.3136	1.0000

**Table A.4.3. Correlation matrix of variables included in the gravity model for EU imports of vegetables**

	Trade value	GDP(ln)	pop(ln)	tcost	Share	ER	FTAplus	SPS	TBT	oNTM
Trade value	1.0000									
GDP (ln)	0.1880	1.0000								
pop (ln)	0.1392	0.6758	1.0000							
tcost	-0.2909	-0.1711	-0.0792	1.0000						
Share	0.2593	-0.0427	-0.0297	0.0769	1.0000					
ER	-0.2064	0.0350	0.0223	-0.2665	-0.2485	1.0000				
FTAplus	0.2432	0.2530	0.1533	-0.3401	-0.1702	0.7089	1.0000			
SPS	-0.1502	0.0200	0.1482	-0.1967	-0.2034	-0.1763	-0.0153	1.0000		
TBT	0.1514	0.4020	0.2758	-0.3444	0.1690	-0.3539	-0.0490	0.4710	1.0000	
oNTM	-0.5155	-0.0742	-0.0201	-0.0421	-0.0151	0.2352	-0.3006	-0.0876	-0.1912	1.0000

**Table A.4.4. Correlation matrix of variables included in the gravity model for EU imports of meat**

	Trade value	GDP(ln)	pop(ln)	tcost	Share	ER	FTAplus	SPS	TBT	oNTM
Trade value	1.0000									
GDP (ln)	-0.0158	1.0000								
Pop (ln)	-0.0003	0.6758	1.0000							
tcost	-0.3165	-0.1711	-0.0792	1.0000						
Share	0.9499	0.0683	0.0528	-0.2995	1.0000					
ER	-0.2123	0.0350	0.0223	-0.2665	-0.0743	1.0000				
FTAplus	-0.2658	0.2530	0.1533	-0.3401	-0.2062	0.7089	1.0000			
SPS	0.1832	0.2179	0.2473	-0.1696	0.2882	0.0061	-0.0171	1.0000		
TBT	0.5566	0.3978	0.1736	-0.2107	0.5880	-0.3867	-0.3558	0.1628	1.0000	
oNTM	0.2957	0.3918	0.1832	-0.6319	0.2939	0.2365	0.2926	0.1037	0.2894	1.0000

**Table A.4.5. Correlation matrix of variables included in the gravity model for EU imports of fish and seafood**

	Trade value	GDP(ln)	pop(ln)	tcost	Share	ER	FTAplus	SPS	TBT	oNTM
Trade value	1.0000									
GDP (ln)	-0.0046	1.0000								
pop (ln)	-0.0048	0.6758	1.0000							
tcost	-0.1344	-0.1711	-0.0792	1.0000						
Share	0.3331	-0.0638	-0.0437	-0.1715	1.0000					
ER	0.3099	0.0350	0.0223	-0.2665	0.9036	1.0000				
FTAplus	0.2580	0.2530	0.1533	-0.3401	0.7458	0.7089	1.0000			
SPS	-0.0528	-0.1113	0.0036	0.1206	-0.2597	-0.3003	-0.3249	1.0000		
TBT	-0.0878	0.2047	0.1044	-0.3665	-0.4501	-0.2576	-0.2494	0.0677	1.0000	
oNTM	-0.0509	0.6446	0.2766	-0.1097	0.2031	0.2530	0.3949	-0.2505	-0.0406	1.0000

**Table A.4.6. Correlation matrix of variables included in the gravity model for EU imports of dairy products**

	Trade value	GDP(ln)	pop(ln)	tcost	Share	ER	FTAplus	SPS	TBT	oNTM
Trade value	1.0000									
GDP (ln)	-0.2772	1.0000								
pop (ln)	-0.1699	0.6758	1.0000							
tcost	0.3156	-0.1711	-0.0792	1.0000						
Share	0.2940	0.0812	0.0450	0.1317	1.0000					
ER	-0.1167	0.0350	0.0223	-0.2665	-0.0851	1.0000				
FTAplus	-0.1364	0.2530	0.1533	-0.3401	-0.0253	0.7089	1.0000			
SPS	.	.	.	.	.	.	.	1.0000		
TBT	-0.2210	0.4046	0.2353	-0.3822	-0.2866	-0.3544	-0.0925	.	1.0000	
oNTM	.	.	.	.	.	.	.	.	.	1.0000

**Table A.4.7. Descriptive statistics of variables included in the gravity models predicting EU exports**

Variable	Obs	Mean	Std. Dev.	Min	Max
EU real exports					
Fruits	120	166638.1	343548	0	1664402
Vegetables	120	83367.16	156635.7	777.2601	948302.1
Meat	120	256016.6	539224.6	6055.137	2811478
Fish	120	138566.3	209371.5	3122.667	850439.1
Dairy	120	368503.3	453597.4	6610.357	3061986
Gravity model variables					
GDP (ln)	120	20.33316	.8850507	18.66198	21.86495
Pop (ln)	120	10.88505	.8248524	9.645649	12.25985
tcost	120	1.11135	.1384702	1.000937	1.893807
ER	120	124.1234	260.7524	.8953	786.35
FTAplus	120	.2166667	.4137009	0	1
Share					
Fruits	120	.052341	.0023007	.0472782	.0562396
Vegetables	120	.0469303	.0030764	.0425446	.0534009
Meat	120	.1129711	.0036129	.1050728	.1183748
Fish	120	.0542378	.0030754	.0489472	.0580525
Dairy	120	.0883553	.0048061	.0779504	.0973974
NTM variables					
Fruits					
SPS	120	.0384476	.1442559	0	.8159204
TBT	120	.1369987	.1900148	0	.8812364
oNTM	120	.2749345	.2836588	0	1
Vegetables					
SPS	120	.0236106	.1075982	0	.8538485
TBT	120	.1291866	.1760156	0	.9999966
oNTM	120	.3260597	.2659215	0	.9273674
Meat					
SPS	120	.030612	.1304961	0	.7917576
TBT	120	.2109791	.2537721	0	1
oNTM	120	.34968	.3032931	0	.9612608
Fish					
SPS	120	.0156175	.0786609	0	.5236449
TBT	120	.4517196	.3376601	0	.997431
oNTM	120	.0886585	.1029702	0	.6610308
Dairy					
SPS	120	.2351356	.3684336	0	1
TBT	120	.2833333	.4525062	0	1
oNTM	120	.206064	.3802449	0	1

**Table A.4.8. Correlation matrix of variables included in the gravity model for EU exports of fruits**

	Trade value	GDP(ln)	pop(ln)	tcost	Share	ER	FTAplus	SPS	TBT	oNTM
Trade value	1.0000									
GDP(ln)	0.5859	1.0000								
pop(ln)	0.5948	0.9270	1.0000							
tcost	-0.2829	-0.1185	-0.0208	1.0000						
share	-0.1898	-0.1948	-0.0417	0.0757	1.0000					
ER	-0.2006	-0.4112	-0.6140	-0.1881	0.0039	1.0000				
FTAplus	-0.2362	-0.4238	-0.5913	-0.0717	-0.1599	0.7089	1.0000			
SPS	0.0673	0.1128	0.0814	-0.1293	-0.0866	-0.0829	-0.1016	1.0000		
TBT	0.0731	0.0118	-0.2029	-0.1510	-0.2864	0.4282	0.3930	-0.1524	1.0000	
oNTM	-0.0369	0.0235	0.0353	-0.0591	-0.1090	-0.2037	-0.1540	-0.1430	-0.0735	1.0000

**Table A.4.9. Correlation matrix of variables included in the gravity model for EU exports of vegetables**

	Trade value	GDP(ln)	pop(ln)	tcost	Share	ER	FTAplus	SPS	TBT	oNTM
Trade value	1.0000									
GDP(ln)	0.5051	1.0000								
pop(ln)	0.4826	0.9270	1.0000							
tcost	-0.2592	-0.1185	-0.0208	1.0000						
Share	-0.2864	-0.2624	-0.0619	0.1280	1.0000					
ER	-0.0949	-0.4112	-0.6140	-0.1881	-0.0115	1.0000				
FTAplus	-0.1525	-0.4238	-0.5913	-0.0717	-0.2221	0.7089	1.0000			
SPS	-0.0781	-0.1971	-0.2399	-0.0382	-0.0548	0.2405	0.2075	1.0000		
TBT	0.0754	0.0578	-0.0152	-0.0522	-0.2892	-0.1759	0.0695	-0.1242	1.0000	
oNTM	-0.0553	0.1171	0.1341	0.2116	-0.2875	-0.2865	0.0810	-0.1202	0.2451	1.0000

**Table A.4.10. Correlation matrix of variables included in the gravity model for EU exports of meat**

	Trade value	GDP(ln)	pop(ln)	tcost	Share	ER	FTAplus	SPS	TBT	oNTM
Trade value	1.0000									
GDP(ln)	0.0513	1.0000								
Pop(ln)	0.0443	0.9270	1.0000							
tcost	-0.0694	-0.1185	-0.0208	1.0000						
Share	0.0036	0.1035	0.0133	-0.0621	1.0000					
ER	-0.1236	-0.4112	-0.6140	-0.1881	-0.0041	1.0000				
FTAplus	-0.1762	-0.4238	-0.5913	-0.0717	0.0717	0.7089	1.0000			
SPS	-0.0586	-0.0905	-0.1463	-0.1560	0.2016	0.2557	0.2138	1.0000		
TBT	0.3385	0.0121	-0.0463	-0.0842	-0.0174	-0.0664	0.1063	-0.0326	1.0000	
oNTM	-0.3372	0.3351	0.4077	-0.0092	-0.0276	-0.3513	-0.1119	-0.1718	-0.1417	1.0000

**Table A.4.11. Correlation matrix of variables included in the gravity model for EU exports of fish and seafood**

	Trade value	GDP(ln)	pop(ln)	tcost	Share	ER	FTAplus	SPS	TBT	oNTM
Trade value	1.0000									
GDP(ln)	0.6937	1.0000								
pop(ln)	0.7007	0.9270	1.0000							
tcost	-0.2453	-0.1185	-0.0208	1.0000						
Share	-0.0570	-0.0927	-0.0109	-0.0566	1.0000					
ER	-0.2306	-0.4112	-0.6140	-0.1881	0.0005	1.0000				
FTAplus	-0.2653	-0.4238	-0.5913	-0.0717	-0.0786	0.7089	1.0000			
SPS	-0.0840	-0.1242	-0.0724	-0.0724	0.1624	-0.0905	-0.1042	1.0000		
TBT	0.0371	0.0994	-0.0857	-0.3581	0.0644	0.1930	0.2734	-0.0104	1.0000	
oNTM	0.2527	0.0078	0.0168	-0.0594	-0.0478	0.0433	-0.1458	0.0177	-0.2547	1.0000

**Table A.4.12. Correlation matrix of variables included in the gravity model for EU exports of dairy products**

	Trade value	GDP(ln)	pop(ln)	tcost	Share	ER	FTAplus	SPS	TBT	oNTM
Trade value	1.0000									
GDP(ln)	0.3794	1.0000								
pop(ln)	0.3629	0.9270	1.0000							
tcost	0.2578	-0.1185	-0.0208	1.0000						
Share	0.0508	-0.1822	-0.0500	0.0379	1.0000					
ER	-0.1860	-0.4112	-0.6140	-0.1881	-0.0264	1.0000				
FTAplus	-0.2068	-0.4238	-0.5913	-0.0717	-0.1542	0.7089	1.0000			
SPS	-0.0353	0.6086	0.6015	-0.2276	-0.1003	-0.2901	-0.3371	1.0000		
TBT	-0.2871	0.2165	0.0318	-0.3240	-0.2121	0.0835	-0.0165	0.3577	1.0000	
oNTM	0.2794	0.0409	0.0959	-0.0465	-0.0179	-0.2338	-0.2848	-0.0643	-0.3306	1.0000



## Non-tariff measures in agri-food trade between Chile and the EU: comparative trade effects

Serena Olivera

Sanitary and phytosanitary (SPS) and Technical Barriers to Trade (TBT) measures are in the agenda of the negotiations for the modernization of the Association Agreement (AA) between Chile and the EU. The impact of these measures on trade has been largely discussed in existing literature. In the frame of the existing AA, the present paper aims to contribute to the understanding of the impact of non-tariff measures and specially SPS and TBT in agri-food trade between the EU and Chile through a comparative analysis of trade between the EU and Chile main southern hemisphere competitors (Argentina, Brazil, Mexico, Peru and South Africa)<sup>5</sup>. The analysis focuses on the following sub-sectors of interest: fruits, vegetables, meat, fish and seafood, and dairy products. In order to address this question, we first carry-on interviews with the main private actors and political decision makers both in Chile and in the EU. Complementary to this, a gravity model allows to contribute with empirical evidence to test whether SPS and TBT provisions in EU trade agreements facilitate trade between the EU and its partners and whether these provisions contribute to reducing trade disputes between the EU and its partners. Our main findings are that the effect of these provisions vary for EU imports and exports and across agri-food subsectors. For EU imports, we find that SPS and TBT provisions in EU trade agreements have a positive impact in the traded value for meat and dairy products sub-sectors, no significant effect for the fruits and fish and seafood subsectors whereas the impact on the vegetables subsector appears to be negative. For EU exports, we find a positive effect of SPS and TBT provisions in EU trade agreements for the fruit sub-sector yet a negative impact for the vegetables. The other sub-sectors under study present no significant effect of EU trade agreement with deep SPS and TBT provisions.

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<sup>5</sup> The author is aware that Mexico is not in the Southern Hemisphere yet defines the countries under study as “Chilean southern hemisphere competitors” due to counter-seasonal exports.