ESTIMATING THE EFFECTS OF SANITARY AND PHYTOSANITARY MEASURES ON UKRAINE-EU AGRICULTURAL TRADE IN THE EUROPEAN MARKET

by

Oles Tsarevskyi

A thesis submitted in partial
fulfillment of the requirements for the
degree of

MA in Mathematical Economics and
Econometrics

Kyiv School of Economics

2019

Thesis Supervisor: _____ Professor Elena Besedina

Approved by _____
Head of the KSE Defense Committee,

_____

_____

_____

Date _____

Kyiv School of Economics

Abstract

ESTIMATING THE EFFECTS OF SANITARY AND PHYTOSANITARY MEASURES ON UKRAINE-EU AGRICULTURAL TRADE IN THE EUROPEAN MARKET

by Oles Tsarevskyi

Thesis Supervisor: Professor Elena Besedina

This work estimates the effects of specific type of Non-tariff measures (NTMs), namely Sanitary and Phytosanitary measures (SPSs) on the agricultural trade between Ukraine and the European Union. There exists a wide variety of studies concerning the NTMs and their influence on trade, however this branch of research it is underrepresented for Ukraine. NTMs are considered problematic by the World Trade Organization, theirs effect on trade is ambiguous, so it is important for us to address their importance in case of Ukraine. We believe that SPSs imposed by the EU present a barrier to trade for the Ukrainian exporters. In our analysis we are using Gravity Model approach with the use of Poisson Pseudo Maximum Likelihood estimator to address large amount of zero trade flows. Our research is conducted inside the European market for year 2017. We found that for 5 out of 10 analyzed groups of agricultural products SPSs are indeed significant impediments to trade, same result was observed for non-group specific data, meaning that on average Ukrainian exporter is more likely to face trade barriers in form of SPSs when trading with the European Union.

TABLE OF CONTENTS

LIST OF FIGURES

Number *Page*

LIST OF TABLES

Number *Page*

ACKNOWLEDGMENTS

The author wishes to express the deepest appreciation to his thesis advisor, Professor Elena Besedina, for her insightful comments, meaningful suggestions and support, which were immensely helpful throughout preparation of this paper.

Besides, author would like to thank his best friend Dmytro Bezushchak for his support and huge helpful comments.

Author also expresses his gratitude to the KSE faculty: Olesia Verchenko, Volodymyr Vakhitov, Hanna Vakhitova, Oleg Nivievskyi, Maksym Obrizan, Olga Kupets, Sergii Kiiashko, Timothy Brick, Pavlo Prokopovych.

Finally, author would like emphasize his gratefulness to his family for a big amount of motivation and support.

GLOSSARY

FTA. Free Trade Area

PTA. Preferential Trade Agreements

DCFTA. Deep and Comprehensible Free Trade Area

EFTA. European Free Trade Association

GMO. Genetically Modified Organizm

WTO. World Trade Organization

NTM. Non-Tariff Measures

SPS. Sanitary and Phytosanitary measures

TBT. Technical Barriers to Trade

STC. Specific Trade Concern

AVE. Ad Valorem Equivalent

PPML. Poisson Pseudo Maximum Likelihood

TRQ. Tariff-Rate Quota

HS. Harmonized System

ITC. International Trade Centre

i-TIP. Integrated Trade Intelligence Portal

MAcMap. Market Access Map

CEPII. Centre d'Études Prospectives et d'Informations Internationales

Chapter 1

INTRODUCTION

Over the last few decades humanity has been experiencing a rapid growth, especially in trading sector. Global trade in goods has reached over US$ 19 trillion in 2013, yet it was only slightly reaching US$ 1 trillion in 1996. How does that happen? Globalization is the obvious answer. We can observe a rapid growth in number of Preferential Trade Agreements (PTA), from 70 PTAs in 1990 all the way to 300 PTAs in 2010 (according to the World Trade Report 2011). A significant reduction in tariffs, quotas, prohibitions etc. of all sorts followed. However, in the light of these reductions, a new non-tariff measures (NTM) begun to emerge, as an obvious attempt of countries to protect what was previously protected by regular trade policy instruments.

Non-tariff measures 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.

The most common NTMs can be classified as follows:

- Sanitary and Phytosanitary Measures (SPS) – imposed when there is a need to protect human, animal or plant health from additives, contaminants, toxins or disease-causing micro-organisms etc. Example - geographical restrictions on eligibility: Imports of dairy products from countries;

- Technical Barriers to Trade (TBT) – referred to technical regulations, and procedures for assessment of conformity with technical regulations and standards. Example - labelling requirements: Washing machines need

to carry a label indicating their size, weight and electricity consumption level;

- Contingent Trade-protective Measures - measures implemented to counteract particular adverse effects of imports in the market of the importing country contingent upon the fulfilment of certain procedural and substantive requirements. Example - anti-dumping duty: An anti-dumping duty of between 8.5 per cent and 36 per cent has been imposed on imports of biodiesel products from country A.

The number of notifications on TBT and SPS combined has gone from roughly 400 to an enormous number, almost 4000 in 2014 (as shown in Figure 1 below), and continue to grow. From the World Trade Organization (WTO) official website, we can find out that by the end of 2018, there were over 18 thousands SPSs and almost 26 thousands TBTs in place. These measures have become obvious problem since the beginning of a millennia – at some point NTMs becoming barriers to trade, and in 2012 WTO prepared the whole World Trade Report specifically on this matter. Pascal Lamy – former Director General of the WTO in his speech on launching WTO report in 2012 stated:

"*First, NTMs have acquired growing importance as tariffs have come down, whether through multilateral, preferential or unilateral action. Secondly, a clear trend has emerged over the years in which NTMs are less about shielding producers from import competition and more about the attainment of a broad range of public policy objectives. You could say we are moving from protection to precaution.*" [1]

In his farewell statement he stressed this growing problem once again.

[1] Pascal Lamy, *World Trade Report 2012*, (Geneva, Atar Roto Presse SA, 2012), 3.

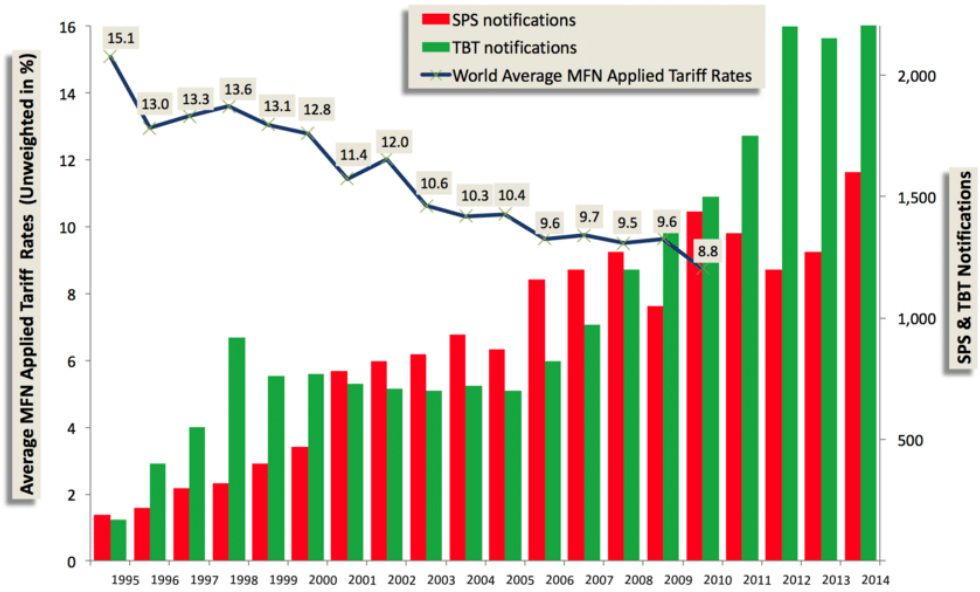

Figure 1. Yearly increase in number of NTMs and decrease in applied tariffs

Source: Ronen (2017)

As far as economic theory goes nobody can predict how the implementation of TBT/SPS measures will affect trade, the impact may be ambiguous for several reasons. It is understandable how effects may be negative, because it is a barrier to trade which is going to humper the trade. However, from other perspective – if consumers know that the product (i.e. some food), is safe, since it goes through with the SPS implemented, customers may increase trust in foreign product, thus increasing trade. Also these measures may lead to a significant rise in competiveness in the market which may have a positive effect on the trade as a whole. Having this in mind, we have to conclude that in order to understand the effects of NTMs we cannot simply speculate about the effects, but have to rely on estimations for specific cases.

In this paper we would like to study how a particular type of NTMs – SPS measures affect Ukraine`s trade with the world, more specifically with one of Ukraine`s main partners – European Union (EU). After the events of 2013-2014 the relationship between Ukraine and the EU started to strengthen as

never before. In fact, in 2016 Ukraine and EU have signed an agreement of Deep and Comprehensive Free Trade Area (DCFTA). Prior to Ukraine similar agreements have been signed by Georgia and Moldova in 2013, states that are not members of the EU, but are close to the EU. This agreement has granted Ukraine substantial tariff reduction, it has also lead to increase in number of NTMs imposed by Ukraine due to harmonization with the EU.

We will estimate the effects of SPSs on Ukraine – EU trade, using the gravity model approach, which has proven to be one of the best methods for this tasks. For estimations we will be using Poisson Pseudo Maximum Likelihood estimator. Since there is no convenient dataset, we will have to provide one by merging needed information from a few big datasets. Namely, we will be using UN COMTRADE for obtaining bilateral trade data, ITC MAcMaps in order to obtain tariff data, WTO website for information about Regional Trade Agreements (RTAs) and CEPII`s various datasets in order to obtain information for gravitational model.

We have found evidences that SPSs can indeed be considered as barriers (have negative significant effect on a trade) to Ukraine – EU trade in the European market.

This paper may be helpful for Ukrainian agricultural exporters, in order to give them the idea which products are more protected in the EU by the SPSs, which in term may give them an idea to allocate their resources differently or maybe to change strategic partners etc. We also hope that it will inspire more studies to look into this area, since for Ukraine it is very relevant given a high share of agricultural exports in total exports.

The structure of this paper is the following: Chapter 2 provides a brief literature review of the recent and not so recent empirical papers on this matter and the problem of NTMs evaluation, note that everything that is applied to NTMs may as well be applied to SPSs, since they are one of the major parts of NTMs

(WTO gives the number of all SPSs, that are currently initiated or in force of 18047, it is 36% of all NTMs and it is a second biggest category after TBTs – 51% but they are not in the scope of this research); Chapter 3 provides the description of the methodology of the analysis; Chapter 4 presents a data limitations, sources and data description; Chapter 5 follows with the results and Chapter 6 concludes.

Chapter 2

LITERATURE REVIEW

This Chapter will be divided in several parts: the overview of the NTMs and recent empirical findings, review of the literature touching upon problem of evaluating NTMs and used methods in estimating effects on trade, review of studies on Ukraine.

1.1 Overview of empirical evidence on NTMs

NTMs were around for some time, and it is crucial for us to understand the relationship between them and regular tariffs. Ray (1981) using 1970 trade data finds that for the case of the United States of America (US) nontariff trade restrictions can be considered as supplements to the existent at that time tariffs. Author also finds out that both tariffs and NTMs are biased to the industries in which US does not have advantages in world trade, which may be used as another argument towards NTMs been considered protection tools even 40 years ago.

One of the more recent studies on the matter - Kee et al. (2009). Authors have been testing substitutability between ad valorem equivalent (AVE) of NTMs and existence tariffs for 78 countries. They conclude that tariffs and NTMs are indeed substitutes. They also find that poor countries on average have higher tariffs, but in turn are facing more trade barriers for their exports.

It is also important to understand that NTMs are necessary, but at some point they may become barriers to trade. Today, when a country – exporter thinks that NTM is set for no other reason than to substantially humper trade, Specific

Trade Concern (STC) is raised in WTO. Orefice (2017) using 1996-2010 STC dataset presented by WTO find that STCs (on both SPS and TBT) are raised by exporting countries when the underlying NTM becomes a barrier to trade. They also find that this is more likely to occur between countries that compete on a similar quality product. Thus SPS measures are consistent barrier to trade for exporter countries.

Orefice (2017) motivates his idea of STCs being barriers to trade by the timing of such events. Indeed, he provides some interesting examples in recent history that make that a good motive. For example, in 2003 China raised STCs complaining about NTM imposed by the EU on natural honey (HS 0409). SPS measure which was imposed was tolerated by presence of a toxic antibiotic in Chinese honey. This seems rather understandable, however, what is interesting is that the new (at the time) EU states – Poland and Slovenia have a very high tariff on honey (89% and 45% respectively), which they had to reduce upon accession into the EU to their standard level of 17%. Something similar happened in 2008, now with pineapples from Ecuador (HS 0804), again there were SPS measure about Ethephon levels in product. Thus the STC was raised by Ecuador, interestingly enough, it was at a time when Romania entered the EU, and this country has 23% tariff on pineapples, which had to be eradicated by the EU standards. And the evidence does not stop there, there were other similar cases. Of course, all of these may be just a coincidence, it has not been proven by author to have a direct causality between the events, however, this is something that we should be aware of, while talking about NTMs.

Since the signing of DCFTA in 2017 number of TBTs and SPSs has raised substantially (see Figure 2 below), however this is not a subject to back up Oreifece`s theory, but rather due to the harmonization with the EU, since Ukraine and EU is now within the same FTA, same spikes may be observed in 2008, at the time TBTs were initiated in order to harmonize with the WTO, since Ukraine become a member of WTO on May of 2008.

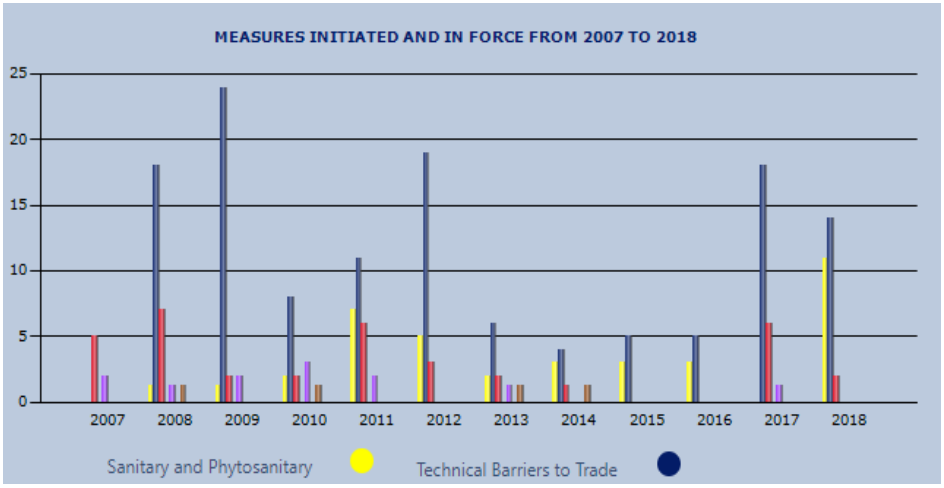

Figure 2. Changes in number of initiated SPSs and TBTs by Ukraine through 2008-2018
Source: International Trade Intelligence Portal (i-TIP)

The empirical results of estimating effects of NTMs across the world often suggest significantly negative ones. Arita et al. (2015) estimate effect of TBT/SPS measures on the US-EU agricultural trade in 9 out of 11 cases, which corresponds to different products, authors find that NTMs are significant barriers to trade.

Disdier and Fontagné (2010) come to the same conclusion, looking at the US, Canada, Argentina against EU dispute on genetically modified organisms (GMO), among other things they find that SPS measures have a significant negative effect on trade.

Disdier, Fontagné, Mimouni (2008) show that NTMs significantly reduce developing-to-developed countries exports, but do not have a significant effect on trade between developed countries. They also find that EU imports suffer the most from TBT/SPS measures of all OECD countries.

1.2 Evaluation problem and methods

Since NTMs are not the regular tariffs, it is a very complex problem to quantify them, since we can not do this directly, they are hard to model and the data for doing this is often limited or not existent. Ferrantino (2010) and Beghin et al. (2012) provide us with very deep analysis of NTMs and ways to quantify them. They both distinguished two methods of NTMs measurement: price or quantity gaps. They also provide some insights about sources of information and express caution about some of them, as well as an information about differentiation between products and its complexity and many more useful advices, that we cannot cover in this paper.

As mentioned before, recent literature provides us with two main methods of estimating NTMs effects. One of them is price – gap method, for example used in Bradford (2003), who estimate AVE for NTMs for 8 developed countries, ranging from 12% to 57%. Price-gap method is often criticized due to product differentiation, data limitation, aggregation and for not dealing with zero-trade flows. Other, more frequently used method in recent research (used in the most of what is presented in Empirical overview) is gravity model (quantity-gap) based approach. Anderson (2003) provides a very hefty theoretical background for the use of exactly this method instead of previous one, and Anderson and van Wincoop (2010) presented model that is used in most of the studies on this matter thereafter. We will also use it (more on that, methodology and ongoing developments in this field in Chapter 3).

1.3 Existing Research on Ukraine

As we have already mentioned this area of research is severely underdeveloped in Ukraine-related studies. Though there are a few papers in open access that can help this research and provide some interesting insights.

Movchan and Shportyuk (2008) were studying the impact of both TBT and SPS measures on trade in Ukraine. They find that the effect can be either trade-distorting or trade-facilitating, with the highest protection set for food products, there is also a paper of Movchan (2004) but it rather serves as a part of the paper discussed before.

Hartwell (2015) focuses on quantifications of non-tariff barriers in Ukraine, using a comprehensive trade cost approach. The author estimates AVE of NTMs on Ukraine`s and key partners` markets, such as EU28, Russia, Turkey, EFTA. He shows that a broad amount of products faces barriers at an AVE of over 100%. The overall level of protection estimated for Ukraine seems to be realistic, given evidence in literature and historical experience that is, especially in the agricultural sectors. However, author points to the positive evolution of these NTMs throughout three-year span from 2010 to 2012.

Chapter 3

METHODOLOGY

In this paper we will be using gravity model in order to model the trade between Ukraine and EU countries. The traditional model drew on analogy with Newton`s Law of Gravitation, thus the name. Strictly applying the analogy:

$$X_{ij} = \frac{Y_i * E_j}{{d_{ij}}^2} \quad (1)$$

where, speaking in terms of gravity – some mass of goods or services or labor, etc. is supplied at origin *i*, Y_i, is gravitationally attracted (just as we are attracted by Earth) to some mass of demand for goods or services or labor, etc. at origin *j,* E_j*,* but this flow is reduced by a distance between them, d_{ij}.

This is the basic model for trade between countries *i* and *j*, which was firstly use outside the physics implications by Ravenstein (1889). But the first use of gravity to explain trade flows was done by Tinbergen (1962). This method has quickly become the staple in the field. Why? Well for one it was quite successful in fitting data points, 80-90% of the variation was captured by the fitted relationship, this was concluded by Anderson (2010). He also pointed out that fitted values were generously improved when researchers add other proxies for trade frictions, like common language, shared borders etc.

Brief theory development, which is just below is taken from Anderson (2010), but comprised into main points.

Next step in a theory is the implementation of frictionless, or in other words homogeneous world. Under these assumptions it is logical that $\frac{X_{ij}}{E_j} = \frac{Y_i}{Y}$, meaning that proportion of spending by origin country *j* is in fact equal to the proportion of global spending on goods from county *i*, countries used here as an example, it may be everything we can think of, it is just easier to explain this way.

Theory also imposes some constrains, it is required that sum of sales to all destinations must be equal to sum of all purchases from every destination, in other words: $\sum Y_i = \sum E_j = Y$. Now by multiplying our benchmark by E_j we have $X_{ij} = Y_i * E_j/Y$.

In order to model the economy with trade costs it is best to move backward from the final user i.e. starting with evaluation of all goods at user prices, applying demand structure to determine the allocation of demand at those prices. And treat all costs incurred in between production and buyer by the supply side of the market, even though it is not necessarily true, but economically what matters the most is overall cost since production till consumption, these costs are not directly observable, so in empirical gravity literature they are often use proxies instead of these costs.

The supply side in this case produces and distributes goods, while incurring costs, which are paid by users. The markets for these goods must clear at equilibrium prices, however, standard description of general economic equilibrium is too complex to yield something like gravity. Economists found a way to simplify this – through modularity, which Anderson & van Wincoop refers to, as trade separability. Basically it helps us focus only on inference about distribution costs from the pattern of distribution of goods and not on the determinants of supply to all destination and vice versa. In order to meet the requirements of modularity Bergstrand (1985) derived a joint cost function that

is homogeneous of degree one with Constant Elasticity of Transformation (CET).

It is also usual to imply identical preferences across countries (origins), differences in demand across countries (home bias) is often incorporated in the trade costs, since it is often proxy by language, border, colonial ties, etc.

First economic foundation for the gravity model was proposed by Anderson (1979), author specified the expenditure function by Constant Elasticity of Substitution (CES) function. Expenditure shares are given as:

$$\frac{X_{ij}}{E_j} = \left(\frac{\beta_i p_i t_{ij}}{P_j}\right)^{1-\sigma} \tag{2}$$

where, P_j is CES price index, σ is the elasticity of substitution parameter, p_i is price at production level, t_{ij} is trade cost between country *i* and *j*, β_i is "distribution parameter". The CES price index is given by:

$$P_j = \left(\sum_i (\beta_i p_i t_{ij})^{\,1-\sigma}\right)^{1/(1-\sigma)} \tag{3}$$

Multiplying both sides of expenditure shares equation (Equation 2) by E_j and then summing over *j*, will yield:

$$(\beta_i p_i)^{1-\sigma} = \frac{Y_i}{\sum_j (t_{ij}/P_j)^{1-\sigma} E_j} = \frac{Y_i}{\Pi_j^{1-\sigma}} \tag{4}$$

Now after we substitute this into equations 2 and 3:

$$X_{ij} = \frac{E_j Y_i}{Y} \left(\frac{t_{ij}}{P_j \Pi_j}\right)^{1-\sigma} \quad (5)$$

We will be using this gravity model presented in Anderson and van Wincoop (2010), but on the commodity-level, which goes as follows:

$$p_{ij}^k x_{ij}^k = v_{ij}^k = \left(\frac{Y_i^k E_j^k}{Y^k}\right)\left(\frac{t_{ij}^k}{P_i^k \Pi_j^k}\right)^{1-\sigma_k} \quad (6)$$

Where, $p_{ij}^k, x_{ij}^k, v_{ij}^k$ are total quantity, average price, value of commodity k supplied by country i to country j respectively.

Y_i^k – total production of commodity k by country i; E_j^k –total expenditure of k on commodity k by country j

$P_i^k \Pi_j^k$ - price indices (designed to catch the general equilibrium effects)

t_{ij}^k – trade cost of shipping commodity k from i to j

σ_k – elasticity of substitution of commodity k

As we said this model assumes separability, meaning that allocation of output and expenditures by firms and households to domestic varieties (commodities) is separable from foreign varieties. Combined with a nested

CES function, this allow us for the estimation of the partial effect on imports of changes in trade barriers, where supply and expenditure are taken as given. While estimating the effects of NTMs, the model may only estimate the level of forgone trade, holding other factors constant. This partial effect ignores demand changes and other welfare effects that may result from removing the NTMs.

In order to econometrically estimate this equation, we follow Feenstra (2003) and introduce exporter and importer fixed effects to control for $Y_i^k(\Pi_j^k)^{1-\sigma_k}\ \ E_j^k(P_i^k)^{1-\sigma_k}$. These fixed-effects are effective at controlling other country-level characteristics that might affect trade.

Next logical step in estimation is to take logs of previous equation:

$$\ln v_{ij}^k = \alpha_i^k + b_j^k - (\sigma^k - 1)\ln t_{ij}^k + \varepsilon_{ij}^k \quad (7)$$

where, α_i^k, b_j^k – fixed import and export effects.

We than need to proxy trade costs, here we follow Arita et al. (2015), which has conducted rather similar research, however for the US – EU trade. They proxy trade costs as a multiplicative function (additive in logarithmic terms) that consists of tariffs, distance between capitals and FTA, EU, SPS, shared border, common language dummies:

$$\ln v_{ij}^k = \beta_1 SPS_{ij}^k + \beta_2 \ln Distance_{ij} + \beta_3 ln\left(1 + tariff_{ij}^k\right) + \beta_4 EU_{ij} + \beta_5 FTA_{ij} + \beta_6 Border_{ij} + \beta_7 Language_{ij} \quad (8)$$

where *SPS* (binary – is there an active SPS measure in this trade flow? In order to catch the trade between the EU and Ukraine, we will multiply before said value by dummies: *Reporter Ukraine* and *Partner EU*), we may potentially differentiate this variable into TBT and SPS in order to obtain more insightful results, *tariff* (AVE of existent tariff in this trade flow), *Distance* (distance between capital cities, measured in kilometers), *EU* (binary – are both countries members of the EU?), *Language* (binary – does countries share official language?), *Border* (binary – does those countries share border, regardless land or water?), *FTA* (binary – are countries members of the same Free Trade Agreement). This set of variables is considered somewhat standard throughout empirical literature in this field.

Since the way of how trade flows constructed, there inevitably will be a big enough portion of zero trade flows, in addition there may be missing data that may or may not reflect the true zero. We follow Silva and Tenreyro (2006) and using theirs Poisson Pseudo Maximum Likelihood (PPML) estimator in order to correct for the biases that may occur with the presence of zero trade flows. So in the end our Poisson specification is:

$$v_{ij}^{k} = \exp[\alpha_i^k + b_j^k + \beta_1 SPS_{ij}^k + \beta_2 \ln Distance_{ij} + \beta_3 ln(1 + tariff_{ij}^k) + \beta_4 EU_{ij} + \beta_5 FTA_{ij} + \beta_6 Border_{ij} + \beta_7 Language_{ij}]\varepsilon_{ij}^k \quad (9)$$

However, PPML method is criticized by Anderson and van Wincoop (2003) and Martin and Pham (2008), both this papers found the solution of heteroscedastic error problem not convincing. Martin and Phan (2008) argue that when heteroscedasticity is controlled, Tobit estimators outperform PPML when zeros are common. This is still an ongoing debate in literature, in the empirical papers most of the methods that are common

today, namely PPML Helpman, Melitz and Rubinstein (HMR) and OLS leads to identical results when the portion of zero trade flows is less than half of all observations, as it was proven by Anderson and Yotov (2010).

Chapter 4

DATA

We constructed the dataset using some of the datasets that are in free access. This section will be structured in this way: 1. Data set up, where we will outline basic information about the data, 2-5 Some information about the datasets, as well as about the data that has been collected from them.

4.1 Data set up

In order to conduct our research, we have used such datasets as UN COMTRADE, MAcMaps, CEPII, we will talk about them in details in their respective chapters. We have done our research for a specific set of countries, namely there are countries which are at least partially in geographical Europe, while excluding countries due to absence of data, full list of countries can be found in Appendix. Total number of countries is 43 (See Figure 3 below). Time period that has been chosen is the most recent one the data was available for is 2017. Products that we choose are the ones that are incorporated in the ITC-AGR (International Trade Centre – Agriculture products) list, which uses the HS6 (Harmonized System 6-digit) level of aggregation, for which most tariffs are available as well as it provides us with diversity needed to estimate the effects of SPS measures on trade. ITC-AGR list in itself has 902 products, in order to provide meaningful output, we group these products by their first two digits. After this we had 33 groups, which we than narrow to 10 groups with the most exports trade volume. Total number of products in these groups is 407. The resulting dataset have nearly 700 thousand trade flows, a bit more than 80% of which

are zero trade flows. Still 20% is almost 134 000 observations that have actual trade flow.

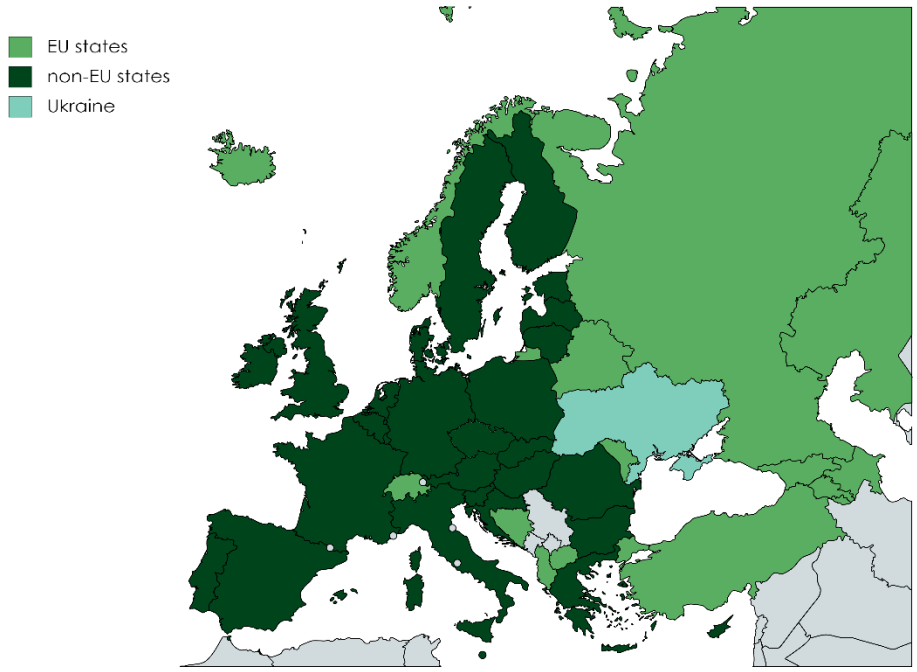

Figure 3. Map of countries used in research

4.2 Trade values from UN COMTRADE

United Nations Commodity Trade Statistics online database is the largest dataset on trade flows that is in a free access, which contains detailed imports and exports statistics reported by 200 countries or areas from the 1962 year. However, there are some limitations to dataset, we think we should point out:

1. Due to confidentiality, countries may not report some of its detailed trade, what this means is that for example country may not report details of some HS6 code, but this data should be reported on a higher commodity level i.e. HS4 or HS2. For us it

may lead to some biases, due to the fact that we operating at HS6 level of aggregation, but, it should not cause the change of effect of the variable we choose, since we are not trying to quantify AVE SPSs this problem is negligible.

2. Due to the fact that there been a change in HS classifications, some countries may not report data in the most recent classification, the last changes to these codes has been in 2017, so there is a possibility even though slight, that some commodities were wrongly specified.

3. Imports reported by one country do not coincide with exports reported by its partner. Differences are due to various factors.

In our research we will only be considering export trade flows. The biggest agricultural exporters in the European market are unsurprisingly Netherlands (52 000 mln. US$), Germany (42 000 mln. US$), Spain (31 000 mln. US$), France (28 000 mln. US$) and Belgium (26 000 mln. US$). Countries that export the least of all are Malta, Iceland, Albania, Kazakhstan and North Macedonia. On the imports side – largest importers are: Germany (55 000 mln. US$), France (32 000 mln. US$), United Kingdom (32 000 mln. US$), Netherlands (25 000 mln. US$), Italy (21 000 mln. US$). Smallest importers are Armenia, Albania, North Macedonia, Iceland and Moldova.

4.3 Tariff data from MAcMaps

Market Access Map has been developed by the ITC in order to support the needs of exporters, researchers, policy makers etc. Providing tariff data from almost 200 countries, the best thing about this online resource is that it

provides tariff data in estimated AVEs for tariff rates and tariff-rate-quotas. For TRQs, it is assumed that:

1. If the fill rate quota is less than 90 percent, in-quota tariff rate is assumed;

2. If the fill rate quota is above 98 percent, out-of-quota rate is assumed;

3. If the fill rate quota is in between 90 and 98 percent, a simple average is assumed.

On average (country-wise and commodity-wise) in the dataset an exporter would face an AVE tariff of 24.65%. Exporters from Albania on average face the biggest tariffs of 25.85%, and the softest tariffs of all can be felt by Switzerland`s exporters (22.25%).

4.4 Values from CEPII

Centre d'Etudes Prospectives et d'Informations Internationales is a leading French center for research and expertise on world economy. They have produce quite a few immensely helpful datasets, that are free to download and use. From the CEPII data we have taken data about shared border, common languages presented as dummy variables and distances between the capitals, that is presented in kilometers. Unfortunately, this dataset is a bit outdated, and does not possess information about Serbia and Montenegro, due to the fact that they have been split not a long time ago, also some ISO codes for countries were outdated, but that is not a big problem. We still had to cross Serbia and Montenegro out of our analysis.

4.5 Other data

The remaining parts of our datasets have been collected from the WTO official website and i-TIP website. WTO website provided us with the information about regional FTAs and i-TIP website gave us access to a comprehensive data on the SPSs. For analysis we have used only those which were "in force" throughout all of 2017. There may be of course some cases where new SPS was implemented early in the year, but it will not be considered here, because of low likelihood of this event, and because of the way we have constructed our SPS dummies (1 – if there is at least one SPS in force, 0 otherwise). It is very unlikely that there were no measures implemented for some commodity in some country and then they decided to do that, often these decisions take a lot of time.

Descriptive statistics of the data we have collected is presented in Table 1.

Table 1. Descriptive statistics (N=681 218)

Variable	Mean	Std.Dev.	Min	Max
Trade Value, 1000 US	451.1	6912.5	0	1259507
Shared border	.09	.28	0	1
Common language	.03	.16	0	1
Distance between capitals, km	1753.1	1013.59	59.62	6170.34
Tariff	.25	.47	0	10
EU	.43	.5	0	1
FTA	.78	.42	0	1
SPS	.5	.5	0	1

Chapter 5

RESULTS

We were using commodity level gravity model for this research, this approach allows us to analyze a certain product on the HS6 level. Following the discussion in chapter 4.1 we have narrowed our analysis to 10 groups, the results specific to this groups will be presented in section 5.2 of this chapter. Section 5.1 is devoted for the whole dataset (i.e. not group-specific).

Also because of possible collinearity across variables we will estimate three different specifications:

1. Including everything
2. Excluding EU and FTA dummies
3. Excluding dummies for border and language

We also note that all specifications include importer and exporter fixed effects, that will not be reported due to understandable reasons.

Our main hypothesis is that SPSs are impediments to trade between Ukraine and the EU, in order to approve or reject this hypothesis, we will be looking at the *EU-Ukraine SPS* variable, which is constructed as a multiplication of three dummies: SPS, reporter Ukraine and partner EU.

5.1 Non-specific results

First of all, let us take a look at what is the averaged effect of the SPSs implemented by the EU to our exports, while not specifying neither commodity. Results are presented in Table 2 below.

Table 2. Effects of EU-Ukraine SPSs on overall agricultural trade

Variables	Model (1)	Model (2)	Model (3)
EU-Ukraine SPS	-0.17***	-0.68***	-0.16***
	(0.05)	(0.05)	(0.05)
ln (1 + tariff)	0.39***	0.33***	0.33***
	(0.01)	(0.01)	(0.01)
EU	0.9***		0.88***
	(0.02)		(0.02)
FTA	1.11***		1.17***
	(0.02)		(0.02)
ln (Distance)	-0.66***	-0.7***	-0.8***
	(0.01)	(0.01)	(0.01)
Shared border	0.29***	0.33***	
	(0.01)	(0.01)	
Common language	0.23***	0.23***	
	(0.01)	(0.01)	
R^2	0.33	0.32	0.33
N	681 218	681 218	681 218

Notes: Robust standard errors reported in parenthesis. *,**,*** significant at the 10-, 5- and 1- percent level, respectively. All specifications include importer and exporter fixed effects. Constant and fixed effects are not reported. Dependent variable – exports from country *i* to *j*. SPS = sanitary and phytosanitary measure. FTA = free-trade agreement.

As we can see the coefficient for EU-Ukraine SPS is negative and statistically significant, as well as every coefficient (out of displayed ones) is, this gives us a right to say that on average Ukrainian exporter will face SPSs that will be barriers to his or her trade with the EU. Every other coefficient has a predicted sign: EU, FTA, Shared border, Common language are positive, logically they indeed help trade to prosper; Distance is negative, which is also understandable since the further country I from country j the lesser the likelihood of trade between them; However, tariff coefficient is rather strange, this probably due to the interesting nature of obtaining AVE tariffs.

5.2 Group-specific results

As we mentioned we have divided our data into the 10 groups, and will now present our findings regarding these groups in the pages to follow, we will also outline the main results in the last page of this Chapter in Table 14.

"04. Dairy Produce" is the highest trade volume group in our dataset, as we can see that results (Table 3) for this group are somewhat contrary to our idea, but we can also notice that not for all of the specifications these results are significant, so in reality we can neither reject nor approve our hypothesis about SPSs being impediments to trade. We can also notice that all coefficient but tariff are with the intuitive sign and highly significant across all specifications.

Table 3. Effects of EU-Ukraine SPSs on trade in group "04. Dairy Produce"

Variables	Model (1)	Model (2)	Model (3)
EU-Ukraine SPS	0.27	1.7***	0.29*
	(0.17)	(0.16)	(0.17)
ln (1 + tariff)	0.72***	0.72***	0.72***
	(0.03)	(0.03)	(0.03)
EU	2.03***		1.99***
	(0.08)		(0.08)
FTA	1.32***		1.38***
	(0.07)		(0.06)
ln (Distance)	-0.66***	-0.71***	-0.79***
	(0.02)	(0.02)	(0.01)
Shared border	0.23***	0.33***	
	(0.03)	(0.01)	
Common language	0.32***	0.31***	
	(0.04)	(0.04)	
R^2	0.42	0.4	0.42
N	55 529	55 529	55 529

Notes: Robust standard errors reported in parenthesis. *,**,*** significant at the 10-, 5- and 1- percent level, respectively. All specifications include importer and exporter fixed effects. Constant and fixed effects are not reported. Dependent variable – exports from country *i* to *j*. SPS = sanitary and phytosanitary measure. FTA = free-trade agreement.

For "02. Meat and edible meat offal" group is one of the largest groups in the set with a second-high trade volume. From the results (Table 4) we can that our variable of interest is highly volatile even to the point of sign changing, thus we have no evidence to suggest that our hypothesis is true or false.

Table 4. Effects of EU Ukraine SPSs on trade in group "02. Meat and edible meat offal"

Variables	Model (1)	Model (2)	Model (3)
EU-Ukraine SPS	0.55***	-1.99***	0.58***
	(0.21)	(0.18)	(0.21)
ln (1 + tariff)	1.02***	1.02***	1.02***
	(0.03)	(0.03)	(0.03)
EU	2.39***		2.37***
	(0.12)		(0.12)
FTA	1.77***		1.82***
	(0.1)		(0.1)
ln (Distance)	-0.71***	-0.74***	-0.85***
	(0.02)	(0.02)	(0.01)
Shared border	0.27***	0.3***	
	(0.03)	(0.0)	
Common language	0.25***	0.27***	
	(0.04)	(0.04)	
R^2	0.33	0.32	0.33
N	101 547	101 547	101 547

Notes: Robust standard errors reported in parenthesis. *,**,*** significant at the 10-, 5- and 1- percent level, respectively. All specifications include importer and exporter fixed effects. Constant and fixed effects are not reported. Dependent variable – exports from country *i* to *j*. SPS = sanitary and phytosanitary measure. FTA = free-trade agreement.

For group "22. Beverages, Spirits and vinegar" we can see (Table 5) that results fully support our hypothesis, also this is the first group for what all of the signs are what we predicted.

Table 5. Effects of EU Ukraine SPSs on trade in group "22. Beverages, Spirits and vinegar"

Variables	Model (1)	Model (2)	Model (3)
EU-Ukraine SPS	-0.72***	-0.99***	-0.72***
	(0.14)	(0.13)	(0.13)
ln (1 + tariff)	-1.27***	-1.26***	-1.27***
	(0.06)	(0.06)	(0.06)
EU	0.2***		0.19***
	(0.06)		(0.06)
FTA	0.84***		0.87***
	(0.05)		(0.05)
ln (Distance)	-0.56***	-0.59***	-0.65***
	(0.02)	(0.01)	(0.01)
Shared border	0.2***	0.22***	
	(0.02)	(0.02)	
Common language	0.13***	0.13***	
	(0.03)	(0.04)	
R^2	0.43	0.42	0.43
N	36 877	36 877	36 877

Notes: Robust standard errors reported in parenthesis. *,**,*** significant at the 10-, 5- and 1- percent level, respectively. All specifications include importer and exporter fixed effects. Constant and fixed effects are not reported. Dependent variable – exports from country *i* to *j*. SPS = sanitary and phytosanitary measure. FTA = free-trade agreement.

For "08. Fruit and nuts" group we can see (Table 6) that our coefficient of interest is negative but not significant in all of the specifications, so we once again can not conclude that our hypothesis holds or not.

Table 6. Effects of EU Ukraine SPSs on trade in group "08. Fruit and nuts"

Variables	Model (1)	Model (2)	Model (3)
EU-Ukraine SPS	-0.13	-0.76***	-0.15
	(0.16)	(0.15)	(0.16)
ln (1 + tariff)	2.16***	2.15***	-2.15***
	(0.07)	(0.07)	(0.07)
EU	1***		0.96***
	(0.06)		(0.06)
FTA	1.18***		1.25***
	(0.06)		(0.06)
ln (Distance)	-0.71***	-0.75***	-0.89***
	(0.01)	(0.01)	(0.01)
Shared border	0.35***	0.39***	
	(0.02)	(0.02)	
Common language	0.27***	0.24***	
	(0.03)	(0.03)	
R^2	0.38	0.37	0.38
N	109 773	109 773	109 773

Notes: Robust standard errors reported in parenthesis. *,**,*** significant at the 10-, 5- and 1- percent level, respectively. All specifications include importer and exporter fixed effects. Constant and fixed effects are not reported. Dependent variable – exports from country *i* to *j*. SPS = sanitary and phytosanitary measure. FTA = free-trade agreement.

Most of the cases of "19. Preparations of cereals" group (Table 7) suggest that our hypothesis should be rejected, however, for second specification results are highly insignificant thus we can not say anything with absolute certainty.

Table 7. Effects of EU Ukraine SPSs on trade in group "19. Preparations of cereals"

Variables	Model (1)	Model (2)	Model (3)
EU-Ukraine SPS	0.41***	0.33	0.42***
	(0.16)	(0.16)	(0.16)
ln (1 + tariff)	0.06	0.06	0.06
	(0.07)	(0.07)	(0.07)
EU	0.71***		0.68***
	(0.06)		(0.06)
FTA	1.15***		1.19***
	(0.06)		(0.05)
ln (Distance)	-0.66***	-0.7***	-0.76***
	(0.02)	(0.02)	(0.01)
Shared border	0.19***	0.24***	
	(0.03)	(0.03)	
Common language	0.23***	0.24***	
	(0.04)	(0.04)	
R^2	0.42	0.4	0.38
N	27 531	27 531	27 531

Notes: Robust standard errors reported in parenthesis. *,**,*** significant at the 10-, 5- and 1- percent level, respectively. All specifications include importer and exporter fixed effects. Constant and fixed effects are not reported. Dependent variable – exports from country *i* to *j*. SPS = sanitary and phytosanitary measure. FTA = free-trade agreement.

The results for group "21. Miscellaneous edible preparations" shows, even though not absolutely significant, but significant enough coefficients on EU-Ukraine SPS, thus giving us all rights to conclude that hypothesis holds for this case.

Table 8. Effects of EU Ukraine SPSs on trade in group "21. Miscellaneous edible preparations"

Variables	Model (1)	Model (2)	Model (3)
EU-Ukraine SPS	-0.28**	-0.87***	-0.27**
	(0.13)	(0.12)	(0.13)
ln (1 + tariff)	1.74***	1.74***	1.74***
	(0.09)	(0.09)	(0.09)
EU	0.6***		0.58***
	(0.07)		(0.07)
FTA	1***		1.04***
	(0.05)		(0.05)
ln (Distance)	-0.57***	-0.6***	-0.66***
	(0.02)	(0.02)	(0.01)
Shared border	0.17***	0.21***	
	(0.03)	(0.03)	
Common language	0.24***	0.26***	
	(0.04)	(0.04)	
R^2	0.42	0.42	0.43
N	28 224	28 224	28 224

Notes: Robust standard errors reported in parenthesis. *,**,*** significant at the 10-, 5- and 1- percent level, respectively. All specifications include importer and exporter fixed effects. Constant and fixed effects are not reported. Dependent variable – exports from country *i* to *j*. SPS = sanitary and phytosanitary measure. FTA = free-trade agreement.

Group "07. Vegetables and certain roots" has the most amount of observations from all, results for it shows (Table 9) that our hypothesis holds, similarly to the previous case on the 10-percent level.

Table 9. Effects of EU Ukraine SPSs on trade in group "07. Vegetables and certain roots"

Variables	Model (1)	Model (2)	Model (3)
EU-Ukraine SPS	-0.34*	-0.78***	-0.34*
	(0.2)	(0.2)	(0.2)
ln (1 + tariff)	0.4***	0.4***	0.04***
	(0.06)	(0.03)	(0.03)
EU	1.13***		1.1***
	(0.06)		(0.06)
FTA	1.13***		1.2***
	(0.05)		(0.06)
ln (Distance)	-0.69***	-0.73***	-0.89***
	(0.01)	(0.01)	(0.01)
Shared border	0.39***	0.43***	
	(0.02)	(0.02)	
Common language	0.25***	0.24***	
	(0.04)	(0.03)	
R^2	0.37	0.36	0.37
N	113 062	113 062	113 062

Notes: Robust standard errors reported in parenthesis. *,**,*** significant at the 10-, 5- and 1- percent level, respectively. All specifications include importer and exporter fixed effects. Constant and fixed effects are not reported. Dependent variable – exports from country *i* to *j*. SPS = sanitary and phytosanitary measure. FTA = free-trade agreement.

For group "20. Preparations of vegetables etc.", as can be seen in results (Table 10), our hypothesis holds strong across all of the specifications with little to no volatility.

Table 10. Effects of EU Ukraine SPSs on trade in group "20. Preparations of vegetables etc."

Variables	Model (1)	Model (2)	Model (3)
EU-Ukraine SPS	-0.66***	-0.97***	-0.66***
	(0.17)	(0.17)	(0.17)
ln (1 + tariff)	-0.19***	-0.19***	-0.19***
	(0.03)	(0.03)	(0.03)
EU	0.65***		0.63***
	(0.05)		(0.05)
FTA	1.27***		1.32***
	(0.04)		(0.04)
ln (Distance)	-0.64***	-0.68***	-0.79***
	(0.01)	(0.01)	(0.01)
Shared border	0.31***	0.34***	
	(0.02)	(0.02)	
Common language	0.22***	0.23***	
	(0.03)	(0.03)	
R^2	0.43	0.41	0.42
N	90 577	90 577	90 577

Notes: Robust standard errors reported in parenthesis. *,**,*** significant at the 10-, 5- and 1- percent level, respectively. All specifications include importer and exporter fixed effects. Constant and fixed effects are not reported. Dependent variable – exports from country *i* to *j*. SPS = sanitary and phytosanitary measure. FTA = free-trade agreement.

Group "15. Animal or vegetable fats and oils" (Tables 11) results for the coefficient of interest are highly volatile for the second specification, thus we once again can not approve or disapprove our hypothesis.

Table 11. Effects of EU Ukraine SPSs on trade in group "15. Animal or vegetable fats and oils"

Variables	Model (1)	Model (2)	Model (3)
EU-Ukraine SPS	0.49***	-0.01	0.51***
	(0.15)	(0.14)	(0.15)
ln (1 + tariff)	0.97***	0.97***	0.97***
	(0.07)	(0.07)	(0.07)
EU	0.87***		0.87***
	(0.09)		(0.09)
FTA	1.02***		1.01***
	(0.07)		(0.07)
ln (Distance)	-0.8***	-0.83***	-0.99***
	(0.01)	(0.02)	(0.02)
Shared border	0.4***	0.44***	
	(0.03)	(0.03)	
Common language	0.15***	0.16***	
	(0.04)	(0.05)	
R^2	0.31	0.3	0.31
N	73 678	73 678	73 678

Notes: Robust standard errors reported in parenthesis. *,**,*** significant at the 10-, 5- and 1- percent level, respectively. All specifications include importer and exporter fixed effects. Constant and fixed effects are not reported. Dependent variable – exports from country *i* to *j*. SPS = sanitary and phytosanitary measure. FTA = free-trade agreement.

Group "23. Food industries, residues and waste" results (Tables 12) also approves our statement about SPSs being impediments to trade between Ukraine and the EU.

Table 12. Effects of EU Ukraine SPSs on trade in group "23. Food industries, residues and waste"

Variables	Model (1)	Model (2)	Model (3)
EU-Ukraine SPS	-0.64**	-0.81***	-0.64**
	(0.27)	(0.26)	(0.27)
ln (1 + tariff)	1.71***	1.71***	1.71***
	(0.07)	(0.07)	(0.07)
EU	0.58***		0.57***
	(0.11)		(0.11)
FTA	0.67***		0.75***
	(0.09)		(0.09)
ln (Distance)	-0.77***	-0.8***	-0.97***
	(0.03)	(0.03)	(0.02)
Shared border	0.4***	0.43***	
	(0.04)	(0.04)	
Common language	0.23***	0.25***	
	(0.07)	(0.07)	
R^2	0.27	0.26	0.27
N	34 062	34 062	34 062

Notes: Robust standard errors reported in parenthesis. *,**,*** significant at the 10-, 5- and 1- percent level, respectively. All specifications include importer and exporter fixed effects. Constant and fixed effects are not reported. Dependent variable – exports from country *i* to *j*. SPS = sanitary and phytosanitary measure. FTA = free-trade agreement.

You can find the compressed results in the Table 13 below, as we can see 5 out of 10 cases are in line with the idea of SPSs being impediments to trade between Ukraine and EU, and for all other cases we can not be certain.

Table 13. Main findings

Group id	Model (1)	Model (2)	Model (3)	Hypothesis, approve or reject?
04	0.27	1.7***	0.29*	Neither
02	0.55***	-1.99***	0.58***	Neither
22	-0.72***	-0.99***	-0.72***	Approve
08	-0.13	-0.76***	-0.15	Neither
19	0.41***	0.33	0.42***	Neither
21	-0.28**	-0.87***	-0.27**	Approve
07	-0.34*	-0.78***	-0.34*	Approve
20	-0.66***	-0.97***	-0.66***	Approve
15	0.49***	-0.01	0.51***	Neither
23	-0.64**	-0.81***	-0.64**	Approve

Chapter 6

CONCLUSIONS

This research provides an estimation of effects of selected SPS measures on the Ukraine – EU agricultural trade in the European market. In 5 out of 10 cases that we have analyzed we found this effect to be significantly negative, in the other cases we found this effect very volatile, thus for those cases we can not conclude weather SPSs can be considered viable barriers to trade between Ukraine and the EU or not. Possibly if we would have disaggregated this groups into more subgroups we could have pinpoint what is causing this volatility, however, it is far beyond the goal of this research.

Overall we may conclude that Ukrainian exporters faces some barriers to trade almost half of the time, when trading with the EU on the European market.

The research can be expanded in the number of ways, for starters we can widen the number of countries in our sample, not to have only Europe, but the whole world, or at least the largest world markets, we can also analyze products on the tariff line, thus further increasing accuracy of the research. Also it is possible, though a bit complicated to quantify our results in order to obtain AVE of SPSs.

WORKS CITED

Anderson, James E. 1979. "A theoretical foundation for the gravity equation." *The American Economic Review* 69, no. 1: 106-116.

Anderson, JE, & van Wincoop, E. 2003. "Gravity with Gravitas: A Solution to the Border Puzzle." *The American Economic Review* 93, no. 1 (2010): 170-192.

Anderson, James E., and Yoto V. Yotov. 2010. "Specialization: Pro-and anti-globalizing, 1990-2002." *National Bureau of Economic Research* No. w16301.

Arita, Shawn, Lorraine Mitchell, and Jayson Beckman. 2015 "Estimating the effects of selected sanitary and phytosanitary measures and technical barriers to trade on US-EU agricultural trade." United States Department of Agriculture, *Economic Research Service*, No. 212887.

Beghin, John C., and Jean-Christophe Bureau. 2017. "Quantitative policy analysis of sanitary, phytosanitary and technical barriers to trade." In *Nontariff Measures and International Trade*, pp. 39-62.

Bergstrand, Jeffrey H. 1985. "The gravity equation in international trade: some microeconomic foundations and empirical evidence." *The review of economics and statistics*: 474-481.

Bradford, Scott. 2003."Paying the price: final goods protection in OECD countries." *Review of Economics and Statistics* 85, no. 1: 24-37.

Disdier, Anne-Célia, and Lionel Fontagné. 2010. "Trade impact of European measures on GMOs condemned by the WTO panel." *Review of World Economics* 146, no. 3: 495-514.

Disdier, Anne-Célia, Lionel Fontagné, and Mondher Mimouni. 2008. "The impact of regulations on agricultural trade: evidence from the SPS and TBT agreements." *American Journal of Agricultural Economics* 90, no. 2: 336-350.

Feenstra, Robert C. 2015. *Advanced international trade: theory and evidence*. Princeton university press.

Ferrantino, Michael J. 2010. "Chapter IX Methodological approaches to the quantification of non-tariff measures." *Rising non-tariff protectionism and crisis recovery*: 172.

Hartwell, Christopher A. 2016. "Quantifying nontariff barriers in Ukraine: a comprehensive trade cost approach." *Applied Economics Letters* 23, no. 1: 47-55.

Looi Kee, Hiau, Alessandro Nicita, and Marcelo Olarreaga. 2008. "Estimating trade restrictiveness indices." *The Economic Journal* 119, no. 534: 172-199.

Martin, Will, and Cong Pham S.. 2015. "Estimating the Gravity Model When Zero Trade Flows Are Frequant and economically determined." Policy Research working paper; no. WPS 7308. Washington, D.C.: World Bank Group.

Movchan, Veronika, and Volodymyr Shportyuk. 2008."Effects of non-tariff protectionism in Ukraine: sector aspects." In Paper for the *Tenth Annual Conference of the European Trade Study Group* (ETSG) September, pp. 11-13.

Orefice, Gianluca. 2017. "Non-Tariff Measures, Specific Trade Concerns and Tariff Reduction." *The World Economy* 40, no. 9: 1807-1835.

Ravenstein, E. G. 1889. "The Laws of Migration" *Journal of the royal statistical society* 52, no. 2: 241-305.

Ray, Edward John. 1981. "The determinants of tariff and nontariff trade restrictions in the United States." *Journal of Political Economy* 89, no. 1: 105-121.

Ronen, Eyal. 2017. "Tariffs and non-tariff measures: substitutes or complements. A cross-country analysis." *A Cross-Country Analysis*: 45-72.

Silva, JMC Santos, and Silvana Tenreyro. 2006. "The log of gravity." *The Review of Economics and statistics* 88, no. 4: 641-658.

Tinbergen, Jan J. 1962. "Shaping the world economy; suggestions for an international economic policy." *New York: The Twentieth Century Fund*.

World Bank. 2012, *Non-Tariff Measures – A Fresh Look at Trade Policy's New Frontier*, ed. O. Cadot and M. Malouche, The World Bank, Washington D.C.

APPENDIX

Table 14. Countries for which, the research had been conducted

Country	ISO3 code
Albania	ALB
Armenia	ARM
Austria	AUT
Azerbaijan	AZE
Belarus	BLR
Belgium	BEL
Bosnia_and_Herzegovina	BIH
Bulgaria	BGR
Croatia	HRV
Cyprus	CYP
Czech_Republic	CZE
Denmark	DNK
Estonia	EST
Finland	FIN
France	FRA
Georgia	GEO
Germany	DEU
Greece	GRC
Hungary	HUN
Iceland	ISL
Ireland	IRL
Italy	ITA
Kazakhstan	KAZ
Latvia	LVA
Lithuania	LTU
Luxembourg	LUX
Macedonia_North	MKD
Malta	MLT
Moldova	MDA

TABLE 13 – Continued.

Country	ISO3 code
Netherlands	NLD
Norway	NOR
Poland	POL
Portugal	PRT
Romania	ROU
Russia	RUS
Slovakia	SVK
Slovenia	SVN
Spain	ESP
Sweden	SWE
Switzerland	CHE
Turkey	TUR
Ukraine	UKR
United_Kingdom	GBR