POLITECNICO DI MILANO

School of Industrial and Information Engineering

POLITECNICO
MILANO 1863

Master of Science in Management Engineering

ANALYSIS OF THE SERBIAN AGRICULTURAL SECTOR IN THE CONTEXT OF THE EUROPEAN UNION ACCESSION

Supervisor:

Prof. Lucia Tajoli

Student:

Vladimir Stoiljkovic

Matriculation number: 815684

ACADEMIC YEAR 2015/16

Milan, December 2016

Contents

List of Figures ..... **i**

List of Tables ..... **ii**

Abstract ..... **iii**

Acknowledgements ..... **iv**

1 Introduction **1**

1.1 Motivation and objectives 1

1.2 Thesis outline 2

2 Models of economic integration **5**

2.1 Typology of integration schemes 5

2.2 Trade creation and diversion 7

2.3 Viner's Model of Customs Union 9

2.4 Studies on welfare effects in agriculture 15

2.5 Gravity model 18

2.5.1 Economic theories of the gravity model 19

2.5.2 General gravity model 26

3 Agricultural support and protection **29**

3.1 Overview of agriculture protectionism 29

3.2 Instruments of protection 32

3.2.1 Direct interventions 32

3.2.2 Indirect interventions 33

3.3 Current state of support to agriculture 34

3.4 Analysis of protection across selected countries 36

3.5 The Common Agricultural Policy 37

3.5.1 Objectives of the CAP 38

3.5.2 Principles of the CAP 38

3.5.3 Main pillars of the CAP 39

4 Economy of Serbia **42**

4.1 General information 42

4.2 Basic macroeconomic indicators ... 43
4.3 GDP and GDP growth ... 45
4.4 Trade overview ... 47
4.5 Trade agreements ... 50
4.6 Accession of Serbia to the European Union ... 53
4.6.1 History of accession process ... 53
4.6.2 Public opinion of Serbian citizens towards EU integration ... 55
5 Agriculture in Serbia ... 57
5.1 Importance of the food and agricultural sector ... 57
5.2 Land use and farm structure ... 58
5.3 Agricultural production and labor force ... 63
5.4 Agricultural trade ... 64
5.4.1 Top exported groups and products ... 67
5.4.2 Top imported groups and products ... 68
5.5 Main trade partners ... 70
5.5.1 Trade with the EU ... 71
5.5.2 Trade with CEFTA ... 77
5.5.3 Trade with other countries ... 77
6 Empirical analysis ... 78
6.1 Gravity model in the case of Serbia ... 78
6.2 Variables ... 80
6.3 Data ... 83
6.4 Selection of model ... 85
6.5 Results ... 86
6.6 Trade potential ... 91
7 Conclusion ... 94
Bibliography ... 98
Appendix ... 103

List of Figures

Figure 1: A hierarchy of regional economic arrangements 5
Figure 2: Country H not belonging to customs union 11
Figure 3: Customs union formation 12
Figure 4: Producer Support Estimate by country, 2015 (in %) 35
Figure 5: Composition of PSE by country, 2013-15 35
Figure 6: Main pillars of the CAP 39
Figure 7: Gross domestic product (in million EUR) 45
Figure 8: GDP per capita of ex-Yugoslavia countries (current $US) 46
Figure 9: GDP Growth Rate of Serbia and the EU (in %) 46
Figure 10: Imports and exports of goods and services (in million EUR) 47
Figure 11: Serbia's major export partners in 2015 (in million EUR) 48
Figure 12: Serbia's major import partners in 2015 (in million EUR) 49
Figure 13: Serbia-EU total trade (in million EUR) 50
Figure 14: Structure of utilized agricultural area (UAA) in Serbia 60
Figure 15: Structure of agricultural holdings in terms of number and UAA 61
Figure 16: Size of holding in hectares of UAA in Serbia and EU-28 62
Figure 17: Holdings of legal entities by legal form 62
Figure 18: Structure of agricultural production value in Serbia (%), 2012 63
Figure 19: Serbia's foreign trade in agriculture (in million EUR) 65
Figure 20: Participation of individual product groups in trade 66
Figure 21: Main trade partners of Serbia in agricultural sector 71
Figure 22: Agri-food exports from Serbia to the EU 72
Figure 23: Agri-food imports from the EU to Serbia 73

List of Tables

Table 1: Main trade policy instruments in agriculture protectionism 32
Table 2: General information of Serbia 42
Table 3: Key macroeconomic indicators in the period 2011-15 43
Table 4: Trade Agreements of Serbia 51
Table 5: Key dates in Serbia's path towards the EU 55
Table 6: Agriculture share in Serbia's GDP, GVA, employment and foreign trade 58
Table 7: Used and unused agricultural land in Serbia 58
Table 8: Used and unused agricultural land across main regions in Serbia 59
Table 9: Serbia's foreign trade in agriculture (in million EUR) 66
Table 10: Overview of top exported groups of agri-food products 67
Table 11: Overview of top exported individual agri-food products 68
Table 12: Overview of top imported groups of agri-food products 69
Table 13: Overview of top imported individual agri-food products 70
Table 14: Agricultural trade with the EU (in million EUR) 71
Table 15: Top 10 imported and exported commodity groups from Serbia to EU 74
Table 16: Number of products subject to removal of tariffs 75
Table 17: Trade liberalization dynamics 76
Table 18: Protected items in agriculture and their tariff 76
Table 19: Expected signs for each variable 83
Table 20: Results of the model 87
Table 21: Actual and predicted trade of Serbia (in million EUR) 92

Abstract

Agriculture has a very important role in the economic and social life in Serbia and has always been a key sector in the Serbian economy, contributing around 7% of the country's gross domestic product (GDP) and employing about 20% of the workforce. It is the most important export sector, as it accounts for about 20% of Serbian exports with a positive foreign trade balance.

The purpose of this thesis is to provide a comprehensive overview of Serbian agriculture and to assess the impact of Serbian accession to the EU on the agricultural sector. The study evaluates the determinants of bilateral agricultural trade flows between Serbia and its main trade partners and estimates the trade potential of Serbian agricultural exports to the foreign market through the use of the gravity model of international trade.

Keywords: gravity model, agriculture, serbia, european union

L'agricoltura ha un ruolo molto importante nella vita economica e sociale della Serbia, tanto è vero che è sempre stato considerato un settore chiave per l'economia del Paese, che contribuisce per circa il 10% al prodotto interno lordo (PIL) e impiega circa il 21% della forza lavoro. L'agricoltura è il settore più importante per quanto riguarda le esportazioni, poiché circa il 20% delle esportazioni serbe è da attribuire a questo settore.

Lo scopo di questa tesi è quello di fornire una panoramica completa del settore agricolo della Serbia e al contempo valutare l'impatto che può avere, sul settore agricolo, l'adesione della Serbia all'Unione Europea. Lo studio valuta le determinanti dei flussi commerciali agricoli bilaterali tra la Serbia e i suoi principali partner commerciali e stima il potenziale commerciale delle esportazioni agricole verso il mercato estero, attraverso l'utilizzo del modello gravitazionale.

Keywords: modello gravitazionale, agricoltura, serbia, unione europea

Acknowledgements

First and foremost, I would like to express my appreciation and gratitude to my thesis supervisor Professor Lucia Tajoli for her valuable support and constant guidance throughout my thesis work.

I wish to thank my girlfriend Alessandra for her patience and love. Furthermore, I would like to thank all my friends, whom I met in Italy, for making my stay here memorable, and to my friends in Serbia for their support despite the distance between us.

Lastly, and most importantly, I wish to thank my parents and my brother for their continuous support, love, and encouragement throughout my whole educational journey in Politecnico di Milano. To them, I dedicate this thesis.

Chapter 1

Introduction

1.1 Motivation and objectives

Agriculture has a crucial role in the economic and social life in Serbia and has always been a vital sector in the Serbian economy. It contributes to some 7% of the country's GDP and employs 20% of the workforce. Since the 2000s, the agricultural exports have been increasing intensively, and such phenomenon led to a real surplus in the agricultural trade balance. The EU market represents the primary destination for Serbian agriculture producers as 48% of agricultural products are exported to one of the EU countries. It is followed by the CEFTA signatories and the Russian Federation.

Despite having favorable climate conditions, Serbian agricultural sector is facing many difficulties in different areas: low labor productivity, lack of financial resources, modern technology, to name a few. Serbia officially applied for EU membership in 2009 and received the status of candidate country in 2012. Accession negotiations were launched in 2014, while the first negotiating chapters were opened during 2016. As Serbia advances towards the full European integration, the fear of the adverse impact of enlargement on the agricultural sector is increasing. There is a belief that the introduction to the common market will cause a decrease of competitiveness for the Serbian agricultural sector and market distortions as Serbian farmers will lose free access to export agricultural products to other important markets, such as CEFTA and Russian Federation. On the other hand, it is expected

that trade flows of agricultural goods with the EU will be enhanced and better off despite causing significant changes in the trade composition of Serbia with its main trading partners.

The objective of the thesis is to provide a comprehensive position of Serbian agriculture and to analyze the impact of Serbian accession to the EU from an economic point of view by focusing on the agricultural sector. Further, this thesis will address the determinants of bilateral agricultural trade flows between Serbia and its main trading partners. Finally, it will estimate the trade potential of Serbian agricultural exports to the world market following EU membership.

Analysis of bilateral trade flows and potential extent of the volume of agricultural commodities from Serbia to the international market will be performed using the gravity-type model. The model has proven to derive very good results in the analysis of bilateral economic relations and has been widely employed in empirical studies to examine determinants of bilateral flows. With regard to Viner's theory of trade creation and trade diversion, the results of the model will be used to evaluate the roles of Serbia's main trade agreements, such as the ones made with the EU-28, CEFTA and Russian Federation, on trade patterns and whether participation in these trade agreements is beneficial to the Serbian agricultural trade. Moreover, the results will be used to estimate agricultural exports with respect to the EU and CEFTA markets if Serbia joins the EU. By comparing the real and estimated exports results, markets that experience growth or decline in exports will be identified. In other words, the gravity model will also evaluate the effects of the potential accession of Serbia to the EU in view of current trade agreements.

1.2 Thesis outline

The thesis presents first a review of the literature of the models that will be used to analyze the economic integration process between Serbia and the EU and its impact on trade between two regions. That will be followed by the brief overview of the EU's Common Agricultural Policy (CAP) and analysis of the agricultural protectionism in the world. Next, the key indicators of the economy of Serbia and its existing trade agreements will be presented. This will be accompanied by an extensive overview of the agriculture in Serbia. Finally, the empirical econometric results which estimate the bilateral trade flows

determinants between Serbia and its main trading partners and evaluate the impact of Serbian accession to the EU on the amount of exported agricultural goods will be discussed.

The thesis is structured as follows.

Chapter two presents Balassa's classic typology of economic integration and introduces the concepts of trade creation and trade diversion. It discusses Viner's and subsequent theories of the customs union and explains the effects of customs union formation on welfare gains and losses. Further, it reviews the impact of various trade agreements in the agricultural sector from the viewpoint of trade creation and trade diversion. The last part of this chapter describes the gravity model of international trade thoroughly. Main theoretical foundations of the gravity equation, and econometric frameworks of the gravity model are included in this part. Studying welfare effects of the customs union and learning the fundamental concepts of the gravity model are crucial to identify gains and costs of trade liberalization and to accurately define the gravity equation which can estimate the factors influencing the Serbian agricultural trade.

Chapter three focuses on the agricultural trade policies and protectionism in agriculture across the world. It summarizes main agricultural trade policies, the EU's CAP, and most important instruments of protection in the agricultural sector. The understanding of the EU agricultural policies is necessary to evaluate how these policies can have an impact on the Serbian agricultural production after the accession of the country to the EU.

Chapter four provides an overview of the Serbian economy. It presents key macroeconomic indicators of Serbia, trade structure and regional trade agreements, and a list of key events in Serbia's accession to the EU. Besides knowing the economic outlook of Serbia, it is important to distinguish characteristics of the key trade agreements and to address the nature of goods traded as well as to identify trade volumes among Serbia and the EU.

Chapter five presents the state of the agriculture in Serbia. It starts with explaining why the sector of agriculture and food plays a key role in the Serbian economy. Then, it describes the Serbian land use, farming structure, the structure of production, and labor force in agriculture. Further, it compares indicators of these elements with the empirical evidence from the EU. Analysis of the agricultural trade makes the core part of this chapter. This

section illustrates foreign trade of agricultural goods, most exported and imported product groups and goods, and main trade partners of Serbia. It also shows the composition of trade between Serbia and the EU and explains in detail the Stabilization and Association Agreement signed by both parties as a part of the EU membership process. This chapter relies on the available data from the Statistical Office of Republic of Serbia and Eurostat. The in-depth coverage of the Serbian agricultural sector is necessary to give a good understanding of the level of its competitiveness in comparison to the EU and to find out what agricultural goods from Serbia are the most attractive to foreign customers concerning exports.

Chapter six discusses the development of the gravity equation, issues encountered during modeling, and the results achieved. The chapter presents the gravity model to estimate the determinants of bilateral trade flows between Serbia and its main trading partners and to evaluate the export potential of Serbian agricultural goods in the case of Serbia's accession to the EU. The estimation of the bilateral flows determinants will be done by adapting the general gravity model with an additional set of dummy variables that capture the impact of EU accession and the influence of current Serbian trade agreements on the agricultural sector. The evaluation of trade potential will be carried out by measuring the degree of shift in agricultural trade towards the EU away from CEFTA markets. The econometric analysis will be performed on a cross-sectional dataset of 38 countries. The data set will be obtained for the year 2014 and will consist of bilateral agricultural trade. The results of the gravity model reveal insights on the major factors influencing bilateral trade flows of Serbia and give a good understanding of the impact weight of each trade agreement in the Serbian agricultural trade.

Chapter seven provides a conclusion to the thesis and outlines directions for potential future research.

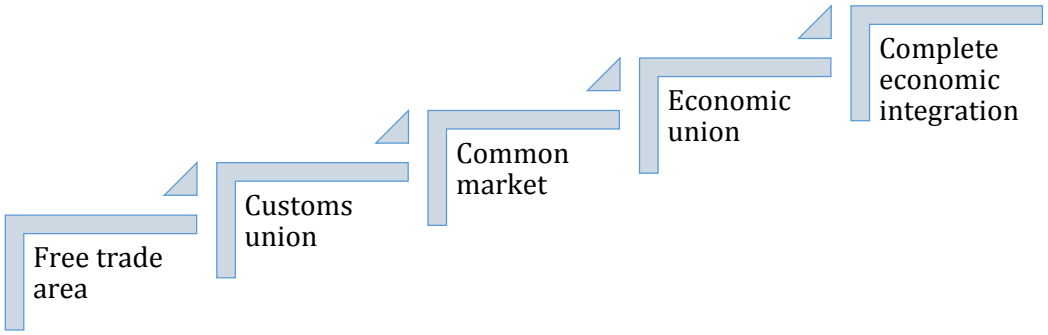
Chapter 2

Models of economic integration

2.1 Typology of integration schemes

The significant contribution to the economic integration was provided by Balassa, who in his book "The Theory of Economic Integration" for the first time introduced five forms of integration: a free trade area, customs union, common market, economic union and total economic union (Balassa, 1961). All stages follow the sequential path of integration from lower to higher levels, where each form of higher rank of integration includes properties of the lower as well as new features that enlarge the scope of the integration process.

Figure 1: A hierarchy of regional economic arrangements



Source: Balassa (1961)

In Balassa's hierarchy of integration forms, it is worth including the definition of preferential trade agreements (PTA). Panagariya (2000) defines PTA as an agreement between two or more countries in which the tariffs charged on particular goods are reduced. In other words,

tariffs and other trade barriers are much lower for the countries included in the agreement than for the countries who are not. An example of PTA is a bilateral agreement between the EU and African, Caribbean and Pacific (ACP) group of states.

A free trade area (FTA) is a regional integration agreement (RIA) in which tariffs on trade among member nations are removed, while member countries have autonomy in setting their tariffs on trade with non-member countries (Grossman & Rogoff, 1997). This is usually referred to as "trade integration" (Hosny, 2013). An example of FTA agreement is North American Free Trade Agreement (NAFTA) formed between the United States, Canada, and Mexico in 1994.

A customs union (CU) applies a common external trade policy by setting the common external tariff on goods imported from non-members. Common external tariff set can be different across products, but not across member countries. An example is the European Economic Community (EEC) formed in 1957 between Belgium, France, Italy, Luxembourg, the Netherlands and West Germany.

A common market (CM) allows free circulation of factors of production, which includes firms and labor, as well as goods and services, between member countries. The form of integration requires the elimination of all trade barriers and a certain level of coordination of some economic policies. This stage is referred as “factor integration” (Hosny, 2013). The EU reached the phase of common market integration with the Treaty of Maastricht in 1993.

An economic union (ECU) is a deeper form of integration which combines common external trade policy and free movement of goods, services, and factors of production. In this form of integration monetary and fiscal policies are harmonized and unified. This phase requires coordination and synchronization of national economic policies, and it is often referred as “integration of policies” (Hosny, 2013).

Economic and Monetary Union (EMU) is the next stage of the integration process, and besides common monetary policy and the coordination of economic and fiscal policies, it involves the introduction of a common currency. The most famous example of EMU is the launch of the Eurozone and its common currency ‘the euro’ introduced in 2002.

The ultimate stage of the economic integration is the full economic integration which requires member states to unify their monetary, fiscal, social and anti-cyclical policies and requires the establishment of supranational authorities whose decisions are binding on the member states (Balassa, 1961). In this stage, institutions of the integration community have the exclusive competence on the design and the implementation of the economic policies (Grossman & Rogoff, 1997).

Some scholars claim that there exists an additional form of the integration process, defined as Political Union (PU). In this stage, integration is carried out also in the areas which affect national sovereignty. This term is often used to indicate the ultimate goal of the process of European integration where the EU will become a full-fledged country with the introduction of the common citizenship and the attempts for implementation of standard policies in foreign affairs, security, justice and internal affairs (Eduard, 2015).

2.2 Trade creation and diversion

Creation of Customs Unions implies the elimination of the barriers to trade between members that are involved in the new union. Typically, upon creation of a union, tariffs or quotas on trade between members are eliminated, while the common external tariff to countries outside the union is imposed. This affects the flow of trade between countries in the union and those outside. It is expected that the trade between members will increase, since countries have a higher incentive to trade, and consequently lead to a decrease of trade between members and non-members.

The first to analyze the trade flow effects was Jacob Viner, a Chicago School economist. According to Viner's study in The Customs Union Issue from 1950, the elimination of trade barriers may cause ambiguous effects. Viner introduced two terms, trade creation and trade diversion, which induce positive and adverse consequences respectively. Trade creation refers to the effect of moving in trade from more expensive to less expensive producers. It involves shifting from a high-cost and inefficient domestic producers to a lower-cost and more efficient regional producers who are belonging to the union. Trade diversion refers to the effect of trade switching from less expensive to more expensive producers. It implicates

a shift from lower-cost and more efficient regional producers to high-cost and less efficient domestic producers (Sukanovic, 2010).

Both trade creation and trade diversion emerge as a result of the creation of the customs union. On the one hand, trade creation refers to the creation of a new trade between member countries and thus reflects a positive effect of the customs union, as the international allocation of resources is improved. On the other hand, trade diversion means a change of trade from a non-member country to a partner country and thus causes a negative effect of the customs union, as the international allocation of resources is worsened. Therefore, accession of a country to the customs union is economically beneficial if trade creation outperforms trade diversion resulting in net welfare gain of the nation.

Creation of customs union produces two effects – static and dynamic. Static effects deal with the economy immediately after the integration, and they refer to the reallocation of the resources among existing industries using current supplies and technology. In this scenario, some industries expand while others contract and this might lead to reduced prices on certain products for customers to enjoy. Dynamic effects are changes in the economy over time, and they include the likes of increased competition, technological changes, investments and increased economies of scale. There are two broad types of static effects – production and consumption effects (Cherunilam, 2008).

Viner's original work focused on static gains, and in particular on the production effects of the customs union, while the subsequent developments of theory emphasized the consumption effects. Production effects appear as the result of changes in the sources of supply upon the formation of a customs union. Production effects result from switching purchases of a given product from more expensive domestic to cheaper member country sources of supply, which creates the positive effect, and from shifting sources of supply from lower-cost foreign to higher-cost member-country producers, which generates negative effect (Cherunilam, 2008).

Balassa (1961) discusses the positive and negative aspects of the production effects. According to him, a shift of purchases from higher cost to lower cost sources of supply is naturally cost-reductive, and it results in a positive production effect. Alternatively, negative

production effect refers to the additional cost of producing a product in the partner country rather than in the foreign country, as the trade diversion makes the switch from lower (foreign cost) to higher cost (partner) producers. Therefore, the success of customs union is determined if the positive production factors are greater than the negative production effects.

The studies of Meade (1955), Lipsey (1957) and Gehrels (1956) showed that customs union might produce positive and negative consumption effects. Consumers are said to benefit from the positive consumption effects of the union if the efficiency in the allocation of resources is increased. Because of the access to the low-cost supply of commodities enabled by the newly formed customs union, consumers would be able to buy more goods at lower prices. Therefore, their real income will increase. On the other hand, negative consumption effect is the result of uniform tariff on imported commodities imposed on non-member countries. With the formation of the union, it might happen that a commodity which was previously enjoying a duty-free status is imposed to a uniform tariff set to imports from non-member countries. This results in consumer purchases diversion from low-cost non-member producers to high-cost producers inside the union. As the price paid increases, the real income of consumers will decrease, ultimately leading to negative consumption effect taking place.

Although the original Viner's theory described trade creation as a positive effect (a good thing) and trade diversion as a negative effect (a bad thing), Lipsley demonstrated that not necessarily trade creation is a good thing and trade diversion is a bad thing. He argued that trade diversion in some cases does not reduce country's national welfare but it might lead to a positive welfare effect (Cherunilam, 2008).

2.3 Viner's Model of Customs Union

The original Viner's contribution in the Theory of Customs Unions demonstrated that the formation of customs union does not necessarily result in welfare gains to member countries. This is referred to as Viner's ambiguity (Baldwin, Wyplosz, & Wyplosz, 2006). His model was built using the assumptions of perfect competition in commodity and factor markets, perfect factor mobility within the individual countries, full employment, foreign

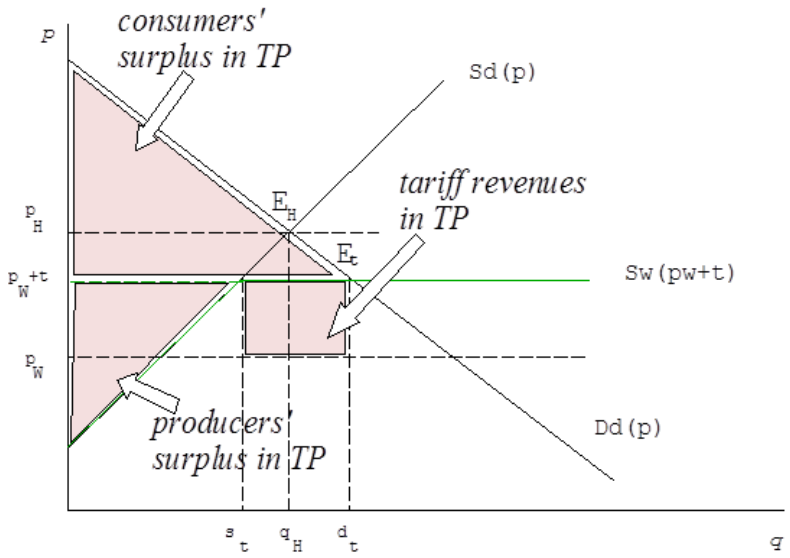
trade equilibrium, and perfectly price elastic supply on the world market. Furthermore, economies and/or diseconomies of scale and transport costs are not considered (Strielkowski, 2013).

The model assumes partial equilibrium framework, that is, to study a single market, as well as the existence of three countries (or regions): home country H, possible partner country P and world market W. It is also assumed that home country H is a small country, country P is a big country, whereas world market W is assumed to represent the rest of the world (ROW). Each country has supply and demand functions for a homogeneous commodity in the partial industry. The analysis focuses on home country H, which initially is assumed not to be a part of the customs union. That is, before the establishment of a customs union, country H applies a common tariff on imported goods coming from country P and world market W.

In the general Viner's model, $S_h(p)$ represents domestic supply function, $D_h(p)$ is domestic demand function, p_w is the world price, t is a non-discriminatory tariff, p_p is the price in the partner country P, p_h is the closed equilibrium price, while $p_w + t$ is the tariff protected price in the home country H. It is assumed that the world price p_w of the homogeneous good is lower than the price p_p of the partner country P, the tariff-protected price $p_w + t$ and the price p_h of the home country H, hence $p_w < p_p < p_w + t < p_h$. Following the equation, initial assumption states that the demand of the home country H is partially covered by the country itself, but also from tariff protected imports from the world market W. The case when country H forms the customs union with a partner country P is analyzed below.

Figure 2 describes the initial tariff-ridden equilibrium in which country H is not a part of the customs union. Domestic supply and demand of country H is denoted as s_t and d_t respectively, while the price at which at which the good is imported from the world market is $p_w + t$. As one can observe from the figure, demand is higher than supply, meaning that country H would need to import the goods from the outside to cover the remaining quantity. The difference between d_t and s_t, denoted as $d_t - s_t$, represents the amount of good country H imports from the ROW.

Figure 2: Country H not belonging to customs union



Source: Strielkowski (2013)

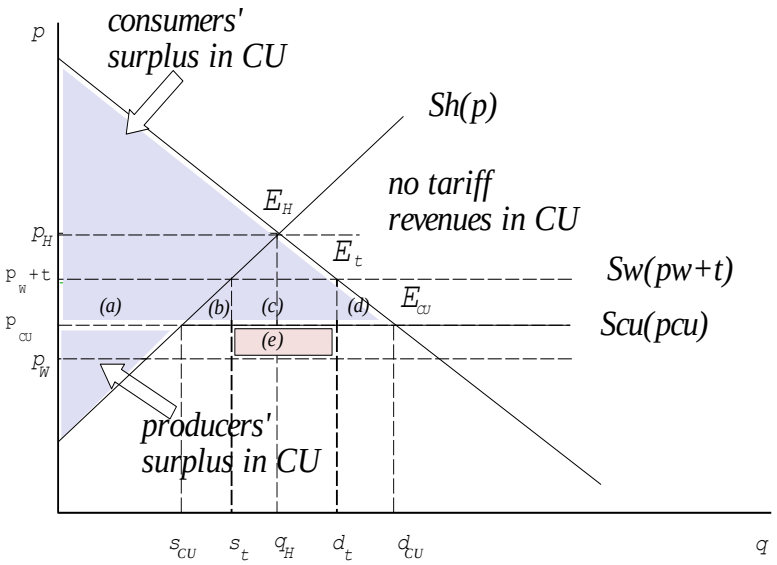
In this scenario, the total welfare of the country H is represented by the sum of consumer surplus (CS), depicted by the triangle $p - p_h - p_w + t$, producer surplus (PS), depicted by the triangle in the bottom-left part, and the revenues from the tariff protection, illustrated by the two small rectangles. As noted on the graph, the equilibrium price is formed by the demand curve d_t and $p_w + t$.

In case the country H decides to join the customs union with country P the welfare effect will change. The formation of the customs union will affect the price at which the country H imports the commodity. As described earlier, before joining customs union, country H was importing the commodity at price $p_w + t$. Following the creation of customs union, trade within it will be tariff free. Hence country H will import the goods from country H at the price $p_p = p_{cu}$ which is less than $p_w + t$. The tariff t for the imports from the world market will remain the same.

The effect of the customs union formation is depicted in Figure 3. In the new scenario, the demand of the country H will increase from d_t to d_{cu}, while supply will decrease from s_t to s_{cu}. Due to the elimination of tariffs, the imported commodity amount from country P will rise from $d_t - s_t$ to $d_{cu} - s_{cu}$. The new equilibrium price at E_{cu} will decrease from $p_w + t$ to $p_p = p_{cu}$. However, the new equilibrium price due to the elimination of tariffs p_{cu} is higher

than the price without tariff p_w from which the country H was importing from the ROW before joining the customs union. At the same time, the increase in the producer price leads to the reduction of the domestic production which is replaced by the imports at a lower price from country P and consequently to the increase of domestic supply of country H.

Figure 3: Customs union formation



Source: Strielkowski (2013)

Following the change of the equilibrium price, one can observe two things. First, the reduction of the equilibrium price (from E_t to E_{cu}) leads to the increase of the CS, depicted by triangle $p - p_{cu} - E_{cu}$ (amount equal to areas (a), (b), (c) and (d)), while the PS decreases by the amount equal to the area (a). The tariff-free regime results in loss of the tariff revenues for the government, and this is equal to the areas (c) and (e). Area (c) represents the tariff revenues lost on imports from country P, while area (e) represents the revenue in the form of tariffs the government is not getting in case the country H imports from country P instead from the world market W.

The formation of the union makes the following welfare changes. Regions (a) and (c) can be considered as neither gain nor loss as they represent the internal relocation of welfare among producers and consumers. Regions (b) and (d) represent the trade creation effect due to trade liberalization and therefore make positive welfare effect, while the region (e) gives the trade diversion effect due to the partial loss of tariff revenues and thus represents

negative welfare effect. As a result, the overall net effect will be ambiguous given that trade liberalization creates a positive effect while trade inefficiency in supply gives an adverse effect.

Whether positive or negative net welfare effect will prevail depends on the comparison of the sum of regions (b) and (d) with the region (e). Therefore, no general statement about the gain or loss cannot be made, but the empirical investigation is necessary. In the case areas (b) and (d) are bigger than the area (e), positive welfare effect is expected for the country H and therefore the creation of customs union is justified. On the contrary case, negative welfare effect prevails, and the formation of a customs union is trade diverting for the country H.

Before Viner's theory, many economists believed that the formation of customs union would be welfare improving for the country participants. Viner's study was the first economic framework which proved that customs unions do not necessarily result in gains to member countries. He identified possible advantages and disadvantages of the creation of customs union. As stated before, Viner's static effects of integration consider only the production side and refer to the concepts of trade creation and trade diversion, where the former raises the home country's welfare and the latter lowers it. Viner's analysis concluded that it is difficult to assess whether the welfare effect of customs union formation will be positive, meaning that no general statement can be made. According to the author, creation of customs union are "*more likely to produce more economic harm than gain and, unless they are made between sizeable countries which practice substantial protection of substantially similar industries*." (Viner, 1950).

Many subsequent developments of Viner's theory were made. Meade (1955) criticized Viner's work stating that his model is justified only in the cases of completely elastic supply and inelastic demand. He argued that customs unions might lead to the increase of the trade volume even in the presence of trade diversion, in case demand is allowed to be more elastic. He defines this effect as "trade expansion" and concludes it should be added to traditional Viner effects of trade creation and diversion, as in this case trade diversion doesn't lead to ineffective allocation of resources. Furthermore, Meade criticized Viner for considering tariff reduction on a single commodity. He argues that increase of welfare can be achieved if

complementary and substitute goods are considered. He suggests that welfare improving customs union should be formed between partner countries who are potentially complementary, are partners for the goods traded and between whom initial tariffs are high.

Lipsley (1957) criticized Viner's analysis for focusing only on production effects and leaving out consumption effects. He argued that economic welfare is made of production and consumption effects and that both of them need to be taken into consideration in the analysis of customs unions net welfare. Although he admired Viner's classification of welfare effects, he stated that trade creation and trade diversion does not necessarily bring positive and negative effects respectively. Lipsley claimed that trade diverting custom union may still be beneficial for a country and that it might lead to increase in welfare.

Gehrels (1956) shared the similar point of view stating that consumption effects will always lead to the welfare increase as the consumers' response to the drop in import prices caused by the tariff removal. In another study, (Lipsley, 1960) stated that notion of the production effect and consumption effect should be expanded to the concept of inter-country substitution and inter-commodity substitution. Inter-country substitution happens when one country is replaced by another and refers to Viner's original framework of trade creation and trade diversion. Conversely, the inter-commodity substitution occurs when one commodity is switched by another as a consequence of relative price change.

Traditional integration theories relied on static analysis which proved to be insufficient. Therefore, researchers started introducing the concept of dynamic effects in the welfare analysis of economic integration. Balassa (1961) was the first who introduced the concept of dynamic effects of customs union formation. He proved that static effects have limited impact on country's welfare and are not sufficient enough when analyzing overall net welfare of economic integration. He proposed a list of dynamic effects as a result of customs union creation, among which are increased competition, change in market structure, higher risk and uncertainty, the rapid spread of technology, an increase of productivity and investment growth.

In a similar fashion, Cooper and Massell (1965) have stated that static effects are no longer valid when performing welfare analysis of customs union. The authors have claimed that

non-preferential agreements are more beneficial to customs unions and that customs union creation might hurt more participating countries, as they tend to protect their domestic market. They argued that better allocation of resources cannot be achieved through customs unions. Likewise Balassa, the authors propose dynamic effects as a rationale behind the economic integration or formation of the customs union.

Krauss (1972) introduced the notion of the terms of trade effect. He noticed that previous studies assumed the country analyzed is small and with no effect on world prices. He argued that if the country was large enough to have an impact on global prices and change them, it might influence the demand for imports by leveraging on a tariff and consequently lead to the decrease of the prices of those imported goods, thus improve its terms of trade. The author concluded that the terms of trade effect might improve the quality of economic integration analysis.

Johnson (1974) stated that trade diversion might be welfare increasing if both production and substitution effects are taken into account. He argued that benefits consumers receive from reduced prices due to the elimination of tariffs might outweigh welfare losses due to a switch from low-cost to the high-cost supplier. The author concluded that consumer surplus would be increased as a consequence of customs union creation regardless of whether goods are imported from the least-cost supplier or not.

Summarizing, many researchers who developed subsequent theories on to Viner's theory of customs unions came to the conclusion that no direct answer could be given to the question of whether customs union increases world welfare or not. As Meade (1955) has stated:

"Our main conclusion must be that it is impossible to pass judgment upon customs union in general. They may or may not be instruments for leading to a more economic use of resources. It all depends on the particular circumstances of the case".

2.4 Studies on welfare effects in agriculture

Many authors have analyzed the consequences of joining regional trade agreements from the viewpoint of welfare effects. Trade agreements between countries have existed for centuries, but since the 1950s the number of arrangements has received rapid growth. The following

section presents effects of some trade agreements on agricultural trade creation and trade diversion.

Michalopolous and Tarr (1997) have analyzed the economic implications of the formation of a customs union between four Common Commonwealth of Independent States (CIS) member states: Belarus, Kazakhstan, the Kyrgyz Republic and Russia. The central point of the paper is static and dynamic effects of a customs union. The authors conclude that static effects are mixed but are adverse for countries that have liberal trade regimes with a lower tariff structure compared to the common external tariff. As for dynamic effects, authors argue that they are likely to be negative as countries would tend to be locked in the old technology of the Soviet Union.

Zahniser, Pick, Pompelli and Gehlhar (2002) assessed trade creation and trade diversion effects of agricultural trade liberalization in the Western Hemisphere. The paper examines US agricultural exports with respect to the NAFTA and Southern Common Market (MERCOSUR) trade agreements. Using a series of modified gravity models, the authors concluded that both trade creation and trade diversion exists among members, subject to the region and the individual agricultural commodity considered. For instance, US agricultural exports to Mexico significantly increased over the observed period, although authors note that the unilateral reforms by Mexico initiated before the agreement came into effect were responsible for the amplified level of trade. In this regard, NAFTA's major benefit to US agricultural products was not aimed to open the Mexican market further, but to "lock in" previous reforms by Mexico.

Koo, Kennedy, and Skripnitchenko (2006) study evaluated the effects of some regional trade agreements (RTA) on the agricultural trade. Their paper focuses on examining trade creation and trade diversion effects on the following trade agreements: ASEAN Free Trade Agreement (AFTA), Andean Community (CAN), EU and NAFTA. The economic consequences were estimated using the gravity model framework. The analysis revealed that the overall effects of RTAs were significantly positive, demonstrating that trade agreements increase the amount of trade among member states. The trade creation effect was not significant only for the NAFTA agreement, but authors suggest this phenomenon occurred due to a strong trade relationship between countries as a consequence of their proximity. The trade diversion

effect was positive, indicating that trade agreements do not harm trade of agricultural products with non-member countries. The results of the analysis showed that RTAs benefits are greater for participating countries than for non-participants, but also that they are not damaging trade towards non-member countries. This suggests that RTAs improve global welfare by increasing agricultural trade volume among member countries and, to a lesser degree, among non-member countries.

Cakmak and Eruygur (2008) evaluated the impact of Turkish integration to the EU on agriculture products. The approach that was undertaken involves agricultural sector model of Turkey and incorporates the economic tool of Positive Mathematical Programming with Maximum Entropy. The authors found that the Turkey's integration with the EU will result in the small net welfare effects of agriculture products in the customs union. Consumers will benefit from declined prices as consumption of agricultural commodities will increase with a lower expenditure. Although aggregate levels of producers will not change following the membership, producers of agriculture goods will not be able to remain competitive. The support of the CAP policies is important for the welfare of producers. Finally, overall exports of agricultural products will decline, while net imports will drastically increase compared to the base period, especially in the trade of livestock products.

Jayasinghe and Sarker (2008) investigated economic effects of NAFTA in six agricultural commodities for the period 1985-2000. They found out that trade between member countries was greater than trade with non-members in the observed period. As authors indicate, either reduction of intra-NAFTA tariffs or trade diverted from the ROW market has led to the expansion of trade among member countries. The paper concludes that NAFTA trade policies promote trade among member forcefully while displacing trade with non-members states.

Lambert and McKoy (2009) analyzed the effects of various FTAs for agricultural trade in three different time periods. The authors found out that membership in FTAs brought benefits in terms of enlarged intra-bloc trade. Furthermore, the findings confirmed trade creation for a majority of agri-food products, while trade diversion was observed for several trade associations made of developing countries.

Hatab, Romstad, and Huo (2010) analyzed the main factors which influence agricultural exports of Egypt to major trade partners for the period 1994-2008. A gravity model has evaluated that a 1% increase in Egypt's GDP results in roughly a 5% increase in Egypt's agricultural export flows. In contrast, the increase in Egypt's GDP per capita causes exports to decrease. This is mostly because an increase in economic growth raises the demand per capita for all goods.

2.5 Gravity model

Gravity models are one of the most successful empirical methods in economics that have proven to be useful in explaining different type of effects, such as the effects of trade policies on trade flows, population migration, commuting between two places, traffic movement, tourist travel and commodity shipping, to name a few. The gravity equation has been used 50 years as a workhorse for analyzing the determinants of bilateral trade flows between countries (Bergstrand, 1985).

Foundations of the gravity model of international trade are based on the Newton's law of universal gravitation, which relates the amount of gravity between two objects to their masses and distance. According to Newton's law, the strength of gravitational force F_{ij} between two objects i and j is directly proportional to their respective masses m_i and m_j and inversely proportional to the square of the distance ${d_{ij}}^2$ between these objects. In other words, the larger the objects, the greater is the gravitational attraction between them. On the contrary, the double the distance, the strength of gravity decreases by a factor of four. Newton's law of gravitation can be formalized by the following formula:

$$F_{ij} = c\frac{m_i m_j}{d_{ij}^2} \tag{2.1}$$

where c is the gravitational constant.

Historically, the so-called "gravity equations" for bilateral trade have been considered as deriving from analogy with Newtonian physics rather than on the principles of economic theories and therefore referred as examples of social physics. As a consequence, they were mostly ignored by trade economists who questioned the respectability of the gravity model

in describing trade flows. However, over the last two decades, enormous efforts of trade researchers were made towards integrating gravity equations in the modeling framework in economics, thus making them an important part of policy analysis in international trade. Nowadays, gravity models are regarded as one of the most stable and robust empirical methodologies for explaining a range of economic phenomena, where the most remarkable applications were seen in the field of explaining bilateral trade flows.

In its simplest form, the gravity model to examine international trade flow is analogous to Newton's law of gravity, where the gravitational force F_{ij} is equivalent to the volume of trade T_{ij} between countries i and j, masses m_i and m_j represent the economic sizes for countries i and j generally measured as the gross domestic product (GDP), and the distance d_{ij} denotes the geographical distance between two countries. Thus, the gravity equation can be specified in the following form:

$$T_{ij} = c\frac{GDP_i GDP_j}{d_{ij}} \tag{2.2}$$

What this formula states is that bilateral trade between countries i and j is proportional and positively related to the economic sizes of the two countries, measured by their respective GDPs, and inversely proportional and negatively related to the distance between them.

2.5.1 Economic theories of the gravity model

The initial link between formal economic theory and Newton's universal law of gravitation was made by Tinbergen (1962), Pöyhönen (1963) and Linnemann (1967). They were the first to derive econometric studies based on the gravity equation, in which they identified patterns of international trade flows and estimated its determinants.

The first application of the gravity model to international trade was made by Tinbergen (1962). His main motivation for using the gravity theory was "*to determine the standard pattern of international trade that would prevail in the absence of discriminating trade impediments*". Tinbergen identified the gross national product (GNP) and the distance between any pair of countries as primary explanatory variables that play a predominant role in determining the size of trade flow. The model provided a static analysis and did not

require separate demand and supply functions for the estimation of trade flows. Tinbergen found out that GNP has a positive influence on trade flows for both exporting and importing countries, as it determines the export amount a country can supply, as well as the amount that can be imported into a country. On the other hand, the distance has a negative influence on trade flows as it affects transportation costs. The author claimed that the gravity equation can be viewed as the approximation of the demand and supply forces. In other words, the aggregate income of the importer and exporter represented by GNP approximates the level of demand and supply of countries, while distance proxies transportation costs.

According to Tinbergen's model, the volume of the trade between countries i and j can be explained by the following regression equation:

$$E_{ij} = a_0 \, Yi^{a_1} \, Y_j^{a_2} \, D_{ij}^{a_3} \tag{2.3}$$

where E_{ij} denotes the exports from country i to country j, Y_i and Y_j represent GNP of countries i and j respectively and D_{ij} is the distance between country i and country j. E_{ij} is the variable to be explained (dependent), Y_i, Y_j and D_{ij} are explanatory (independent) variables, while a_0, a_1, a_2, a_3 are a set of coefficients. These coefficients indicate no direct proportionality among dependent variable and independent variables, as such proportionality would exist only in case all coefficients are equal to 1. The coefficient a_0 is a constant and its numerical value depends on the units in which the variables are measured.

The general gravity model specifies the constant linear relationship between export flows and explanatory variables. Thus, 1 percent increase in the GNP of country j will always result in an increase of a_2 percent of exports to the supplying country i and vice-versa. Furthermore, a higher level of income of the importing country should result in a higher level of imported goods in that country. Similarly, a higher level of income in the exporting country should provide greater incentive to suppliers to increase their overall production, which in turn will enhance the availability of goods for export.

Pöyhönen (1963) used national income per capita for a measure of mass, and transportation costs as a measure of the distance between the trading regions i and j. He proposed the following cross-sectional gravity equation for determining trade flows:

$$EX_{ij} = \frac{cc_i c_j (GNP_i^{a_1} GNP_j^{a_2})}{(1 + a_3 D_{ij})^{a_4}} \quad (2.4)$$

Where coefficients a_1, a_2 are export elasticities, coefficient a_3 represents transportation costs, a_4 is an isolation parameter, c_i and c_j are export and import parameters for i-th exporting and j-th importing country respectively, and c is a constant.

Linnemann (1966) continued the previous work of Tinbergen and provided a theoretical justification of the gravity equation using the Walrasian general equilibrium system which includes more explanatory variables for each trade flow. He pointed out three main factors that are governing foreign trade:

- the total potential supply of an exporting country on the world market;
- the total potential demand of an importing country on the world market;
- factors representing the "resistance" to a trade flow between countries (ordinarily tariff barriers and transportation costs)

The author proposes the following gravity equation for the amount of goods flowing from country i to country j (X_{ij}):

$$X_{ij} = \beta_0 Y_i^{B_1} N_i^{-\beta_2} Y^{\beta_3} N_j^{-\beta_4} D_{ij}^{-\beta_5} P_{ij}^{\beta_6} u_{ij} \quad (2.5)$$

where Y is a gross national product, N is population size, D is geographical distance, P is a preferential trade factor (a dummy variable), and u is a disturbance term. The model can be subsequently modified to include an additional variable: the commodity composition of trade, denoted by C_j, which represents the extent to which the supply availability match import needs.

The empirical findings show that the growth of national income is directly proportional to the growth of trade. On the contrary, the larger the population or the distance between countries the lower is the trade amount. The author concludes that countries tend to be more self-sufficient as domestic markets become larger (Linnemann, 1967).

The theoretical foundations of gravity models described previously were formalized in a pure probabilistic manner with little economic foundation. The subsequent efforts of

Anderson (1979), Bergstrand (1985) and Helpman and Krugman (1985) went further towards the economic development in support of gravity equation.

Anderson (1979) provided the basis for the conventional economic model of gravity. He was the first who formally derived the conditional general equilibrium model of the gravity equation. His model was based on three main assumptions:

- each country is completely specialized in the production of its own good (one good for each country, goods are differentiated by a country of origin);
- identical homothetic preferences;
- no existence of tariffs or transportation costs

Anderson showed that gravity equation can be derived by assuming Cobb-Douglas and Constant Elasticity of Substitution (CES) preferences which were modeled at aggregate level over only traded goods. Anderson derived the gravity model in two environments: a pure expenditure system model in which each country is specialized in the production of a single tradable good, and trade-share-expenditure model where all countries produce traded and nontraded goods.

In the pure expenditure system model, Anderson's gravity model postulates identical Cobb-Douglas preferences for all countries, implying identical expenditure shares. This means that the part of income spent on the good of country i, denoted by b_i, is the same in all countries. The author argued that the simplest possible gravity-type model can be obtained under the following conditions (Krishnakumar, 2002):

- the existence of the share relationships with trade balance identity;
- prices being constant at equilibrium values in cross-sections;
- units of goods chosen such they are all unity

The process of deriving the gravity-type model starts by rearranging a Cobb-Douglas expenditure system. Supposing the assumptions defined in the model, the consumption of good i in country j (M_{ij}), equal to imports of good i by country j, can be defined as follows:

$$M_{ij} = b_i Y_j \tag{2.6}$$

where Y_{ij} represents income in country j. The requirement states that income of a country must equal sales, therefore:

$$Yi = b_i(\sum_j Y_j) \tag{2.7}$$

Solving (2.7) for b_i and substituting into (2.6), the simplest form of the gravity model is obtained:

$$M_{ij} = \frac{Y_i Y_j}{\sum Y_j} \tag{2.8}$$

The generalization of the gravity model can be obtained by performing ordinary least squares method, with exponents on Y_i and Y_j unrestricted. The gravity equation (2.8) represents the pure expenditure system model.

Anderson demonstrated that if assumptions on identical preferences and unity income elasticity of demand are relaxed in a less restrictive form such as the CES, transportation costs are included in the model. The identical preferences for traded goods imply that expenditure shares for any good are the same across countries.

In the trade-share-expenditure system model, the author assumes that all countries produce a traded and a nontraded good. Let θ_i be the expenditure on tradeable good of country i divided by total expenditure in j on tradeable goods; i.e. θ_i is an exponent of Cobb-Douglas function g. Finally, let ϕ be the share of expenditure on all traded goods in total expenditure of countries i and j and $\phi_j = F(Y_j, N_j)$.

Demand for good i in country j can be formulated as follows:

$$M_{ij} = \theta_i \phi_j Y_j \tag{2.9}$$

The balance of trade relation for country i implies:

$$Y_i \phi_i = (\sum_j Y_j \phi_j)\theta_i \tag{2.10}$$

Solving (2.10) for θ_i and substituting into (2.9) we have:

$$M_{ij} = \frac{\phi_i Y_i \phi_j Y_j}{\sum_j \phi_j Y_j} = \frac{\phi_i Y_i \phi_j Y_j}{\sum_i \sum_j M_{ij}} \tag{2.11}$$

With $F(Y_j, N_j)$ taking log-linear form, and m_{ij} being a trade imbalance due to long term capital account transactions (as a function of income and population) one can define the "basic" balance as:

$$Y_i \phi_i m_i = \sum_j Y_j \phi_j) \theta_i \tag{2.12}$$

Denoting $m_i = m(Y_i, N_i)$ and substituting it into (2.10) and (2.11) the final form of deterministic gravity equation is obtained (Anderson, 1979):

$$M_{ij} = \frac{m_i \phi_i Y_i \phi_j Y_j}{\sum_i \sum_i M_{\mathrm{ij}}} \tag{2.13}$$

Bergstrand (1985) provided a microeconomic foundation to the gravity within the framework of a general equilibrium model of world trade. His model follows Anderson's work, where prices of tradeable goods and its transportation costs are assumed as primary factors affecting consumers' consumption decision. The author uses CES function to derive the import demand (utility maximization) equation and Constant Elasticity of Transformation (CET) function to derive the export supply (profit maximization) equation. By introducing the equilibrium condition a "generalized" gravity equation is obtained with the following form:

$$P_{ij} X_{ij} = Y_i^{\alpha} Y_j^{\beta} C_{ij}^{\gamma} T_{ij}^{\delta} E_{ij}^{\sigma} f(P) \tag{2.14}$$

where P and X represent the price and amount of traded goods respectively, f is a complex function containing various price factors, C is the transportation costs, T is tariff rate, E is spot rate, while $\alpha, \beta, \delta, \gamma, \sigma$ take the various forms of CES and CET coefficients.

Krugman (1979) and Helpman and Krugman (1985) derived the gravity model by assuming a monopolistic competitive market structure with increasing returns to scale in production

and differentiated product framework. Their gravity equations are characterized by the following main elements:

- consumers seek variety in goods they consume;
- products are differentiated by the firm and not just by a country;
- firms are monopolistically competitive

The authors argued whether the national income of countries have an impact on bilateral trade. They have shown that classical Heckscher-Ohlin (HO) theory of comparative advantage does not contain the property that shows bilateral trade depends on the product of GDPs.

Deardorff (1995) demonstrated that the gravity equation could be obtained within the HO framework in two cases. The first approach assumes frictionless trade and identical preferences, in which trading partners by consumers and producers are randomly chosen. The second method assumes unequal factor prices for trade impediments. He argued that the gravity equation is able to characterize a large class of models and can be justified from standard trade theories.

Eaton and Kortum (2002) obtained an alternative unconditional general equilibrium equation from a Ricardian type of model, which focuses on a production side and continuum of goods. The model assumes perfect competition and differential access to technology across countries. As such, the efficiency varies across countries, resulting in the cost of a bundle of inputs identical across goods within a country. The authors defined the gravity equation as follows:

$$X_{ij} = T_i Y_j \frac{(c_i t_{ij})^{-\theta}}{\sum_{k=1}^{N} T_k (c_k t_{kj})^{-\theta}} \tag{2.15}$$

where T_i represents the efficiency level of the exporter and c_i denotes the unit cost of inputs. The efficiency level influences the overall sale of the exporter and is measured by the country's state of technology. Therefore, the gravity equation obtained describes the trade flow from i to j as a function of importer j's overall economic activity and the price of

exporter i's output relative to a measure of the overall level of prices of goods facing importer j.

More recently, Anderson and Wincoop (2003) showed that commonly estimated gravity equations are not theoretically grounded, leading to biased estimation, incorrect comparative statics analysis and lack of understanding of what is driving the results. Additionally, the authors have found out that borders reduce bilateral national trade levels by a plausible magnitude. As a remedy to this problem, they suggest a model based on the manipulation of the CES expenditure system that solves the so-called "border puzzle."

Feenstra (2004) notes that frictionless world of identical prices for a good across countries results in misspecification of the gravity model. As a consequence, differential prices are not included in the gravity equation as a variable that affects bilateral flows. Based on the existing theoretical foundations of other researchers, Feenstra suggests three approaches that cope with this problem. In the first approach, the so-named "price effect" may be measured by price indexes, as Bergstrand (1985) proposed in his model. The second method utilizes border effects as a measure of prices, as suggested by Anderson and Wincoop (2003). Finally, the third method of fixed-effects for importers and exporters which permit each country to be different may be applied as Rose and Wincoop (2001) proposed.

2.5.2 General gravity model

Most of the gravity model specifications depart from the general gravity equation which has the following multiplicative form:

$$X_{ij} = GS_i M_J \phi_{ij} \tag{2.16}$$

where X_{ij} denotes the amount of exports expressed in monetary value from country i to j, M_j represents specific factors that compose the total importer's demand (such as the GDP of importing country) and S_i encompasses specific factors that make up the total amount exporters are willing to supply (such as the GDP of exporting country). G is a variable that is not contingent on i or j such as the level of world liberalization. Finally, ϕ_{ij} denotes the exporter and importer ease of market access; i.e. the inverse of bilateral trade costs (Bacchetta, et al., 2012). The equation (2.16) may contain time indexes and all these variables

can vary over time. Furthermore, all gravity models can be run with both aggregate and sectoral data.

For estimating the gravity model, the most commonly applied procedure suggests taking the natural logarithms of the equation to obtain a log-linear form that can be later estimated by ordinary least squares (OLS) regression:

$$lnX_{ij} = lnG + lnS_i + lnM_j + ln\phi_{ij} \tag{2.17}$$

In practical terms, the gravity equation relates the natural logarithm of the trade volume between two countries i and j (X_{ij}) to the log of their respective GDPs (S_i and M_j), a composite term representing obstacles and incentives to trade between them (G), and terms measuring trade barriers between each of them and the ROW (ϕ_{ij}). The parameters estimated in logarithms are elasticities. As an example, the estimated parameter for the GDP in the gravity equation above represents the elasticity of trade to GDP, which indicates the percentage variation in trade following a 1 percent increase in GDP (Bacchetta, et al., 2012).

A number of variables may be used to capture the trade costs ϕ_{ij}. Although many empirical studies proxy trade costs with bilateral distance, a vast number of the so-called "dummy" variables could be included in the model in order to denote similarities and differences between countries. Dummy variables for islands, landlocked countries and common borders are used to capture transportation costs. They serve in order to test the hypothesis that transportation costs are higher for islands and landlocked countries and that they increase as the distance between countries increases. Other dummy variables for common language, adjacency or colonial history are used to capture search costs. Information costs are probably lower in case relevant cultural features between countries are similar. For example, customers are more likely to search for goods from firms in adjacent countries and suppliers who operate in countries with a common language, as the business environment is familiar to them compared to firms operating in a less-similar environments. Finally, dummy variables for regional trade agreements are used to reflect on whether tariff or other trade barriers between countries exist or not.

Anderson and Wincoop (2003) introduced the concept of relative trade costs and demonstrated that controlling for relative trade costs is essential for a well-defined gravity model. In other words, the willingness of country j to import from country i is contingent on trade cost of country j toward i relative to its overall "resistance" to imports (measured by weighted average trade costs) and to the average "resistance" of exporters in country i. The authors define this concept as the multi-lateral resistance (MTR) terms and demonstrate its impact on border barriers in bilateral trade. They claim that for small countries increased trade barriers have a larger effect on MTR terms, as such countries depend more on trade than larger countries. In their proposed framework, gravity equation resolves the severe inaccuracy made by those models that proxy S_i and M_j without taking care of MTR terms. The gravity equation takes the following form:

$$X_{ij} = \frac{Y_i\, Y_j}{Y}\left(\frac{t_{ij}}{\prod_i P_j}\right)^{1-\sigma} \tag{2.18}$$

where Y is the world GDP, Yi and Yj denote the GDP of countries i and j respectively, t_{ij} is the cost of country j in importing a good from i, σ is the elasticity of distribution and $\prod_i$ and P_j denotes the level of openness of a market for exporter and importer (outward and inward MTR of country i and j). MTR terms represent the remoteness of a country from world market and are determined by the physical and policy factors, such as distance, high tariff barriers or other trade costs. Low MTR level means larger remoteness of a country from world markets.

By taking the logarithm of the equation, like in the general gravity model, the equation is transformed to:

$$lnX_{ij} = a_0 + a_1 lnY_i + a_2 lnY_j + a_3 lnt_{ij} + a_4 ln\prod_i + a_5 lnP_j + \varepsilon_i \tag{2.19}$$

where a_0 is a constant, a_1 and a_2 are GDP coefficients of two countries, a_3 is equal to $1-\sigma$, a_4 and a_5 represent elasticities of distribution and market openness, and ε_i is the error term.

Chapter 3

Agricultural support and protection

3.1 Overview of agriculture protectionism

Protectionism is widespread in agricultural trade. Until the 1990s, industrial countries made trade regulations with the aim to protect agricultural sector and give support to their domestic producers. Support was given by providing various subsidies to producers, setting high tariffs, and pursuing other non-tariff measures such as import restrictions and quotas (Aksoy & Beghin, 2004). This has led to the market being harder to access and less open to foreign producers. Conversely, developing countries made policies that subsided sales of imported food goods and discriminated domestic producers by taxing export on agricultural products in order to generate government revenues. These countries used exchange rate policies and price controls to keep down prices for urban consumption. But in reality, such policies led to suboptimal food supply and increased prices of agricultural goods in their economies. Both cases (protection by giving subsidies in industrial countries and by taxing in developing countries) brought low market openness, the level of trade determined by governments, and imperfect consumption and resource allocation. As a result, world markets and their prices were largely distorted and unstable (Josling, 1993) .

Since the 1980s, governments and state trading agencies have made various approaches to bring in order agricultural protectionism, both through the negotiation of intergovernmental multilateral agreements and through regional and unilateral policies with a goal to liberalize agricultural trade. Over the last two decades, developing countries launched initiatives

related to removal of import quotas, elimination of export tax rates, a decrease of average tariffs and disappearance of other import restrictions (World Bank, 2001). In a similar style, industrial countries started modifying their agricultural policies to reduce the impact of distortions in the world markets. This is because governmental agricultural subsidies paid to farmers and agribusiness, such as market price support, caused an oversupply of agricultural commodities above the market equilibrium level (Aksoy & Beghin, 2004).

The first attempts to limit agricultural protection and governmental subsidies on a global level were made in 1994 with the Uruguay Round of negotiations which led to the creation of the World Trade organization (WTO) and to the inclusion of the agreement on agriculture (AOA) as a part of the WTO agreements. The AOA was formed with the goal of reducing protectionism and discrimination in agriculture. Through this agreement, WTO members committed themselves to reduce agricultural protection by performing the following measures (International Food Policy Research Institute, 2007):

- Converting quantitative restrictions (such as import quotas) and other non-tariff barriers (such as variable levies) to tariffs or tariff rate quotas
- Setting a maximum (bound) tariff rate for each product by each country
- Decreasing of the bound tariff rate for a period of six years

Developing countries were given special treatment. They were allowed to set bound tariff rate above the maximum one and to reduce the tariff by around two-thirds of those required for industrial countries. They were also permitted to implement necessary changes in a period of ten instead of six years.

Three different types of governmental spending were included in the AOA: green box, blue box, and amber box expenditures. Amber box expenditures include market price support and production subsidies. WTO members committed to reducing expenses by 20% in case they were belonging to a group of industrial countries or 13.3% in case of being a developing country. Green box expenditures include government fund support for a wide range of programs, from agricultural research through animal and plant health programs to food safety programs. Blue box expenditures cover payments to farmers made under production-

limiting programs, provided that they are made in planted area in the base period (Aksoy & Beghin, 2004).

The implication of the Uruguay Round provided modest effects on the agricultural protection across countries. There could be two reasons for these results. The first one is that levels of protection and governmental support to farmers were already high in the base period (from 1986 to 1988). The second one is that prior to negotiations highly developed countries, like the United States, for example, already undertook necessary reforms to comply with the new rules, and for such countries proposed requirements were fulfilled quickly (OECD, 2001).

The Doha Round, launched in 2011, followed up and it represents the latest round of trade negotiations among the WTO membership. One of its objectives regards further integration of negotiations on agricultural subsidies and services that were initiated a year before the official negotiations started. Although trade round was planned to finish by 2005, this never happened due to failed discussions and disagreements over agricultural subsidies, tariff and non-tariff barriers, services and other trade obstacles between developed countries (led by US, EU and Japan) and major developing countries (led by Brazil, China, India and South Africa). The latter complained about extremely high tariffs set for their most exported products (such as textiles, clothing and fish products). Hanrahan and Schnepf (2005) summarized measures proposed by US and EU in this trade round. While both parties agree on complete elimination of agricultural export subsidies, main differences are reflected on the level of magnitude at how tariffs are set. While the US proposes reducement of tariffs by 55-90%, the EU suggests decrease by 35-60%. At the same time, the US recommends setting maximum agricultural tariffs at 75% and limitation of sensitive products to 1% of tariff lines, while the EU proposes the implementation of smaller tariffs cuts for developing countries and limitation of sensitive products to 8%. To increase the bargaining power of negotiations, many WTO members formed alliances. While G20 forum promotes reforms related to agricultural subsidies and protection that are in favor of developed countries, other alliances mainly made of developing countries do not share the same view and have made other proposals. As of today, the future of the Doha Round remains unclear.

3.2 Instruments of protection

Main agricultural protection instruments used by governments can be divided into direct and indirect trade policy measures. Direct instruments focus on international trade and goods that enter either as import or exports. Indirect instruments are production-related and they mainly support domestic producers by favoring them over foreign competitors. Table 1 shows main policy instruments that are used to protect farmers from external competition proposed by Caballero, Calegar, and Cappi (2000).

Table 1: Main trade policy instruments in agriculture protectionism

Direct interventions	Indirect interventions
Tariffs	Exchange rate management
Import and export quotas	Commodity programmes
Export subsidies	Input subsidies and tax exemptions
Sanitary and phytosanitary restrictions	Long-term investment assistance

Source: Caballero, Calegar, & Cappi (2000)

3.2.1 Direct interventions

Tariffs are the simplest and oldest method that provides protection to domestic producers. Tariff is defined as tax charged on imported good. Two types of tariffs may be levied – specific tariff and ad valorem tariff. Specific tariffs are imposed as a fixed charge per unit of the imported good. Ad valorem tariffs are imposed as a percentage of the value of the good imported (Sgro, 2009). Most governments in the past raised their revenue from tariffs, but today they use them to protect domestic economies from international competition by raising the price of the imported good. Tariffs increase the income of the government and domestic producers at the expense of customers, as they pay the higher price of the import-competing good. Therefore, setting tariffs as the protective measure for agriculture producers' results in a welfare loss for the country imposing the tariff.

Quotas are direct quantitative limits on the amount of imported or exported goods. They can be unilaterally set by the country or imposed "voluntarily" in the case when one country

restricts imports or exports from or to another country on a particular commodity. Like for tariffs, quotas are welfare decreasing, as they tend to increase the price of the good and consequently the revenue of government and producers at the expense of consumers.

Export subsidies are financial payments issued to firms and individuals by the government with a goal to encourage exports and sell abroad rather than in the domestic market. As a consequence, the price of the good is pushed up. This comes at the expense of domestic consumers as they usually pay a higher price than foreign consumers for the commodity exported.

3.2.2 Indirect interventions

The exchange rate, depending on whether is devaluated or overvalued, can affect the amount of imported and exported goods. On the one hand, devaluated exchange rate encourages exports and discourages imports, as the price rise increases the domestic price of the good and the revenue received by exporters. As a consequence, producers benefit at the expense of consumers. On the other hand, overvalued exchange rate encourages imports and discourages exports, as imports become cheaper and exports more expensive. In this way, domestic consumers benefit at the expense of producers.

Commodity programs are designed to aid local farmers in the form of price and income support paid by the government. These programs include direct subsidies to domestic farmers and are often made to control the supply of the commodity, encouraging overproduction and pushing down world prices.

Input subsidies instruments are intended to reduce the production cost through different programs that lower the value of inputs needed for producing the good. They might include direct price reduction on inputs, tax or profit exemptions, special insurance programs, among other measures. These programs are prevalent in developing countries.

Long-term investment assistance refers to governmental support through research, training, technology, marketing support, and infrastructure in agriculture. These instruments aim to improve the competitiveness of domestic producers and increase their productivity.

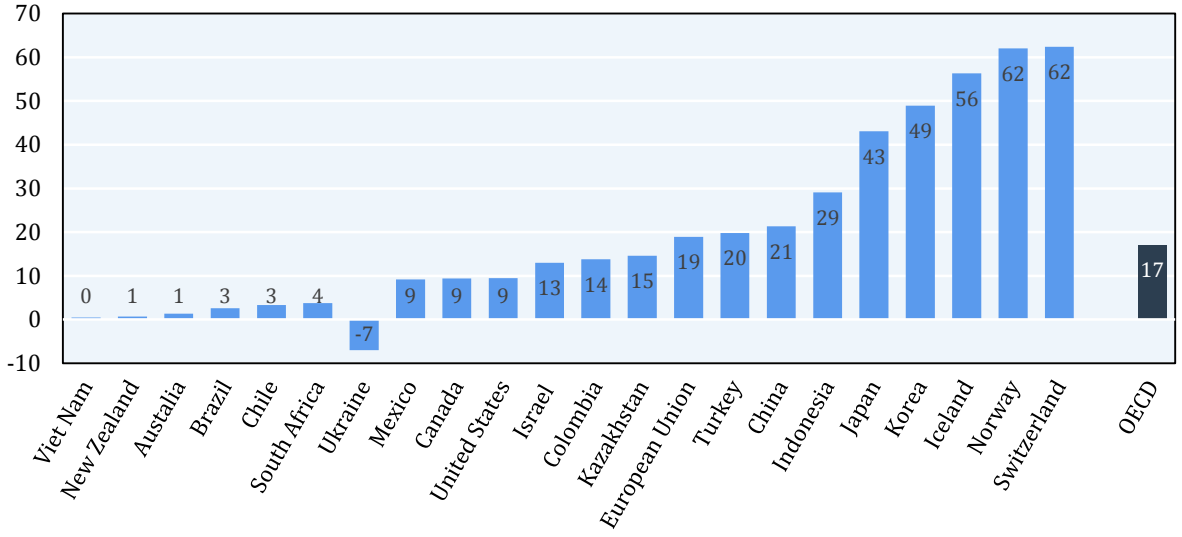
3.3 Current state of support to agriculture

According to the OECD's Agricultural Policy Monitoring and Evaluation 2016 report, 50 countries (accounting for the majority of global agricultural value added) in the period 2013-15 provided annually an average of 538 billion euro for the agricultural support. 469 billion euro went directly to agricultural producers while remaining 87 billion euro was spent on services supporting the agricultural sector. Around 68% of the total level of support to farmers was directly linked to market price support and to payments based on output or input use without constraints. This support not only distorts markets and trade but also leads to substantial costs paid by consumers. Over the past 20 years, average support levels have roughly halved and now represent over 17% of the gross farm receipts (OECD, 2016).

Levels of support to farmers differ across the world. The indicator that can be used to compare levels of support farmers receive in different countries is Producer Support Estimate (PSE) developed by OECD. It expresses the annual value of gross receipts from consumers and taxpayers to agricultural producers. PSE is measured at the farm-gate level and arises from policy measures that support agriculture, regardless of their nature, impact on objectives they might have on farm production or income (OECD, 2009).

Figure 4 shows PSE by country in 2015. Within the OECD area, the support to farmers is falling, but the same cannot be said for emerging countries who experience growing support. Low support to farmers was given in Vietnam, New Zealand, Australia, Brazil, Chile and South Africa, who reported their PSE level below or around 3%. By contrast, high support to farmers was made in Switzerland, Norway, Iceland, Korea, and Japan, who received close to or above 50% of gross farm receipts from agricultural policies. Countries who had their PSE level between 10% and 17% (the OECD average level) were Ukraine, Mexico, Canada, United States, Israel, Colombia, and Kazakhstan. Lastly, countries who had their level above the OECD average and below 50% were the EU, Turkey, China, and Indonesia.

Figure 4: Producer Support Estimate by country, 2015 (in %)

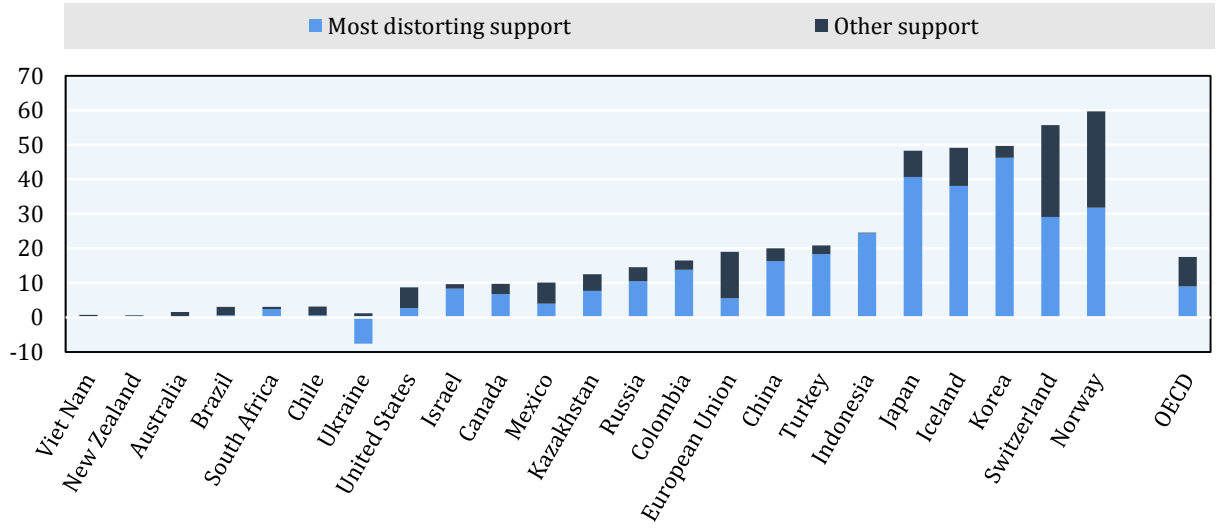


Source: OECD (2016)

As explained before, there are many different ways through which countries can give support to farmers. OECD analysis has shown that market price support, payments conditional on farmers being engaged in production (output), and payments based on unlimited input use have the greatest potential to distort agricultural production and trade.

The Figure 5 shows what share of farmers' income comes from measures that provide the most distorting support. It can be noted that Indonesia, Korea, Turkey, Israel, Japan, Colombia, and China deliver more than 80% of all farm support in the most distorting forms.

Figure 5: Composition of PSE by country, 2013-15



Source: OECD (2016)

For countries analyzed in the period 2013-15, market price support remained the most distorting instrument for production and trade, after which came payments based on output, and finally payments based on input use. Market price support reached more than 90% of the producer support estimate in Indonesia and Kina, payments based on output made almost one-third of PSE in Iceland, while payments based on inputs with constraints (such as those who achieve environmental protection objectives) provided more than 70% of PSE in Chile and Brazil. Payments per hectare area, animal amount or farmers' income are very popular in the EU and the US and account for above or close to 50% of PSE.

3.4 Analysis of protection across selected countries

This section describes an overview of agricultural policies around the world and their support in agriculture. The following four countries were chosen: the EU and the US, as the most important agri-food traders, New Zealand, a country with the lowest level of gross farm income resulting from agricultural policies, and Japan, a country with the highest support to agriculture. The data which describes the level of agricultural support was taken from the 2016 edition of the Agricultural Policy Monitoring and Evaluation report of OECD.

The EU has reduced agricultural support significantly since the 1990s. This was largely due to a decrease of PSE and introduction of payments that do not require production. However, PSE still has the largest share of support to agriculture accounting for more than 85% of Total Support Estimate (all gross transfers from taxpayers and consumers arising from policy measures which support agriculture). In addition, the EU's PSE level is slightly above the average OECD level, amounting to 19% of farm income. Market price support, payments based on output and input subsidies accounted for around one-third of total support to farmers. The introduction of payments that are not related to production volume allowed farmers to make decisions independently from the government in response to market fluctuations. However, payments that require production have increased in the period 2013-15. In particular, support for environmental farming practices grew in the last two years and accounted for around 30% of direct payments. Regarding trade liberalization, many bilateral agreements with non-EU countries were signed which improved market access for agricultural products.

The average support to farmers in the USA was approximately 9%, representing half of the OECD average in 2013-15. Payments based on output and input accounted for almost 50% of the support given to producers, and are 10% below the level of OECD average. The implementation of the 2014 Farm Act has brought down many direct payment schemes and has introduced insurance subsidies programs. Around 20% of support is distributed in the form of insurance, based on a difference between observed and pre-planting values of production, yield or revenue at the individual farm level.

New Zealand has completely abandoned its production and trade policies which support agricultural sector. The elimination of subsidy programs and the adoption of free trade policy was initiated in the mid-1980s with an objective to improve productivity and encourage the growth of the overall economy. For more than 25 years, New Zealand's PSE has been the lowest among OECD members. Very few of pre-existing agricultural production and trade distorting policies remain today. Due to free trade, most domestic prices are aligned with world market prices. Payment support is only provided for agricultural knowledge and information system, animal disease control and relief in the event of natural disasters (Agriculture and Horticulture Development Board, 2016).

Support to Japanese producers has decreased over the last 20 years, but it is still dominated by the most distorting production and trade policies. Around 48% of farm income came from agricultural policies and is three times bigger than the level of OECD average. Support through influencing market prices accounted for more than 80% of total support, while the remaining 20% were spent support for general agricultural services, particularly on the development and maintenance of infrastructure.

3.5 The Common Agricultural Policy

The Common Agricultural Policy (CAP) was born in 1962 following the creation of the European Economic Community (EEC). The process of agricultural policy integration in Europe started in the 1950s after the World War II had ended. At that time, the Europe was still recovering from the World War II and one of the most important challenges European governments were facing with were severe food shortages, insufficient supply of quality food, negative trade balance, a decrease in farmer's income and low agricultural

productivity. The CAP represents one of the most important and most expensive EU policies, as the EU for decades allocated the largest funds from the budget for its implementation. Since 1962 to date, the CAP has undergone significant reforms and changes.

3.5.1 Objectives of the CAP

The CAP was foreseen as a common policy for the first time following the signing of the Treaty of Rome in 1957 and the establishment of EEC in 1958. The main set of objectives to be worked out were specified by Article 39 of the Treaty (Daszkowska & Mudri, 2009):

- to increase agricultural productivity by improving the technical progress and by ensuring the rational development of agricultural products and the optimum utilization of factors of production, in particular, labor;
- to ensure a fair standard of living for the agricultural community, in particular by increasing the individual earnings of persons engaged in agriculture;
- to ensure the supply of agricultural products to consumers at reasonable prices.
- to improve economic aspects of agriculture
- to stabilize markets;
- to assure competitiveness on external markets

3.5.2 Principles of the CAP

At the conference in Stresa in 1958, three basic principles under which the CAP operates were set out: market unity, Community (Union) preferences, and common financial responsibility. Although these principles underwent several major reforms, they still represent the essential pillars of any common agricultural policy of the EU (Hackett, 1995).

Market Unity principle refers to the freedom of trade of agricultural products among all member countries. Similar to the principle of a common market for industrial goods, this implies that agricultural products can move throughout the EU without customs, quantitative or technical barriers. For the goods coming outside the EU, an external tariff is set. The single market includes common support instrument for all farmers in the EU. This implies common decision of agricultural prices throughout the EU, common rules of

competition, a unique system of subsidies, safety and health standards and trade policy towards third countries (Belgrade Chamber Of Commerce, 2014).

Community (Union) preferences principle refers to the creation of the market in which member states would import first from each other and only secondarily search elsewhere for supplies (Oudenaren, 2004). In this way, the principle provides the advantage in terms of protection of domestic producers and their agricultural products compared to imported products. The system also tends to preserve and protect the internal market from possible disorders that may be caused by excessive imports of low-priced agricultural products.

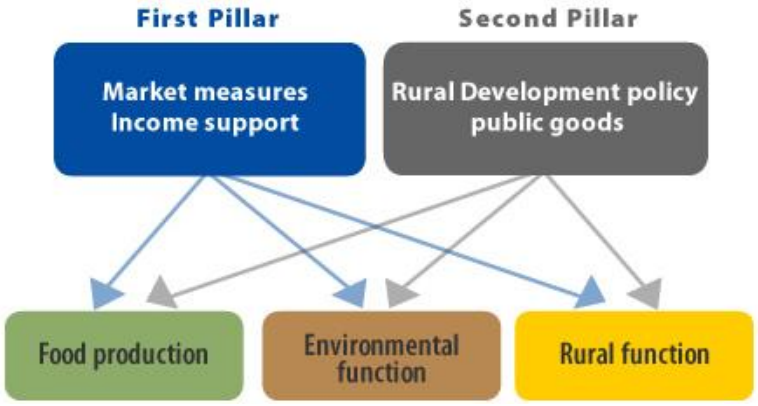
Financial Responsibility is related to the sharing of costs of the CAP. All costs for the implementation of the CAP are distributed among all member states, regardless of their share in financing. In other words, all common agricultural spending is defined through the EU budget (Oudenaren, 2004).

3.5.3 Main pillars of the CAP

Since the 1960s the CAP went through numerous reforms. The latest revision occurred in 2013 where for the first time the entire CAP was reviewed. The new CAP for the period 2014-20 maintains two pillars, as depicted in Figure 6:

- Direct subsidies to farmers and market measures (Pillar I)
- Rural development programs (Pillar II)

Figure 6: Main pillars of the CAP



Source: European Commision (2014)

The pillars together achieve the main aims of CAP, but they address different goals. The first pillar covers direct payments to farmers, while the second pillar deals with the multi-annual Rural Development Programmes (RDP). Both pillars are financed from the funds of the EU budget. Pillar I is financed by the European Agricultural Guarantee Fund (EAGF), whereas Pillar II is funded by the European Agricultural Fund for Rural Development (EARD). The total budget of the CAP for the period 2014-20 accounts for 408 billion euro (European Comission, 2016). 313 billion euro are reserved for policies under the Pillar I, while 95 billion euro finances the Pillar II. The share of the EU budget dedicated for CAP expenditures was reduced along the year. While the CAP represented 75% of the Community budget at the beginning of its implementation, for the period 2014-20 it accounts for around 38% of the total EU budget.

The aim of direct subsidies is to provide farmers a stable income. Direct financial assistance to farmers in the member countries comes from the EAGF funds. As of 2003, the scheme according to which farmers receive subsidy payments has changed. Before this change, farmers in the EU were paid in relation to the quantity of delivered agricultural products. After 2003 payments to farmers in the EU are made irrespective of the food type or amount produced. This modification of the way subsidies are given was done in order to provide long-term benefits for agriculture. This provides farmers revenue stability, easier adaption to market trends and greater freedom in choosing the products for production. To be eligible to receive direct payments, farmers in the EU must respect the principle of cross-compliance. The principle is based on two sets of rules (European Commission, 2015). The first group relates to regulations concerning the production of environmental protection, human health, plant and animal welfare, while the second group covers obligations of keeping land in good agricultural and environmental condition. Respect of cross-compliance of rules within the EU is strictly controlled and payments are reduced in case farmers do not comply with the requirements.

Rural development policy has the aim to develop EU's rural areas and improve the quality of life of people who live in those areas through enhancing economic, environmental and social aspects. Rural development policy is implemented to improve the following policy axes (European Commission, 2008):

- competitiveness of the agricultural and forestry sector;
- environmental protection and countryside;
- the quality of life in rural areas and diversification of the rural economy

The first axis tackles agricultural and forestry sectors and includes a vast number of measures that target human and physical capital in the agriculture, food and forestry sectors. The second axis focuses on the environment and the countryside by delivering measures that protect and enhance natural resources, but also preserve high-value farming, forestry systems, and cultural landscapes in rural areas of Europe. The third axis offers support in the development of local infrastructure and human capital, improves conditions for growth and job creation and diversifies economic activities in all sectors in rural areas (European Commission, 2014).

Chapter 4

Economy of Serbia

4.1 General information

Serbia, officially the Republic of Serbia is a country located in the Central and South-Eastern part of Europe with the population of 7 million people. The World Bank classifies Serbia as a developing upper middle-income country with a gross national income per capita of $5,820 per year. Table 2 shows main facts on Serbia.

Table 2: General information of Serbia

Indicator	
Region	Southern Europe
Total land area (excluding Kosovo*)	77,474 km^2
Density	92.8/km^2
Population	7,114,393
Capital	Belgrade
Currency	Serbian dinar (RSD)

The decade of 1990s Serbia was hit by economic decline and high inflation. War in Yugoslavia and economic sanctions were the main drivers of the economic turmoil. The first 5 years of the decade saw the disintegration of the Social Federal Republic of Yugoslavia shortly followed by a civil war. As a consequence of this, economic sanctions were introduced by

the United Nations (UN). During this period exports were stopped, while production of goods decreased, as well as national income and quality of life. In 1993 Serbia recorded the biggest hyperinflation. Abolishment of UN sanctions occurred in 1996, but this did not result in the recovery of Serbian economy as new political problems started to rise. Conflicts in Kosovo and Metohija (Kosovo*) between 1997 and 1999 resulted in NATO bombing campaign which caused significant damages to the infrastructure and the industry. This has led the economy to collapse where life standard was diminished and thousands of people lost their jobs. After political changes and democratization in 2000, Serbia started to re-establish macroeconomic stability by developing many economic and structural reforms.

4.2 Basic macroeconomic indicators

The main macroeconomic indicators of Serbia for the period from 2011 to 2015 are reported in Table 3.

Table 3: Key macroeconomic indicators in the period 2011-15

	2011	2012	2013	2014	2015
GDP (in million EUR)	33,424	31,683	34,263	33,319	32,908
Real GDP growth (in %)	1,4	-1,0	2,6	-1,8	0,74
Unemployment (in %)	23,0	23,9	22,1	19,5	17,9
Exports (in million EUR)	11,145	11,469	13,937	14,451	15,618
Imports (in million EUR)	16,487	16.992	17,782	18,096	18,899
Trade balance	-5,341	-5,523	-3,845	-3,645	-3,281
Current account balance (% of GDP)	-10,94	-11,59	-6,12	-5,96	-4,79
Consumer prices (in %)	7,0	12,2	2,2	1,7	1,5
RS budget surplus (in % of GDP)	-4,0	-5,9	-5,2	-6,3	-2,9
RS public debt, (in % of GDP)	45,4	56,2	59,6	70,4	75,6
Foreign exchange (RSD/EUR)	101,95	113,13	113,14	117,31	120,73

Source: National Bank of Serbia (2016)

In this period, the economy of Serbia suffered fall of most macroeconomic indicators. The first two years of the period were primarily characterized by a decrease in GDP and by an

increase of unemployment rate, trade deficit, public debt and inflation. In the mid-period macroeconomic indicators were stabilized, particularly in terms of GDP growth, reduction of the budget deficit and a significant drop in the inflation rate. The last two years of the period, on the one hand, were characterized by indicators with negative developments such as a decline in GDP growth and increase of budget deficit and public debt. On the contrary, positive trends were noted in increased foreign trade, reduced unemployment rate, and falling inflation.

After a considerable drop in GDP in 2009 when the global economic crisis also hit Serbia, the Serbian economy saw a slight recovery in 2011. This trend was halt by a recession in 2012, while in 2013 GDP grew significantly by 2.6%. However, yet another recession occurred in 2014, while in 2015 there was a mild GDP growth of 0.7%.

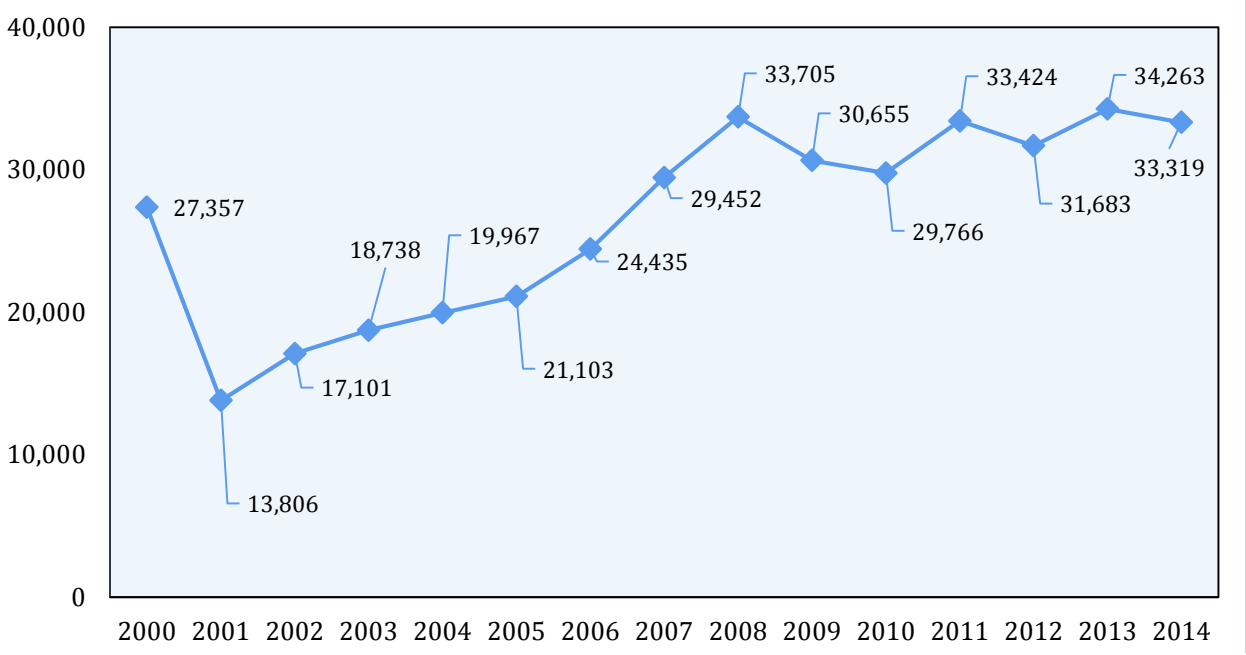
The imbalanced economic activity, measured in GDP trends, was followed by a constant increase of budget deficit in GDP (from -4% in 2011 to -6.3% in 2014). This situation improved somewhat in 2015, as the budget deficit decreased by 3.4% compared to previous year. In the same period, due to lack of resources to fund economic growth, Serbia suffered growing public debt in GDP, from 45% in 2011 to almost 76% in 2015.

Positive trends were perceived in the labor market, trade balance and inflation rate. After recording a peak of 24% in 2012, the level of unemployment fell to 18% in 2015 (reduction by 1.6% compared to the year before). Foreign trade balance recorded a further increase by around 6%, which is about 20% higher than the average rates for the period 2010-14. Despite the weakening of the national currency against the euro (of around 3%), inflationary trends were kept at a low level. In 2015, inflation was 1.5% which represents the lowest inflation rate in the last decade.

4.3 GDP and GDP growth

Since 2001, Serbia recorded slight growth in its gross domestic product (GDP). The Figure 7 shows that in the period 2001-2014 GDP in current prices increased 2.4 times, from almost 14 billion euro in 2001 to around 33 billion euro in 2014. The positive trend in the growing GDP came to a halt for 2008-09 when the global economic crisis started.

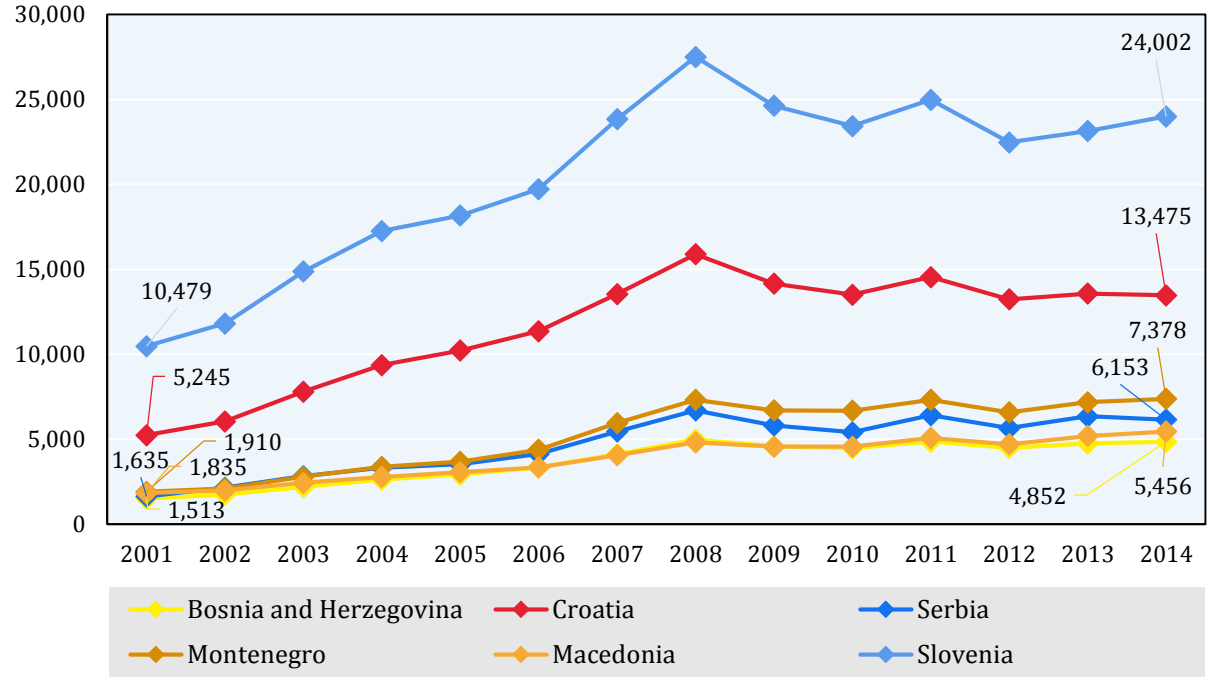
Figure 7: Gross domestic product (in million EUR)



Source: Statistical Office of the Republic of Serbia (2016)

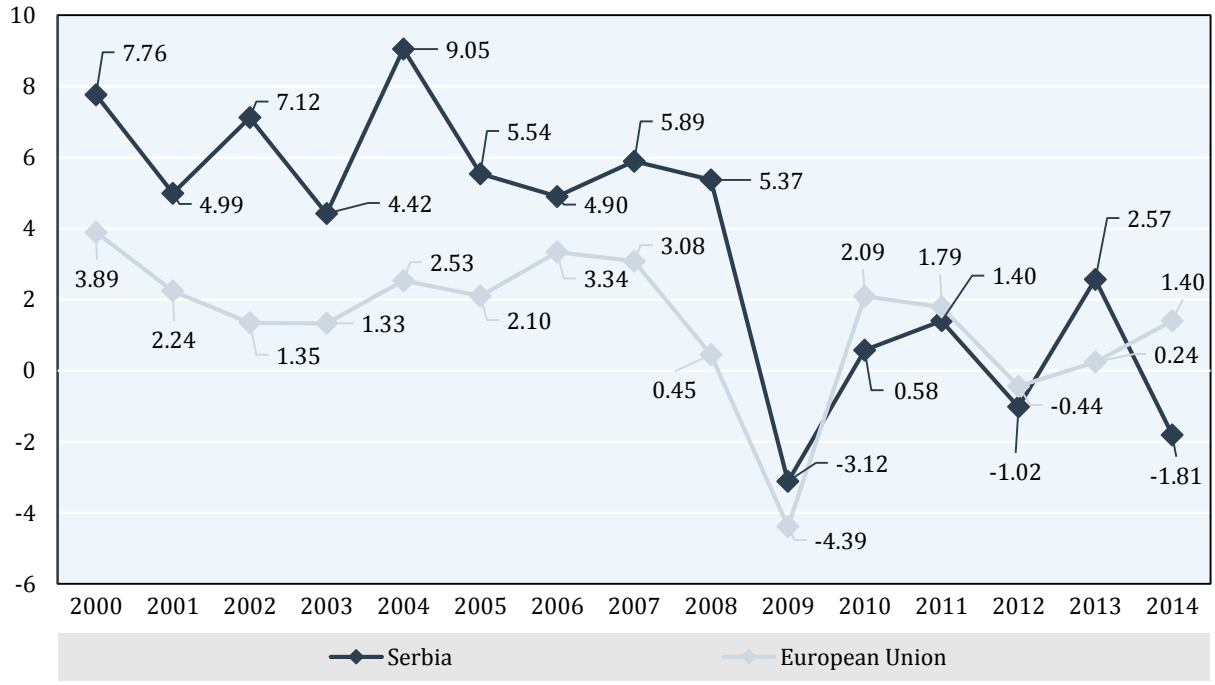
Figure 8 demonstrates that in the same period GDP per capita (current $US) increased 3.76 times, from 1,635 in 2001 to 6,153 to 2014. Compared to countries of ex-Yugoslavia, GDP per capita of Serbia is relatively low. From 2006 to 2014 Serbia had an average GDP per capita of about 5,790, which is below the average levels of countries like Slovenia and Croatia (with average GDP per capita of 23,750 and 13,670 respectively) which are both members of the EU. On average, GDP per capita of Slovenia and Croatia is four and two times larger, respectively, than the one of Serbia. For the same period, Montenegro recorded slightly higher average GDP per capita (6,613) than Serbia. Macedonia (4,645) and Bosnia and Herzegovina (4,495) were the only countries compared to which Serbia had higher GDP per capita.

Figure 8: GDP per capita of ex-Yugoslavia countries (current $US)



Source: The World Bank (2016)

Figure 9: GDP Growth Rate of Serbia and the EU (in %)



Source: SORS (2016) and Eurostat (2016)

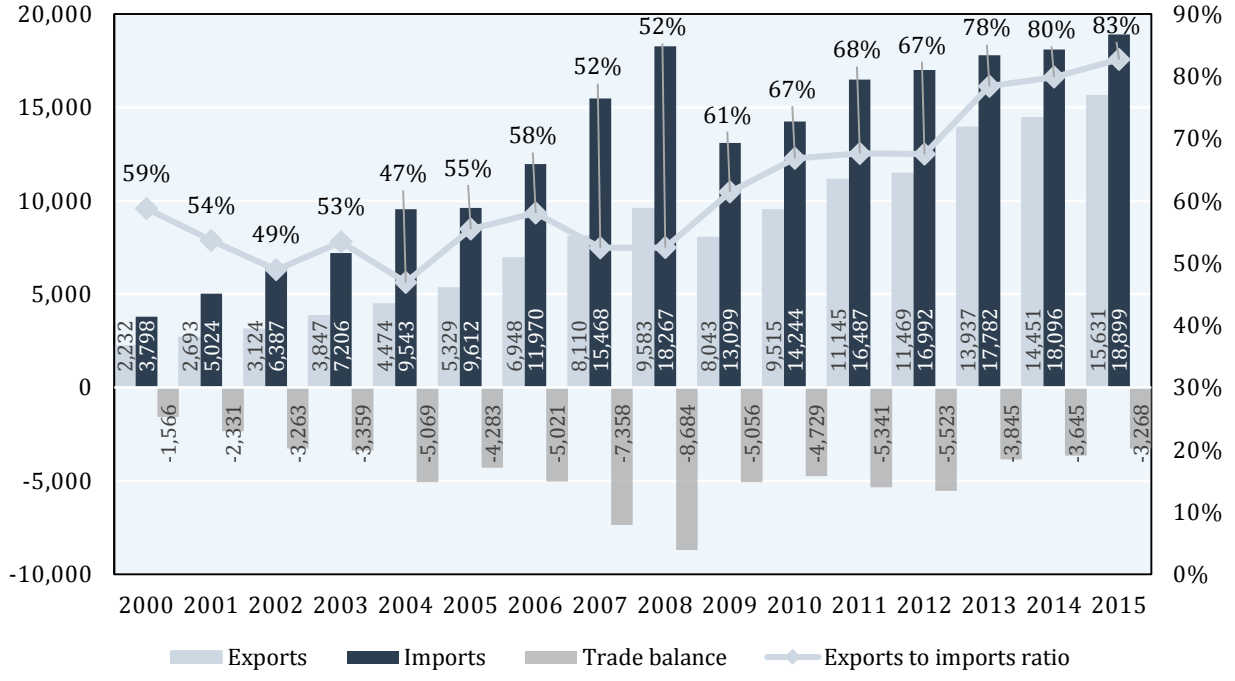
Figure 9 shows annual GDP growth rates of Serbia oscillated between -3 and around 8 percent per year. The peak of GDP growth rate occurred in 2000, while the worst level was

recorded at the end of 2009 in the year of the global economic crisis. In recent years, Serbian economy had seen negative GDP growth rate two more times – in 2012 and 2014. Serbian GDP growth is slightly lower in comparison with the one of the EU. According to the World Bank's projections for the year of 2016, Serbian economic growth is expected to rise to 1.5%, but it represents the slowest growth among six South Eastern European (SEE) countries (The World Bank, 2015).

4.4 Trade overview

From 2000 up to 2009, exports of goods and services from Serbia have been rising with the annual average growth rate of 20%. However, when the world economic crisis occurred in the period 2008-2009 the value of exports shrank by 16% with respect to the previous year. Observing the whole period between 2000 and 2015, exports from Serbia increased by seven times and have grown from 2.2 to 15.3 billion euro.

Figure 10: Imports and exports of goods and services (in million EUR)



Source: Author's calculation based on the data from SORS (2016)

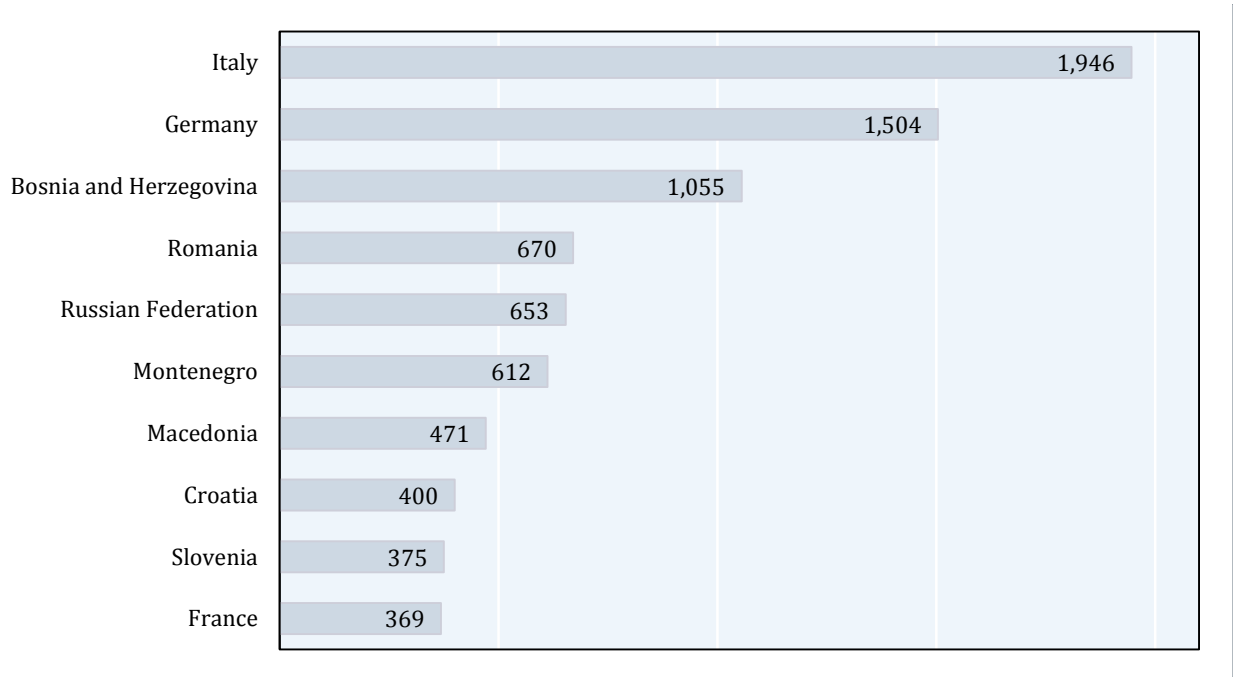
Imports of goods and services to Serbia were following the similar growth pattern. Looking at the graph, one can notice two ambiguous situations. In 2005, Serbia recorded growth of only 1%, while in 2009 imports shrank by 28% compared to previous year. In the period up

to 2009, the annual average growth rate of imports was 12%. Looking at the whole period 2000-2015, the value of imports increased by five times from 3.8 to 18.9 billion euro.

As Figure 10 suggests in 2015 Serbia has reached a peak in the value of imported and exported products and services. Growing trend of both imports and exports resulted in increased coverage of imports by exports, as exports to imports ratio rose from 59% in 2000 to 83% in 2015.

Regarding trade balance, since 2000 trade deficit of Serbia has been growing and reached its peak in 2008. However, in recent years trade deficit has decreased thanks to the greater increase in exports than imports. Indeed, the trade deficit has fallen by 62% since 2008, but it is still two times larger in absolute terms compared to the year of 2000.

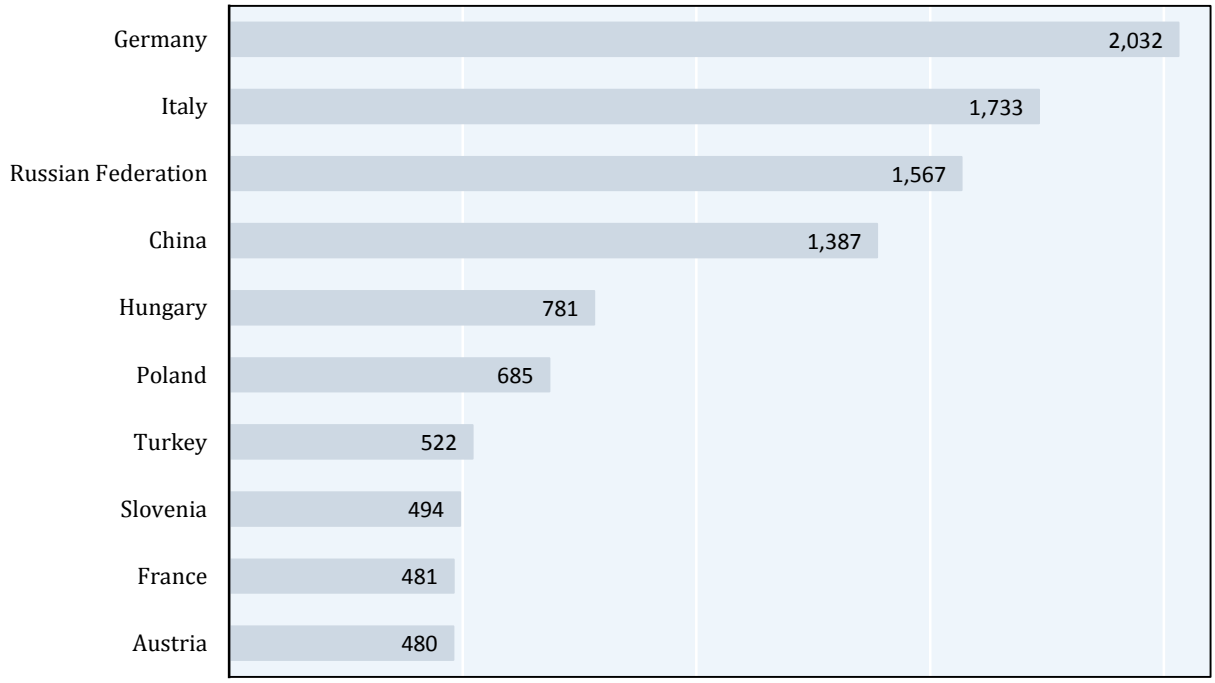
Figure 11: Serbia's major export partners in 2015 (in million EUR)



Source: Author's calculation based on data from SORS (2016)

Figures 11 and 12 show Serbia's major export and import partners. The EU continued to be Serbia's biggest partner in trade, representing over half of foreign trade, followed by the CEFTA member countries.

Figure 12: Serbia's major import partners in 2015 (in million EUR)



Source: Author's calculation based on data from SORS (2016)

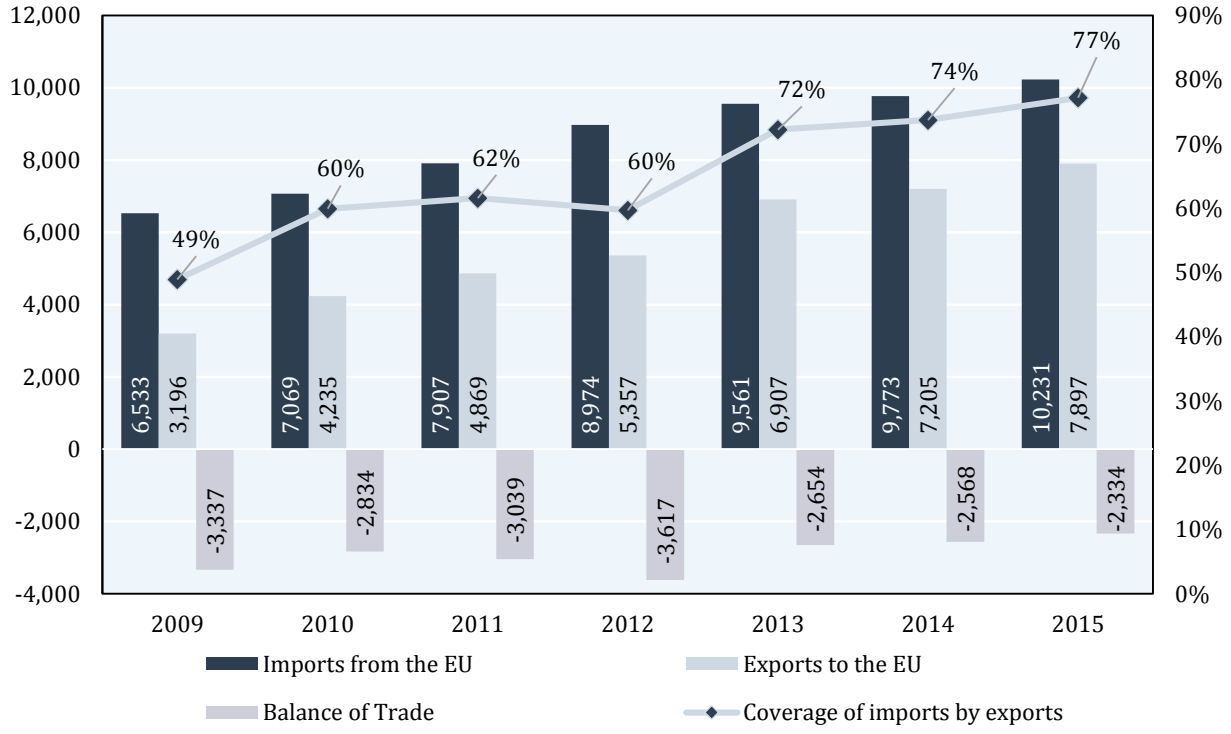
Serbia`s major export destinations in 2015 were: Italy (16.2% of total exports), Germany (12.5%), Bosnia and Herzegovina (8.8%), Romania (5.6%), the Russian Federation (5.4%), Montenegro (5.1%), Macedonia (3.9%), Croatia (3.3%), Slovenia (3.1%), and France (3.1%).

The largest share of imports in 2015 came from Germany (12.4% of total imports), Italy (10.6%), the Russian Federation (9.6%), China (8.5%), Hungary (4.8%), Poland (4.2%), Turkey (3.2%), Slovenia (3%), France (2.9%), and Austria (2.9%).

The EU member states are traditionally the most important trade partners of Serbia, as more than 60% of Serbian overall foreign trade is done with the EU. As the Figure 13 suggests, the trade between EU and Serbia is increasing both in exports and imports. In 2015, the total trade between Serbia and the EU accounted for over 65% of Serbia's total exports and over 62% of Serbia's total imports. Over the years, the total trade volume with the EU increased by 51%, from 9.7 billion euro in 2009 to 18.1 billion euro in 2015. The value of Serbian exports and imports to and from the EU market have experienced constant growth as well. In the period of 2009-15, exports more than doubled and grew by 147%, from 3.2 billion euro in 2009 to 7.9 billion euro in 2015. At the same time, imports recorded growth of 57%,

from 6.3 billion euro in 2009 to 10.2 billion euro in 2015. This phenomenon led to a faster growth of Serbian exports to the EU over imports from the EU. Furthermore, it can be noted that constant growth in exporting to the EU has resulted in increased coverage of imports by exports, as exports to imports ratio rose from 49% in 2009 to over 77% in 2015. Finally, the trend of faster growth in exports than imports contributed to better trade balance of Serbia with the EU. As of 2009, Serbia has managed to reduce its trade deficit with the EU by 30%.

Figure 13: Serbia-EU total trade (in million EUR)



Source: Author's calculation based on data from SORS (2016)

4.5 Trade agreements

Regarding imports and exports, Serbia is the duty-free market for about a billion people. Serbia has in total eight agreements in which the customs-free regime is established with some exceptions in tariffs and annual quotas for a limited number of products. Overview of the markets covered by trade agreements, their type and entry into force are provided in Table 4.

Table 4: Trade Agreements of Serbia

Market	Type of agreement	Entry Into Force
European Union	Free Trade Agreement	January 2009
Russia	Free Trade Agreement	August 2000
Belarus	Free Trade Agreement	March 2009
Kazakhstan	Free Trade Agreement	January 2011
Turkey	Free Trade Agreement	January 2010
CEFTA	Free Trade Agreement	July 2007
EFTA	Free Trade Agreement	October 2010 for Liechtenstein and Switzerland; June 2011 for Norway; October 2011 for Iceland
United States	Generalized System of Preferences	2005

Source: RAS Development Agency of Serbia

Trade with the EU is pursued under Stabilization and Association Agreement (SAA) signed in 2008. The agreement sets mutual obligation relations between Serbia and the EU and precisely defines rights and requirements of both parties. By signing this agreement, Serbia became an associated country of the EU. The two most important obligations that Serbia undertakes are related to the creation of a free trade zone and harmonization of Serbian legislation with the EU standards. Under this agreement, Serbia obliged to gradual abolition of customs duties on goods originating from the EU in the period of six years. Most of the imported duties were phased out fully by 2014 when the final year of the trade liberalization schedule specified by the SAA was reached. However, some agricultural products will remain protected until Serbia's accession to the EU. On the other hand, the EU confirmed free access for goods coming from Serbia into the EU market, the regime that was unilaterally granted by the EU in 2000 with the application of Autonomous Trade Measures. This meant that the EU had abolished all customs duties and quantitative restrictions on imports of all agricultural and industrial products, aside from few exceptions for products of agricultural industry.

Serbia has been a member of Central European Free Trade Agreement (CEFTA) since 2006. This multilateral agreement replaced a set of bilateral agreements made before and

established duty-free trade among member countries with the objective of promoting and expanding trade for all products. Under CEFTA, trade of agricultural and food products is fully liberalized. Besides Serbia, countries included in CEFTA are Macedonia, Montenegro, Bosnia and Herzegovina, Albania, Moldova, and Kosovo*.

A free trade agreement between Serbia and the Russian Federation was signed in 2000 to deepen and improve mutual trade-economic cooperation. Serbia is the only country in Europe, aside members of the Commonwealth of Independent States (CIS), which has signed a FTA with Russia. The agreement stipulates that goods of Serbian origin (which have at least 51% value added in the country), are customs duties free when imported for the Russian market unless they are exempted from the free trade regime. The agreement is one of the main advantages of Serbia in attracting foreign investment, given that no other country in the world, except former Soviet Republics and CIS, have established free trade with Russia.

Serbia has also made FTAs with the European Free Trade Association (EFTA), Turkey, Belarus, and Kazakhstan. Serbia is also a beneficiary of USA's Generalized System of Preferences (GSP).

Trade between Serbia and EFTA member countries (Switzerland, Norway, Iceland, and Liechtenstein) is regulated by the agreement signed in 2009, under which industrial products exported from Serbia are duty-free, with very limited number of exceptions. Imports of industrial products were gradually abolished by 2014. Regarding trade of agricultural products, separate agreements with each EFTA member were made bilaterally in order to allow reciprocity on main agricultural products.

The FTA between Serbia and Turkey from 2009 is similar to the one implemented with the EU with a model of asymmetric liberalization of trade in favor of Serbia. Industrial products exported from Serbia to Turkey are exempted from paying customs duties. Customs duties for imports of industrial products into Serbia were gradually abolished over a six-year period, which ended in 2015. For what concerns agricultural products, only fish products, and products of plant origin are fully liberalized. The trade of products of animal origin is not exempted from paying customs duties.

The FTAs with Belarus and Kazakhstan were signed with the goal of improving trade with recently formed Eurasian Customs Union (EAEU). The free trade agreement with Belarus was signed in 2009. According to the agreement, total trade is fully liberalized, and concessions on agricultural products are fully reciprocal. The following agri-food products exempt from the free trade regime are alcoholic drinks, cigarettes, and sugar. The free trade agreement with Kazakhstan was signed in 2011 according to which agricultural products are fully liberalized, except alcoholic drinks, cheese, white sugar, rakija, and cigarettes.

Trade with the United States (US) is regulated through Generalized System of Preferences (GSP). This regime allows selected agricultural and primary industrial products from Serbia to enjoy preferential duty-free access to US market.

4.6 Accession of Serbia to the European Union

4.6.1 History of accession process

The first negotiations towards integration between Serbia and the EU began in 1999, when the EU developed the new Stabilization and Association Process (SAP) for five countries of South-Eastern Europe, where Serbia, as one of the two federal units of Federal Republic of Yugoslavia (FR Yugoslavia), was included. In November 2000 at the Zagreb Summit of EU and West Balkan Countries FR Yugoslavia was formally included into SAP and the EU informed officially all SAP countries that they are potential candidates for the EU membership. Following the signing of SAP, Serbia started receiving benefits from the application of Autonomous Trade Preferences in which the EU abolished all customs duties and quantitative restrictions on all industrial and agricultural products.

In 2003, FR Yugoslavia was reconstituted into the State Union of Serbia and Montenegro (SCG). At the same year, at Thessaloniki Summit, the European Council confirmed the European future for the SAP countries. As of October 2005, the negotiations for the SAA were launched. In the year of 2006, the negotiations were stalled due to the lack of Serbia's cooperation with the International Criminal Tribunal for the former Yugoslavia (ICTY). In the same year, Montenegro declared its independence from Serbia by referendum.

In the context of European integration, years of 2007 and 2008 were important for Serbia. Following the commitments of Serbia to achieve full cooperation with ICTY, negotiations for SAA were resumed in 2007, and by the end of the year, the agreement was initialed. As of January 2008, the visa facilitation and readmission agreements with the EU entered into force. In April 2008 in Luxembourg, the SAA agreement between the EU and Serbia was signed. On the same date, the Interim Trade Agreement and Trade-related matters (Interim Trade Agreement) was signed, with the decision of Serbia to unilaterally implement the agreement from the next year.

By the end of 2009, Serbia submitted its application for the EU membership. During 2010, The Interim Trade Agreement was established bilaterally by both sides, and the ratification of the SAA between the EU and Serbia was initiated. In 2011, the European Parliament completed the ratification of the agreement.

The next major steps towards EU membership occurred in 2012 when the European Council approved Serbia membership candidate status. During 2013, the first report on Serbia's progress in the EU integration was made, and the EC gave the green light for the start of accession talks with Serbia. In the same year, the ratification of the SAA agreement by all European members was completed and SAA entered into force.

The formal start of Serbia's negotiations to join the EU occurred in 2014. In the same year, all EU acquis screenings were completed and the EC recommended the opening of accession chapters for Serbia. In December 2015 Serbia opened the first two chapters, Chapter 32 (financial control), and 35 (the normalization of relations with Kosovo*). In June 2016 Serbia opened chapters 23 (judiciary and fundamental rights) and 24 (justice, freedom, and security). It is expected that two new chapters will be opened by the end of 2016.

Table 5 summarizes key dates of Serbian path towards the EU membership.

Table 5: Key dates in Serbia's path towards the EU

Date	Topic
October 2000	Serbia moves towards democracy
December 2000	The EU removes tariffs on imported goods from Federal Republic of Yugoslavia (FRY)
February 2002	FRY is transformed into the state union of Serbia and Montenegro (SCG)
May 2006	Montenegro announces independence from SCG
April 2008	The SAA and the Interim Trade Agreement between the EU and Serbia was signed
January 2009	Serbia initiates the unilateral implementation of the ITA
December 2009	The EU initiates the implementation of the ITA. Serbia applies for the EU membership
February 2010	The ITA between the EU and Serbia came into force
January 2011	The European Parliament ratified the SAA between the EU and Serbia
March 2012	The European Council grants Serbia membership candidate status
July 2013	SAA entered into force, while the ITA was put out of force
January 2014	Formal start of Serbia's negotiations to join the EU
December 2015	Opening of chapters 32 (financial control), and 35 (normalization of relations with Kosovo*)
June 2016	Opening of chapters 23 (judiciary and fundamental rights) and 24 (justice, freedom, and security)

4.6.2 Public opinion of Serbian citizens towards EU integration

Periodical surveys in the period between 2009 and 2015 conducted on behalf of the International Republican Institute by IPSOS Strategic Marketing show that the support from citizens of Serbia for the EU integration is declining (International Republican Institute, 2015).

In 2009, when Serbia submitted its application for the EU membership, 76% of Serbs said that they support the Serbia's accession to the EU. However, this number has fallen significantly over the last few years, and in 2015 it accounted for 49% of Serbs who supported the membership in the EU. Similarly, in 2009 only 19% of respondents expressed negative view towards the EU integration, while in 2015 the fraction increased to 44% of

those surveyed. Simulating the referendum question about Serbia's membership in the EU, 44% said they would vote on the admission in the EU, while 50% expressed a vote against membership or would refrain their vote. Compared to the survey in 2011, positive votes for the membership declined by 20%. Consequently, votes against membership increased from 17 to 32%.

Explaining the euro-skepticism phenomenon, 35% said they do not believe in values EU integration brings, while 32% believed EU membership would not bring any good after the economic turmoil experience of Spain and Greece. Furthermore, 20% of Serbs were negative towards EU integration because of constant EU conditioning on Serbia's further progress. Finally, 51% of respondents associated the EU with being costly, while 41% thought the membership to EU would bring loss of sovereignty and independence. Furthermore, the evidence shows that Serbs remain unsure about benefits expected from accession to the EU. 45% of respondents said they do not see any advantages of the EU accession, while only 12% of respondents thought their life will be positively affected by membership.

Chapter 5

Agriculture in Serbia

5.1 Importance of the food and agricultural sector

Agricultural and food sector plays a major role in the Serbian economy. Although it has been decreasing from the start of the transition period, the share of agriculture in total GDP remains very high compared to the EU countries average, and in the last five years, it has been relatively stable with an average of around 8%. In 2015, it remained at 7% and was approximately at the same level as in the previous year. The agriculture share in the Gross Value Added (GVA) was high as well, and it amounted to 11% in 2013. Such large agriculture shares in both GDP and GVA can be explained as a result of rich agricultural resources, favorable climate factors, but also by the slower economic growth in other industries.

The share of agriculture in total employment is very high and accounts for about 20% of the total nation's workforce. However, in the last five years, employment in food and agricultural sector is decreasing regarding the number of people employed. Nevertheless, the share of the workforce in agriculture is very high compared to the average level of the EU (8.3%). It is also larger when compared to the average level of relatively new EU member countries (Romania, Bulgaria, Slovakia, Hungary) that have 12% of employed citizens in the agricultural sector (Tankosić & Stojsavljević, 2014).

Food and agricultural products play a significant part in total foreign trade of Serbia, as agricultural sector is the only sector with a positive foreign trade balance. Participation of agri-food products in the country's total exports has been stable in the recent years, with the

average share of 22%. The share of export of these commodities in the total export was highest in 2012, when it amounted to a rate of 24%, whereas in 2013 was lowest with 19%. Over the same period, the share of agricultural products in total imports was around 8%. In this sense, it can be concluded that the agricultural and food sector remains the engine for development of rural areas with a high coverage of imports by exports.

Table 6: Agriculture share in Serbia's GDP, GVA, employment and foreign trade

Indicator	2011	2012	2013	2014	2015
Share in total GDP (%)	9,0	7,5	7,9	7,7	7,0
Share in total GVA (%)	10,5	9,7	11,4	-	-
Share in total employment (%)	21,2	21,0	21,3	20,0	19,5
Share in total exports of goods (%)	22,9	24,2	19,2	20,7	21,4
Share in total imports of goods (%)	7,0	7,8	7,6	8,0	8,2
Trade balance (%)	12,9	13,9	12,4	13,3	13,8

Source: Serbia Ministry of Agriculture and Environmental Protection (MoAEP), 2015

5.2 Land use and farm structure

According to the results of the Census of Agriculture 2012, agricultural land in Serbia covers the total area of 3,861,477 hectares, which corresponds to nearly 50% of the territory of Serbia. Table 7 shows data on total, used and unused agricultural land.

Table 7: Used and unused agricultural land in Serbia

	Land area (in hectares)	Land share (in %)	Share of territory of Serbia (in %)
Used	3,437,423	89	44,3
Unused	424,054	11	5,5
Total	3,861,477	100	49,8

Source: Author's calculation based on the data from Census of Agriculture (2012)

The total of 3,437,423 hectares represents agricultural land currently being used, equivalent to about 44% of the territory of Serbia. On the other hand, 11% of the total agricultural land is not used, corresponding to 424,054 hectares. In the EU-28 the utilized agricultural land accounts for almost 175 million hectares and makes 40% of the total land area. Although in

absolute terms used agricultural land in EU-28 (on average 6.2 million hectares per country) is two times larger than in Serbia (3.4 million hectares), the percentage of the total land area in Serbia (44%) is bigger than EU-28 (40%) by around 4%.

Both used and unused agricultural land is not uniformly spread across the country. There are four agricultural regions in Serbia: Vojvodina (located in the northern part of the country), Šumadija and Western Serbia, South and Eastern Serbia, and the region around Belgrade.

Table 8 shows differences between used and unused agricultural land among different regions of Serbia. The region of Šumadija and Western Serbia has the highest percentage of used agricultural land, followed by the Southern and Eastern Serbia, Vojvodina and the Belgrade region. On the other hand, areas in the southern and eastern part of Serbia have the highest percentage of unused agricultural land (nearly 47%), while the lowest percentage of unused land is in the Belgrade region (3%).

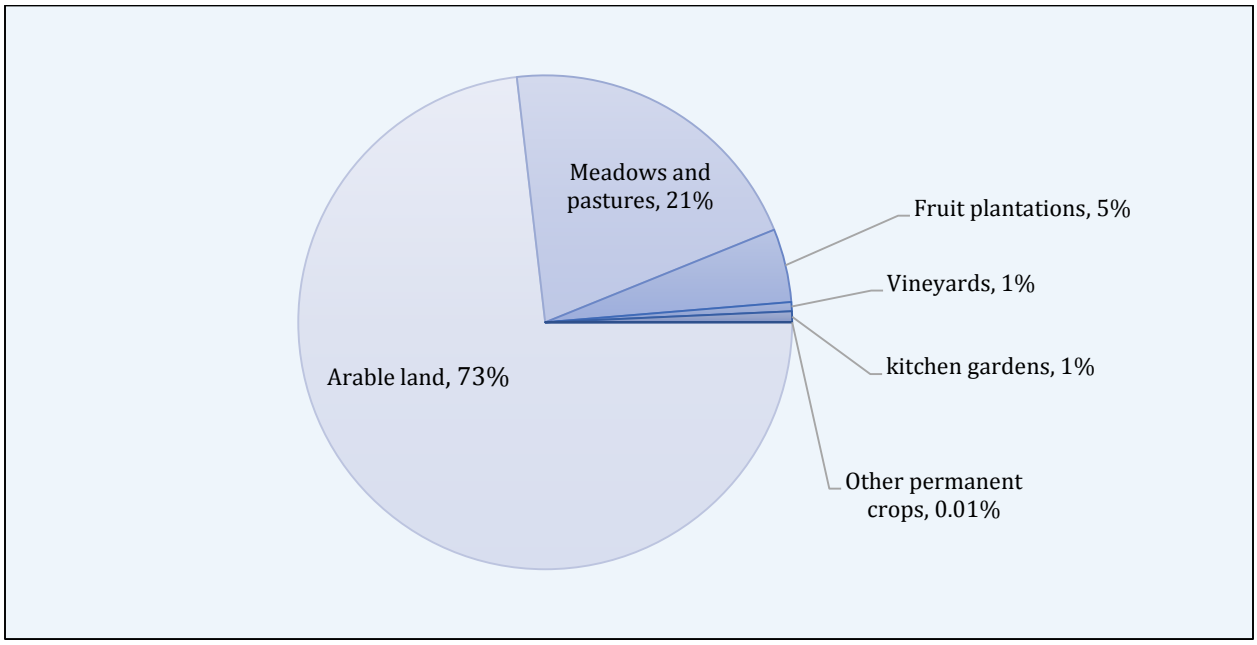
Table 8: Used and unused agricultural land across main regions in Serbia

Region	Used	Unused	Total
Vojvodina	1,608,896	72,313	1,681,209
Belgrade region	136,389	12,076	148,465
Šumadija and Western Serbia	1,014,210	141,220	1,155,430
South and Eastern Serbia	677,928	198,445	876,373
Total	3,437,423	424,054	3,861,477

Source: Author's calculation based on the data from Census of Agriculture (2012)

Utilized agricultural area accounted for over two-fifths (44.3%) of the total land area of Serbia in 2012. Figure 14 shows the structure of utilized agricultural area (UAA). Around 73% of the total agricultural land, equivalent to 2.5 million hectares, is composed of arable land whereas the share in the EU-28 is approximately 60%. Meadows and pastures and fruit plantations account for about 21% and 5% of the total agricultural land, amounting to around 712 and 165 thousand hectares respectively, while they amount in the EU-28 for 34%. No more than 2% of total agricultural land accounts for vineyards, kitchen gardens and other permanent crops, which is three times lower than EU-28's share.

Figure 14: Structure of utilized agricultural area (UAA) in Serbia



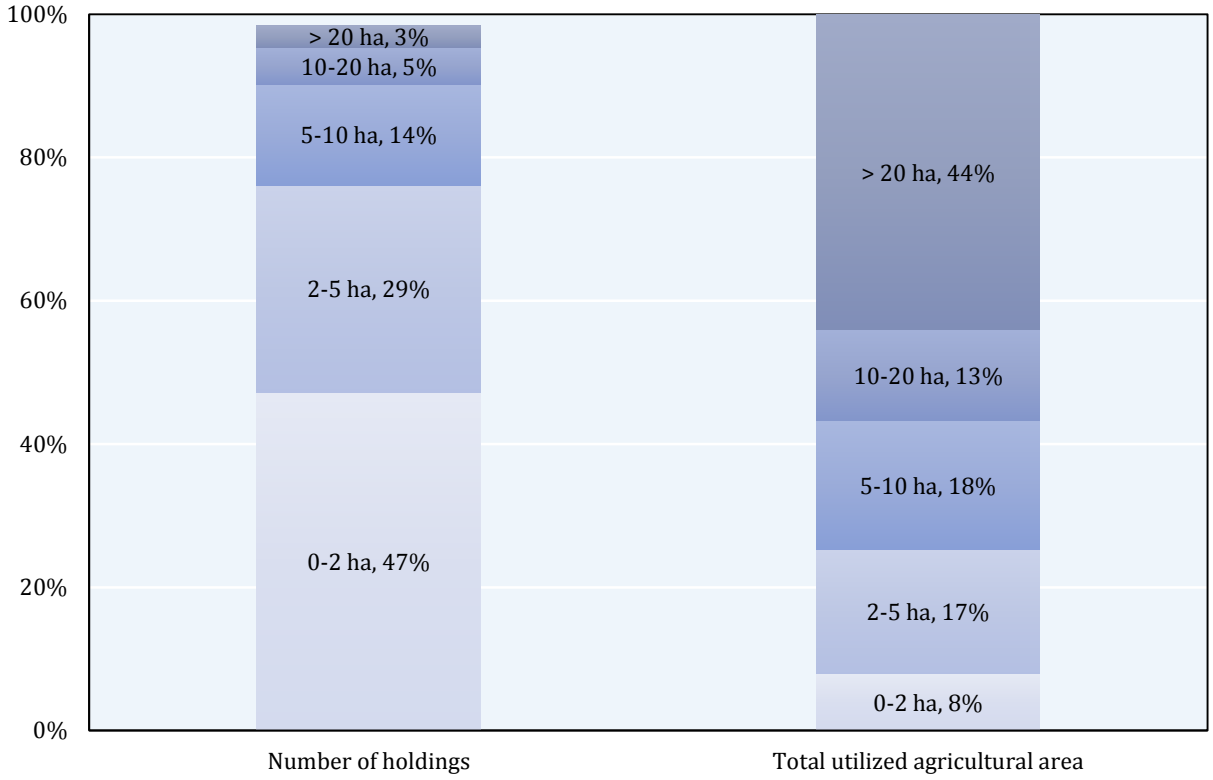
Source: Author's calculation based on the data from Census of Agriculture (2012)

In Serbia there are in total 631,552 agricultural holdings, working 3.4 million hectares of land (UAA) or approximately 44% of the total land area of Serbia. The average size of agricultural holdings is around 5.4 hectares, which is three times lower than EU-28's average size (16.1 hectares). Figure 15 shows the structure of farm holdings with respect to a number of farms and size of UAA.

The left side of the figure demonstrates the prevalence of small farms. Of the total number of holdings, farms up to 2 hectares and farms between 2 and 5 hectares are the most frequent, and together they make up around 76% of the total number of holdings. Around 14% is represented by farms within the range of 5 to 10 hectares. Lastly, only 8% of farms have the size of more than 10 hectares.

The right side of the figure shows that holdings above 10 hectares occupy 57% of agricultural land that is available for use. Holdings between 5 and 10 hectares use 18% of utilized agricultural area. Finally, small farms up to 5 hectares represent one-fourth of all the cultivated land.

Figure 15: Structure of agricultural holdings in terms of number and UAA

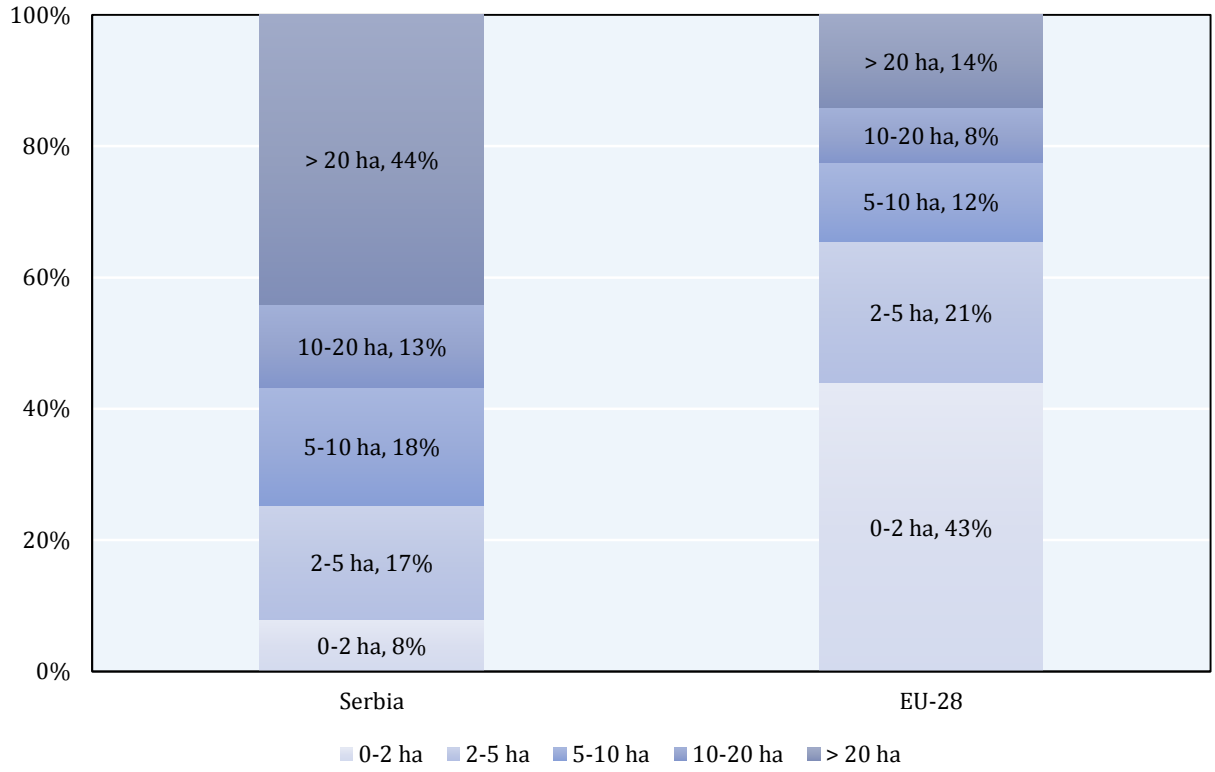


Source: Author's calculation based on the data from Census of Agriculture (2012)

Figure 16 shows holding structure by utilized agricultural land in Serbia and EU-28. It can be noted that there are severe contrasts in the farm structure between Serbia and EU-28. The most notable differences are in the number of small and large farms. On the one hand, in Serbia, there is a vast number of farms over 20 hectares (44%), while they account in EU-28 for only about 14% of UAA. On the other hand, a very small number of small farms is present in Serbia (8%), whereas in EU-28 small farms account for close to half of all holdings (43%). For holdings within a range from 2 to 20 hectares the percentage of holdings is higher by 7% in Serbia than in EU-28 (48% compared to 41%).

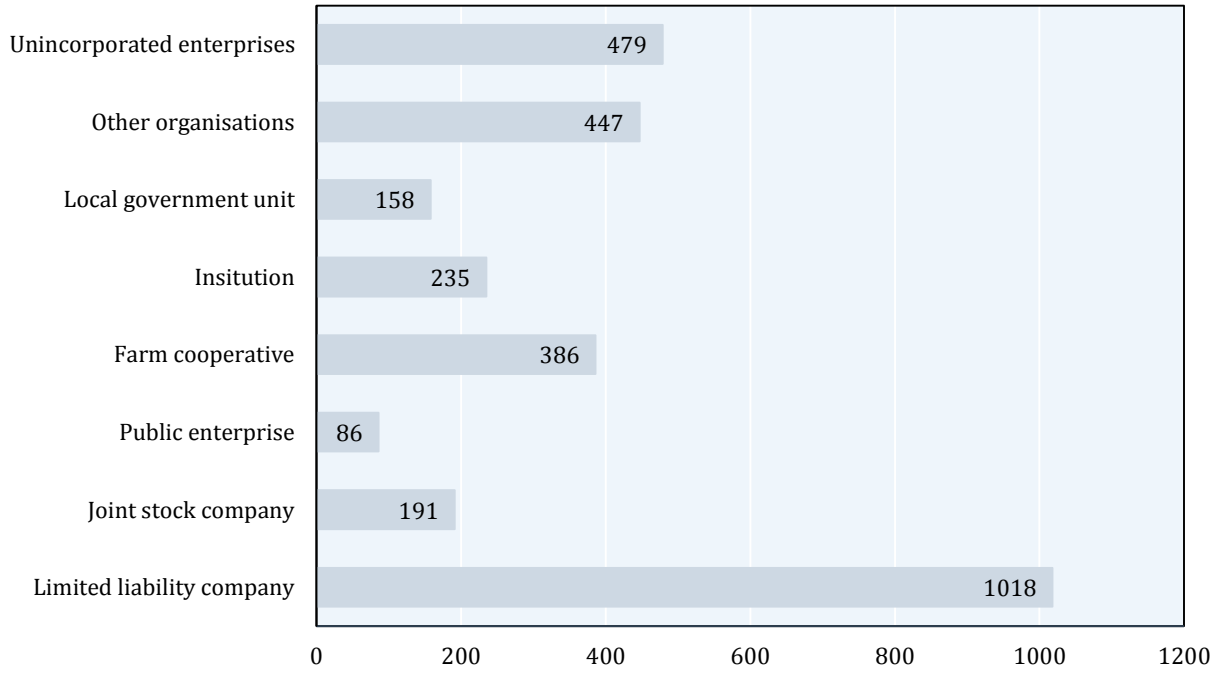
Of the total number of holdings in Serbia, 99.5% are privately-owned, where the holder is either a single natural person or the family. Remaining 0.5% (in total 3,000 farms), are holdings of legal entities and unincorporated enterprises. Figure 17 shows holdings of legal entities by legal form. It can be seen that 34% of all legal holdings are limited liability companies, followed by unincorporated enterprises with a share of 16%, and other organizations with a share of 15%.

Figure 16: Size of holding in hectares of UAA in Serbia and EU-28



Source: Author's calculation based on the data of Census of Agriculture (2012) and Eurostat (2015)

Figure 17: Holdings of legal entities by legal form



Source: Author's calculation based on the data of Census of Agriculture (2012)

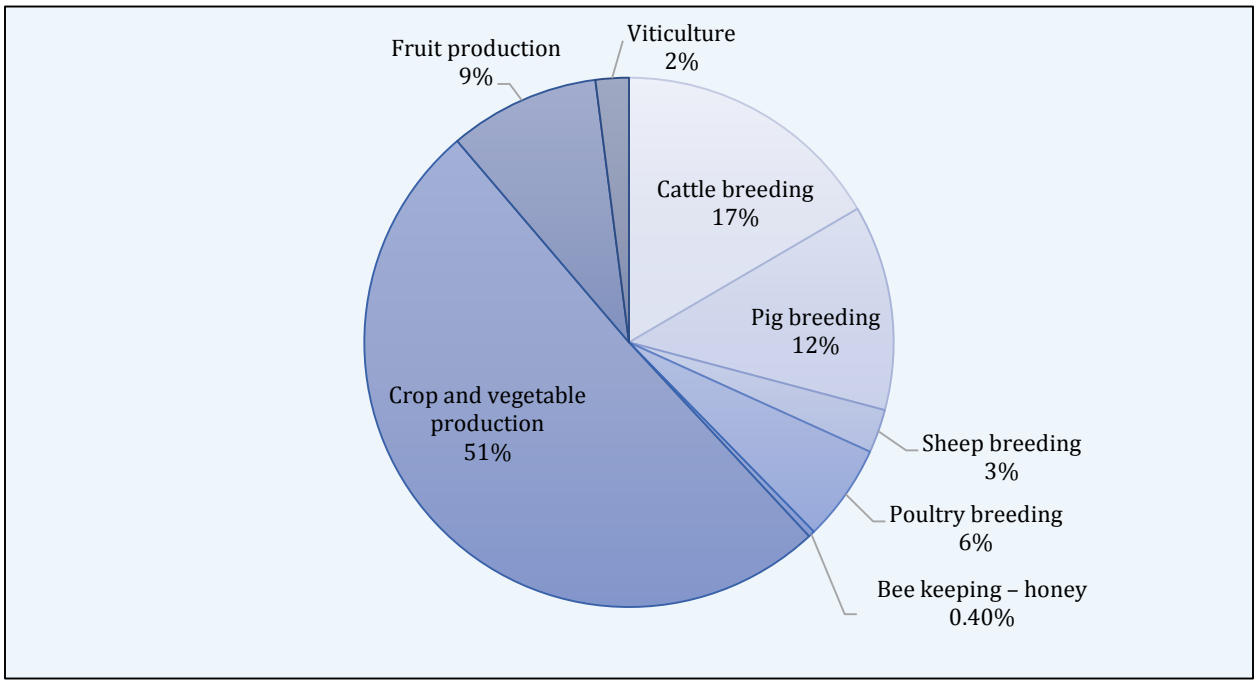
5.3 Agricultural production and labor force

The structure of agricultural production in Serbia in 2012 (shown in Figure 18) was made of plant and livestock production which contributed with 67% and 33% to the total agricultural production respectively.

The value of plant production has been run by crop and vegetable production, accounting for almost half of total agricultural production (51%). The structure of crop and vegetable production was dominated by cereal production who make 28% of the total value of agricultural production, followed by vegetables (10%) and industrial crops (9%). The share of forage crops is smaller and was around 4% of total agricultural production.

In the field of livestock production, cattle breeding had the highest share in the total value of agricultural production (17%) and is followed by pig breeding, which made up 12% of total agricultural production. Fruit production and viticulture accounted for another 11%, while poultry breeding and sheep breeding constituted 6% and 3% of the value of overall agricultural production respectively. Lastly, beekeeping played minor role accounting for 0.4% of the total agricultural production.

Figure 18: Structure of agricultural production value in Serbia (%), 2012



Source: Author's calculation based on the data of Census of Agriculture (2012)

The total farm labor force in Serbia was around 1.4 million in 2012, which equals some 20% of the total active population of Serbia. The share of agriculture workforce is reasonably higher than EU-28, where around 22 million people were employed in agriculture, forestry and fishing activities and represented approximately 5% of total labor force in 2013. Compared with individual EU-28 countries, the percentage of the agricultural labor force in Serbia was the same as in Poland (20%) and higher compared to countries coming after Poland with the largest agricultural workforce: Romania (around 16%), Italy and Spain (approximately 9% each).

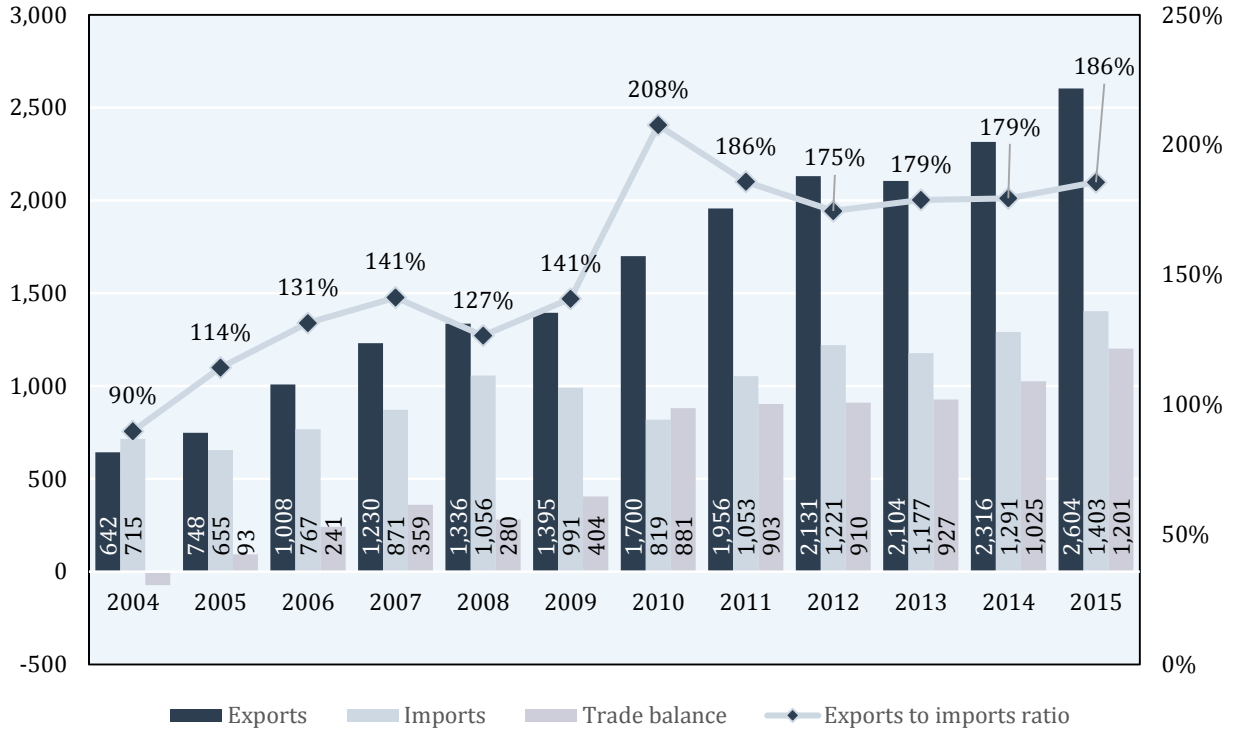
Farming in Serbia is mainly considered as a family activity as 98% of employed people in agriculture consist of the family labor force, of which 43% are farm owners and 55% are members the holder's family. The remaining 2% of total labor force is employed permanently on agricultural holdings. In EU-28, the share of family labor force made 91% of total agricultural labor force, slightly lower than in Serbia.

The total number of annual work units (equivalent to persons working on an agricultural holding on a full-time basis throughout the year) in Serbia was 646,283 in 2012, whereas in EU-28 was 9.5 million. The number of annual work units per holding (calculated by dividing annual work units by a number of holdings) in Serbia is 1.02, while in EU-28 is 0.88. This index is an indicator of labor productivity in agriculture. A person employed full-time in EU-28 works 18.3 hectares of farmland, or around 3.5 times smaller than in Serbia, where a person employed full time works 5.3 hectares of farmland.

5.4 Agricultural trade

Foreign trade of Serbia in agricultural and food products has continuously been growing over the years. As Figure 19 shows, since 2005, Serbian agriculture has a positive foreign trade balance. In 2015, total foreign trade of agri-food products amounted to 4 billion euro. The value of exports amounted to 2.6 billion euro, while the value of imports was equal to 1.4 billion euro. The difference between exports and imports generated the largest positive trade balance in agri-food products of 1.2 billion euro. This is 17% more than the surplus achieved in 2014, 33% more compared to the five-year period and 12 times larger compared to 2005 when the first positive foreign trade balance was achieved.

Figure 19: Serbia's foreign trade in agriculture (in million EUR)



Source: Author's calculation based on data from SORS (2015)

The foreign trade of agricultural and food sector of Serbia for the period 2004-2015 is shown in Table 9. The coverage of imports by exports of agricultural products in 2015 was equivalent to 186%, which is the second best coverage since 2004 given that in 2010 exports to imports ratio was around 208%. Since 2005, the value of exports increased 2.5 times, while the value of imports increased 1.14 times. Compared to the five-year period, the value of agri-food exports in 2015 rose by 33.1%, while the value of agri-food imports enlarged by 33.2%.

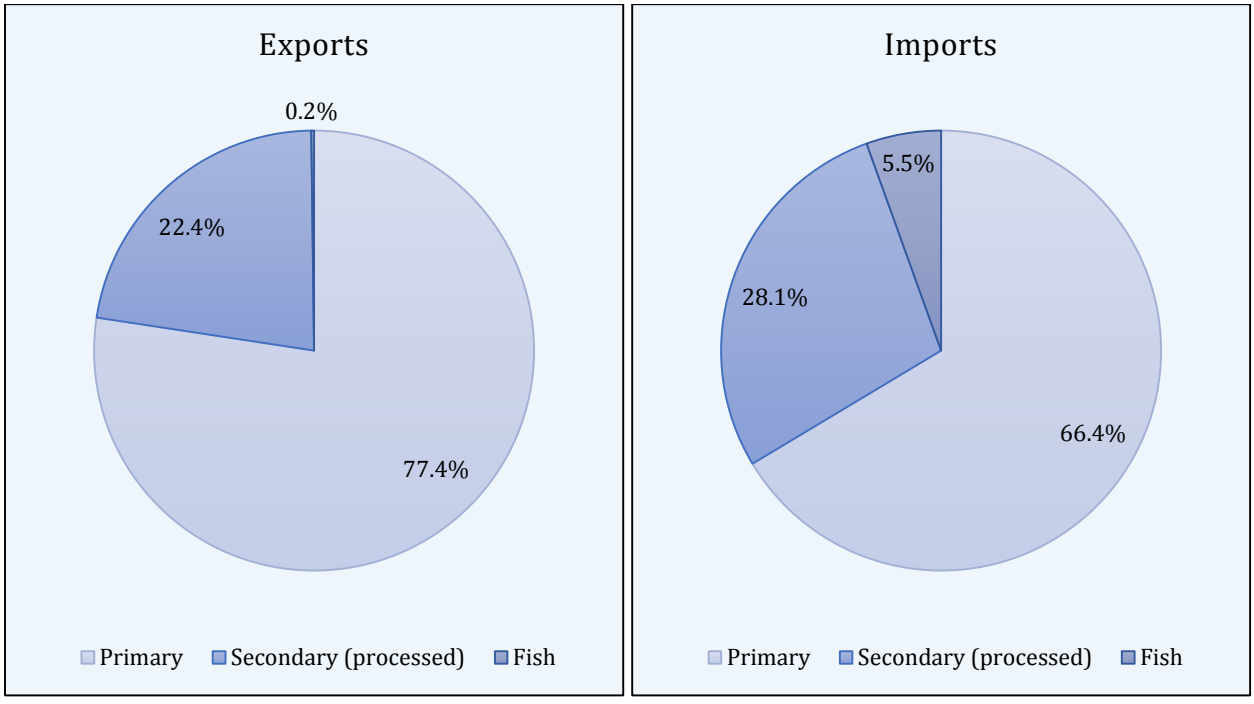
Figure 20 shows the participation of individual product groups in trade for the period 2011-2015. The trade of agricultural and food products was mostly based on primary agricultural products, which participated in the structure of exports and imports with an average of 77% and 66% respectively. Processed agricultural products came on the second place with an average of 22% for exports and 28% for imports. Finally, fish and fishery products had a share of 0.2% in exports and a share of 5.5% in imports.

Table 9: Serbia's foreign trade in agriculture (in million EUR)

	Exports	Imports	Trade balance	Exports to imports ratio
2004	642	715	-73	90%
2005	748	655	93	114%
2006	1,008	767	241	131%
2007	1,230	871	359	141%
2008	1,336	1,056	280	127%
2009	1,395	991	404	141%
2010	1,700	819	881	208%
2011	1,956	1,053	903	186%
2012	2,131	1,221	910	175%
2013	2,104	1,177	927	179%
2014	2,316	1,291	1,025	179%
2015	2,604	1,403	1,201	186%

Source: Author's calculation based on data from SORS

Figure 20: Participation of individual product groups in trade



Source: MoAEP (2015)

5.4.1 Top exported groups and products

Regarding the main groups of agricultural goods in the period 2012-2015, as displayed in Table 10, the top 5 exported groups were: fruit (18% share in total exports of agri-food products), followed by cereals (17%) beverages, spirits and vinegar (7%), animal or vegetable fats (6%), and miscellaneous edible preparations (5%). These groups accounted for 53% of the total value of exports of agri-food products in the last four years.

Table 10: Overview of top exported groups of agri-food products

	2012	2013	2014	2015	Average share
Cereals	521,394	359,937	457,997	435,906	19%
Fruit	289,775	364,459	417,248	525,036	18%
Beverages, spirits and vinegar	167,633	162,765	167,967	171,819	7%
Animal or vegetable fats and oils	159,881	148,928	121,001	148,781	6%
Miscellaneous edible preparations	78,912	106,461	110,311	127,498	5%
Total top 5 groups	1,217,595	1,142,550	1,274,524	1,409,040	54%
Total exports	2,131,454	2,316,186	2,316,186	2,604,046	100%

Source: Author's calculation based on data of Directorate-General for Agriculture and Rural Development (DGAGRI)

By looking at the trade of individual products, the top 5 exported products, as shown in Table 11, remain unchanged in previous years. The most exported product was maize (corn), whose average share in the overall exports was 13%, regardless of the fact that its export value in 2015 dropped by 28% (116 million euro in absolute terms) compared to 2012. The second most exported product were frozen raspberries with an average share of 6% in overall agri-food exports, and whose value increased 2.3 times in the last four years. Cane or beet sugar in solid form was the third most exported product with a share of 5% in exports of agri-food products. However, exports of this type of product have fallen by 37% when compared with the reference year. Continued growth in export of cigarettes is noted, who with the average share of 4% hold fourth place in the list of most exported products. The

share of cigarettes in total exports of agri-food products increased from 1.3% in 2012 to 7.5% in 2015. Finally, the fifth most exported product was edible sunflower-seed oil with a share of 3% in the total exports of agricultural products. Other notable product exports were fresh apples, high-quality common wheat and spelt, and non-alcoholic beverages.

Table 11: Overview of top exported individual agri-food products

	2012	2013	2014	2015	Average share
Maize (corn), except of seed quality	416,665	117,999	341,305	300,367	13%
Frozen raspberries	105,295	82,97	177,984	241,015	6%
Cigarettes containing tobacco	27,709	27,152	108,078	194,195	4%
Beet sugar, refined, in solid form	126,370	128,000	98,769	79,486	5%
Edible sunflower-seed oil, other, for other uses	71,316	65,620	62,506	57,933	3%

Source: Author's calculation based on data of DGAGRI

In 2015, there were 4 agri-food goods among the first 20 products in the total export of Serbia. Corn (maize) was in the third place, frozen raspberries were on the sixth place, cigarettes containing tobacco were on ninth, and lastly fresh apples were on a sixteenth place. The biggest surplus of agri-food products was achieved in trade of cereals, fruit, tobacco and tobacco products, vegetable fats and oils, alcoholic and non-alcoholic drinks and sugar (Serbia Ministry of Agriculture and Environmental Protection, 2015).

5.4.2 Top imported groups and products

Imports from 2012 to 2015 were unchanged and as Table 12 shows were dominated by the following product groups: fruit (11% share in total imports of agri-food products), followed by miscellaneous edible preparations (8%) tobacco and tobacco products (7%), chocolate and cocoa (6%), and fodder (5%). These groups accounted for 38% of the total value of imports of agri-food products in the last four years.

Table 12: Overview of top imported groups of agri-food products

	2012	2013	2014	2015	Average share
Fruit	136,896	133,783	139,71	159,946	11%
Fodder	46,829	69,681	73,521	84,352	5%
Chocolate and cocoa	60,939	67,937	71,592	86,518	6%
Tobacco and tobacco products	80,199	95,215	88,524	115,665	7%
Miscellaneous edible preparations	97,841	100,224	101,807	128,402	8%
Total top 5 groups	422,704	466,84	475,154	574,883	38%
Total imports	1,221,015	1,177,311	1,291,520	1,403,283	100%

Source: Author's calculation based on data of DGAGRI

As in previous years, the product with the biggest import share was coffee, not roasted or decaffeinated, amounting to 5% of total imported value of agri-food products. It is followed by imports of cigars and cigarettes, whose share was around 3%. This type of product recorded slight decrease in imports compared to previous years, mostly due to the increase in domestic production. A significant increase in imports occurred for a variety of food preparations with an average share of 3%. In 2015 they grew by 22% compared to 2013. Finally, the boneless and frozen meat of swine, as well as fresh bananas, were the fourth and fifth most imported products with an average share of about 2%. Imports of agri-food products are not much represented in total imports of Serbia as in the case of exports. Only the coffee is located on the list of top 20 imported products (Serbia Ministry of Agriculture and Environmental Protection, 2015).

Serbia's foreign trade indicates that imports of agricultural products are far more diverse than exports as a share of individual products in imports is considerably less than in the case of exports. This means that the export orientation of Serbian agriculture is focused on specific product groups who have the biggest export potential on the international market. These products are exported with success to foreign customers for many years and this indicates that they are very competitive on the world market. On the other hand, prevailing goods on the import side are mostly ones who are not produced in Serbia.

Table 13: Overview of top imported individual agri-food products

	2012	2013	2014	2015	Average share
Coffee, not roasted, not decaffeinated	76,547	60,.289	52,332	68,337	5%
Food preparations not elsewhere specified or included, other	37,555	38,470	30,034	47,183	3%
Cigars, cheroots, cigarillos and cigarettes, of tobacco or of tobacco substitutes, other	35,427	42,061	40,811	34,180	3%
Meat of swine, other, boneless, frozen	20,043	20,532	31,535	32,678	2%
Bananas, other, fresh	27,518	26,.893	28,987	30,968	2%

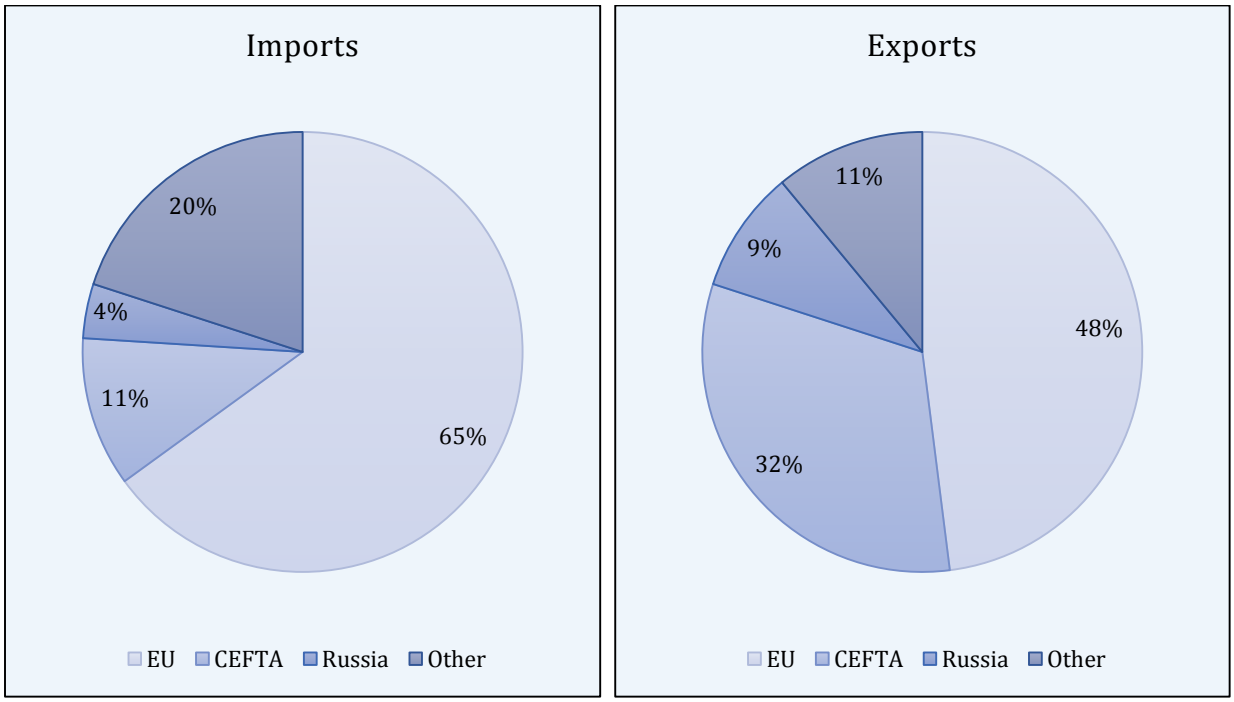
Source: Author's calculation based on data of DGAGRI

5.5 Main trade partners

Regarding the geographic allocation of the export and the import of agri-food products, the EU remains the largest trading partner for Serbia. In 2015, exports to EU countries accounted for 48% Serbia's total agri-food exports, followed by CEFTA member states with 32%, while the remaining 20% of agri-food products were exported to other markets. Imports from the EU in 2015 accounted for about 65% of imports of agri-food products, imports from CEFTA market were 11%, while imports from the rest of the market were at a level of 24% of the total imports of agri-food products.

The third largest export partner is the Russian Federation, where exports increase every year. Because of international trade sanctions that the EU and the US have established towards Russia in early 2014, this market is becoming increasingly important for Serbian exporters. As a result, there was a significant rise of Serbian agri-food exports to this market in the last couple of years. Figure 21 shows the comparison of imports and exports to the EU, CEFTA, Russia and rest of the world.

Figure 21: Main trade partners of Serbia in agricultural sector



Source: Author's calculation based on data from MoAEP

5.5.1 Trade with the EU

The EU continues to represent the most important partner of Serbia when it comes to trade in agricultural and food products. For EU, Serbia holds a 32nd and 28th place on the list of main agri-food trade partners with a share of 0.7% and 1% of imports and exports respectively. Thanks to unilateral EU Autonomous Trade Measures (ATM) agreement implemented in the year 2000, Serbia had the opportunity to export almost all its products to the EU market freely.

Table 14: Agricultural trade with the EU (in million EUR)

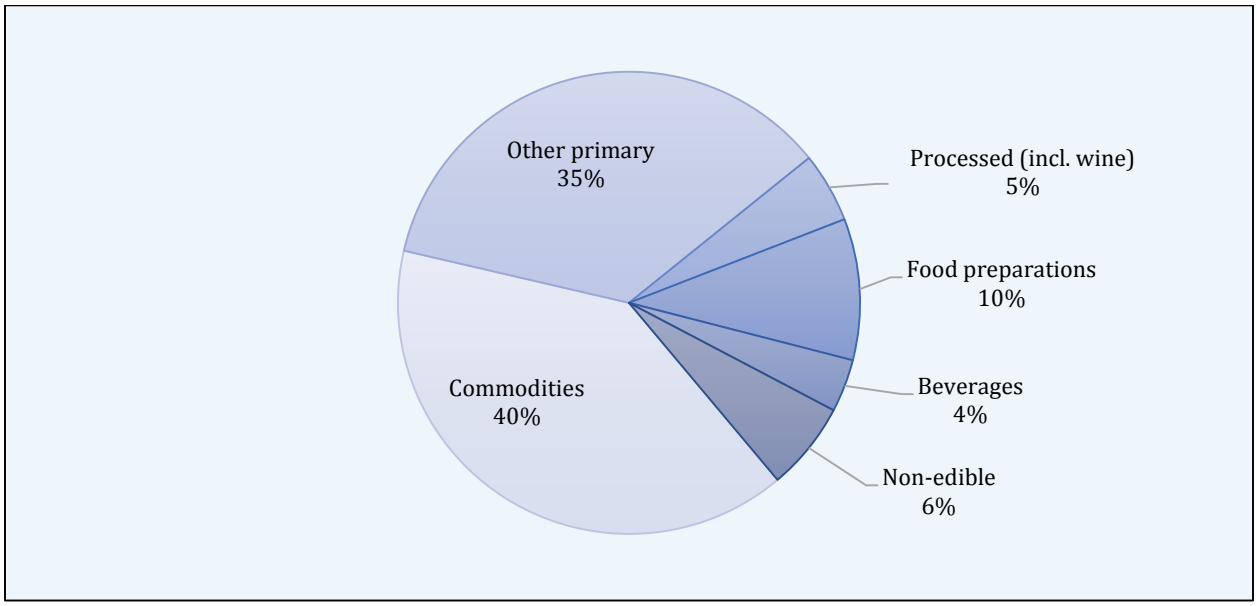
	2009	2013	2014	2015
Exports	642	1,122	1,124	1,214
Imports	439	760	800	838
Trade Balance	203	362	324	376
Share of exports with the EU	46%	53%	49%	47%
Share of imports with the EU	47%	61%	62%	63%

Source: Author's calculation based on data from MoAEP

In 2004 Serbian agriculture started enjoying a positive trade surplus with the EU countries. As Table 14 shows, the EU market as an export destination for Serbian producers is very significant, as almost 50% of agricultural products are exported to one of the EU countries. Over the last six years, Serbian exports of agricultural products to the EU doubled from 642 million euro to 1.2 billion euro in 2015. At the same time, imports of agricultural products from the EU increased two times in the period 2009-2015 from 439 to 838 million euro.

Figure 22 shows the structure of exports of agri-food from Serbia to EU. Exports to EU follow the steadily upward trend, and in 2015 reached a value of 1.2 billion euro, the highest so far recorded export value of Serbian agro-food products to EU. In comparison with 2014, exports of agri-food products to EU increased by 8%.

Figure 22: Agri-food exports from Serbia to the EU



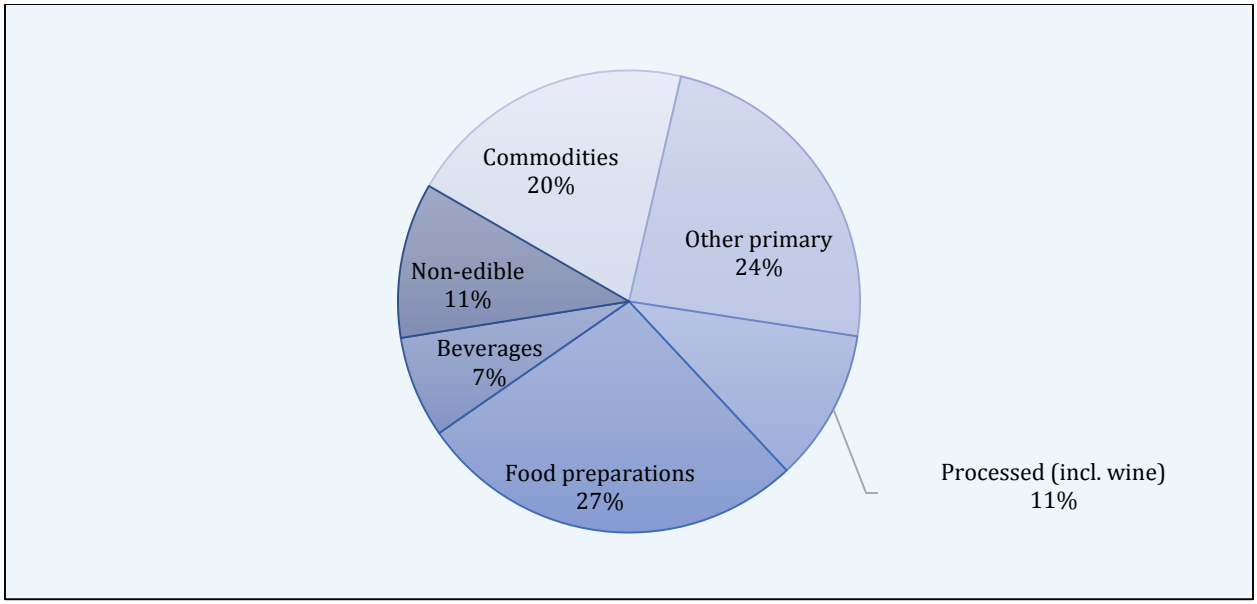
Source: Author's calculation based on data of DGAGRI

Concerning the export value, the following products were the most important: fruit, fresh or dried, excl. citrus & tropical fruit (29.7% of total exports); cereals, other than wheat and rice (15.4%); vegetable oils other than palm & olive oils (7.8%); beet and cane sugar (5.9%); vegetables, fresh, chilled and dried (4.3%); soybeans (2.6%), food preparations, not specified (2.6); pasta, pastry, biscuits and bread (2.4%); and raw hides, skins and fur skins (2,2%).

Observing individual EU member states, the top five importers of Serbian goods in the EU were Romania (24.8% of the value of exports to the EU), Germany (15%), Italy (9.3%), Croatia (7.2%) and France (6.5%) (European Comission, 2016).

Figure 23 shows the structure of imports of agri-food from the EU to Serbia. Imports reached 838 million euro in 2015, which is 5% more than in 2014.

Figure 23: Agri-food imports from the EU to Serbia



Source: Author's calculation based on data of DGAGRI

Concerning the import value, the following products were the most important: food preparations, not specified (7,6% of total imports); chocolate, confectionery and ice cream (5,5%); pork meat, fresh, chilled and frozen (4,4%); pasta, pastry, biscuits and bread (4,3); vegetables, fresh, chilled and dried (3,7%); soybeans (3,6%); fruit, fresh or dried, excl. citrus & tropical fruit (3,6%) ; citrus fruit (3,3%); and, preparations of vegetables, fruit or nuts (3,3).

Among EU member states, the top five exports of EU goods towards Serbia came from Croatia (15.4% of the value of imports from the EU), Italy (9.9%), Germany (9.7%), Hungary (8.2%) and Poland (7.3%) (European Comission, 2016).

By looking at HS classification of EU agri-food trade with Serbia demonstrated in Table 15, exports in 2015 were dominated by the following commodity groups: edible fruits & nuts (29.7%), cereals (16.7), animal or vegetable fats & oils (8%), sugars & sugar confectionery

(6.5%), and oil seeds & oleaginous fruits (5.4%). These top 5 groups accounted for 66.3% of the total value of exports of agri-food products. The most important import commodity groups in 2015 were: miscellaneous edible preparations (12.8%), oilseeds & oleaginous fruits (8.4%), beverages, spirits & vinegar (7.8%), edible fruits & nuts (7.6%), and cocoa & cocoa preparations (6.4%). These top 5 groups made 43% of the total value of imports of agri-food products.

Table 15: Top 10 imported and exported commodity groups from Serbia to EU

Commodity group	Import share (%)	Commodity group	Export share (%)
Miscellaneous edible preparations	12,8	Edible fruits & nuts	29,7
Oilseeds & oleaginous fruits	8,4	Cereals	16,6
Beverages, spirits & vinegar	7,8	Animal or vegetable fats & oils	8,0
Edible fruits & nuts	7,6	Sugars & sugar confectionery	6,5
Cocoa & cocoa preparations	6,4	Oilseeds & oleaginous fruits	5,4
Meat and edible meat offal	6,1	Residues and waste from food industry	5,2
Preps. of cereals, flour, starch, etc.	5,5	Edible vegetables, roots & tubers	4,3
Residues and waste from food industry	5,1	Miscellaneous edible preparations	4,2
Tobacco & tobacco products	4,7	Preps. of vegetables, fruits, nuts & plants	4,2
Preps. of vegetables, fruits, nuts & plants	3,9	Beverages, spirits & vinegar	4,0
Other products	45	Other products	12

Source: Author's calculation based on data of DGAGRI

Serbia achieved the highest surplus of agricultural products in 2015 with Romania, Germany, Austria, France, and Italy, while with Spain, Croatia, Poland, the Netherlands and Greece recorded a significant deficit. Considering individual products, maize (corn), frozen raspberries and white sugar were traditionally seeing the greatest trade surplus in recent

years and this was no different in 2015 (Serbia Ministry of Agriculture and Environmental Protection, 2015).

5.5.1.1 Stabilization and Association Agreement (SAA)

Interim Trade Agreement, as a part of the Stabilization and Association Agreement (SAA), was signed in April 2008. Starting from January 2009, Serbia unilaterally started implementing the agreement to foster its process of European integration. In February 2010, Serbia and the EU fully implemented the Interim Trade Agreement. Upon ratification of SAA by all EU members in September 2013, the Interim Trade Agreement was put out of force, while SAA entered into force.

One of the main objectives of the agreement is the progressive establishment of a free-trade zone between the EU and Serbia. Immediately after the agreement entered into force, the EU abolished all tariffs and other quantitative restrictions on imports of industrial products originating in Serbia. On the other hand, Serbia agreed to gradually reduce tariffs and quotas on goods imported from the EU. This also meant gradual liberalization of agricultural products, processed agricultural products, fish and fishery products. Besides, Serbia committed to remove all tariffs over the period of six years and in accordance with the timetable set in the agreement. As Table 16 illustrates, a total of 6.562 products were subjected to the abolishment of customs duties, and they were classified into four categories according to their sensitivity (length necessary to protect the domestic production): insensitive, sensitive, very sensitive and most sensitive.

Table 16: Number of products subject to removal of tariffs

	Number of products	% of products subject to removal of tariffs	Average tariff as of 2008 (in %)
Insensitive	3,832	58,4	1,84
Sensitive	755	11,51	5,64
Very sensitive	1,361	20,74	9,31
Most sensitive	614	9,36	15,72
Total	6,562	100	5,13

Source: ISAC Fund, 2008

Table 17 shows the dynamics of trade liberalization dynamics setup by the agreement. Import tariffs for the insensitive group were abolished in 2009, upon establishment of the Interim Trade Agreement. Tariffs for a sensitive, very sensitive and most sensitive group of products were abolished gradually in a period of two, five and six years respectively.

Table 17: Trade liberalization dynamics

	Sensitive		Very sensitive		Most sensitive	
	Dynamics of removal	Average tariff (%)	Dynamics of removal	Average tariff (%)	Dynamics of removal	Average tariff (%)
Beginning state	100%	5,02	100%	9,18	100%	15,66
2008	70%	3,51	80%	7,35	85%	13,44
2009	40%	2,01	60%	5,51	70%	10,99
2010	0%	0	40%	3,67	55%	8,63
2011	0%	0	20%	1,84	40%	6,28
2012	0%	0	0%	0	20%	3,14
2013	0%	0	0%	0	0%	0

Source: ISAC Fund (2008)

Stabilization and Association Agreement (SAA) between Serbia and the EU was fully implemented in January 2014 after a six-year period.

Table 18: Protected items in agriculture and their tariff

Sensitive items	Tariff
Live cows, pigs, sheep and lambs up to one year of age	12%
Beef, pork, lamb, goat and poultry meat and offal	12%
Powdered milk, yogurt, butter, cheese spreads, and other cheeses	9%
Poultry eggs	9%
Natural honey	9%
Flavored or colored sugar syrups	9%
Corn and seed corn	9%
Fruit juices and concentrates from the continental fruits	8%
Jams, marmalades and fruit pastes	8%
Certain types of fresh, frozen or canned vegetables such as peas, sweet corn, carrots	4%

Source: USDA Foreign Agricultural Service (2015)

Most EU agri-food products entered duty-free except for sensitive items shown in Table 18. By looking at the protected commodities, it can be easily observed that most exported products are the ones where the high level of protection is ensured. These sensitive items will be liberalized when Serbia becomes an EU member.

5.5.2 Trade with CEFTA

Due to the proximity of the market and the traditional association, region of Southeast European countries (CEFTA) is one of the most crucial markets for agricultural products from Serbia. The total value of exports in 2015 amounted to 832 million euro, while the total value of imports of goods was around 157 million euro. In a foreign trade with CEFTA countries Serbia recorded a surplus in the amount of about 676 million euro, which is 9% more than in 2014 (Serbia Ministry of Agriculture and Environmental Protection, 2015).

Observed by countries within the CEFTA region, in 2015, highest exports were made towards Bosnia and Herzegovina (about 50% of the total value of exports), followed by Montenegro (27%) and Macedonia (19%). In the same year, imports from the CEFTA region mostly came from Montenegro (around 46% of the total value of imports), Bosnia and Herzegovina (37.2%) and Montenegro (10.8%). Due to a distance of the market, the share of imports and exports between Serbia and Moldova was below 1% of the total value of imported and exported agri-food products.

5.5.3 Trade with other countries

Exports to all other markets in 2015 amounted to 524 million euro, while the value of imports was around 340 million euro. Outside of EU and CEFTA, the largest trade partner was the Russian Federation. Thanks to Serbia's free trade agreement with Russia, exports increase yearly and in 2015 they were around 243 million euro. This made Russia the third-ranked country on total exports of Serbian agri-food products with a share of 9%. On the other hand, imports from Russia into Serbia amounted to nearly 57 million euro (Serbia Ministry of Agriculture and Environmental Protection, 2015).

Chapter 6

Empirical analysis

6.1 Gravity model in the case of Serbia

This section analyzes the impact of Serbian accession to the EU and the effects of main regional trade agreements on its agricultural sector from the point of view of the gravity model. To do this, the gravity model is employed as it represents one of the most utilized and efficient methods in explaining bilateral trade flows. Although the gravity model in its most general formulation looks at the full trade flows between countries, the equation used for Serbian case takes into account export and imports flows of agricultural products from Serbia and its major trading partners. This was done in order to provide comprehensive empirical analysis of Serbian agricultural exports to the world market and analyze the main factors of Serbian agro-trade.

The main parts of the original gravity equation, which include GDPs of two countries (GDP_i *and* GDP_j) and their distances ($DIST$), are kept as independent variables. The model is further enhanced with additional predictor variables which represent population (POP_i *and* POP_j), common border ($BORDER$), common language ($COMMONLANG$), and landlocked countries (LANDLOCK). Finally, dummy variables explaining regional trade agreements of the main trading partners of Serbia (EU, $EUSAA$, $CEFTA$ and $RUSSIA$) are introduced to study the possible trade creation and trade diversion effects.

The extended gravity model is estimated in semi-logarithm form with the following formula:

$$Tij = \beta_0 + ln\beta_1 GDPAgriculture_i + ln\beta_2 GDP_j + \beta_3 POP_i + ln\beta_4 POP_j + ln\beta_5 DIST_{ij} + \beta_6 BORDER_{ij} + \beta_7 COMMONLANG_{ij} + \beta_8 LANDLOCK_{ij} + \beta_9 EU_{ij} + \beta_{10} EUSAA_{ij} + \beta_{11} CEFTA_{ij} + \beta_{12} RUSSIA_{ij} + \varepsilon_{ij}$$

Where:

i – exporting country

j – importing country

T_{ij} – trade between country i and country j

$GDPAgriculture_i$ – GDP of exporting country i multiplied by its share of agriculture (agriculture contribution to GDP of exporting country i)

GDP_j – GDP of importing country j

POP_i – population of exporting country i

POP_j– population of importing country j

$DIST$ – distance in kilometers between exporting country i and importing country j

$COMMONLANG$ – common language shared in exporting country i and importing country j

LANDLOCK - landlocked exporting country i and landlocked importing country j

$BORDER$ – common borders between exporting country i and importing country j

EU – European Union membership

$EUSAA$ – Stabilization and Association Agreement with the EU

$CEFTA$ – CEFTA membership

$RUSSIA$ – PTA agreement of exporting country i (or Russian Federation) with importing country j (or Russian Federation)

ε_{ij} - standard residual error

and ln denotes variables in natural logs.

6.2 Variables

The dependent variable is annual trade flow from exporting country i to importing country j. Trade value is expressed in US dollars and contains agricultural and food exports from one country to another. Agri-food trade is comprised of first four sections of the Harmonized System (HS) classification:

- Section I - Live Animals; Animal Products
- Section II - Vegetable Products
- Section III - Animal or vegetable fats and oils and their cleavage products; Prepared edible fats; Animal or vegetable waxes
- Section IV - Prepared foodstuffs; beverages, spirits and vinegar; tobacco and manufactured tobacco substitutes

The GDPs of exporting and importing countries are used as a measure for the economic sizes of the countries. The importing country's GDP defines customer income and absorptive capacity. In other words, it determines the demand originating from the exporting country. The exporting country's GDP is multiplied by the agriculture's share in the economy. This was done for two reasons. The primary one was that the share of agriculture is not uniformly distributed across countries analyzed. This means that the inclusion of the overall GDP of the exporting economy might give biased and incorrect results of the gravity equation. The second one was to indicate the productive capacity of agricultural industry, where higher levels of production suggest a greater amount of agri-food goods available for export. The levels of GDP of both countries should positively affect their trade. This means that higher levels of GDP generate higher trade flows between two or more trading countries. That is to say, bigger and richer countries should trade more compared to smaller and poorer ones. Therefore, it is expected that GDP coefficients β_1 and β_2 of exporter and importer countries have a positive sign.

The population is used as a measure of country or market size, as well as self-sufficiency and absorption effect of exporting and importing countries. The population coefficients of exporting country could be ambiguous depending on how signs are interpreted, as they can be positive or negative. Negative population sign of the exporting country shows absorption

effect, and it means that big country exports less as a result of higher domestic absorption effect of larger population size. Positive population sign of the exporting country indicates economies of scale effect in which the country of larger population size is expected to produce and export more than a small country due to the access of cheap labor. On the other hand, an importing country with a huge population size is indicative of the potentially larger market size and is expected to import more. Hence, the coefficient of two trade partners' population β_3 and β_4 are supposed to be positive.

Distance is used as a proxy for trade costs (transaction, transportation time and other related costs) between countries. As the geographical distance between two countries increases, transport costs will be higher and consequently, trade between them will be less. Therefore it is expected that a distance sign β_5 is negative.

A common language is used as a measure of past historical and cultural connections between countries. Not only people tend to consume similar goods in countries that have the same language, but the cost of doing business for firms is reduced as well, as trade negotiations are facilitated and transactions are eased. Subsequently, trade between these countries is easier and cheaper. Therefore, it is expected that common language fosters bilateral trade and increases the level of trade between both countries. Hence, the coefficient of common language variable β_6 is projected to be positive.

Shared border between countries tends to facilitate and expand trade. Firms are able to supply intermediate goods, and consumers can demand products in countries that share common border much more easily than for countries who are not next to each other. This means that trade between neighboring countries will have lower transaction costs and will be cheaper. The effect of common border variable β_7 is therefore expected to be positive.

Landlocked countries dummy is a proxy of transactional costs. Countries not having access to the sea have a higher cost of transportation and require more time to access oversea markets. In addition, it is expected that a landlocked country will have a lower trade because overall trade costs are larger compared to those of coastal economies. Thus, the coefficient of the landlocked variable β_8 is expected to be negative.

Finally, dummy variables EU, EUSAA, CEFTA and RUSSIA refer to the formation of preferential trade agreements between member countries. They enhance trade between member countries, increase market size and expand bilateral trade and consequently attract non-member countries to join them and transact business in the region. These variables are introduced in the model to control effects of trade agreements and in particular, to capture the trade creation or trade diversion effects between Serbia and its trading partners. Therefore, it is expected that all coefficients regarding preferential trade agreements β_9, β_{10}, β_{11} and β_{12} are positive. Dummies are chosen to capture the level of impact various preferential trade agreements have on Serbian trade. Each dummy variable represents participation in regional and preferential trade agreements and indicates to which agreement country pairs belong.

These countries are the first partners of Serbia in trade and together they make almost 90% of Serbian agricultural exports. Over the observed period, the EU was the largest importer of Serbian agricultural exports, representing 48% of total exported agricultural goods. CEFTA and SAA countries ranked second with 32% of Serbian exported agricultural products. Finally, the Russian Federation ranked third, representing 9% of overall agricultural goods exported.

In particular, EU dummy variable describes the agreement between 28 EU member states and refers to the European single market.

EUSAA dummy variable denotes trade agreement between the EU and the so-called Western Balkan countries (Albania, Bosnia and Herzegovina, Macedonia, Montenegro, Serbia and Kosovo*). For these countries, a Stabilization and Association Agreement (SAA) has been made, as a part of their accession process to the EU. The agreement establishes common political and economic objectives, encourages regional co-operation and implements a free trade area.

CEFTA dummy variable refers to the free trade agreement established in 2006 between non-EU countries (Albania, Bosnia and Herzegovina, Montenegro, Croatia, Macedonia, Moldova, Serbia, and Kosovo*).

RUSSIA dummy variable represents trade agreement between Russia and countries observed in this study. From the list of countries included in the model, only Serbia and Moldova have implemented an RTA with Russia that establishes free trade zone.

Summary of each variable, its description and expected signs is shown in Table 19 below.

Table 19: Expected signs for each variable

Variable	Description	Expected sign
T_{ij}	Bilateral trade flows	+
$\beta_1 GDPAgriculture_i$	The logarithm of agricultural sector's contribution to the GDP for country i	+
$\beta_2 GDP_j$	The logarithm of GDP for country j	+
$\beta_3\ POP_i$	The logarithm of population for country i	+/-
$\beta_4\ POP_j$	The logarithm of population for country j	+/-
$\beta_5\ DIST_{ij}$	Distance between countries	-
$\beta_6\ BORDER_{ij}$	Common border	+
$\beta_7\ COMMONLANG_{ij}$	Common language	+
$\beta_8\ LANDLOCK_{ij}$	Landlocked countries	-
$\beta_9\ EU_{ij}$	EU membership dummy variable	+
β_{10} $EUSAA_{ij}$	EU SAA membership dummy variable	+
β_{11} $CEFTA_{ij}$	CEFTA membership dummy variable	+
β_{12} $RUSSIA_{ij}$	RUSSIA trade agreement dummy variable	+

6.3 Data

The main sources of data were obtained from various statistical databases and publications available online. Data for bilateral trade flows between countries is obtained from UN Comtrade database, data for GDP, share of agriculture and population were obtained from the World Bank's World Development Indicators. Table A1 in the Appendix provides a description of the variables. Data regarding the trade of Liechtenstein and Kosovo* were not fully available, so these countries were excluded from the analysis. Data for distance, common language, landlock and contiguity variables were obtained from CEEPI website. The data on language, landlock, and contiguity is presented on tables A2, A3, and A4 in the

Appendix. Bilateral distance is computed using the great circle distance algorithm. Data for Montenegro regarding distance were not available, so they were calculated using the website DistanceFromTo.net. Finally, information on participation in regional trade agreements of countries was obtained from the interactive map of RTAs by country/territory available online on the World Trade Organization website. The list of preferential trade agreements considered in the analysis is displayed in Table A5 in the Appendix.

The model is estimated for the year 2014 and it covers cross-sectional data set with 1,406 observations containing 38 countries that are main Serbian trade partners and make up above 90% of Serbian agricultural trade:

- EU-28 countries (Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, UK)
- CEFTA and SAA countries (Albania, Bosnia and Herzegovina, Croatia, Macedonia, Moldova, Kosovo*)
- EFTA (Iceland, Norway, Switzerland),
- Russian Federation

Bilateral trade flows between countries (T_{ij}) are measured in millions US dollars, GDPs ($\beta_1 GDPAgriculture_i, GDP_j$) are measured in billions US dollars, population (POP_i, POP_j) is measured in millions of persons, and the distance between capital cities (DIST) is calculated with the great circle formula and is measured in kilometers. Common language variable (COMMONLANG) equals to 1 when a pair of countries has the same language, 0 otherwise. Landlocked countries variable (LANDLOCK) represents 1 if countries do not have access to the sea and 0 otherwise. Border countries variable (BORDER) equals to 1 when countries share a border and 0 otherwise. Regional and preferential trade agreements variables are equal to 1 if both countries are members of agreement and 0 otherwise. Hence, EU variable equals to 1 if countries are members of the European Union and 0 otherwise. EUSAA variable equals to 1 if countries have established Stabilization and Association Agreement with the EU and 0 otherwise. CEFTA variable equals to 1 if countries are members of CEFTA

agreement and 0 otherwise. RUSSIA variable equals to 1 if countries have signed a trade agreement with Russian Federation and 0 otherwise.

6.4 Selection of model

Initially, the model was estimated using Ordinary Least Squared (OLS) method. This prediction technique was chosen as it represents the baseline estimation methodology for a variety of gravity models which provides many satisfactory practical results given the assumptions of the method are satisfied. In order to justify the selection of the method, the data was tested to meet the three necessary and sufficient conditions of OLS regression (United Nations, 2013):

- Normality: the errors e_{ij} should be independently drawn from a normal distribution
- Homoscedasticity: the errors e_{ij} must be constant with a given fixed variance
- Independence: explanatory variables are not correlated with other explanatory variables

White Test was used for checking the existence of homoscedasticity of the model. The null hypothesis on homoscedasticity, stating that the variance of residuals is homogeneous, could not be accepted with the p-value being close to 0. Therefore, the alternative hypothesis that the variance is not homogenous was accepted. Subsequently, Shapiro-Wilk W test for normality estimated p-value close to 0, indicating that the distribution is not normal. Furthermore, inter-quartile range (IQR) test which assumes the symmetry of distribution identified the presence of 8 severe outliners, which confirmed the hypothesis to reject normality at 5% significance level. Finally, Durbin-Watson test for auto-correlation estimated p-value very close to 0 demonstrating that the null hypothesis, asserting that there is no correlation, could not be accepted. With these properties not holding, OLS coefficient estimates may be inconsistent, biased and inefficient. This is why it was decided not to run regression model with this linear method.

Consequently, the Poison Pseudo-Maximum Likelihood (PPML) estimation methodology developed by Santos Silva and Tenreyro (2006) was introduced which successfully overcomes these problems and relaxes above mentioned assumptions of OLS regression. Authors have shown that PPML estimator under weak assumptions provides significant and

consistent estimates of the gravity model. They have pointed out that in the presence of heteroscedasticity OLS estimation is inefficient and inconsistent because it biases the variance of estimated parameters, and subsequently, the t-values are not trustworthy (Gómez-Herrera, 2013). In fact, PPML estimator does not assume normality in any form, thus there is no need to verify if the model is normally distributed. There is no need for checking homogeneous variance as well because the model does not assume homoscedasticity and it is valid with general forms of heteroscedasticity. In addition, the Poisson estimator includes observations for which the trade value is zero. These observations are dropped from the OLS method because the logarithm of zero is not defined, leading to biased and less accurate estimations. The phenomenon of zero trade flows is present in this dataset as well and is typical for gravity data, as not all countries trade all products between each other. Thus, the ability to deal with zero trade flows problem while providing unbiased estimates in the presence of heteroscedasticity lead to the decision to choose PPML as estimation methodology instead of OLS.

6.5 Results

Based on collected and systematized data, regression analysis was performed using the method of Poisson pseudo-maximum-likelihood (PPML) method. This method was chosen because default OLS estimator suffered problems of auto collinearity, normal distribution, heteroscedasticity and multicollinearity, which are the main assumptions of linear regression.

PPML method follows the same pattern of OLS regression in terms of interpretation of the coefficients. The only difference is in the specification of the dependent variable, which is in log-linearized OLS regression expressed as exports in logarithms, while for the PPML regression it is specified as bilateral flows in absolute values. The coefficients of any independent variables can be entered both in logarithms and in levels. In the first case, they are interpreted as simple elasticities, while in the second case they are interpreted as semi-elasticities, as under OLS (United Nations, 2013).

Regression results are presented in Table 20. The regression covers a cross section analysis of 38 countries in 2014. Hence, the dataset consists of 1,406 observations of bilateral export

flows (38 x 37 country pairs) and it is based on equation given at the beginning of this chapter. Countries for which bilateral trade flows are collected include Serbia and Serbia's 37 main partners who make more than 90% of Serbian agricultural trade. The amount of agricultural trade flows (exports or imports from one country to another) are composed of 24 product groups based on the HS classification. The calculation was performed using software STATA 13. The first point to notice is that a number of observations included by PPML method is, as expected, equal to the total number of observations of the original dataset.

Table 20: Results of the model

Tij	Estimate	Standard errors	P-Value
$lnGDPAgriculture_i$	0.617	0.166	0.000
lnGDPj	0.779	0.044	0.000
lnPOPi	0.146	0.163	0.371
lnPOPj	-0.075	0.046	0.100
lnDIST	-0.850	0.100	0.000
BORDER	0.805	0.177	0.000
COMMONLANG	0.292	0.195	0.134
LANDLOCK	-0.686	0.344	0.046
EU	0.931	0.163	0.000
EUSAA	0.810	0.134	0.000
CEFTA	1.894	0.379	0.000
RUSSIA	1.366	0.237	0.000
Cons	17.542	0.722	0.000
Number of observations	1406		
Number of parameters	13		
Pseudo log-likelihood	-1.495e+11		
R-squared	0.652		

To check the adequacy, heteroscedasticity-robust Ramsey Regression Equation Specification Error Test (RESET) was performed. RESET test checks the significance of an additional explanatory variable constructed as $(x'b)^2$, where b is the vector of estimated parameters (United Nations, 2013). In the PPML model, the test accepts the hypothesis that the coefficient on the test variable is 0 with a p-value of 0.63 which means that gravity equation estimated using PPML passes the RESET test. In other words, there is no evidence that the PPML model is misspecified or inappropriate. It is also notable that the estimation regression lines fit the data well and explain 65% of the variation in bilateral trade flows across countries.

The results of the gravity model, as shown in Table 20, indicate that 10 variables ($GDPAgriculture_i$, GDP_j, POP_j, DIST, BORDER, LANDLOCK, EU, EUSAA, CEFTA, RUSSIA) out of 12 are found to be statistically significant. Only two variables (POP_i and COMMOLANG) were insignificant but nevertheless had expected signs. This means that they do not have an impact on the bilateral trade flows between exporting and importing countries and therefore between Serbia and its trading partners. All the coefficients have the sign as expected and they are in line with theoretical expectations of the gravity model and trade assumptions stated in Table 19.

The GDP coefficients of two variables, representing economic sizes of exporter and importer, are positively associated with trade and statistically significant. The estimated coefficients they confirm the hypothesis that high-income countries are expected to trade more. This means that as the size of economies increases the total trade value between two countries increases.

The coefficients on exporter and importer GDP have a positive value of 0.617 and 0.779 respectfully with a statistical significance at 1% level. The coefficient shows that holding other variables constant, a 1% increase in exporter's GDP will increase bilateral trade by roughly 0.62%. On the other hand, 1 % increase in importer's GDP will enhance trade by approximately 0.78%. A higher GDP of exporter translates into increased overall production or greater agricultural share in total production capacity which consequently means the country is able to export more to the foreign market. A higher GDP of importer suggests greater absorption capacity of the country which in turn translates to demand for more

goods from other partners. In the Serbian case, it can be concluded that that the growth of GDP of Serbia and its partners will help increase total trade value; the higher GDP coefficients are, the higher will be bilateral trade between Serbia and importing country and vice versa.

The coefficient of the exporter's population is positive but not statistically significant. This means that population of the exporting country cannot be considered as an explanatory variable for the increase of bilateral trade between countries. On the contrary, the coefficient of the importer's population has a negative value of -0.075 and is statistically significant at 10% level. This indicates that increase of trading partners' population by 1% leads to decrease of bilateral trade value by approximately 0.75%. This negative relationship between bilateral trade flows and importer's population does not confirm the assumption that large population countries are expected to import more, but rather indicate the domestic market power of importing country, that is, the higher is the population of the country, the larger is the domestic production and therefore, the need to trade is lower.

The coefficient on geographical distance is negative and 1% statistically significant with the value of -0.850. This is consistent with the second hypothesis of the gravity model which states that countries that are further apart trade less. With a 1% increase in distance, given that other variables remain unchanged, bilateral trade tends to reduce by about 0.85%. This shows that transportation costs are an important factor of trade flows between Serbia and its trading partners - the larger the distance between countries is, the higher are transportation costs and subsequently trade of country pairs is lesser.

The coefficient of the border dummy has the expected positive value of 0.805 and is statistically significant at 1% level. The positive relationship between border variable and trade between countries indicates that existence of common border increases the probability of trade between two country pairs. Countries sharing a border are 0.80% more likely to trade between themselves than with other non-bordering countries. Interpreted another way, countries that share a common land border trade approximately 24% more than those who not ($\exp[0.805] - 1 = 1.236$).

The coefficient of the common language dummy is positive with a value of 0.292, but this result cannot be taken into consideration as the coefficient is not significant at 10% level.

Therefore, it cannot be concluded that sharing a common language promotes and increases bilateral trade between country pairs.

The coefficient of the landlock dummy variable has the expected negative value of -0.686 that is significant at 5% level. This negative relationship indicates that countries that do not have access to sea or coast are approximately 0.68% less likely to trade with each other than those who have. Put differently, if either exporting or importing country is landlocked, the bilateral trade with any of its partner will be approximately 50% less compared to the situation when both countries have sea or coastal access ($\exp[-0.686] - 1 = -0.496$).

The coefficient of the EU dummy variable is positive and has a value of 0.931 with a 1% level of significance. This means that countries who are members of EU, whether being exporter or importer, are around 0.93% more probable to trade among themselves than those who are not. That is to say, trade between two member states of the EU is on average 154% larger than that between countries who are not members of the EU ($\exp[0.931] - 1 = 1.537$). This means that countries involved in the EU single market are deeply economically integrated with each other, that is, there is a presence of strong mutual trade relations between EU member states.

The coefficient of the EUSAA dummy variable has a positive sign, as expected, and holds a value of 0.810 at a 1% level of significance. The EUSAA dummy shows that two countries that have signed the SAA agreement are 0.81% more likely to trade with each other than those who are without the agreement. In other words, trade between EU countries and non-EU countries who are in the process of joining the EU (have signed a SAA agreement with EU) is 124% larger than trade between countries that do not have SAA agreement signed with EU ($\exp[0.810] - 1 = 1.247$). Thus, it can be concluded that there is the strong impact of trade agreement towards EU member states and candidate countries, as participation in the trade agreement stimulates a high volume of trade between these two groups of countries.

The coefficient of the CEFTA dummy variable has the expected positive sign with a value of 1.894 which is statistically significant at 1% level. The positive relationship suggests that countries belonging to CEFTA are 1.89% more likely to trade with each other than those who

are not. To put it another way, trade between CEFTA countries is on average 565% larger than that between CEFTA non-members ($\exp[1.894] - 1 = 5.649$). This coefficient shows that CEFTA agreements play very important role in Serbian trade, as it generates strong impact in the stimulation of Serbian trade with other member countries. However, it is also the result of historical and cultural ties Serbia has with countries from the agreement, which consists of ex-Yugoslav nations (except Croatia who is part of the EU) and Moldova. Likewise EUSAA, participation in the CEFTA agreement intensely stimulates mutual trade and induces bilateral trade flows between member countries.

The coefficient of the RUSSIA dummy variable is positive with a value of 1.366 and 1% level of significance. This shows that countries who have signed trade agreement with Russian Federation are 1.36 more probable to trade with each other than those who are not. In other words, trade between Serbia or Moldova (countries who have signed FTA with Russia) and Russia is approximately 292% larger than that between any of other countries analyzed and Russia ($\exp[1.366] - 1 = 2.919$). This estimate confirms that Serbia enjoys large trade benefits with Russia, as it is the only country outside of the Commonwealth of the Independent States who has a free trade area with Russia. Also in this case, this estimate is attributed to strong cultural, religious, economic and social ties Serbia has with Russia.

6.6 Trade potential

Predicted values obtained in the regression analysis are used to analyze the degree of trade creation or trade diversion and the trade potential of the Republic of Serbia following possible accession to the EU. Before discussing obtained results, it is important first to point out that after Serbia becomes a member of the EU, its membership to CEFTA will end. Second, countries who have signed SAA agreement with the EU, except the Republic of Moldova, are also members of CEFTA agreement. This information will be used to compare trade effects before and after Serbia's accession to the EU, and in particular, whether leaving CEFTA will produce trade creation or trade diversion for Serbian trade. Dummy variables that are used to perform the analysis are EU, EUSAA and CEFTA. Thus, two specific cases are considered – the first one refers to Serbia not being a member of the EU (and therefore a member of CEFTA

and SAA agreements), while the second one denotes Serbia's EU accession (and therefore ending membership with CEFTA and SAA).

Values that explain the first case, in which Serbia does not belong to the EU but is a part of CEFTA and SAA agreements, are 0.810 and 1.894. They represent Serbia's SAA trade agreement with the EU and Serbia's membership to the CEFTA respectively. These values will be compared with estimated coefficients of the EU dummy variable.

The effect of the accession to the EU is calculated by comparing values of EU and EUSAA coefficients which are 0.931 and 0.810 respectively. The difference of 0.121, calculated by subtracting the coefficient of EUSAA from the coefficient of EU, shows the amount of trade which Serbia can gain with EU trade partners should the accession take place. This increase is equal to approximately 13% more trade with EU member states. This positive effect of joining EU is later compared with the possible negative effect of leaving CEFTA. The effect of ending membership with CEFTA is measured by comparing joined values of EU and EUSAA coefficients with values of CEFTA dummy variable, i.e. subtracting the sum of EU and EUSAA coefficients from CEFTA coefficient. This amount is equal to 0.153. This means that Serbia will trade 16% fewer agri-food products with CEFTA partners.

Table 21 shows actual and predicted trade of Republic of Serbia in terms of exports concerning the EU and the CEFTA trade regions following Serbia's accession to the EU. Actual trade values are based on Serbian agri-food trade data for the year 2015. Predicted trade values are estimated with the help of the coefficients of the gravity model, that is, by comparing coefficients of the gravity model as illustrated above. Other possible trade effects that might encounter in the case of Serbia are not taken into consideration (e.g. whether Serbia will join EU-sanctions on Russia), and therefore, it is assumed that trade with other countries will remain similar and not drastically change.

Table 21: Actual and predicted trade of Serbia (in million EUR)

Partner	Actual trade	Predicted trade	Difference
EU	1,214	1,372	+ 158
CEFTA	832	699	- 133
Total difference			+ 25

As the table demonstrates, the hypothetical situation of Serbia's EU accession will result in roughly 158 million euro increase of agri-food exports towards EU member states, while exports towards CEFTA countries will decrease by around 133 million euro. By comparing these two values, it is observable that the EU accession has a positive effect on Serbian trade. The difference between the trade-creating effect of EU accession and trade-diverting effect of losing CEFTA membership creates a positive value of approximately 25 million euro.

This means that the total welfare effect is positive and leads to trade creation rather than trade diversion for the trade of Serbia with analyzed countries. There are two things to be noted. First, it can be seen that the accession to the EU leads to a higher trade of agricultural products with the member states of the EU. Second, leaving CEFTA area does not diminish trade with remaining CEFTA or SAA members to the significant level that brings trade diversion. This is mostly because these countries are historically linked with Serbia through trade (e.g. Bosnia and Herzegovina), strong political (e.g. Russia), cultural or social (e.g. Macedonia) ties, a shared common border (e.g. Albania), and in the past formed a single country (e.g. Montenegro). Therefore, it can be concluded that the possible EU accession has a positive impact on Serbian agricultural sector and will not cause detrimental effects on the agricultural trade.

Chapter 7

Conclusion

The objective of the thesis was to analyze the current agricultural state of Serbia, the determinants of bilateral agricultural trade flows between Serbia and main trade partners, as well as the impact of Serbian accession to the EU concerning the agricultural trade. The topic was chosen due to the fact that Serbia is a candidate country for EU membership and due to the role agricultural sector has in the Serbian economy. The main interest of the study was to illustrate the effects of EU accession on Serbian exports of agricultural products and to give insights on whether the benefits of EU membership will outweigh costs in terms of agricultural trade. This was performed using the econometric framework that analyzes bilateral trade flows and explains export determinants of Serbia.

The first section covered the introduction in which brief overview of the thesis was given.

The second chapter presented models of economic integration and the notion of trade creation and diversion. Viner's theory of customs union was explained in detail to illustrate advantages and disadvantages of the formation of the customs union. Viner was the first to show that formation of customs union does not necessarily result in positive welfare effects to member countries. Subsequent theories on to Viner's theory were discussed as well who confirmed that no general statement could be made regarding whether customs unions produce more economic gain than harm to member countries. This chapter also illustrated theoretical foundations of the gravity equation and economic frameworks of the gravity model which explain bilateral trade flows. According to the general gravity model, the

volume of trade between two countries is proportional to their economic sizes and inversely proportional to the distance between them.

The third chapter introduced the concept of agriculture protectionism and described main trade policy instruments used by the governments to protect agricultural sector. Tariffs, import or export quotas, and government subsidies are among the most popular methods that give protection to the domestic producer. The last part of the chapter provided analysis of agricultural protection across selected countries and summarized the EU's Common Agricultural Policy. The OECD report showed that in the period 2013-15 the average support level in agriculture was around 17% of the gross farm receipts. Countries with the lowest and highest support were New Zealand and Japan respectively. The EU's support level has reduced significantly since 1990 but remained slightly above the OECD average (19%).

The fourth chapter gave an extensive analysis of the Serbian economy. The macroeconomic data for the period 2011-15 showed that GDP growth rate of Serbia fluctuated from negative to positive values. Although the Serbian GDP doubled in the last ten years, its GDP per capita remained fairly low. Compared to ex-Yugoslavia countries, Serbian GDP per capita was lower than Slovenia, Croatia, and Montenegro. Trade data suggested that exports and imports have constantly been growing since 2001. Exports were growing faster than imports, and this resulted in an increased share of imports by exports which in 2015 was about 83%. The EU contributed to about 60% of foreign trade and was followed by the CEFTA member countries. Italy and Germany were the first two primary export and import destinations. Serbia has signed eight trade agreements, the most important ones being made with the EU, CEFTA and Russian Federation. The section concluded with a brief overview of the current state of Serbian accession to the EU.

The fifth chapter provided a comprehensive analysis of agricultural sector of Serbia. The analysis showed that agriculture represents one of the key sectors in Serbia as it employs about 20% of the workforce and contributes around 7% to the country's GDP. The agricultural contribution to total employment and country's GDP was higher than the average level of the EU and most European countries. The data revealed that the farming structure in Serbia is made of small farms up to 5 hectares which account for roughly three-quarters of the total number of holdings. However, small farms in Serbia make a very low

share in utilized agricultural area (8%), whereas they occupy in EU almost half of the total utilized agricultural land (43%). It was found that Serbia has a positive trade balance in agriculture. In 2015, exports of agricultural goods covered more than one fifth of total exports, while imports containing agricultural goods had a share of 8% in total imports. The EU remained the most important trading partner for Serbia and it accounted for half of the trade, followed by the CEFTA participants who made one-third of the total trade.

The sixth chapter presented gravity model for analyzing determinants of bilateral trade flows between Serbia and main trading partners and demonstrated trade potentials for Serbian agricultural exports. Gravity model was estimated by means of PPML method relying on the agricultural data from 38 countries for the year 2014. The estimated coefficients had the expected signs and indicated that bilateral trade flows between Serbia and its main trading partners are affected by the GDP, population of the importer, the distance between countries, common border, landlocked territories and existing trade agreements. The population of the exporter (home country) and common language were insignificant indicating that they do not influence bilateral trade flows.

Economic size elasticities of Serbia and its trading partners are positively signed. This means that increase in GDP of Serbia and trading partners has a positive impact on the bilateral flows between them. In particular, GDP elasticity of trading partners' has a superior impact as it is higher than the corresponding of Serbia. The population of Serbia's trade partners negatively influences bilateral trade. The geographical distance negatively influences bilateral trade between countries. It was estimated that landlocked countries negatively impact the trade. If both countries are landlocked their incentive to trade will be lower compared to those countries who are not landlocked. Common border positively influences the trade between two countries. Countries sharing a border trade are more likely to trade between themselves than with other non-bordering countries. The values of dummy variables that describe the effect of Serbia's trade agreements with the EU member countries, SAA countries, CEFTA participants and Russian Federation are 0.931, 0.810, 1.894 and 1.366 respectively. The positive sign indicates that all trade agreements generate trade opportunities among member countries. The effect of EU membership was assessed by looking at the values of EU and SAA. It was estimated that the Serbia accession to the EU

would bring 13% more agricultural trade with the EU member states. On the contrary, the effect of leaving CEFTA will bring 16% less agricultural trade with CEFTA signatories. The hypothetical trade potential estimation based the data for the year 2015 showed that in absolute terms EU membership brings around 158 million euro increase of agri-food exports to EU member countries, while losing CEFTA membership leads to decrease by about 133 million euro of agri-food exports. The positive difference of 25 million euro demonstrates that Serbia's accession to the EU results in trade creation rather than trade diversion. Thus, it can be expected that trade with EU member countries will probably be even larger than predicted due to a huge market potential, while trade with CEFTA partners will not significantly drop and will continue to be at the similar level as before, as most of the CEFTA countries share borders with Serbia and have common historical and cultural ties with this country.

This study also has some limitations. One possible limit refers to the time dimension of the dataset, as the model takes into account the cross-sectional data for the year 2014. As the GDP and the trade volume among countries vary over the years, the development of the dataset which includes observations over time may give more insights into the determinants factors bilateral agricultural trade of Serbia. For example, it would be interesting to see what kind of impact the SAA agreement has made when it is considered from the moment of its implementation to today. Additionally, the data contains trade in all agricultural sectors, but as the paper suggests, the exports of Serbia consist of different products than imports, and the similar could be said for other markets. Thus, including all agricultural production might have over or underestimated the weight of the coefficients in the model. Lastly, choosing countries that are main partners of Serbia in the agricultural trade may leave the parameters inconsistent. To make the model more robust and to avoid any biased estimates all countries should be taken into account. When performing future research all the above suggestions should serve as references.

Bibliography

Agriculture and Horticulture Development Board. (2016). *Agricultural policy models in different parts of the world.* Agriculture and Horticulture Development Board.

Aksoy, M. A., & Beghin, J. C. (2004). *Global agricultural trade and developing countries.* World Bank Publications.

Anderson, J. (1979). A Theoretical Foundation for the Gravity Equation. *The American Economic Review, 69*(1), 106-116.

Anderson, J., & Van Wincoop, E. (2003). Gravity with gravitas: a solution to the border puzzle. *The American Economic Review, 93*(1), 170-192.

Bacchetta, M., Beverelli, C., Cadot, O., Fugazza, M., Grether, M., Helble, M., & Piermartini, R. (2012). *A Practical Guide to Trade Policy Analysis.* Geneva: WTO Publications.

Balassa, B. (1961). *The theory of economic integration.* R.D. Irwin.

Baldwin, R., Wyplosz, C., & Wyplosz, C. (2006). *The economics of European integration* (Vol. 2). London: McGraw-Hill.

Belgrade Chamber Of Commerce. (2014). *100 pitanja i odgovora o Evropskoj Uniji za poljoprivrednike.* Belgrade: Belgrade Chamber Of Commerce.

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

Caballero, J. M., Calegar, G., & Cappi, C. (2000). Instruments of Protection and their Economic Impact. In I. o. Impact, *Multilateral trade negotiations on agriculture - A Resource Manual.* Rome: FAO.

Charles, C., & Massel, B. (1965). Toward a General Theory of Customs Unions for Developing Countries. *Journal of Political Economy, 73*(5), 461-476.

Cherunilam, F. (2008). *International economics.* New Delhi: Tata McGraw-Hill.

Daszkowska, E., & Mudri, G. (2009). Does the Common Agricultural Policy still make sense in the twenty-first century? CAP after 2013 from the perspective of Poland and Hungary. *Journal of Agribusiness, 14*, 13-32.

Deardorff, A. (1995). Determinants of Bilateral Trade: Does Gravity Work in a Neoclassical World? *The Regionalization of the World Economy*, 7-32.

Eaton, J., & Kortum, S. (2002). Technology, Geography, and Trade. *Econometrica, 70*(5), 1741-1779.

Bibliography

Eduard, M. (2015). Economic Determinants of Regional Integration in Developing Counties. *International Journal of Business & Management, III*(3), 22-39.

Eruygur, H., & Cakmak, E. (2008). Eu Integration of Turkey: Implications for Turkish Agriculture.

European Comission. (2016). *Agri-food Trade Statistical Factsheet / European Union - Serbia.* Brussels: Directorate-General for Agriculture and Rural Development.

European Comission. (2016, May 13). *EU Funds - The multi-annual financial framework 2014-2020*. Retrieved from European Comission: http://ec.europa.eu/clima/policies/adaptation/financing/funds/index_en.htm

European Commision. (2014, December 22). *Introduction - Importance of rural development*. Retrieved from European Commision: https://enrd.ec.europa.eu/en/policy-in-action/rural-development-policy-overview/introduction

European Commission. (2008, 04 18). *Rural Development Policy 2007-2013*. Retrieved May 15, 2016, from European Commission: http://ec.europa.eu/agriculture/rurdev/index_en.htm

European Commission. (2014, 03 26). *Rural development policy overview*. Retrieved from European Commission: http://enrd.ec.europa.eu/enrd-static/policy-in-action/rural-development-policy-overview/axes-and-measures/en/axes-and-measures_en.html

European Commission. (2015, April 22). *Agriculture and environment - Cross compliance*. Retrieved from European Commission: http://ec.europa.eu/agriculture/envir/cross-compliance/index_en.htm

European Union. (2014). *The EU explained: Agriculture.* Luxembourg City: Publications Office of The European Union.

Eurostat. (2015). *Agriculture, forestry and fishery statistics.* Luxembourg: Publications Office of the European Union.

Eurostat. (2016). *Real GDP growth rate.* Brussels: Eurostat.

Feenstra, R. C. (2004). *Advanced International Trade: Theory and Evidence.* New Jersey: Princeton.

Gehrels, F. (1956). Customs Union from a Single-Country Viewpoint. *The Review of Economic Studies, 24*(1), 61.

Gómez-Herrera, E. (2013). Comparing alternative methods to estimate gravity models of bilateral trade. *44*(3), 1087-1111.

Grossman, G., & Rogoff, K. (1997). *Handbook of International Economics* (Vol. 3). Amsterdam: Elsevier.

Hackett, C. (1995). *Cautious Revolution: The European Union Arrives.* Westport: Greenwood Press.

Hatab, A., Romstad, E., & Huo, X. (2010). Determinants of Egyptian agricultural exports: A Gravity model approach. *Modern Economy, 1*(03), 134.

Helpman, E., & Krugman, P. (1985). *Market structure and foreign trade: Increasing returns, imperfect competition and the international economy.* Massachusetts: MIT Press.

Hosny, A. S. (2013). Theories of economic integration: a survey of the economic and political literature. *International Journal of economy, management and social sciences, 2*(5), 133-155.

International Food Policy Research Institute. (2007). *Impact of Trade Liberalization on Agriculture in the Near East and North Africa.* Washington,: International Food Policy Research Institute.

International Republican Institute. (2015). *Survey of Serbian Public Opinion.* International Republican Institute.

ISAC Fund. (2008). *Ekonomsko - privredni vodič kroz Sporazum o stabilizaciji i pridruživanju.* Belgrade: ISAC Fund.

Jayasinghe, S., & Sarker, R. (2008). Effects of regional trade agreements on trade in agrifood products: evidence from gravity modeling using disaggregated data. *Applied Economic Perspectives and Policy, 30*(1), 61-81.

Johnson, H. (1974). Trade-diverting customs unions: A comment. *The Economic Journal*, 618-621.

Josling, T. (1993). Protectionism in agriculture: Slow progress towards freer trade in agricultural products. *Open Economies Review, 4*(2), 211–228.

Koo, W., Kennedy, L., & Skripnitchenko, A. (2006). Regional Preferential Trade Agreements: Trade Creation and Diversion Effects. *Applied Economic Perspectives and Policy, 28*(3), 408-415.

Krauss, M. (1972). Recent developments in customs union theory: An interpretive survey. *Journal of economic literature, 10*(2), 413-436.

Krishnakumar, J. (2002). A SUR-EC-AR system gravity model of trade. *10th International Conference on Panel Data.* Berlin: International Conferences on Panel Data.

Krugman, P. (1979). Increasing returns, monopolistic competition, and international trade. *Journal of International Economics, 9*(4), 469-479.

Lambert, D., & McKoy, S. (2009). Trade creation and diversion effects of preferential trade associations on agricultural and food trade. *Journal of Agricultural Economics, 60*(1), 17-39.

Linnemann, H. (1967). An Econometric Study of International Trade Flows. *The Economic Journal, 77*(306), 366-368.

Lipsey, R. G. (1957). The Theory of Customs Unions: Trade Diversion and Welfare. *Economica, 24*(93), 40.

Lipsley, R. (1960). The theory of customs unions: A general survey. *The economic journal, 70*(279), 496-513.

Meade, J. E. (1955). *The theory of customs unions* (Vol. 1). Amsterdam: North-Holland Publishing Company.

Michalopoulos, C., & Tarr, D. (1997). The economics of customs unions in the Commonwealth of Independent States. *Post-Soviet Geography and Economics, 38*(3), 125-143.

National Bank of Serbia. (2016, October 14). *Key Macroeconomic Indicators.* Retrieved from National Bank of Serbia: http://nbs.rs/export/sites/default/internet/latinica/80/osnovni_makroekonomski_indikatori.xls

OECD. (2001). *The Uruguay Round Agreement on Agriculture: An Evaluation of Its Implementation in OECD Countries.* Paris: Organisation for Economic Co-operation and Development.

OECD. (2009). *Overview of the OECD Indicators of Agricultural Support.* OECD.

OECD. (2016). *Agricultural Policy Monitoring and Evaluation 2016.* OECD.

Oudenaren, J. V. (2004). *Uniting Europe: An Introduction to the European Union.* Lanham: Rowman & Littlefield Publishers.

Panagariya, A. (2000). Preferential trade liberalization: the traditional theory and new developments. *Journal of Economic literature, 38*(2), 287-331.

Pöyhönen, P. (1963). A Tentative Model for the Volume of Trade between Countries. *Weltwirtschaftliches Archiv*, 93-100.

Schnepf, C. H. (2006). *WTO Doha Round: The Agricultural Negotiations.* BiblioGov .

Serbia Ministry of Agriculture and Environmental Protection. (2015). *Zelena knjiga 2015.* Belgrade: Serbia Ministry of Agriculture and Environmental Protection.

Sgro, P. M. (2009). *International Economics, Finance and Trade - Volume I.* EOLSS Publications.

Bibliography

Statistical Office of the Republic of Serbia. (2012). *Census of Agriculture.* Belgrade: Statistical Office of the Republic of Serbia.

Statistical Office of the Republic of Serbia. (2016). *Statistical Yearbook of the Republic of Serbia - National accounts.* Belgrade: Statistical Office of the Republic of Serbia.

Strielkowski, W. (2013). *Viner's Model of Customs Union.* Retrieved from Institute of Economic Studies, Faculty of Social Sciences, Charles University in Prague: http://ies.fsv.cuni.cz/default/file/download/id/24687

Sukanovic, S. (2010). *International Trade: Theory and Policy.* Washington: Saylor Foundation.

Tankosić, J. V., & Stojsavljević, M. (2014). EU Common Agricultural Policy and pre-accession assistance measures for rural development. *Economics of Agriculture, 61*(1), 195-210.

The World Bank. (2015, September 28). *Modest recovery, Migraton on Balkan Minds*. Retrieved May 29, 2016, from The World Bank: http://www.worldbank.org/en/news/press-release/2015/09/28/modest-recovery-migration-on-balkan-minds

The World Bank. (2016). *GDP per capita (current US$).* Washington: The World Bank.

The World Bank. (2016). *World Development Indicators.* Washington: The World Bank.

Tinbergen, J. (1962). *Shaping the World Economy; Suggestions for an International Economic Policy. Books (Jan Tinbergen).* New York: Twentieth Century Fund.

United Nations. (2013). *The Gravity Model of International Trade: A User Guide.* Bangkok: United Nations.

USDA Foreign Agricultural Service . (2015). *Serbia Exporter Guide - Road map to the Serbian market.* Belgrade: USDA Foreign Agricultural Service .

Viner, J. (1950). *The Customs Union Issue.* Oxford: Oxford University Press.

World Bank. (2001). *Global Economic Prospects and the Developing.* Washington: World Bank.

Zahniser, S., Pick, D., Pompelli, G., & Gehlhar, M. J. (2002). Regionalism in the Western Hemisphere and its impact on US agricultural exports: A gravity-model analysis. *American Journal of Agricultural Economics, 84*(3), 791-797.

Appendix

Table A1: GDP, share of agriculture, GDP from agriculture and population

Country	GDP (billion US$)	Share of agriculture (%)	GDP from agriculture (billion US$)	Population (million)
Austria	436.89	1.40	6.12	8.6
Albania	13.28	22.90	3.04	2.9
Belgium	531.23	0.70	3.72	11.3
Bosnia and Herzegovina	18.52	7.24	1.34	3.8
Bulgaria	56.72	5.27	2.99	7.2
Croatia	57.14	4.33	2.47	4.2
Cyprus	23.23	2.35	0.55	1.2
Czech Republic	205.27	2.70	5.54	10.6
Denmark	346.12	1.58	5.47	5.7
Estonia	26.49	3.44	0.91	1.3
Finland	272.34	2.84	7.73	5.5
France	2829.19	1.73	48.94	66.8
Germany	3868.29	0.68	26.30	81.4
Greece	235.57	3.84	9.05	10.8
Hungary	138.35	4.46	6.17	9.8
Iceland	17.04	6.91	1.18	0.3
Ireland	250.81	1.56	3.91	4.6
Italy	2138.54	2.16	46.19	60.8
Latvia	31.29	3.27	1.02	2
Lithuania	48.35	3.44	1.66	2.9
Luxembourg	64.87	0.30	0.19	0.6
Malta	9.6	1.92	0.18	0.4
Montenegro	4.59	10.01	0.46	0.6

Netherlands	879.32	1.83	16.09	16.9
Norway	500.52	1.62	8.11	5.2
Poland	544.98	2.94	16.02	38
Portugal	230.12	2.33	5.36	10.3
Moldova	7.98	15.47	1.23	3.6
Romania	199.32	5.33	10.62	19.8
Russian Federation	2030.97	4.21	85.50	144.1
Serbia	44.21	9.28	4.10	7.1
Slovakia	100.25	4.40	4.41	5.4
Slovenia	49.49	2.20	1.09	2.1
Spain	1381.34	2.52	34.81	46.4
Sweden	571.1	1.38	7.88	9.8
Switzerland	701.04	0.75	5.26	8.3
Macedonia	11.32	11.61	1.31	2.1
United Kingdom	2990.2	0.69	20.63	65.1

Table A2: Common official and second languages

Language	Country
Dutch	Belgium, the Netherlands
English	Ireland, Malta, United Kingdom
French	Belgium, France, Luxembourg, Switzerland
German	Austria, Belgium, Germany, Luxembourg, Switzerland
Italian	Italy, Switzerland
Romanian	Moldova, Romania
Serbo-Croatian	Bosnia and Herzegovina, Croatia, Montenegro, Serbia
Greek	Cyprus, Greece
Swedish	Finland, Sweden

Table A3: Landlocked countries

Landlocked countries	
Austria	Macedonia
Czech Republic	Serbia
Hungary	Slovakia
Luxembourg	Switzerland

Table A4: Common borders

Country	Bordering with
Austria	The Czech Republic, Germany, Hungary, Italy, Slovakia, Slovenia, Switzerland
Albania	Montenegro, Macedonia, Greece, Serbia
Belgium	Luxembourg, Germany, Netherlands, France
Bosnia and Herzegovina	Croatia, Montenegro, Serbia
Bulgaria	Greece, Macedonia, Romania, Serbia
Croatia	Bosnia and Herzegovina, Hungary, Montenegro, Serbia, Slovenia
Cyprus	-
Czech Republic	Austria, Germany, Poland, Slovakia
Denmark	Germany
Estonia	Latvia, Russian Federation
Finland	Norway, Russian Federation, Sweden
France	Belgium, Germany, Italy, Luxembourg, Spain, Switzerland
Germany	Austria, Belgium, Czech Republic Denmark, France, Luxembourg, Netherlands, Poland, Switzerland
Greece	Albania, Bulgaria, Macedonia
Hungary	Austria, Croatia, Romania, Serbia, Slovakia, Slovenia
Iceland	-
Ireland	United Kingdom
Italy	Austria, France, Slovenia, Switzerland
Latvia	Estonia, Lithuania, Russian Federation
Lithuania	Latvia, Poland, Russian Federation
Luxembourg	Belgium, France, Germany
Malta	-
Montenegro	Albania, Bosnia and Herzegovina, Croatia, Serbia
Netherlands	Belgium, Germany
Norway	Finland, Russian Federation, Sweden
Poland	Czech Republic , Germany, Lithuania, Russian Federation, Slovakia

Portugal	Spain
Moldova	Romania
Romania	Bulgaria, Hungary, Moldova, Serbia
Russian Federation	Estonia, Finland, Latvia, Lithuania, Norway, Poland
Serbia	Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Hungary, Montenegro, Romania, Macedonia
Slovakia	Austria, Czech Republic, Hungary, Poland
Slovenia	Austria, Croatia, Hungary, Italy
Spain	France, Portugal
Sweden	Finland, Norway
Switzerland	Austria, France, Germany, Italy
Macedonia	Albania, Bulgaria, Greece, Serbia
United Kingdom	Ireland

Table A5: List of trade agreements

Trade agreement	Country
EU	Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom
EUSAA	EU-28 Albania, Bosnia and Herzegovina, Kosovo*, Macedonia, Montenegro, Serbia
CEFTA	Albania, Bosnia and Herzegovina, Kosovo*, Moldova, Montenegro, Serbia
RUSSIA	Russian Federation Moldova, Serbia
EFTA	Iceland, Norway, Switzerland Albania, Bosnia and Herzegovina, Macedonia, Montenegro, Serbia