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Assessment of the Effects of Sanctions on Trade between

the EU and Russia

Master dissertation

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Declaration of authorship

I, **Barbara Hašková**, hereby declare that the thesis "Assessment of the Effects of Sanctions on Trade between the EU and Russia" was written by myself, and that all presented results are my own, unless stated otherwise. The literature sources are listed in the References section.

Prague, September , 2015

Signature

Abstract

This thesis concerns about the effectiveness of sanctions imposed between Russia and the EU in 2014. Firstly are conducted theoretical foundations of sanctions and their imposition from the EU as well as Russian contra-sanctions. Secondly, the analysis is based on the gravity model in trade in log-linear form and further develop out-of-sample estimations about trade potentials. Although trade potentials did not proved the expected decrease in exports from EU to Russia, the Input-Output analysis of impacts on exports of food products did so. Results yielded calculated impacts on GDP of various countries due to food embargo that are more or less comparable with the actual evolution of GDP and tradeflows. Thirdly, the indirect effects of sanctions of third country effect and re-exports are observed from trade patterns. There has been recorded increased exports of food related products from the EU towards members of Euroasian Customs Union as well as increased imports from these countries to Russia. Finally, the results points out decreased economic activity of Russia due to depreciation of domestic currency, capital flight, decline in oil prices and also sanctions adding up to the problems the economy deals with. The economic impacts of sanctions are present in both parties. However, from the political view sanctions did not proved to be effective so far. Russian intervention in Ukraine territory is continuing.

Key words:

Sanctions, Russia-Ukraine conflict, EU-Russia tradeflows, gravity model, out-of-sample analysis, trade potentials, Input-Output analysis, re-exports.

List of abbreviations

AA/DCFTA	Association Agreement/Deep and Comprehensive Free Trade Area
CPA	Statistical Classification of Products by Activity
DCFTA	Deep and Comprehensive Free Trade Area
EaP	The Eastern Partnership
EU	The European Union
FE	Fixed Effects Model
GDP	Gross Domestic Product
HSEO	Hufbauer, Schott, Elliott and Oegg – Economic Sanctions Reconsidered 3rd
	edition
ILSA	Iran and Libya Sanctions Act
ITC	International Trade Centre
ΙΟ	Input-Output model
LSDV	Least Square Dummy Variables
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
OSCE	Organization for Security and Cooperation in Europe
RCB	Central Bank of Russia
RE	Random Effects Model
SE	Standard Errors
SITC	Standard International Trade Classification
S&P	Standards and Poor's
WITS	World Integrated Trade Solution, The World Bank

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Introduction

This thesis is engaged in the analysis of the sanctions imposed on trade between the EU and Russia. In consideration of the latest events in Ukraine and its conflict with Russia, foundation and efficiency of the sanctions imposed are important and much discussed. The main reason for the development of this topic is the magnitude of the effects for the EU and Russia. In global world the economic and trade relations between countries is a vital part of their functioning and major changes caused by sanctions can result into economic imbalances and unrest among the population. Whether these sanctions have been effective or not is an important question not only for economists but for the EU as well. However, their assessment is much complicated that it seems and the evaluation of its political and economic efficiency is not so simple.

Respecting the territorial integrity is one of the basic principles of developed countries and one would think in 21th century also valued axiom in Europe. However, the latest situation in Ukraine proves us wrong. The interference of Russia against Ukrainian sovereignty has been seen as an act of aggression and therefore required necessary measures taken by the EU and other governments. The EU approved that Ukrainian sovereignty was clearly violated by Russia in March 2014. From that date, in order to retrieve peace in Ukraine-Russian border and avoid deeper violence respectively, the EU decided to take action and has imposed economic sanctions on Russia, followed by the United States, Norway, Canada, Australia and others.

All of these actions resulted in the Ukrainian crisis and have contributed to the collapse of the ruble and the Russian crisis. Moreover, the depth and width of the sanctions are spreading as the war in the Donbass region is continuing. Although sanctions can be effective measure in fighting with injustice, numerous EU politicians disagree with them and insist on their negative effects for EU economic subjects¹. Grounds of these ideas is in fact that Russia is an important trade partner for many companies in EU countries and equally important, Russia is a relevant importer of energy (crude oil, natural gas, refined petroleum) into the EU region.

Needlessly to say, conflict represents very unpleasant situation for the EU, Ukraine and Russia and complicates fragile economic recovery after the Great recession and the debt crisis in the EU. Therefore, it is important and interesting to conclude how these sanctions affected

¹ Often we see that sanctions are not effective and are used more as a symbol of power than means for changing policies. For example, long US embargo on Cuba caused more harm than success or EU embargo on arms exports to China.

the trade and the countries themselves.² Consequently, the main goal and the research question of this thesis is to assess the effects of the sanctions on trade and predict the main consequences for the concerned states. My expectations are that the sanctions reduced the trade between the EU and Russia with deteriorated trading conditions of Russia.

The research will be conducted as an empirical work based on the analysis of the trade flows between EU and Russia with prediction of the future development and the conduction of the prediction with the reality in 2014 with further implication to the possible effects for exporting countries. The effects of oil and gas prices and other impacts on economy that might influence this research will be discussed but the research by itself is based on trade effects from sanctions. However, these "side effects" as re-export or third country effects are often mentioned in explanation of the outcome of the research hence cannot be ignored.

The most useful sources for this work are the statistical databases from Eurostat COMEXT offering whole range of data needed for the empirical part. The data includes exports and imports between Russia and the EU, GDP and the distance between the commerce centres and the exchange rate between the EU and Russia from 2000 until 2014. These gravity variables were retrieved from Eurostat, OECD statistical database, CEPII database, UN Comtrade and Central bank of Russia database. The study will be proceeded by running regression for trade flows.

In order to have a clear image about the sanctions the thesis is divided into theoretical and empirical parts. Theoretical part includes first chapter and empirical part second and third chapter. Firstly the thesis describes previous attempts of sanctions used in trade and briefly discussed their political and economic impact. First chapter also characterises sanctions imposed by the EU and consequently the response to these by Russia. Moreover, the first chapter describes the reasons of this study and why the effects of sanctions should be analysed. The reasons behind the imposition of sanctions will be briefly discussed but I will not be focusing on them.

In the empirical part, second chapter consists of the out-of-sample forecast including the prediction of the possible evolution of the trade between the EU and Russia without sanctions by gravity model followed by comparison with the reality. Third chapter completes the work by simple input-output model of the predicted consequences with possible indirect effects. Lastly, conclusion sums up findings and try to give the most appropriate answer to the research question.

 $^{^2}$ "Not In My Back Yard" syndrome – characterise governments by proposing a new solution that is needed but that have negative impacts on other countries (further the better).

This thesis will convey the findings that are able to assess and estimate with given access to data in order to provide reliable opinion about the effects of sanctions on trade between the EU and Russia.

1 Sanctions in brief

Definition of sanctions can vary among different organisations, states or persons. According to the EU "sanctions as restrictive measures against third countries, individuals or entities, are an essential EU foreign policy tool that it uses to pursue objectives in accordance with the principles of the Common Foreign and Security Policy." James Lindsay defines sanctions "as measures in which one country (the initiator) publicly suspends a major portion of its trade with another country (the target) to attain political objectives" (Lindsay, 1986, p.153). Most of the economists agree upon this definition and therefore are sanctions generally considered as restrictive measures that are allowed to impose in the case of preventive actions. However what politicians consider as legitimate preventive action is mostly subjective opinions and difficult to define.

Among the types of sanctions is important to mention that the greatest share have unilateral sanctions. These are enforced by one country due to disagreement with the way of leading other country (whether it is human rights violation or mode of government) and desire to change it. The case of multilateral sanctions is applied by one or more countries on a number of countries. The occurrence of complete embargos on a country are not so common however, we can meet with examples of such a resolution.³ The question of efficiency of multilateral sanctions compared to unilateral is researched in many studies⁴ however most of the policymakers are more disposed towards multilateral sanctions due to significant cut off of the trade whereas unilateral sanction might only divert the trade (Hufbauer, Schott, Elliott, 1990).

Imposition of economic sanctions results from various economic and political reasons. Usually the main goal of sanctions is to change the policy of targeted country. According to Robert A. Pape there are two main categories of restrictions; financial and trade. Trade restrictions can suspend trade by charging higher tariffs hence restrict export and import. Financial flow may be as well completely or partially blocked via asset freezing. However, from the experience with sanctions in the past, its efficacy of achieving its goal is disputable. Nonetheless there are three main purposes of governments to impose sanctions and these are to coerce, constrain or signal. Coercive sanctions has the effect of changing target's behaviour

³ The most famous cases are Napoleon's Continental System (1806-1814) against British trade that proved to be very ineffective, US embargo on Cuba or the EU and US arms embargo on China.

⁴ Haufbeur, Schott and Elliott study in *Economic Sanctions reconsidered* presents unilateral sanctions as working better; Morgan and Bapat in *Multilateral Versus Unilateral Sanctions Reconsidered: A Test Using New Data* prove that multilateral sanctions are more effective in pursuing their goal depending on the number of issues and engagement of international organisations.

according to sender's desire. Usually they are restrictive measures concerning violation of human rights and religious cases fighting against terrorism and inequality. For example embargo on Cuba or sanctions against North Korea, Brazil and others. Constraining sanctions have the opposite goal as coercive. They try to prohibit target from implementing undesired actions. Both their successes is conventionally measured if there either was or was not the alteration of the target's behaviour so the costs of target's actions is increasing. Lastly, signalling sanctions do not pose direct material damage to target hence their success cannot be measured by cost-benefit function. Their effectiveness can be seen as reactions that were expected.

By choosing the way of sanctions, often countries avoid military actions or war. Before the decision on such a radical step, diplomatic talks, public persuasion or non-economic sanctions can take place but when they fail, economic sanctions will be most likely applied. Every sanctions can have different purpose and therefore its success has to be measured according to the purpose it has. In addition, they are part of the foreign policy hence has to set into its objectives.

Aforementioned, economic sanctions represents a form of avoiding war conflict that could be too aggressive or even expensive, and meanwhile are enough to make a theatrical impression for others who try to break international order. However, they are never costless and often do not accomplish their main goal or accomplish goal with "side effects". The most important focus in assessing economic sanctions is on their costs, response of a target country and attitude of third countries (Caruso, 2003, p. 2). Costs of embargo, export or/and import restrictions can climb higher than expected benefit of the goal which ultimately may not even be accomplished. Country imposing these measures has to face a decrease of trade exported to the target country, losing the market and investment opportunities. In addition, the effects on third countries are unpredictable as they might be positive tool for punishment but also have negative consequences from spillovers.

For better image, next section describes shortly the most interesting cases and later sanctions imposed by the EU and Russia separately.

1.1 Literature overview on trade sanctions

For the review of trade sanctions in the past and their assessment is considered as a "Holy Grail" study work of Gary Clyde Hufbauer, Jeffrey J. Schott and Kimberly Ann Elliott *Economic sanctions reconsidered*. Its third edition from 2007 involves the contribution of

Barbara Oegg and is a base work on sanctions for this review. According to HSE the origins of sanction policy dates back to Athenian Empire. Shortly before the outbreak of the Peloponnesian, war there was a Megarian Decree representing the set of economic sanctions and put fire into the fragile relations between Sparta and Athens. In spite of fact that sanctions were used from 432 BC, the focus is on sanctions starting from World War I, due to abstruseness of cases and data. HSEO analysed 174 cases of economic sanctions through 1914 till 2005. Each case is judged by its goals, response of the target, attitudes of third countries, economic costs to both sender and target⁵. Among main conclusions was that sanctions can work but their success depends on the type of policy and the change government wants to pursue. From all studied cases, 34% was successful. Half of the cases where the goals of sender were modest (release of political prisoners) attained success and only one-fifth with disruption of military adventures succeeded. All in all HSEO stands behind the opinion that sanctions can work but they need to fit into the situation and on the other hand cannot have conflicting goals or too high hopes for what they want to achieve (HSEO, 2007, p. 2-10).

Another interesting study is by James M. Lindsay, *Trade Sanctions as Policy Instruments: A Re-Examination*, 2002. By studying 19 sanction cases and their 3 goals (compliance, subversion or deterrence), he researched whether governments can achieve their initial goals via sanctions. Lindsay here agrees that sanctions are strong political symbols and can work for governments to satisfy public expectations. Lindsay divided initial objectives into five categories. (1) Goal of compliance is to transform behaviour in a way that identify with initiator. (2) Concept of subversion means removal of the entire regime. These types of sanction is usually used to avoid war conflicts or to change behaviour of some leaders. (3) Another objective of initiator may be deterrence, to prevent the target from repeating actions, or (4) international symbolism to express a disagreement to other countries all over the world. (5) Finally, initiator might be also willing to act in order to get a domestic approval and avoid criticism about its foreign policy. Each of 19 cases was assigned whether the objective was desired or not (Lindsay, 1986, p. 155-156).

This part will review the most famous and interesting cases of sanctions following these two important studies and combining their findings with other similar studies.

The most common initiators of sanctions are the USA and EU. Together they imposed so far, more than a half of all sanctions over the world ever. The most famous cases of US sanctions

⁵ Sender is a country imposing sanctions and target is a country on which sanctions were imposed (HSEO, 2007, p.2)

are those imposed on North Korea since 1950 and Cuba since 1960 where sanctions did not accomplish the main objectives.

North Korea case is an isolated case outset as a reaction to Korean War and continued with selected sanctions against North Korea. In 1994, they were changed after North Korea promised to terminate its nuclear weapons programme⁶ and US decided to lighten economic sanctions gradually. After inauguration of George W. Bush, the relations started to be tense and after North Korea's testing of nuclear weapons in 2006, US imposed bans and asset freezes (HSEO, 2007, p.143-144)⁷. On the other hand the EU sanctions imposed on North Korea intended to abolish any aid in nuclear programme while keeping the main economic help (as trade, food aid, assistance in the case of catastrophes) in order to improve their economic development. The goal of sanctions against North Korea is to stabilise the country, non-proliferation of nuclear weapons and respect human rights. However, their effectiveness be questionable. The fact that North Korea is maintaining its independent status and keeping in touch with its allies⁸ from the Cold War time is playing in their benefit. The inequality in country seems to only increase and ruling of Kim Jong-un dictatorship does not show any sign of ending in near future.

The case of long-lasting embargo on Cuba is another interesting case where sanctions failed to achieve its initial goals such as forcing Cuba to establish democracy. Cause of imposing economic sanctions by US in 1960 were Fidel Castro's close relations with Soviet Union and socialist regime (HSEO, 2007 p.146-147). After the collapse of Soviet Union, it was expected from Castro to surrender as well. However, the relations with US were still tight and political discussion remained frozen. The US put effort into lifting embargo under specific conditions but Cuba's political regime refused to change⁹ and so embargo lasted more than 50 years. This year political discussion between Castro's successor Raul Castro and US President Barack Obama yielded success and moves towards complete removal of the sanctions with restoration of diplomatic ties. Yet another case where sanction, even held over 50 years, did not accomplish their goal to reverse Castro's regime and establish democracy with respect to human rights. No other country wanted to join US sanctions and that might be one of the reasons why this case is so long-lasting and propose in the future more effective sanctions by cooperating with other countries to make a change.

⁶ Under the Agreed Framework

⁷ Interesting fact: export ban of luxury good, after the North's Korea nuclear test in 2006, was taken mainly to irritate leader Kim Jong-II who enjoys luxury goods and fancy food from USA (HSEO, 2007, p. 139).

⁸ Help from allies - before USSR and now Russia and China.

⁹ One of the requirements is also compensation for assets confiscated by Cuban government

Among one of the successful stories belong sanctions that contributed at least modestly to overthrew leaders as in cases of Dominican Republic – Rafael Truijllo in 1961, Brazil – Joao Gouralt in 1964, Chile - Salvador Allende in 1973, which proves that sanction might help to achieve their goals (HSEO, 2007, p.13). These cases are assigned with modest goals of overthrow political regimes and they belong among the most successful cases.

To identify success of sanction policy one has to take into account every aspect of the possible effects and not only costs of them and whether sanctions achieved their main goal or not¹⁰. The concept of applying economic sanctions mirrors state's strategy on two levels, different political and economic goals.

On an economic level, sanctions demonstrate a significant negative impact on trade flows between sender and target. In fact, depending on a reliance of the target country on exports from the sender country, sanctions can have a huge negative effect on a choice of goods and services for domestic consumers and on costs of doing business for firms that operates on the sender's market. This economic instability can then result into tendencies towards extremism rather than overthrow of the current regime/government. One possibility how to avoid lower trade flows is to find new markets and allies. The main reason why economic punishment through sanctions often does not work is exactly due to "third country effect" when firms find new suppliers from other countries and hence do not suffer from imposed sanctions. An example from history of Napoleon's Berlin Decree in 1806 of trade embargo on Great Britain proves how smuggling can outdistance sanctions. This blockade ended in 1814 after admitting that it hurt his own economy more than British due to smuggling through borders and opening the British-American trade relation (Arnold, 1998, p.49-54).

On a political level as Lindsay states the reason in continuing imposition of economic sanctions is because "governments believe that domestic or international audiences expect them to react strongly to the target's behaviour" (Lindsay, 1968, p. 171). For political scene, symbols and threats are important. On the other side, HSEO define successful sanctions as those that are appropriate to the circumstances and senders should carefully analyse the unintended costs and consequences as well as do not neglect the importance of possible withdrawal of sanctions when they are no longer necessary (HSEO, 2007, p.178). Although many studies proved sanctions do not achieve its political goals, even Robert Pape's analysis proved only few cases out of more than 100 could be seen as successful, admitted adoption of strict behavioural change criterion that can distort effectiveness of sanctions (Pape, 1997, p. 93). In his article *Why Economic*

¹⁰ For example sanctions imposed on countries where there is a direct threat of nuclear weapons or terrorists actions, sanctions are reasoned whether they eventually accomplish its goal or not

Sanctions Do Not Work from 1997, Robert Pape finds sanctions as rather ineffective tool. On the other hand, David Baldwin suggests in his book *Economic Statecraft* from 1985 more positive view of sanctions and criticize the negative analysis of literature (Eriksson, 2011, p.10).

Each coin has two sides and so does the problem of sanctions. Some are against and some are for them however, the leaders of country decide about whether to sanction or not to sanction. Therefore while analysing data of trade effects of sanctions is important, it does not offer the whole image of the complex phenomena of sanctions and their impacts on countries politically and economically.

1.2 Brief review of conflict

The reasons for imposing the economic sanctions on Russia by many governments and international organisations originate from a conflict between Ukraine and Russia that goes far back to the past. With presidential election's winner Viktor Yanukovych and imprisonment of his opponent Yulia Tymoshenko for abuse of powers in 2010 – 2011 tensions appeared. Small protests started with abandoning the treaty of The Ukraine-European Union Association Agreement about economic, judicial and political convergence towards the EU in 2013. The treaty enables four EaP countries (Armenia, Georgia, Moldova and Ukraine) to later approach DCFTA offering a framework for economic development and opening up to the EU markets (Havlik, 2014, p.1). During summer 2013, Russia's answered negatively since they have seen the treaty as a threat to Russian-Ukrainian Strategic Partnership and Friendship from 1997 and as a threat to Russian relations with EaP countries entirely. The warnings from Russia on that matter were mostly about the possibility of losing Ukraine's most important partner however included also threats of unrest in the country and possible intervention of Russia at the request of pro-Russian regions. Starting with trade restrictions Russia tried to avoid closer relations between EaP countries and the EU (The Economist, 24th August 2013, Trading Insults). This implementation of fear among EaP countries led Armenia to join Russian-led Eurasian Customs Union with Belarus and Kazakhstan instead (Havlik, 2014, p.1).

Postponing signing of AA by Ukraine's president V. Yanukovych the conflict of Russia-Ukraine disagreement resulted in ongoing protests, violent demonstrations and occupations that triggered a wave of discontent of people of Ukraine with the economic and political situation. Violent protests on Kyiv's Maidan were broadcasted all over the world. Immediately after negotiation about early elections and constitutional changes in order to stop protests in February 2014 president Yanukovych disappeared. Transitory government took over, protesters took control over presidential buildings, Yulia Tymoshenko was released from jail and new parliamentary elections were set. In March parliament of Russia approved Putin's request of use of military force in Ukraine in order to protect Russian interests. Afterwards the Crimean crisis and subsequent annexation of Crimea by the Russian Federation accelerated the first wave of reaction of the whole world.

Within approved sanctions on Russia, from March 2014 by the EU, are bans on trade and asset freezes applied to 150 persons (37 entities) held responsible for action against Ukraine's territorial integrity. AA was signed only on 27st June of 2014 by new president Petro Poroshenko. During the year 2014, there were new sanctions introduced from the EU and other countries on Russia due to events on Ukraine's territory¹¹. Also on 4th September 2014, Minsk Protocol about immediate ceasefire was signed by Ukraine, Russia and OSCE due to continuing fighting in Donbass region in Ukraine (OSCE, 15 September 2014). Unfortunately, by January 2015 Minsk Protocol completely failed after the separatists' victory over Donetsk International Airport. A call for new package of measure to stop war in Donetsk occurred at a summit Minsk II on 11 February 2015 with leaders of Germany, Ukraine, Russia and France. This new package was intended to revive agreements upon Donetsk riot however is widely criticized for being too complicated and similar as the previous unsuccessful Minsk Protocol (MacFarquhar, The New York Times, 12 February 2015). The end of sanctions does not seem to have end in near future and the statement of implied travel bans and asset freezes against Russia are inclined toward continuation until the peace reign over Ukraine¹².

1.3 Sanctions imposed by the EU

"In response to the illegal annexation of Crimea and deliberate destabilisation of a neighbouring sovereign country, the EU has imposed restrictive measures against the Russian Federation." (EU statement on sanctions against Russia, March 2014)

The activity of the EU related to the sanctions has been progressive and currently restrictive measures have been imposed on 37 different countries¹³ and 3 special regimes since the signing of Treaty of Maastricht (1992) (Giumelli, 2013, p.2). According to study of

¹¹ Tragic plane crash of Malaysian airlines on 17 July 2014 over Ukraine's territory with nobody accused so far.

¹² Statement of Mr. Obama and Mrs. Merkel from G7 summit: "The duration of sanctions should be clearly linked to Russia's full implementation of the Minsk agreements and respect for Ukraine's sovereignty. " (BBC News, 7 June 2015).

¹³ List of *Restrictive measures in force* up to 19.3.2015 available on website of the EU http://eeas.europa.eu/; © European Union, 1995-2015

Francesco Giumelli in work *The Succes of Sanctions Lessons Learned from the EU Experience* from 2013, the most preferred goals among 45 cases until December 2012 are constraining and signalling. Only 4 cases had as a main objective coercing, for instance against Iran 2007-2010. This fact is indicating that the EU rather stop countries from making undesired actions (or signal them to stop) than force their aspirations, with the most common restrictive measures: asset freezes, travel bans and/or arms embargo.

Restrictive measures targeted to stop Ukrainian crisis and violent protests were implemented first by the United States in March 2014 followed by the EU and other G7 countries¹⁴ (Havlik, 2014, p.3).

From March 2014, EU Council imposed restrictive measures against trade and financial flows with Russia in specific economic sectors. During the year Council extended sanctions and in March 2015 leaders decided to align restrictions with the agreements of Minsk meetings. These sanctions were extended to be valid until 31 January 2016 when hopefully Minsk agreements will be implemented in reality (European Council – Response to the crisis in Ukraine). These restrictions for 150 persons and 37 entities include:

- Travel ban and asset freezing on further individuals involved in Russian-Ukraine crisis
- New or debt financial transactions over 30 days maturity for 5 major Russian stateowned financial institutions including their subsidiaries, 3 major Russian energy companies and 3 major defence companies; Gazprombank, Rosselhozbank, Sberbank, VEB, VTB, Rosneft, Gazpromneft, Transneft, Kalashnikov Concern, Almaz-Antey, Dobrolet
- Embargo on the import and export of arms and related materials from/to Russia
- Export ban for dual-use goods for military use or military end users in Russia, all together for 10 categories of items listed in the EC Regulation¹⁵, for example "Nuclear materials, facilities and equipment; Electronics; Aerospace and propulsion, Sensors and lasers"
- Reduction of Russian access to certain energy-related technologies and services with possible use in oil production

¹⁴ France, Germany, U.K., Canada, Italy, Japan, U.S.

¹⁵ According to the EU COUNCIL REGULATION (EC) No 428/2009 of 5 May 2009 - 'dual-use items' shall mean items, including software and technology, which can be used for both civil and military purposes, and shall include all goods which can be used for both non-explosive uses and assisting in any way in the manufacture of nuclear weapons or other nuclear explosive devices.

- Ban on services linked to deep-water oil exploration and production, Arctic oil exploration or production and shale oil project in Russia are prohibited

1.4 Response of Russia

Response of Russia to the restrictive measures imposed by the EU, USA and other G7 countries have not have to wait long. Initially retaliatory measures taken by Russian government started on 7 August 2014 when Russia imposed 1-year ban on import of listed agricultural products, raw materials and food products originating in the US, EU, Australia, Canada and Norway. Among these food products belong (according to the *Resolution of the Government of the Russian Federation* from 7 August 2014):

- Meat and meat products
- Certain types of fish and sea products
- Milk and dairy products
- Certain types of vegetables, fruit and nuts
- Sausages and similar products
- Other certain food products

Moreover in June 2015 Russian government announced extension of food embargo on food products originating additionally from Albania, Montenegro, Iceland, Lichtenstein and Ukraine. With special conditions to the Ukraine: the embargo on agricultural products will be applied only if Ukraine implements the economic part of the EU Association Agreement by the time of 1 January 2016. This prohibition is valid up to 5 August 2016 and is focusing on the distribution of special economic retaliation to the individual states to the extent of their involvement in the sanctions regime against Russia (Decree of 13 August 2015 N=842, Government of the Russian Federation).

Development of Russian economy after imposition of sanctions from the EU, USA and other countries has been experiencing slowdown. Although the aim of sanctions was not to affect ordinary people (end consumers) in Russia and cause hate toward West, there is no doubt that sanctions contributed to the economic instability in Russia. Nevertheless, drop of oil price significantly hit Russian economy as almost two-thirds of total export revenue comes from oil. This had serious impact also on investment activity, Russia experienced great capital outflows in 2014, and according to Central Bank of Russia the capital outflows doubled previous year (Dreyer, Popescu, 2014, p.2). These shocks led to ruble crisis and to economic crisis overall. Sharp depreciation of ruble (more than 90RUB for 1 EUR in the beginning of 2015) caused increase of corporate debts that are usually denominated in US dollars (Appendix 1). Downfall

of GDP growth of 2014 and striking raise of inflation¹⁶ put country into recession and prospects are not looking good. Rating agencies as S&P, Fitch and Moody's predicted negative development of Russia and decreased Russian investment position by knocking down its credit ranking. The ruble crisis, capital flight, decline of oil prices, with trade and financial sanctions from the closest economic partners to top it all, are threating Russia's economic and political position in the world.

The response to the EU sanctions, ban on food imports, brings also another problem to Russia. The insufficient supply of food due to sanctions is causing shortages of certain types of food in country. It is not same as food shortage in 1990s when Russia defaulted on its national debt. It is rather a situation of unavailability of Western food products and rising prices of domestic products on the other hand. Russia imported more than a half of domestically consumed meat and about 70% of fruits and on the other site the price of domestically grown cabbage climbed by more than 60% since the beginning of 2015 alone (Stratfor, 23 April 2015).

What is also interesting about the food situation in Russia is that imported food is viewed by Russian population as act of strength and they may believe that food situation over the EU is similar to their own. "*Fifty-eight percent of the people surveyed by the Levada Center*¹⁷ believe that the embargo imposed on food from Europe and the U.S. is effective and is now yielding positive political results, and Russia is now more respected in the world and its interests are taken into account more" (Russia Beyond The Headlines, 31 August 2015).

Doubtlessly, Russian economy is in recession that however do not need to be explicitly deeper than the recession from financial crisis of 2007. According to Figure 1, GPD level in 2009 (USD 1.2 bn) was quite below GDP from 2014 (USD 1.9 bn) indicating the overcome of financial crises which had much more devastating impact than sanctions imposed by EU. In order to avoid price increase the Ministry of Agriculture of the Russian Federation accepted a set of measures to boost the production of banned items (Stratfor, 23 April 2015). However, combination of depreciated ruble, government budget cuts as a cause of sanctions and increasing prices might cause protest inside federation. The attempt of Russian government of food embargo was a way to put some pressure on Western countries. In a fear of social unrest is Russia forced to allow some illegal re-exports and reducing the effectiveness of the ban itself.

¹⁶ Inflation 2014 reached almost 8% against the RCB's target of 5-6%; GDP growth at 1% in 2014. Data available on RCB website: http://www.cbr.ru/; © Bank of Russia, 2000–2015

¹⁷ The poll, which surveyed 1,600 people living in 134 populated areas in 46 regions of Russia, was conducted on 21-24 August 2015.



Source: WITS and own editing, September 2015

2 Economic impacts on trade

The assessment of effects of any sanctions on trade flows is challenging and it is not always easy to calculate its economic effects. Taken into account that the goal of economic sanctions imposed from the EU was to stop Russia from intervening in Ukraine and return of Crimea, they have not been successful so far. However, the impact on trade is real and we can see in everyday newspapers how sanctions make troubles to EU exporters after losing Russian market and how it is affecting the people and business in Russia. For better understanding how the trade between Russia and the EU was working right before the sanctions, this chapter includes a short review of their trade flows and possible vulnerability for both parts. Next part is concerning the gravity model of bilateral trade and the out of sample analysis of the results from regressions.

2.1 Trade exposure

Inspired by the work of Peter Havlik, *Economic Consequences of the Ukraine Conflict*, October 2014, this part is considering the size and volume of the trade between EU members and Russia in 2013 before imposition of sanctions. The trade exposure by itself is very unevenly divided and the danger of greater loss is on Russian side. According to database of Eurostat, in 2013 the EU exported to Russia about 6% of the total (EUR 105bn) and imported from Russia approximately 11% of the total (EUR 180bn). While the EU was a great trading partner to Russia in 2013, accounting for 46% of the total exports and 43% of the total imports. In fact, EU exports to Russia makes about 1% of its GDP however Russian exports to EU are about 34% of its GDP. Accordingly, any mere shock to the trade flows can affect Russian economy more than the European.

In fact, among the top ten trading partners of Russia belongs EU on the first position with 49% share in the world in 2013 (about EUR 308bn)¹⁸. Otherwise, Russia trades extensively with countries like China, Belarus, Ukraine and Japan. Figure 2 is showing the division of Russian exports to EU. The greatest share of exports (from all EU) is heading to Netherlands, about 30% in 2013, followed by 10% to Germany. The next Figure (3) illustrating the exports from EU to Russia is assigning 28% to Germany and 11% to Italy. Those are the biggest market partners with whom Russia trades over the EU. On the other hand Russia operates very few or none trade with Luxembourg, Malta or Croatia and Austria and others.

¹⁸ Data available on the EU webpage; europa.eu

EXPORTS FROM RUSSIA TO THE EU (IN % OF THE EU TOTAL) 2013



Source: Eurostat Comext, ITC and own editing

Figure 3 Russia-EU trade - Imports 2013



EXPORTS FROM THE EU TO RUSSIA

Source: Eurostat Comext, ITC and own editing

In the case of sectoral trade exposure, there are 5 SITC industries where the share of exports to Russia was the highest in EU28; SITC 7 – Machinery and transport equipment, SITC 5 – Chemicals and related products, SITC 8 – Miscellaneous manufactured articles, SITC 6 – Manufactured goods classified chiefly by material and lastly SITC 0 – Food and live animals. Figure 4 illustrates the share of top ten EU exporters to Russia in each SITC group individually. The most important sector is machinery and transport equipment making together 54% of total

exports to Russia, followed by Chemicals and related products with 19% of total exports to Russia. In addition, the most important exporter to Russia is Germany who has the biggest share of exports in each category.

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Figure 4 EU goods exports to Russia 2013
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Source: Eurostat Comext and own editing

For the trade in services, available data shows that travel and transportation are important exports towards Russia especially for Lithuania, Cyprus, Finland, Greece and Italy. The Figure 5 is illustrating the division of services exported by top ten exporting countries from EU to Russia.





EU services exports to Russia: 5 key industries and 10 major exporters 2013 (million EUR)

Source: Eurostat Comext and own editing

Trade exposure of individual EU members is different. Trade of Russia with nearby countries is more exposed, for instance Lithuania, Finland, and Bulgaria. The most of these imports consists of mineral fuels, lubricant and related materials (SITC3), meaning energy fuels as crude oil, natural gas and refined petroleum. Among the greatest importers of energy are Netherlands, Germany, Italy, Poland and France with about 6-16% of the total imported energy in the EU from Russia (see Figure 6 of Russian goods exports to the EU in 2013).

In conclusion, effects on individual EU members differ depending on their trade relations with Russian markets. Generally, countries of Baltic States and other countries with deeper connections to Russia suffer more. The possible loss from the cease of trade relations with Russia would be greater if Russia would take advantage of its important position as a supplier of energy to the Western Europe. The experience from history proves possibility of this step, when on January 1st 2009 gas supplies were cut off due to pricing dispute between Ukrainian company Naftogaz and Russian company Gazprom. Limiting supplies of gas to Southeastern Europe created problems for mainly Hungary, Romania, and Poland who were the first to report decline of pressure in their pipelines. Slovakia announced state of emergency and other countries (Czech Republic, Bulgaria and other) were caught off guard unprepared for this situation and did not have sufficient alternative energy sources. From this time, countries made investment to avoid danger of lack of reserves. However many countries still depends greatly on imports of energy from Russia, therefore the trade exposure is more substantial for them.

Figure 6 Russian goods exports to the EU 2013



Russian goods exports to the EU: 5 key industries and 10 major importers 2013 (million EUR)

Source: Eurostat Comext and own editing

EU is net exporter of machinery and transport equipment, chemicals, manufactured goods and other articles while it is the net importer of mineral fuels and related materials. Consequently disturbed trade relations with Russia exposes the EU to the problem of energy shortages while Russia could suffer from outdated technology and lack of manufactured goods.

2.2 Methodology

The theoretical basis of Gravity model was put by the work of Anderson (1979) and followed by Bergstrand (1985 and 1989) and a rise of gravity models affected its use in various trade theories. Many variations of gravity model have been introduced and generally, the contribution to the econometrics of gravity equation is important in many fields. Particularly with the contribution of Anderson and van Wincoop's (2003) paper of well specified model with trade cost controlling for and defining the "multilateral trade-resistance" (MTR) terms. Baier and Bergstrand (2009) later used simplified method to control for MTR by fixed effects of exporters and importers year dummy variables. These findings established structural model for further development in trade theories. Moreover, the gravity model can be used to describe trade potentials, migration flows, investment flows or effects of membership in regional trade agreements or customs unions. This paper is focusing on the illustration of trade potentials as the effect of imposition of sanctions on trade between the EU and Russia.

The Gravity Model for international trade has been used in many research papers and achieved success from the empirical point of view. However, there have been some critical views on the quality of microfoundation. Three important econometrics problems arise with the gravity model in international trade according to Peter Egger in his work *An Econometric View on the Estimation of Gravity Models and the Calculations of Trade Potentials*, 2002. First, there is a severe problem of misspecification caused by representation of bilateral flows therefore the OLS based trade potential can produce inconsistent estimates and disprove the prediction concept (Egger, 2002, p. 298). Second, obtained data set is most probably long-term horizons while estimating FE or RE model reflects short-run parameters. Finally, the case of very large un-exhausted trade potential between countries can suggest misspecification and parameter inconsistency. Pointing out these three problems may result into situation of unforeseen outcomes of the model.

This research paper is using the gravity model for assessment of the effects of sanctions with so called out of sample analysis where trade potentials are discovered and analysed. Wang

and Winters (1991), Hamilton and Winters (1992) and Brulhart and Kelly (1999) came up with the technique of out-of-sample analysis.

2.2.1 Gravity model

In the 60s economists established gravity model broadly used in the field of international trade and statistical analysis to explore mutual trade flows between geographical subjects. Its foundation, as its name clearly implies, comes from the gravity equation of Isaac Newton and the discovery of the law of gravity. This empirical model explains the size of mutual international trade between countries. Gravitational equations describing the gravity model in international trade is based on a simple function interpreting the gravitational force of Newton's laws. Based on the gravity equation the empirical evidence defines that bilateral trade flows are related to the size of countries and geographic variables as distance, common language, shared border or colonial history (Caruso, 2003, p. 9). Generally, trade flows between countries should be positively related to the size of countries and negatively related to the distance between them.

 $F_{ij} = G^*M_i^*M_j/D_{ij}$

G – Constant of proportionality

 F_{ij} – size of gravity; (trade) flows between i and j

 M_i , M_j – size of the two subjects; two countries

D_{ij} - distance between two subjects; two countries

Where attraction force is proportional to the sizes of two objects (M_i, M_j) and inversely proportional to the distance between the subjects. The gravity model explains bilateral trade flows by operating a single log-linear equation:

$$\ln TRADE_{ijt} = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} - \beta_3 DIST_{ij} + \beta_4 A_t + \mu_{ijt}$$

Where TRADE_{ijt} denotes the bilateral flows between country i and country j at time t, GDP_{it} and GDP_{jt} countries' gross domestic products at time t, DIST_{ij} measures the distance usually between capital cities (or centres) of the countries and A_t as other possible factors (usually as dummy variables for common language, share borderline, colonial history and others) and μ_{ijt} being usual random error term. In fact the term A_t is a simplified proxy for trade costs between countries where countries further away from each other have to overcome greater trade costs than with neighbouring countries. Dummies for language or colonial history captures information costs and communication costs (due to cultural distance). The log-linear

form is used in order to get out of multiplicative a linear relationship. This step is also important for later interpretation of the results where estimated parameters of logarithmic equation are elasticities. For instance, the coefficient for GDP would be the elasticity of trade to GDP demonstrating the percentage change in trade with 1 percent increase in GDP.

The gravity equation suggests that countries with similar GDP should trade more than countries with development gap. Moreover, the same logic applies to distance where countries further away from each other supposedly trade less then neighbouring countries. Dummy variables also suggest that countries with colonial history, same language or shared border trade more extensively.

This research estimates an augmented gravity model with addition of dummy variables indicating whether two countries are contiguous (*contig*), share a common official language (*comlang_off*), share a common ethnic language (*comlang_ethno*), have had common colonizer after 1945 (*comcol*), have ever had colonial link (*colony*), have had a colonial relation after 1945 (*col45*), are currently in a colonial relationship (*curcol*) and/or were/are the same country (*smctry*) (Mayer, Zignago, 2011, p.12). Tendencies to share history makes countries trade more than otherwise. The gravity equation for bilateral exports in this research is following:

$$\begin{aligned} \ln EXP_{ijt} &= \beta_{0} + \beta_{1} \ln GDP_{it} + \beta_{2} \ln GDP_{jt} - \beta_{3} dist_{ij} + \beta_{4} contig + \beta_{5} comlang_{off} \\ &+ \beta_{6} comcol + \beta_{7} colony + \beta_{7} col45 + \beta_{8} curcol + \beta_{9} smctry \\ &+ \beta_{10} comlang_{ethno} + \mu_{ijt} \end{aligned}$$

Explanatory variables are:

 EXP_{ijt} are exports from country i to country j at the time t over period 2000-2013

GDP_{it} is GDP of country i in time t in current USD over period 2000-2013

GDP_{jt} is GDP of country j in time t in current USD over period 2000-2013

Dist_{ij} is distance between centres of country i and country j in kilometres

For simplification of the model, i countries are the major EU exporters to Russia according to Eurostat database; Germany, Italy, France, Poland and Netherlands.

2.2.2 Regression analysis

For the establishment and calculations of the gravity model, I used regression that is together with other methods of variance statistics the most valuable method in use to examining and analysing the interdependence between various parameters. Hence, the regression analysis help to find the right model to determine the relationship of two or more parameters. In the context of regression analysis, I used LSDV, so called Least Squared Dummy Variables regression that is used to analyse dependencies and relationships in panel data set. When analysing the effect of sanctions on trade between the EU and Russia the research proceeded as follows:

- 1. Creating the panel data by clustering it to the long format in the STATA software and merging the data sets of trade flows, GDPs and CEPII dummy variables.
- Taking the natural logarithms of explanatory variables except dummy variables that were added after taking logs of explanatory variables in order to get log-linear equation.
- 3. Regression conducted on STATA software by using FE and RE models with the application of Hausman test statistics to decide whether to use FE or RE analysis.
- 4. Interpretation of results of regression (of the best model).
- 5. Based on regressed results follows comparison with the values of actual and potential trade between the EU and Russia by putting the real independent values into an estimated equation. Results explain if the trade value is lower or higher than the predicted one.

One of the problematic issues of the gravity model of trade are zero trade flows in a given year between two countries. The foundation of this problem is in the missing observations where the trade is zero and taking log of zero is not defined therefore the zero trade flows will be dropped out of the estimation¹⁹. If zeros of trade flows in the data set are random missing data and do not mean low or zero near trade flows, they can be simply dropped out of the data set. While creating the data set no trade flows values were missing hence there was no problem with zero trade. However, some values for GDP of countries were missing in specific years and these were added from another source of estimated values.

¹⁹ An alternative approach may be (Pseudo) Poisson maximum likelihood (ML) estimator applied to the levels of trade. Non-linear form is directly estimated without dropping zeros.

2.2.3 Sources of data

Making a panel data set is the first step towards gravity model. Many organisations offer wide range of statistics on trade and macroeconomic indications. For this thesis, the data were extracted from following sources. Exports of countries is gathered from statistical database of OSN – COMTRADE websites of bilateral flows in period 2000-2013 of 5 major exporting countries to Russia: Germany, Italy, France, Poland and Netherlands. These are used as proxies for the EU exports. GDP statistics for period 2000-2013 is extracted from WDI database of The World Bank. The missing values of few countries in specific years were added from the estimated values of GDP work of Ivan Kushnir research, *World Macroeconomic Research 1970-2013*. Both exports and GDP are nominated in current US dollars. Commonly used dummy variables for gravity models are extracted from CEPII database. All variables are listed in Table 1 below.

	NAME	VALUE	UNIT	SOURCE
ID exporter	Ident_exp	1-5		
ID importer	importers	1-202		
Time	Time	2000-2013	3	
log(export)	In_exp		USD	UN Comtrade
log(GDP of exporter)	L_GDPexp		USD	World Bank
log(GDP of importer)	L_GDPimp		USD	World Bank
log(distance)	Ldist		kilometres	CEPII
contiguous countries	contig	0/1	dummy	CEPII
common language official	comlang_off	0/1	dummy	CEPII
common language ethnic	comlang_ethno	0/1	dummy	CEPII
common colonizer after 1945	comcol	0/1	dummy	CEPII
colonial link	colony	0/1	dummy	CEPII
colonial relation after 1945	col45	0/1	dummy	CEPII
current colonial relationship	curcol	0/1	dummy	CEPII
were/are the same country	smctry	0/1	dummy	CEPII

Table 1 List of variables

2.3 Prediction of trade without sanctions and other disturbances

With the regression equation and finalised dataset for exports of five EU countries, the next step is to run separate regressions. Important move in proceeding towards regression is to

define panel dataset with generating pairs of importers and exporters as individual dimensions that vary over time dimension as id of the panel. Moreover, in order to control for global economic effects (booms and slowdowns in the global economy) literature suggests creating a set of dummy variables for each year as well as for exporter and importer to control for the time-varying multilateral trade-resistance terms (Anderson and van Wincoop, 2003). In this way, the heterogeneity is controlled for.

After that, we can run OLS regression with FE and RE. The Hausman test application obtained a p-value of 0.000 meaning we can reject H0 on a 1% confidence level and consequently FE model is more appropriate model for its consistency. Final estimates with robust²⁰ standard errors are displayed in Table 2.

The results seem to be quite convincing with explaining overall of 69% of the variation in data, joint p-value 0.000. All variables have expected signs and are significant at the 1% level. Unfortunately using FE we eliminate the unobserved effect entirely hence it is impossible to estimate time-invariant country-specific variables such as dummy variables therefore are omitted in the regression output due to perfect multicollinearity with the intercept. We consider the model appropriate and well specified.

Number of obs.	=	13,574	R ² :	within	=	0.3316
Number of groups	=	999		between	=	0.7241
F(17,998)	=	366.41		overall	=	0.6880
Prob > F	=	0.0000		corr(u_i,Xb)	=	0.4935
		Robust				
ln_exp	Coef.	Std. Err.	t	P> t	[95% Conf.	Interval]
In_exp L_gdpexp	Coef. 1.30438	Std. Err. .1801147	t 7.24	P> t 0.000	[95% Conf. .9509332	Interval] 1.657827
In_exp L_gdpexp L_gdpimp	Coef. 1.30438 .5380883	Std. Err. .1801147 .055306	t 7.24 9.73	P> t 0.000 0.000	[95% Conf. .9509332 .4295589	Interval] 1.657827 .6466177
In_exp L_gdpexp L_gdpimp Ldist	Coef. 1.30438 .5380883 158037	Std. Err. .1801147 .055306 .0258974	t 7.24 9.73 -6.10	P> t 0.000 0.000 0.000	[95% Conf. .9509332 .4295589 2088573	Interval] 1.657827 .6466177 107218

Table 2 Fixed effects with robust standard errors

Source: Own estimations

Both exporter's and importer's GDP have significant positive impact on exports. A 1% increase in exporter's GDP is associated with about 1,3% increase in its exports. A 1% increase in importer's GDP is associated with about 0,5% increase in exports from exporter. A 1% increase in distance between country centres is associated with about 0,16% decrease in exports. Model confirms the expectations about the gravity equation.

²⁰ Controlling for heteroscedasticity and serial correlation using robust option

The estimated equation has the following form without the time dummies²¹:

 $ln_exp = -29.569 + 1.304*L_gdpexp + .538*L_gdpimp - .158*Ldist$ (5.311) (.180) (.055) (.026)

2.4 Trade potentials

The estimated equation is giving us the idea of average trade flows however; the actual trade can be smaller or larger. The actual development of exports from five EU countries towards Russia is captured in Table 3.

Table 3 Ac	tual exports	to Russia	2014
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Reporter	Trade Value (million USD)
France	7 720
Germany	35 789
Italy	10 771
Netherlands	7 956
Poland	8 112

Source: UN Comtrade and own editing

Comparing actual to estimated trade values is a common practice for evaluating trade policies. In Table 4 are result from

	Table 4 Actual to	o potential	trade with	Russia 2014
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Exports to Russia (%)	Actual	Potential	Change
France	22,77	21,81	0,96
Germany	24,30	21,25	3,05
Italy	23,10	20,50	2,61
Netherlands	22,80	19,33	3,46
Poland	22,82	18,83	3,99

Source: Own calculations

The calculation of actual to potential trade proved to be logically wrong and we cannot deduct results from the estimations. The potential trade should be according to the expectations greater than the actual trade. Hence due to sanction the change should be negative not positive. This can be affected from the unbalanced dataset or other distortions that were not taken into account when estimating the gravity equation.

²¹ Only 5 coefficient of time dummies were significant on 5%. Others were insignificant and other exporter and importer dummies were omitted by STATA.

3 Economic impacts on the countries

Economic effects of sanctions have two dimension, direct and indirect impacts on trade. The evident results of sanctions are lower exports of agriculture products from EU to Russia as the direct consequences of contra-sanctions. For the main indirect effects can be considered reexports and change of target market. In this aspect, the next section studies the influence of food embargo on EU imports towards Russia by simple Input-Output analysis and further develop the foundations of indirect effects (re-exports and third-country effect).

In economics and international trade IO model is a quantitative method that explains the interdependencies between countries. Founder of IO model is Nobel Prize winner, Wassily Leontief, inspired by the work of classical economists. First adoptions of understanding of linked sectors within economy goes back to François Quesnay and Léon Walras. Nevertheless, Leontief was the first one to use matrix table to express national inter-industry sectors. In the IO table input and output, sectors are connected so the input of one sector can be output of another sector. This development became very useful in the era of socialist planners who planned how much each sector should produce next year. In addition, further research on IO tables gain success in economics for its analytical skills. The analysing of countries sensitivity to sector trade-related shocks, identifying national key sectors or also investigating the effects of inter-regional trade earned achievements over the years.

The basics behind IO model are transaction matrices constructed from observed data of an economy presenting national outputs and inputs of various sectors. The essential assumption is that there are stable coefficient of how much production of sector i (row) we need for the production of a unit of output of sector j (column) (Aristotle University of Thessaloniki, 2007, p.5). The calculation behind IO table from Appendix 3 gets us to the matrix of changes of total demand:

$$\Delta x^* = (I - A)^{-1} \Delta d$$

For the simplicity, the IO analysis ignores indirect and induced effects. In addition, my analysis does not address the changes in relative prices as they affect structure of demand from companies for inputs from various countries, as well as consumer choice between substitutes²².

²² For inclusion of these factors AGE/CGE analysis would be needed.

3.1 Estimation of the trade related to the structure of sanctions

The IO analysis of trade shock on EU countries will be proceeded by picking five major exporting countries²³: Germany, Netherlands, Poland, Lithuania and Denmark of 3 CPA groups: CPA01 – Products of agriculture, hunting and related services, CPA03 – Fish and other fishing products and CPA10 – Food products. These 3 groups²⁴ are the most influenced export items due to food embargo. Figure 7 illustrates EU exports to Russia in the three CPA groups together in 2013 and 2014^{25} .

Figure 7 Actual export of EU to RU 2013-2014 CPA categories



Actual exports of EU in CPA01,03,10 to Russia

Source: Eurostat Comext and own editing

In the process of IO analysis the data set were extracted from Eurostat Comext database of EU countries exports of embargoed food and agriculture products. The data of the same year as extracted exports were downloaded IO tables from Eurostat database for each of 5 EU member states. From the input-output table downloaded from Eurostat we can observe following indicators input-output tables that are calculations either for domestic output, imports or for whole economy while our interest is primarily on domestic output. The next step is to create inverse matrix according to the process in Appendix 3. Hence, with this technique we can easily achieve numeric changes in the exports of the three CPA groups of five major exporters to Russia.

²³ Data from Eurostat Comext for year 2013

²⁴ By classification according to Nace Rev.2

²⁵ Couple of countries are omitted in the diagram due to small values of exports of CPA01/03/10 to Russia. These are Croatia, Cyprus, Luxembourg and Malta.

Netherlands

The first country analysed and substantial exporter of agriculture products is Netherlands. The IO tables available from Eurostat on year 2010 and the export trade shocks on agricultural products suggest that in the situation of assuming a complete elimination of the exports of 3 embargoed flows the effects on Netherlands are negative with the overall relative drop of 0,16% in GDP. In absolute values, the loss is about EUR 1,8bn due to sanctions. The greatest impact of sanctions from Table 5 seems to be products of agriculture sector however, the biggest loss experienced sector of food products. Shocks influenced also some minor changes in sector of Electricity, gas, steam and air conditioning supply (about 0,3% change) seemingly not connected to the food embargo.

Table 5 IO Analysis Netherlands 2010		
NETHERLANDS 2010	change in m EUR	% change
CPA01 – Products of agriculture	-917	-3,5
CPA03 – Fish products	-0,3	-0,1
CPA10 – Food products	-931	-1,5
Total value	-2 552	-0,16

Source: Eurostat and own calculations

Considering the destination o Netherlands exports of all products, mainly to Germany (24% share of exports), Belgium, UK and France, and the most exporting sectors as machinery and nuclear reactors, electronic equipment, pharmaceuticals products, the conclusion of 0,16% drop in GDP does not seem to be as important for export as it would be for other industries. Exports of sector with food and agricultural products took minor positions of all exporting sectors to Russia. Moreover the share of Russia on all exports from Netherlands was only 1,4% in 2010 (Appendix 4).

Actual exports of all products to Russia fell by less than 0,5% from 2013 to 2014. However Netherlands experienced a GDP growth rate of 1,5% after negative "growth" rate from 2012 (Appendix 6). This might mean that Netherlands changed the destination of its exports and probably increased the share of other export markets.

Germany

The second rank on food exports of the EU exports to Russia took over Germany. Germany is an important Russian trade partner however, on the other hand, Russia is making only up to 3% share of total exports, exporting mainly machinery and vehicles and electronic equipment. The IO analysis, on Table 6 suggests the drop in GDP by 0,04%. The total value of loss is making EUR 2bn.

GERMANY 2010	change in m EUR	% change
CPA01 – Products of agriculture	-395	-0,98
CPA03 – Fish products	-2	-0,42
CPA10 – Food products	-1 647	-1,08
Total value	-2 044	-0,04

Source: Eurostat and own calculations

The reality is more subtle with loss of not even 1% in share of exports to Russia from 2013 to 2014 (Appendix 4). Actual exports of CPA products stayed flat with a slight increase. While imports from Russia grew by 1% (Appendix 5). These changes are considered just a small drop in the ocean of huge exports of Germany and imposition of sanctions did not mean a threat to Germany individually.

Poland

Although Poland's trade exposure is supposed to be greater because of the economic and political connection to Russia, Eurostat tables shows the most important destinations of Polish exports to be above all is Germany (share value of 25%) followed by France, United Kingdom and Czech Republic in 2005. Russian destination is making up to only 4% of total exports in 2005. From the sectorial division Poland mostly exports electronic equipment, machinery, nuclear reactors and plastics. Food-related products stood on lower positions.

The IO tables available from Eurostat on year 2005 and the export trade shocks on agricultural products offer, in the situation of assuming a complete elimination of the exports of 3 embargoed flows, the overall negative effect on Poland with the relative drop by 0,15% in GDP. From Table 7, the results of IO analysis points out the biggest absolute loss yielded by CPA10, almost EUR 0,5m while percentage change was maximized in CPA01.

Table 7 IO Analysis Poland 2005		
POLAND 2005	change in m EUR	% change
CPA01 – Products of agriculture	-294	-1,5
CPA03 – Fish products	0,1	0,1
CPA10 – Food products	-453	-1,4
Total value	-747	-0,15

In fact actual increase of GDP from 2013 to 2014 did increase in Poland by 1,7% (Appendix 6) and may suggests either indirect effects (like re-export to Russia through other countries) or other implication of situation not related to the EU-Russian sanctions. However, exports of all products to Russia fall by slightly 1% indicating work of sanctions (Appendix 4).

<u>Lithuania</u>

Lithuania's exports to Russia have actually increasing tendency by having about 16% share in 2010 and 21% share in 2014 of total exports (Appendix 4). Exports are focused mainly on machinery, electronic equipment but also beverages, vegetables and fruits. The dependency on Russian market for Lithuania is essential for its imports of mineral fuels, iron and steel, chemicals and other commodities. Imports from Russia to Lithuania are about 20% in 2014 of all imports although they have decreasing tendency (Appendix 5).

As expected the IO tables available from Eurostat on year 2010 and the export trade shocks on agricultural products offer, in the situation of assuming a complete elimination of the exports of 3 embargoed flows, the overall negative effect on Lithuania with the relative drop by 1,83% in GDP. This fall is equivalent to almost EUR 1bn.

Table 8 IO Analysis Lithuania 2010		
LITHUANIA 2010	change in m EUR	% change
CPA01 – Products of agriculture	-555	-27
CPA03 – Fish products	-4	-9
CPA10 – Food products	-351	-12
Total value	-910	-1,83

Source: Eurostat Comext and own calculations

Table 8 shows how trade shock influenced each sector with the greatest percentage change in CPA01. In reality GDP growth rate of Lithuania fell by 0,4% and share of exports to Russia grew by 1% while imports dropped by 6% from 2013 to 2014 (Appendix 4 and 5). Hence, ongoing sanctions can result into severe negative impact on Lithuanian economy.

Results of IO analysis

To sum all of the calculated impacts of agri-food import ban, Table 09 illustrates the overall absolute and relative loss in GDP of each country of five EU countries. In the case of an absolute GPD loss the most affected country is Germany with estimated loss of 0,07% equivalent to EUR 3,3bn. On the other hand, the largest relative loss recorded Lithuania nevertheless the drop is EUR 1,2bn. Third of the loss of Germany. All together, the IO analysis

propose EUR 10bn loss in GDP for EU countries who exports the most food-related products to the Russia.

Table 9	Input-Output	analysis	results
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	Absolute GDP loss	Relative GDP
IO analysis results	(million EUR)	IOSS
Lithuania 2010	1 242	2,49%
Denmark 2007	1 052	0,26%
Poland 2005	1 094	0,23%
Netherlands 2010	2 552	0,22%
Germany 2010	3 317	0,07%
France 2010	1 062	0,03%
Total value	10 318	

Source: Eurostat and own calculations

Although trade exposure of the EU is relatively low on average, few countries trade extensively with Russia (mainly Baltic States). Other countries should not be affected severely by food embargo. Moreover, food products do not feature precisely among EU exports to Russia. On the other hand couple of EU countries depends greatly on imports from Russia, i.e. Lithuania, Poland, Bulgaria and Finland. Whereas the structure of Russian imports consists mainly of energy: crude oil, natural gas and refined petroleum (Havlik, 2014, p.13).

The actual development of exports from 2013 to 2014 is depicted in Figure 8. Important to point out is that in CPA10 food products Russia trade the most with Germany and Poland. In 2014, the overall exports of the six EU countries decreased significantly.



EU exports to Russia 2013 CPA01,10 (million EUR)

Source: Eurostat Comext and own editing

On the following Table 10, the relative and absolute change in year 2013 and 2014 is illustrated. Evidently, the considerable change experienced Denmark where trade shock caused drop of almost 3% in the exports of total EU exports to Russia. However, the greatest absolute loss recorded Germany that lost more than EUR 400m. Just these six countries make together more than a half of exports of the EU to Russia and the relative loss on the imposed food embargo is 4%, equivalent to EUR 1,6bn.

Share in total EU exports of CPA01,03,10 to RU	2013	2014	2013-2014 change (%)	2013-2014 change (m EUR)
Denmark	6,20%	3,70%	-2,50%	-355
Germany	14%	13%	-1%	-417
Netherlands	15%	15%	0%	-349
Poland	12%	12%	0%	-373
Lithuania	11%	11%	0%	-312
Sum	64%	61%	-4%	-1 954

Table 10 Actual share in total EU exports to Russia 2013-2014

Source: Eurostat Comext and own calculations

The results of IO analysis are quite larger than the actual effect in 2014 however if the food sanctions will continue for some EU countries it may cause severe problems and the exporters of food products would have to find other markets to trade with. Among the most

exposed countries are Denmark, Germany and Lithuania that notably export to Russia. Nevertheless, the sanctions imposed are more forward-looking meaning the ongoing deals are honoured but future deals will not be proceeded. Hence, continuation of sanctions could affect economies in a larger scale. Especially for Lithuania, the threat of damaging trade relations with Russia might have severe negative impacts on Lithuania's economy.

3.2 Indirect effects of sanctions on trade

Among the indirect effects belong re-exports and so called third country effect. With the loss of EU market Russia tends to turn on the other trade partners for new markets and also has to deal with the smuggling of food products via neighbouring countries.

As a starting point to Russia may serve opportunity to deepen connections with other countries as from the Middle East, Latin America and especially China. Russian-Chinese economic relations has already extended last year with agreements about gas and oil pipeline projects that would double their trade and oppose a threat to the USA hegemony as a shared desire of both these superpowers (The Guardian, 7 July 2015). On the other hand, this increase of trade with other countries like China, Turkey or Brazil is a way of coping with limited supply of banned items and satisfying, at least partially, domestic demand. Under the pressure of sanctions Russia may approached even not so lucrative deals.

Ban on food imports originating from the EU hit also EU companies extensively especially the biggest exporters (Figure 7). However, a phenomenon of re-exports arises as well and Russia is already taking steps against increase food imports from Serbia, Ukraine, Moldova, Montenegro and Albania due to suspicion of re-exports. Moreover, Russian authorities issued a law about destruction of contraband food and already destroyed over 300 tons of vegetable, meat and cheese that was from illegal shipments (often from Belarus, Finland, Lithuania, Latvia and others). It initiated wild protests about the law and insist on giving the food to those in need. The decision of authorities however deny to accept contraband food due to danger of unhealthy food without any certification whatsoever and want to send it back to the country of origin (Gill, Kuchma, Russia Beyond The Headlines, 7 August 2015). In fact, re-exports might be a reason of not being the sanctions as effective as could be for both parties but might as well help Russia to cover domestic demand. Re-exports are important "side effect" of sanctions and also described some of irregularities in the research of the effects of sanctions on trade.

To illustrate the case of re-export the Figure 9 and Figure 10 describe development of imports of food products from Belarus and Serbia in 2013 and 2014 to Russia. The monitoring categories were according to Table 11 SITCO categories of Food products.

Table 11 SITC0 commodity codes

Commodity Code	Commodity
00	Live animals chiefly for food
01	Meat and preparations
02	Dairy products and birds' eggs
03	Fish, crustacean and molluscs, and preparations thereof
04	Cereals and cereal preparations
05	Vegetables and fruit
06	Sugar, sugar preparations and honey
07	Coffee, tea, cocoa, spices, and manufactures thereof
08	Feeding stuff for animals (not including un-milled cereals)
09	Miscellaneous edible products and preparations
urce: UN Comtrade and own	editing

Figure 9 Imports from Belarus to Russia 2013-2014



Source: UN Comtrade and own editing



Serbia exports to Russia 2013-2014

Source: UN Comtrade and own editing

For both countries, Serbia and Belarus, there have been increase in exports of food products to Russia. For Belarus mainly in dairy products while imports from Serbia focus on vegetables and fruits. In consideration of introduced sanctions, this increase may originate from the re-exporting activities. In addition, if we look at the EU exports of food products to these two countries an increase in exports toward Belarus especially from Lithuania and Netherlands (Appendix 7). Exports to Serbia increased almost in all five countries mainly from Poland.

Table 12 EU-Belarus/Serbia trade, RU-Belarus/Serbia trade 2013-2014

(million USD)	2013	2014	Change	%Change
Belarus				
EU exports	807	790	-17	-2%
RU imports	2880	3681	800	22%
Serbia				
EU exports	231	261	29	11%
RU imports	192	347	155	45%

Source: UN Comtrade and own calculations

Table 12 presents the calculations of change in EU exports and Russian imports with Belarus and Serbia individually. Increase in Russian imports of food from Serbia incredibly doubled imports from 2013. Belarus recorded increase as well but more subtle of about 22%. On the other hand, EU exports to Belarus slightly drop while to Serbia grew by 11%. These findings observably propose the argument of smuggling EU food products through Serbia, Belarus and other countries to Russia. What is making smuggling easier is Eurasian Customs Union formed between Russia, Belarus, Kazakhstan, Kyrgyzstan and Armenia. Exporters find their ways to avoid losing market base in Russia though the idea of further tightening of trade between EU and Russia would cause serious problems to both parties.

Conclusion

This thesis analysed the impacts of sanctions imposed between the EU and Russia in 2014. The aim of this paper was to assess whether these effects have some effect at all and whether it has negative or positive impact on the EU-Russia trade relations. This has been carried out in two analysis. First by applying the gravity model on period 2000 to 2013 for five major exporting EU countries to Russia; France, Germany, Italy, Netherlands and Poland, and evaluating trade potentials created due to sanctions. Secondly, I analysed the effects of Russian food embargo on EU products by conducting input-output analysis and described the possible indirect effects as well.

First of all thesis provided the background of the literature on sanctions theoretically and described the merit of introduced sanctions from both parties. Goal of the sanctions imposed in 2014 by the EU and other G7 countries was to stop Russia from intervening into Ukraine. EU sanctions were rather targeted on asset freezes and travel bans in order to slowdown Russian economy. Hence, according to theoretical explanations can be regarded as unilateral coercive sanctions with the goal of changing undesired behaviour due to disrespect to international law. On the other hand, Russia introduced contra-sanctions on food imports from EU countries. As I conducted in the trade exposure, section the trade of Russia is much more dependent on EU markets making Russian economy more vulnerable against diverted trade. In fact, EU forms about 46% of the total exports of Russia while the other way around Russia is making up to only 6% of total EU exports and 11% of total imports. Clearly, trade relations before imposition of sanctions suggests that diversion of trade can cause more damage to Russian market than to the EU.

Consequently, the expected outcome of the out-of-sample analysis on trade flows between five EU countries and Russia would be the gap between the actual and potential exports to Russia be negative. Although the gravity model provides statistical significant and expected estimates, trade potential evaluation does not answer the logical justification behind the model and therefore cannot be used as a valid explanation. However, the gravity model confirm the nature of the trade where GDP of exporter and importer countries have positive impact on trade and on the other hand distance is inversely proportional to trade. This result can be affected by the unbalanced and unevenly distributed sample. Also adding fixed time-effects for control of multilateral trade resistance lead (by Hausman test) to fixed effect model whereas in this case the random effects model would be option that is more appropriate. Though the expectations of the trade potentials did not proved to be as expected the gravity model approach seems to be valid and further research is suggested.

The next analysis on trade with food products was conducted in the third chapter and calculated the expected fall in the exports of food products to Russia for five major exporting EU countries. These are Netherlands as the greatest food exporter to Russia followed by Germany, Poland, Lithuania and Denmark and together they form more than 50% of the total EU exports aimed to Russia. The categories of food products were analysed according to CPA divisions of CPA01, 03 and 10 whereas the most exported category is CPA10 - food products. The results yielded values that correctly assumed GDP loss. The overall calculated GDP loss was 18% and the most concerned countries were Denmark, Germany and Lithuania. The actual GDP loss from 2013-2014 was only 4% however if the ongoing sanction will continue and do not start to relieve the pressure on exporters there might be such severe impact as the calculated one. Although the trade exposure of the EU is relatively low on average there are countries that trade with Russia extensively, those are mainly Baltic States.

As the I-O analysis ignores the indirect effects, I tried to capture them in the next section by describing the EU food exports' trends towards Belarus and Serbia. The case of Belarus proved to be higher in year 2014 compared to 2013. In addition by looking at the Russian imports from both countries can be observed the growing trend. In case of Belarus, imports of food products doubled the value from 2013. The hot-headed response of Russian authorities to destroy contraband food has met with wave of criticism from both domestic and foreign sides. There are two possibilities how to cope with sanctions. That is either to find new markets or taking advantage of Eurasian Customs Union by smuggling food products to Russia. The effect of third countries is present as well and Russian trade connection with China, Brazil and others is on the rise.

According to the analysis and deductions few conclusion can be drawn from the impacts of sanctions. First due to its limited nature EU, sanctions can be recognize rather as a political symbol to show power, stop civil unrest and end Russian intervention in Ukraine. On the other hand, for making significant impact, the EU is already tightening the restrictions and with the "help" of slowdown of oil prices Russia is struck in the most vulnerable place. Secondly, the Russian contra-sanctions on food products from EU caused damage to the European industry. However, EU authorities present commitment to support agriculture industry and so help to counterbalance imposed food bans. Moreover, the combination of depreciated ruble, government budget cuts and increasing prices cause stagnation of Russian economy and make the further development more difficult. To answer the research question in simple way is rather difficult. From the political view, sanctions have not been effective so far because Russia is still intervening in Ukraine's territory. Nonetheless, they have economic impact on Russia and are important political symbol of power as well. The effects are negative on both sides and the question whether the impact would be even greater. The EU authorities stand by the decision to keep sanctions until Russia leave territory of Ukraine and are committed to tighten restriction if necessary.

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Source: European Central Bank, 2015

		Dependent Variable	
		In_exp	
Independent Variables ¹	Fixed Effects	Random Effects	Fixed Effects
			robust
L_GDPexp	1.304***	1.148***	1.304***
	(.078)	(.078)	(.180)
L_GDPimp	.538***	.520***	.538***
	(.025)	(.025)	(.055)
Ldist	145	975***	158***
	(.318)	(.109)	(.026)
contig	-	-	-
comlang_off	-	-	-
comlang_ethno	.083	.454**	-
	(.412)	(.169)	-
comcol	-	-	-
colony	-	-	-
col45	-	1.492***	-
	-	(.189)	-
curcol	-	1.432**	-
	-	(.494)	-
smctry	-	.484	-
	-	(.479)	-
_const	-29.686***	-19.496***	-29.569***
	(3.511)	(2.377)	(5.311)
Number of Observations	13,574	13,574	13,574
Number of Groups	999	999	999
corr(u_i, Xb)	0.493	0 (assumed)	0.495
R ² overall	0.688	0.914	0.690

Appendix 2: Panel Regression Result Summary Table

Notes:

¹ Standard errors in parentheses

*** Significant at 1 per cent

** Significant at 5 per cent

* Significant at 10 per cent

Appendix 3: Input-Output Analysis

Economy with n sectors where each sector produces x_i units of a single homogeneous good. Sector *i* needs a_{ij} unit from sector *j* in order to produce 1 unit. Each sector sells some of its output to other sectors and some to consumers creating final demand in *i* sector d_i .

Total intermediate consumption:	$\sum_{j=1}^{n} a_{ij} x_j$
Final consumption:	di
Total consumption:	$x_i = \sum_{j=1}^n a_{ij} x_j + d_i$
Matrix equation:	x = Ax + d
Calculations:	x = Ax + d
	x - Ax = d
	(I-A)x = d
Total demand:	$x^* = (I - A)^{-1} \Delta d$

General form of the IO table:

Source: Aristotle University of Thessaloniki, 2007, Food Industry Dynamics and Methodological Advances

	Demand sector (buyer)	Intern	mediate	demand			Fi	al de	mand				
		Agriculture, forestry and tishery Mining to	M anufacturing		Total	Consumption expenditure outside households	Expenditure	Fixed capital formation	Increase in stocks	Exports	Total	(Less) Import	Domestic production
Sup	ply sector (seller) 1 Agriculture, forestry and fishery 2 Mining				A						В	с	A+B-C
nterm ediate ir	3 Manufacturing		aterials and (input)	Com	iposi	tion of :	sales	sector	of pro	oducts	s (ou	tput)
-	Total D		ded										j j
Gross value added	Consumption expenditure outside households Compensation of employees Operating surplus Depreciation of fixed capital Indirect taxes (Less) Current subsidies Total E		Cost structure for ra gross value ad										
Don	nestic production D+E												

Source: © Statistics Bureau, 1996-2008

Appendix 4: Share of total exports to Russia from 6 EU members

Exports to Russia/Total Exports	2010	2011	2012	2013	2014	Change 13-14
LT	15,7%	16,6%	18,9%	19,8%	20,8%	1,0%
PL	4,2%	4,5%	5,4%	5,3%	4,3%	-1,0%
DE	2,8%	3,2%	3,5%	3,3%	2,6%	-0,7%
FR	1,6%	1,7%	2,1%	1,8%	1,6%	-0,2%
DK	1,7%	1,9%	1,9%	1,9%	1,4%	-0,5%
NL	1,4%	1,5%	1,6%	1,6%	1,3%	-0,3%
SUM	27,3%	29,4%	33,3%	33,6%	31,9%	-1,7%

Share of exports to Russia 2010-2014

Imports from Russia/Total Imports	2010	2011	2012	2013	2014	change 13-14
LT	33%	32%	32%	28%	22%	-6%
PL	10%	12%	15%	12%	11%	-1%
NL	4%	5%	5%	5%	5%	0%
DE	4%	4%	5%	3%	4%	1%
DK	1%	2%	1%	3%	1%	-2%
FR	3%	3%	2%	2%	2%	0%
SUM	55%	58%	60%	53%	45%	-8%

Appendix 5 Share of total imports from Russia to EU members

35% 30% 25% 20% 15% 10% 5% 0% 2010 2011 2012 2013 2014 ■LT ■ PL ■ NL ■ DE ■ DK ■ FR

Share of imports from Russia 2010-2014

Appendix 6: GDP growth rate of 6 EU members 2010-2014

Growth rate (%)	2010	2011	2012	2013	2014	% change 13-14
Lithuania	1,6	6,1	3,8	3,3	2,9	-0,4
Poland	3,7	4,8	1,8	1,7	3,4	1,7
France	2	2,1	0,2	0,7	0,2	-0,5
Germany	4,1	3,7	0,4	0,3	1,6	1,3
EU28	2,1	1,7	-0,5	0,2	1,4	1,2
Denmark	1,6	1,2	-0,7	-0,5	1,1	1,6
Netherlands	1,4	1,7	-1,1	-0,5	1	1,5





Appendix 7: EU exports to Serbia and Belarus



EU exports to Belarus 2013-2014 (million US dollars)

EU exports to Serbia in 2013-2014 (million US dollars)



2013 201

Source: UN Comtrade database and own editing