

THE IMPACT OF 2014 SANCTIONS ON THE RUSSIAN ECONOMY

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ABSTRACT

After annexing the Crimea in March, 2014, the international community imposed wide ranging sanctions on the Russian Federation with the aim of changing Russia's foreign policy. However, Russia did not sit idly and responded by imposing counter-sanctions on most of the sanctioning countries. This study aims to examine the impact of the sanctions on the Russian economy. The paper takes two approaches. Firstly, it applies a gravity model to compare the impact of the sanctions on Russian exports and imports. Secondly, the paper uses synthetic control method to investigate how the Russian economy, indentified with per capita GDP in PPP, would have evolved without the imposition of the sanctions. The estimation results from the gravity model suggest that Russian exports suffered more than imports. Besides, the estimation results based on the synthetic control method approach show that per capita Russia GDP declined by more than \$2,714 in PPP.

Keywords: sanctions, Russia, gravity model, synthetic control method, exports, imports, fixed effects, random effects, OLS.

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All remaining errors are mine.

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1. Introduction

Literature is full of studies on economic sanctions, since they are not a new thing. In their classic book on the topic, Gary Hufbauer and Jeffrey Schott note that the imposition of economic sanctions goes as far back as 432 BC, when Pericles set economic sanctions upon Megarian merchants, called “Megarian decree” for having committed a sacrilege. As a consequence, the Megarians were prevented from having an access to the harbors and markets of the Athenian Empire. Economic sanctions, however, have significantly evolved over the course of human history and contemporary economic sanctions are imposed in search of diverse goals, from the promotion of human rights to the suspension of nuclear programs. The mechanism of sanctions works as a tool to change the targeted country’s domestic or foreign policies. Yet, Rarick (2007) emphasizes the ineffectiveness of economic sanctions as tools of foreign policy.

After annexing the Crimea in early March 2014, with the goal of changing Russia’s behavior towards Ukraine, the EU and the US imposed costs on Russia by issuing sanctions. The reasons behind the imposition of the sanctions were the views that the referendum in Crimea was illegitimate; Russia illegally annexed Crimea by violating the Ukrainian sovereignty and supported pro-Russian separatists (Oxenstierna & Olsson, 2015). Nevertheless, on March 18, 2014 Russian President Putin signed a bill into law adding the Crimea to Russia.

Being a major player in the international economy, analysts have debated the potential effects of the current sanctions on the Russian economy. Measuring the impact the sanctions have had on the Russian economy is what this study aims to do. Hence comes the subject of my thesis topic, “The impact of 2014 sanctions on the Russian economy.” I will potentially contribute to the literature by analyzing the impact of the sanctions on the Russian exports

and imports using the Gravity Model. I will also demonstrate the evolution that the Russian economy could have had without the imposition of the sanctions using the Synthetic Control Method. The latter was initially my primary methodology. The main challenges of using Synthetic Control Method as the primary methodology were three facts. Firstly, the economic sanctions on Russia were imposed in 2014. This did not allow me to have significant number of post-intervention periods. Secondly, I had access to annual data only, which though could be divided into quarterly periods has not been modified to have as much accurate results as possible. Thirdly, data availability was up to 2015. As a result, two methods both relying on panel data will be used.

Firstly, the Gravity model will be used to compare the effects of the sanctions on the Russian economy with the pursuit of identifying whether the sanctions impacted the Russian exports or imports most. Gravity Model is by no means new to the study of trade, but to my best knowledge, it has not been applied to a comparative analysis of the effects caused by the sanctions on the Russian economy. Hence, this thesis will apply a much used method to a current issue within the international trade. Secondly, despite the debate about the effects 2014 sanctions have had on the Russian economy, current literature pays little attention to an issue of how the Russian economy would have evolved without the imposition of the sanctions. This is why Synthetic Control Method will be used to evaluate the trajectory of the economic growth that the Russian economy would have followed without the sanctions.

This study is exceptional thanks to a combination of three factors. It is focused on a contemporary topic that is relevant from a theoretical point of view; it discusses the impact of sanctions on a major power, and plays an important regional role in the context of Armenia's regional location.

The remainder of this study will be structured as follows: (1) previous research is discussed and summarized; (2) sanctions against Russia and Russian counter-sanctions are presented, which is followed by a discussion on the economic implications that the sanctions caused on Russia, (3) the next part of the study starts with the empirical analysis by introducing the methodology for the gravity model and data (4) the estimation results for the Gravity Model are presented; (5) this is followed by the introduction to the methodology and data for the synthetic control method. (6) Estimation results for SCM are discussed and are followed by the Placebo test to check the robustness of the findings; (7) the final section of the study summarizes the paper, which then ends up with the bibliography list and the appendix, including tables and figures.

2. Literature Review

The literature related to the sanctions and to the sanctions imposed on Russia can be divided into two strands of study: (i) investigation of the effects of sanctions on the economic variables of Russia; (ii) exploration of the impact of the sanctions on the sanctioning countries, particularly EU. Additionally, current literature considers the effects of sanctions on a certain economy using the Gravity Model and Computable General Equilibrium Method, which in this study will hereinafter qualify as a third strand of literature.

In the first strand of literature, authors focus on the effects sanctions have caused on certain economic variables and politics of the Russian Federation. Several authors have done studies in the Russian language to analyze how the economic sanctions would affect certain areas of the Russian economy. Ziganshin et al (2015) measure the impact of the sanctions on the expansion of the Russian tourism. Doing descriptive analysis as well as historic review of the sanctions the authors find that the economic sanctions of 2014 have negatively affected

Russian tourism industry and offer to reorient the focus to internal tourism. Primarily, the authors emphasize the need to boost investments into Russia, which can be achieved by ceasing the capital outflow. However, taking into account the introduction of sanctions this can only be made using internal resources. Therefore, as the authors suggest tour agencies should work on diversifying their packages to positively influence the growth of the tourism in Russia at times of sanctions. Another study done by Masyutin et al (2015) examines the potential that Russian economy overall can have for growth. Using descriptive analysis, the authors come up with a list of suggestions that when prioritized will best work at enhancing the potential of growth for the Russian economy. Gurvich and Prilepskiy (2015) examine the impact of the sanctions on the Russian economy. The authors model capital flow components and reveal that state-controlled banks, oil, gas, and arms companies have been severely impacted by sanctions as the inflows of foreign direct investment has reduced. Other papers that have done similar studies and observed similar effects can be found in Table A1 under Tables in Appendix.

In the second strand of the literature, authors address the effects that Russian sanctions had on the sanctioning countries. Szczepański (2015) argues that the EU exports have had slight decrease. Losses in the EU connected to the embargo have cost as many as 130 000 jobs in the agricultural sector and US\$ 6.7 billion. Nevertheless, despite the fact that some argue that EU will not be able to find an alternative market that will be as remunerating as Russia, the author states that in most affected areas, members have managed to find substitutes. Similarly, Gros and Mustilli (2015) through a descriptive study claim that sanctions on Russian have had limited impact on the EU, though they find it difficult to assess the exact effects on value added and employment.

In the third strand of the literature, authors use Computable General Equilibrium (CGE) or Gravity Model to assess the impact that sanctions have on the economy. In terms of CGE, Gharibnavaz and Waschik (2015) use stimulate the effects of international sanctions on the Iranian economy, government, as well as upper- and lower-income rural and urban Iranian households as closely as possible. CGE results show that the sanctions imposed on the Iranian oil exports had a negative effect on the government's budget, but a much limited impact on the well-being of Iranian rural and urban households. Ianchovichina et al (2016) quantify the effects of lifting economic sanctions on Iran using CGE. The authors find that Iran benefits in case their crude oil exports to the European Union recover to half their pre-embargo level. In terms of the Gravity Model, Anderson & van Wincoop (2001) analyze the gravity model suggesting a model for the model. The examination of McCallum's Gravity Equation yields that national borders reduce US - Canada trade by about 44%. Leslie et al (2014) employ the model to analyze the trade that America as well as key EU states have lost as a result of sanctions on Iran since 1995. The authors classify the sanctions as low, medium and high and accordingly assign dummy variable to estimate the effects of the sanctions. The authors find that medium trade levels decreased by 70.6%, high intensity sanctions lowered trade by over 98%. Notably low intensity sanctions were the only statistically insignificant category. Caruso (2003) uses Gravity Model to study the effects that U.S. sanctions had on bilateral trade flows between the US and 49 largest countries over the period of 1960 – 2000. The results show that extensive and comprehensive sanctions have a large negative impact on bilateral trade, whereas this is not the case for limited and moderate sanctions. My study is much similar to the one done by Caruso (2003) when it comes to the overall replication of the methodology of the Gravity model used. Besides, I follow Anderson & van Wincoop (2001). However, my study is different in that it runs an estimation on Russia and its partners.

Finally, my study uses Synthetic Control Method (SCM). To my best knowledge, there has only been one study done on the evolution the Russian economy without sanctions using SCM. Pchelintsev (2017)¹ applies SCM to quantify the costs of sanctions on the Russian economy. Pchelintsev identifies that sanctions had a positive impact on Russia's current account balance. However, my study is different from that done by Pchelintsev in that I make an addition to what Pchelintsev found by improving his conclusions and validating the arguments. Firstly, Pchelintsev studies the impact using annual data which was converted into quarterly ones using software. I do mine using annual data figures, since SCM works best when using annual data. Secondly, Pchelintsev's donor pool is predetermined, but I use SCM methodology to come up with my donor pool.

Besides, there are four main papers that I base and borrow the methodology, application and robustness of my study from. Being a policy analysis tool, these papers discuss the effects of various policies on different countries using SCM, though none of them focuses on sanctions, the application of SCM is the same regardless of the estimated effect. Therefore, these studies provide me with a solid ground to construct my study on.

The first paper that I use for SCM is that of the developers of the Synthetic Control Method, Abadie and Gardeazabal (2003), who investigate the application of synthetic control methods to comparative studies, particularly on the Basque country. They discuss the advantages of the model and apply them to study the economic effects of terrorist conflicts on the Country. Authors find that late 1960's terrorism deducted per capita GDP in the Basque country by about 10 percentage points relative to the synthetic control region. The other papers that I borrow from are based on Abadie and Gardeazabal's (2003) study. Specifically, Horiuchi and Mayerson (2014) examine the evolution Israel's economy could have had without the 2000

¹ The author studies "Evaluating the Effects of 2014 Sanctions against Russia Using Synthetic Control Methods" for his Master's thesis at Charles University, Prague, Czech Republic

Palestinian Intifada. The authors find that per capita Gross Domestic Product (GDP) of Israel during the Second Intifada was reduced by an average of about 2,003 U.S. dollars per year (in 2005 U.S. dollars). This amounts to about 8.6% of the 2000 baseline level. In the case of the Second Intifada, the opportunity cost of conflict was indeed substantial and significant. A third one is that of Aytug et al (2015), who study the impact of customs union on the countries' export and GDP performance. Specifically, the authors analyze whether export and GDP per capita in Turkey have increased after Turkey became a member of the European Customs Union in 1996. The SCM estimates what would have been the level of export and GDP per capita in Turkey if Turkey had not become a member of the European Customs Union. Authors find that Turkey would have experienced a lower level of export and GDP per capita in the absence of the European Customs Union. Specifically, Turkey's export to the European Union countries and GDP per capita in Turkey could have been 38 and 13 percent less, respectively. The last paper that I use is done by Matta et al. (2016). This paper uses Synthetic Control Methodology to estimate the output loss in Tunisia as a result of the "Arab Spring." The results suggest that the loss was 5.5 percent, 5.1 percent, and 6.4 percent of GDP in 2011, 2012, and 2013 respectively. These findings are robust to a series of placebo tests.

Thus, it can be inferred that my thesis potentially contributes to two different groups of literature. The first group of literature is about the impact of sanctions on the exports and imports between Russia and its major partner countries. So far, there have been few comparative studies on how sanctions have affected Russian exports and imports. The second literature is about the impact the sanctions have had on the economic growth of the Russia economy, measured by per capita GDP. Though there have been a number of studies on how the Russian economy has suffered from sanctions, current literature has not

considered the evolution Russian economy would have had without the absence of sanctions. Hence, the use of SCM will be pioneering in that respect.

3. Sanctions on Russia and Russian counter-sanctions

In response to Russia's annexation of the Crimean region and the ongoing military interventions in eastern Ukraine, after the "Maidan Revolution," 37 Western countries (including all EU member countries, the United States and Japan) levied sanctions on Russian individuals, entities, and economic sectors starting early March 2014 (Crozet & Hinz, 2016). The goal of these sanctions was to compel Russia to end its interventions in Ukraine, change Russia's political behavior by targeting essential functions and sectors in the Russian economy and impose a considerable cost on Russia to stop it from more hostilities (Oxenstierna & Olsson, 2015).

3.1. The Waves of the Sanctions

Sanctions on Russian can be divided into three waves: *First Wave*: asset freezes and restriction of entry into EU and USA of targeted individuals and organizations involved in the invasion and annexation of Crimea starting March 2014. *Second Wave*: the extension of the sanctions in period 1. And *Third Wave*: comprised of trade restrictions, sectoral limitations and financial sanctions.

3.1.1. First wave of the sanctions: Smart sanctions, March/April 2014

European and allied Western countries, most prominently the United States, imposed the first wave of the smart sanctions² on the Russian Federation in mid-March 2014 (Dreyer et al., 2015). These sanctions focused on organizations and individuals, including the Speaker of the Crimean Parliament and several Russian MPs, who were involved in threatening the

² According to Friedman (2012) measures such as arms embargoes, asset freezes, and travel bans on key individuals and organizations. Retrieved from Foreign Policy

independence and territorial integrity of Ukraine or had supported the annexation of Crimea (Bond, et al 2015). In respect of the organizations, the sanctions were meant to hurt the target country's economy, as the diplomacy had failed, and bring the desired change in Russia's policies (Crozet & Hinz, 2016). In respect of the individuals, the sanctions were limited to travel restrictions and asset freezes. Curiously, as a response to the sanctions introduced, the State Duma (Russian parliament) unanimously passed a resolution asking for all members of the Duma to be included on the sanctions list.

Additionally, in the course of the first wave of the imposition of the sanctions, the leaders of G7 countries at the nuclear security summit on March 24, 2014 in Hague announced the suspension of Russia's membership to the group of the advanced economies and the EU suspended their bilateral talks on visa matters with Russia (Fisher, 2014).

3.1.2. Second wave of the sanctions: April 2014

As violence escalated, the second wave of the sanctions expanded the list of the targeted individuals and entities conducting transactions with the separatist groups in the Donbass region of Ukraine. On the one hand, the U.S. brought new penalties and assets freezes on 7 Russian individuals and 17 companies, including Bank Rossiya, for having supported officials involved in the annexation of the Crimea.

On the other hand, EU issued travel bans against 15 individuals and included 18 entities³ on its list of sanctions in July 2014 (Christian, 2015) stating that their "sanctions are not punitive, but designed to bring about a change in policy or activity by the target country, entities or individuals [...]. At the same time, the EU makes every effort to minimize the adverse consequences for the civilian population or for legitimate activities".

³ The list of those sanctioned has been extended several times and currently includes 128 people and 102 entities in the United States and 151 people and 37 companies in the EU (Aleksashenko, 2016).

3.1.3. Third wave of the sanctions: Trade restrictions and financial sanctions, 2014 - present

The third wave of the sanctions went beyond the previous ones both in its depth and scope. Not only were Russian individuals and entities targeted, but the European entities were restricted from importing arms and related materials from Russia and providing technical assistance, brokering services or financial assistance related to these materials (Szczepański, 2015). There was an embargo on

- dual-use goods and technology intended for military use,
- export of equipment for the oil industry,
- imports of arms and related material and
- a restriction to engage in new debt or equity financing with maturities over 90 days.

The US additionally banned transactions with two major Russian energy firms, Rosneft and Novatek, and two banks, Vnesheconombank and Gazprombank. US companies also became restricted from trading with Russian energy firms conducting deepwater offshore projects.

In its turn, the EU implemented similar trade sanctions and financial restrictions urging energy firms to lower their dependence on Russian gas (Oxenstierna & Olsson, 2015).

3.1.4. More countries join the sanctions

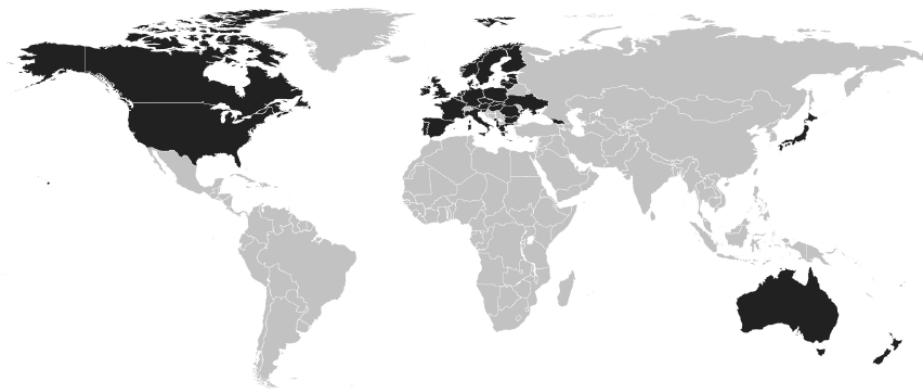
Other countries⁴ followed similar paths and introduced sanctions on Russia. Norway, Albania, Montenegro, Georgia, Ukraine, Moldova, Canada, Australia, New Zealand, and Japan enacted similar policies.

⁴ The economic size of the countries that sanctioned Russia equals 55.2% of 2014 World GDP (Crozet & Hinz, 2016).

- Japan suspended talks with Russia on matters concerning visa norms, investments, military issues and space exploration. The Japanese sanctions restrict the activities of Russian banks in Japan and tighten controls on arms exports (Christian, et al 2015).
- Canada added sanctions on Russian arms, financial and energy companies, as well as provided a list of 8 targeted Ukrainian individuals (Aleksashenko, 2016).
- Switzerland, historically politically neutral, enacted a legislation that made it more difficult to transshipping exports and imports through the country. They tightened military embargo including drones, simulators and small arms.

Figure 1 shows the map of the countries that imposed sanctions on Russia. Countries painted in the darker shade present the pool of those countries that have joint the imposition of the sanctions against the Russian Federation at different periods after March, 2014.

Figure 1: Countries that have imposed sanctions on Russia



Source: Crozet & Hinz. (2016). Collateral Damage: The Impact of the Russia Sanctions. Research and Expertise on the World Economy. *Working Paper CEPII*

3.2. Russian counter-sanctions

Russia did not sit idly when covered with so many restrictive measures by the international community and condemned the measures by first issuing travel bans on high-ranking and influential politicians and officials in the US.

On 6 August 2014, Russia put into force a list of embargoed agricultural products as an “application of certain special economic measures to ensure the security of the Russian Federation.” The edict created a boomerang effect and prohibited the import of raw materials, meat and meat products, milk and dairy products, root crops, vegetables, fruits and nuts, vegetable fat-based food products, fish and shellfish⁵. The counter-sanctions targeted the EU member states, the US, Australia, Canada and Norway for a year, but were extended in summer 2015.

On 13 August, 2015, Russia updated the list of the countries and banned food imports originating from Albania, Montenegro, Iceland and the County of Liechtenstein, countries that had imposed sanctions against Russian entities or individuals.

The ban did not apply to imports by private individuals or to products intended for children.

3.3. Challenges for the economy

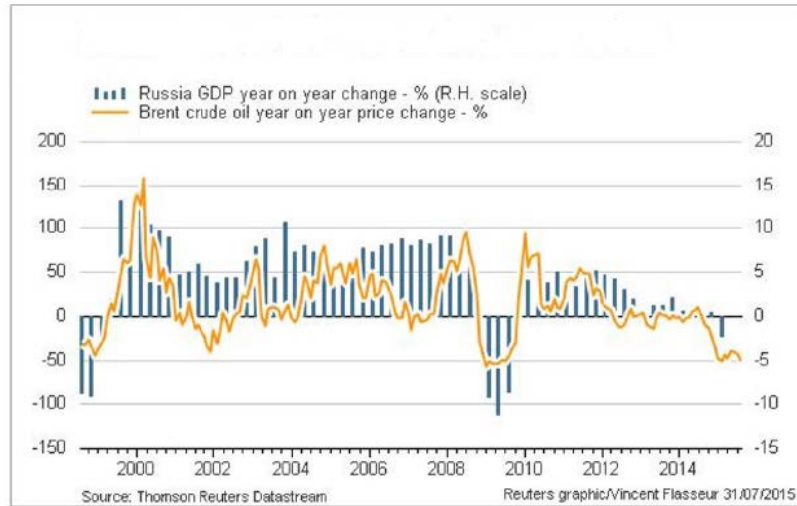
Lektzian and Souva (2007) maintain that ‘if economic sanctions are severe enough, they will harm a target state’s economy.’ However, sanctions on Russia were imposed at a time when the Russian economy was struggling to recover from the 2008-2009 global financial crisis (Nelson, 2015).

Being a major oil producer and exporter, in the 2000s, the Russian economy benefited from the rising oil prices. However, in the course of global financial crisis, as can be concluded from Figure 2 below, the Russian economy was significantly affected by a fall in the demand for oil exports particularly in Europe and in 2009 Russian economy contracted by 7.8% (Nelson, 2015). Since then the rate of economic growth in Russia has gone down every year

⁵ Szczepański argued that the EU will be affected most from Russian counter-measures, since 73% of these imports to Russia came from the EU (Szczepański, 2015).

negatively influencing a number of key economic indicators (Table A2 under Tables in the Appendix).

Figure 2: Russian GDP and the oil prices, 2000 – 2014



Source: Reuters, Russian Investment Summit, <http://graphics.thomsonreuters.com/11/09/RussiaSummit.html>

During the initial phase of the sanctions, most commentators claimed that the sanctions had no immediate consequences on Russia's economy. Views started to differ after the second and the third waves of the sanctions.

In a few months after the sanctions, economic conditions in Russia started to deteriorate at a faster rate (de Galbert, 2015). World Bank stated that sanctions had had the greatest impact on destabilizing the Russian economy, due to restrictions on Russia's access to international financial markets, as well as the degradation of consumer and investor confidence.

Hence, the shock to the Russian economy can be divided into two strands:

- The first shock was the sharp decline in oil prices during the third and fourth quarters of 2014. While nearing USD 105 per barrel from 2011-2013, oil prices ended in 2014 at less than USD 60 per barrel.
- The second shock was the economic sanctions imposed on Russia, which negatively affected the Russian economy.

In the rest of this study, I will go over the impact that the second strand of shocks had on the Russian economy.

The economic sanctions accelerated the crisis that Russia was trying to get over. Above all capital flight from Russia accelerated, the ruble depreciated, and inflation started. Below I discuss each of these in greater detail.

3.3.1. Capital flight

The economic turndown in Russia caused investors to become uncertain about doing business in Russia and led them to pull capital out of the country. In 2014, net private capital outflows from Russia totaled \$152 billion, compared to net outflows of \$54 billion in 2012 and \$61 billion in 2013.

In July 2014, no Russian company received loans in U.S. dollars, Swiss francs, or euros, for the first time since the global financial crisis. Nevertheless, Russian officials denied any plans to use capital controls. (Nelson, 2015) The reason according to Russia's Central Bank (Bank Rossii) was that "[...] the main part of net capital outflow was a result of private external debt redemption."

As Western sanctions and a shrinking economy made it more difficult for Russian banks and companies to obtain foreign funding, there was no option for companies and banks but to pay down their debts, so Russia had to be deleveraged. Debts of the corporate as well as the financial sector fell from around US \$715 billion (€650 billion) in January 2014 to \$597 billion (€45 billion) at the end of 2014. The net change in Russian banks' foreign financial obligations reached a record negative \$60 billion in 2015, and non-financial companies' foreign obligations shrank by \$5.8 billion setting another record (Bershidsky, 2017).

3.3.2. Devaluation of the Ruble

In 2014, the ruble became the worst currency of the year, having lost 58% of the cost in relation to US dollar when in 2008 it fell in price only for 17,7% (Galbert, 2015).

Capital flight, low oil prices along with reduced access to international capital markets because of the sanctions on Russia, as IMF mentioned caused a significant devaluation of the ruble at the end of 2014.

This situation was exacerbated by the mistakes that the monetary authorities made.

Starting June 2013, Bank Rossii, underestimating the changes occurring in the current account balance, regularly intervened in the domestic market by selling foreign currency⁶. Owing to these interventions, the demand for imported goods and services increased and brought the ruble for a major devaluation.

Therefore, to stem its further depreciation, investors started to massively sell the ruble. Bank Rossi announced its biggest interest rate hike since 1988 raising from 10.5% to 17%. Besides, it stopped refinancing in rubles, and started to provide dollar-denominated loans to exporting companies for debt-repayment). However, the ruble continued to sharply decline. In early January 2015, the ruble was trading at 63 rubles per dollar, compared to 33 rubles per dollar a year earlier. Hence, the central bank is periodically intervened by selling foreign currencies and purchasing rubles to keep the value of the ruble.

Though ruble has stabilized, it lost 45 percent of its value against the dollar in 2014. What is more, monetary interventions in support of the ruble have reduced Russia's foreign reserves, from \$475 billion in June 2014 to nearly \$360 billion in March 2015.

⁶ CBR sold \$100 billion or 20 percent of its foreign currency reserves from June 1, 2013, until September 1, 2014

3.3.3. Inflation

In November 2014, inflation in Russia increased to 9.1%, the fastest acceleration since 2011 and well above the central bank's target rate of 5% to 6%. One factor driving higher rates of inflation has been the depreciation of the ruble, which makes imports in Russia more expensive.

In addition, Russia's ban on certain agricultural imports has caused food prices in Russia to rise. For example, in November 2014, the price of buckwheat increased more than 50% and the cost of fresh tomatoes jumped nearly 35%. The ban has also resulted in limited shortages and/or decline in quality of certain kinds of food products. Rising food prices were the main driver, climbing 11.4 percent year-on-year in September, up from a 10.3 percent increase in August. Prices on other goods rose by 5.5 percent year-on-year and the cost of services climbed 6.9 percent (Moscow Times, 2014). Prices rose fastest on meat, fish and fruit and vegetables – the same products hit by Russia's retaliatory ban in August on a range of food imports from countries that had slapped Russia with economic sanctions over the crisis in Ukraine. The price of meat and fowl rose 16.8 percent, fish by 14.1 percent, milk products by 16.2 percent and fruit and vegetables by 6.1 percent. The cost of imported goods and products made from foreign components has also been hit by the rapid devaluation of the ruble, which on Monday reached 40 rubles to the dollar for the first time since Russia's 1998 default (Moscow Times, 2014).

4. Empirical Analysis

In order to answer the research questions of this thesis paper, the empirical analysis is divided into two parts. The first part examines the role of sanctions in a gravity model, and the second

part examines the way the Russian economy would have evolved if the sanctions were not imposed.

As the purpose of this paper is to examine the effects of sanctions, I use the gravity model with the goal of comparing the effects of the sanctions on the Russian exports and imports. Thus, I will run two regressions, one for exports and the other for imports encompassing the periods from 2000 – 2015 between Russia and its major trading partners.

Then I make Synthetic Russia using SCM by a pool of donor countries.

4.1. Gravity Model

In this part of my study, I present the main building blocks of the Gravity Model, which will be used to compare the strength of the sanctions on the Russian export and imports. After that, I will proceed with the data description.

4.1.1. Methodology

Gravity model has been one of the most proliferate approaches to modeling trade flows, both due to its simplicity and empirical success (Sleptsova, 2007).

The original gravity model is based on Newton's law of gravitation, expressed as $G_{ij} = G \frac{M_i M_j}{d_{ij}^2}$, where G_{ij} is the gravitational bond between objects i and j , G is the gravitational constant, M_i and M_j are measures of the attractiveness of masses i and j , and d_{ij}^2 is the square of the distance between objects i and j .

The theoretical principle of the gravity model is twofold: (1) the degree of interaction is directly proportional to the size of the masses and (2) the degree of interaction is indirectly proportional to the distance that separates them.

Hitherto, quite a few different designs of gravity model have been used by economists. An important contribution to the theoretical foundation of the gravity equation is the later work of Anderson and van Wincoop (2003), who I have chosen to follow in designing my model to make the comparison of the impact of exports and imports by the presence of the sanctions.

I use two models for estimating the trade effects of the economic sanctions employed by the international community on Russia. I compare the impact that the sanctions caused on the exports and the imports between Russian and its 33 most important trading partners between 2000 and 2015 using the Gravity Model of Trade. These 33 countries represent roughly 70-75% of Russia's total exports and total imports. First the regression is run for the exports between Russia and its 33 major trading export partner countries for the period of 2000 - 2015. Then, I run the second regression for the imports between Russia and its 33 major trading export partner countries for the period of 2000 – 2015 and jointly present the estimation results. This is done using panel data.

I estimate a minimally augmented gravity model adding to the standard model dummy variable contiguity and sanctions in order to distinguish the effects that the latter caused. The models that I use have the following forms:

$$\ln Exports_{RUS-it} = \beta_0 + \beta_1 \ln(GDP_{RUS_t}) + \beta_2 \ln(GDP_{it}) + \beta_3 \ln(Population_{RUS_t}) + \beta_4 \ln(Population_{it}) + \beta_5 \ln DistCap_{RUS-i} + \beta_6 Sanc + \beta_7 Contig + u_{RUS-it},$$

$$\ln Imports_{RUS-it} = \beta_0 + \beta_1 \ln(GDP_{RUS_t}) + \beta_2 \ln(GDP_{it}) + \beta_3 \ln(Population_{RUS_t}) + \beta_4 \ln(Population_{it}) + \beta_5 \ln DistCap_{RUS-i} + \beta_6 Sanc + \beta_7 Contig + u_{RUS-it},$$

where $Exports_{RUS-it}$ is the exports between Russia and country i in year t . Similarly, $Imports_{RUS-it}$ is the imports between Russia and country i in year t .

β_0 is a constant

GDP_{RUS_t} and GDP_{it} are the Gross Domestic Products of Russia and country i in year t , expressed in constant 2010 US Dollar.

$Population_{RUSi}$ and $Population_{it}$ are the number of population in Russia and the major trading partner i in time t

$DistCap_{RUS-i}$ is the distance between Moscow (Russia's capital city) and that of the major trading partner i measured in kilometers

$Sanc$ is a variable denoting 1 if either Russia or its trading partner imposed sanctions, 0 if none did, and 2 if both did.

$Contig$ is a dummy variable indicating 1 if the trading partner country shares a border with Russia and 0 otherwise.

u_{RUS-it} is an error term

t is the time period including from 2000 – 2015.

In evaluating the sanctions imposed on Russia, one distinction should be made. When under the wave of sanctions, Russia has also imposed sanctions on the EU states, the US and some other countries, many of which are its major trading partners and are also included in the analysis. This means that the Russian economy was not the only one affected. This is why variable sanctions assign 2 to show that sanctions have been imposed by both sides, 1 if only one country did, 0 if none did. A case of interest is that of Russia-Turkey, the imposition of sanctions on Turkey by Russia was not influenced by the 2014 sanctions on Russia. Yet, when interpreting the results, the emphasis will be put on 1 sided (that is $sanc = 1$) sanctions' effects.

4.1.2. Data

To construct the Gravity Model for Russia and its trading partners, I use country-level panel data for Russia and 33 (Belarus has been omitted, because of the lack of data availability for this country) of its major trading partner countries available in the Observatory of Economic Complexity.

The period of investigation is from 2000 – 2015, which is comprised of two rounds: 2000-2013 when no sanctions were in place and 2014 – 2015 when sanctions became imposed.

Exports/Imports

I extracted data on Russian exports and imports to/from the major trading partners for the period of 2000 – 2015 from the Direction of Trade Statistics, International Monetary Fund,

GDP

Annual GDP in constant 2010 US Dollar is a time variant variable that was extracted from World Development Indicators, World Bank. My expectation is that an increase in GDP will have a positive impact on exports and imports.

Population

Also the populations for all of the countries included in the estimation were found from World Development Indicators database. Population is another time variant variable that should be positively correlated with trade as larger markets should develop larger trade flows with each other. On the other hand, a large economy is able to produce a wider variety of goods, so in a simplistic world, such a nation should have less need for foreign imports. My expectation is that an increase in Population will have a positive impact on exports and imports.

Distance

Distance is a time invariant variable, so it remains constant during the whole period of my study. I extracted this variable from CEPII GeoDist Database, a French research center. In Gravity Model of Trade, distance is often used as a proxy for transaction costs for the trade between the two countries. Therefore a longer distance between two countries should reduce the amount of trade between them, as trade costs are assumed to rise.

For a country of Russia's size, the trading partners can actually be very close to each other even though their capitals are far away (for example Russia – China). This is why I also add a

dummy variable Contig, a time invariant variable standing for contiguity, to make sure that I cover this gap. My assumption is that neighboring countries will trade more, as the transportations costs should be relative low.

Sanctions

Finally, the most important variable of this study is sanctions. To account for the effect of the sanctions, I have manually added the observations for the presence of sanctions between Russia and its trading partner by doing an Internet search. As sanctions make it more difficult to trade, imposing sanctions should have a negative effect on both exports and imports, however, it is not clear which one will be affected more. As discussed earlier in this study, Russia has also imposed sanctions on the sanctioning countries, who in most cases are its major trading partners. Hence, Russia has had to find an alternative market to send its exports to and receive imports from. This might lower the impact of the sanctions on both the exports and imports and result in unprecedented results. Thus, an estimation and a comparative analysis is of vital interest in this respect.

In order to compare the effects of sanctions imposed on Russia on exports and imports, besides the percentage effect based on the coefficients obtained, I use the following formula to calculate the exact percentage change in the value of exports and imports from Wooldridge (2016): $(\exp(\text{coefficient}) - 1) * 100$

Furthermore, the gravity model relates the natural logarithm of the value of exports and imports from Russia to the logarithm of the GDPs, populations, and distance. This allows the coefficients to be interpreted as elasticities, which however is outside the discussion of this thesis paper, except for the variable of sanctions, since the interest is on the direction of the effects caused by the coefficients.

Obviously, in addition to the variables used in this study, there are many other variables that affect Russian exports and imports, such as political relations, changes in its trade partners' preferences, official language, and etc. Unfortunately, not all of them could be included in the model, both due to lack of data and the complication of the model.

4.1.3. Estimation Results

There are three methods that can be used in panel data estimation. These are OLS estimator, fixed effects, and random effects. I will follow current literature and present all of the three results. The main problem with a fixed effects model is that those variables that do not change over time, i.e., distance and contiguity, cannot be estimated directly because the inherent transformation wipes out such variables. However, the decision between fixed effects and random effects can be based on Hausman test.

Anderson and Wincoop (2003) suggest the Fixed Effects approach, whereas Sören et al. (2014) propose the random effects, because of the pitfalls of the fixed effects mentioned, when it comes to Gravity Model analysis. Fidrmuc (2009) believes that there is not any problem with using fixed or random effects estimators, and their results are similar to the fully modified OLS. Therefore, I follow Fidrmuc's suggestion and apply all of these three panel data estimators to find and compare the results for the Russian exports and imports under the presence of the sanctions. Nevertheless, for the sake of curiosity I run the Hausman test, to see the preference my study would have given in terms of either of the effects.

On the next page the test results for Hausman test are jointly shown for both the Russian exports and the imports:

Table 1: Results for the Hausman test for the Russian Exports and Imports

VARIABLES	(Exports)	(Imports)
InGDPrus	3.096*** (0.456)	3.645*** (0.298)
InGDPI	0.450*** (0.0350)	0.589*** (0.0369)
InPOPPrus	6.550 (10.41)	-5.611 (6.956)
InPOPI	0.273*** (0.0462)	0.0496 (0.0375)
InDistCap	-1.251*** (0.0778)	-0.320*** (0.0386)
Sanc	-0.178** (0.0888)	-0.136** (0.0598)
Contig	0.173* (0.100)	0.866*** (0.0687)
Constant	-194.6 (207.0)	10.62 (137.9)
Observations	528	528
R-squared	0.589	0.805
b = consistent under Ho and Ha; obtained from xtreg		
B = inconsistent under Ha, efficient under Ho; obtained from xtreg		
Test: Ho: difference in coefficients not systematic		
chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)	= 0.41	= 5.77
Prob>chi2 = 0.9951	0.9951	0.329

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Author's Calculations

As can be seen, for both the exports and the imports, the Hausman test gives its preference to the random effects, since Prob > chi2 is greater than 0.05 for the results.

The estimation results of the models by Fixed effects, Random effects, and OLS robust⁷ for imports and exports are shown below in Table 2. Overall, the regression yielded results that were consistent with my initial hypotheses on gravity modeling. When using fixed effects, variables DistCap and Contig become omitted, as there is no variance in this variable over time.

Table 2: Results for the panel data estimation on the Russian Exports and Imports

VARIABLES	Exports			Imports		
	(FE)	(RE)	(OLS)	(FE)	(RE)	(OLS)
lnGDP _{Prus}	3.219*** (0.241)	3.187*** (0.210)	3.096*** (0.456)	4.023*** (0.196)	3.781*** (0.167)	3.645*** (0.298)
lnGDP _{Pi}	0.489*** (0.126)	0.471*** (0.0936)	0.450*** (0.0350)	0.377*** (0.124)	0.495*** (0.0877)	0.589*** (0.0369)
lnPOP _{Prus}	9.243** (4.403)	8.691** (4.245)	6.550 (10.41)	-1.949 (3.498)	-4.078 (3.395)	-5.611 (6.956)
lnPOP _{Pi}	0.00587 (0.397)	0.234* (0.141)	0.273*** (0.0462)	-0.523 (0.342)	0.0931 (0.0914)	0.0496* (0.0375)
lnDistCap	-	-1.218*** (0.340)	-1.251*** (0.0778)	-	-0.325** (0.142)	-0.320*** (0.0386)
Sanc	-0.217*** (0.0384)	-0.213*** (0.0372)	-0.178** (0.0888)	-0.173*** (0.0298)	-0.156*** (0.0291)	-0.136** (0.0598)
Contig	-	0.190 (0.375)	0.173* (0.100)	-	0.765*** (0.258)	0.866*** (0.0687)
Constant	-254.6*** (86.58)	-237.5*** (84.57)	-194.6 (207.0)	-55.69 (68.75)	-20.13 (67.54)	10.62 (137.9)
Observations	528	528	528	528	528	528
Number of id	33	33		33	33	
R-squared	0.757		0.589	0.896		0.805

Standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

The overall explanatory capacity of the model as explained by R² was strong for both the exports and the imports. According to this metric, my independent variables explained 75.7%

⁷ It is better to account for the heteroskedasticity by running OLS robust regression, since it does not cause bias in the coefficients of the variables and gives the exact coefficients as a simple OLS regression.

and 58.9% of the variation in exports by Fixed Effects and OLS respectively and 89.6% and 80.5% of the variation in imports by Fixed Effects and OLS accordingly.

Taking a look at the results obtained by the estimation of the three methods, I observe approximately similar results for the logarithmic gravity variables and almost expected results in terms of the signs of the coefficients. Since I am only interested in learning whether these variables affect positively or negatively exports and imports, as already mentioned, no discussion of the percentage effect, except for the variable of sanctions, will follow below.

The table above suggests that a larger economic size measured by constant GDP in 2010 US Dollars has a positive effect on both the exports and imports and are significant at even 1% level for both of the dependent variables.

The significance of the Population in Russia and its partner export and import countries differs based on the method used. Overall, as it appears, Russian population itself does not explain the imports for being an insignificant variable. However, it performs significantly well in explaining the exports with Fixed effects and Random effects at 5% significance level. As expected, it shows that an increase in population positively affects exports. Similarly, the increase in the population of the trading partner positively impacts exports and at 10% for the imports.

As mentioned several times above, Distance is dropped when using the Fixed Effects. Yet, the other two methods satisfy my expectations for the exports and the imports and show that being significant at 1%, as distance between Russia and its major trading partner lengthens then export and import negatively suffer.

Similar to distance, contiguity is omitted when running the fixed effects. Whatsoever, the variable of contiguity is significant only at 10% using OLS for the exports and it shows that

when Russia and its partner share a border then exports between them increase. Equally, imports rise between Russia and its partner, when both share a border, as explained by 1% significance level.

Taking a look at the results for sanctions in Table 2, one can note that the imposition of sanctions on Russia had a negative impact on Russian exports and imports, being significant to the variation in both of the dependent variables at 1% and 5% significance levels using all of the three methods. Hence, the gravity model proves the initial assumption of the possibility of having a negative effect on the exports and the imports.

Yet, being interested in the magnitude of the effects that the imposition of the sanctions in 2014 caused, the coefficients of the sanctions when sanctions explain exports range from 17.8% to 21.7% and from 13.6% to 17.3% when explaining imports. Moreover, following Wooldridge (2016), the exact percentage effect shows that, while being significant at 1%⁸, the imposition of sanctions has decreased Russian exports by $(\exp(-0.217)-1)*100 = 19,5\%$ $(\exp(-0.213)-1)*100 = 19.2\%$ and $(\exp(-0.178)-1)*100 = 16.3\%$, ranging from 16,3% to 19,5% and imports by $(\exp(-0.173)-1)*100 = 15.9\%$, $(\exp(-0.156)-1)*100 = 14.4\%$ and $(\exp(-0.136)-1)*100 = 12.7\%$ ranging from 12.7% to 15.9% showing that exports were the more impacted of the two, whenever there has been a sanction imposed either by Russia or by the other side. It is noteworthy that the presence of the two-sided sanctions decreases exports at worst almost by half (2*the coefficient).

⁸ Sanc is significant at 5% using OLS to observe the effect on Russian imports.

4.2. Synthetic Control Method

4.2.1. Methodology

In this part of my study, I present the main building blocks of the Synthetic Control Method, which will be used to estimate how the Russian economy would have evolved in the absence of sanctions. After that, I will proceed to describe the data.

Developed by Abadie and Gardeazabal (2003), the Synthetic Control Method creates a synthetic control unit through a weighted average of other control units (representing countries, states, or regions) that had not experienced the treatment (representing shocks, events, or interventions) of the synthetic control unit, such that the outcome (in this case per capita GDP in PPP) of the synthetic control and that of the treated unit are the same during the pre-treatment period. When a synthetic model is made, the impact of the event is simply calculated as the difference between the actual and the post treatment period result.

The GDP per capita in PPP of Synthetic Russia is constructed as follows:

Let Y_{it}^0 be the GDP per capita in PPP that would be observed for the Russian Federation at time t in the absence of the sanctions for units (countries) $i = 1, \dots, J + 1$ ($J = 27$ in this case, hence, I examine 28 countries where Russia is assigned number 23 based on alphabetical order using STATA) and time periods $t = 1, \dots, T$ (from 2000 to 2015, which is $t = 1, \dots, 16$). Let's suppose that only the first region is exposed to sanctions, so that J (that is 27) countries remain as potential controls.

Let T_0 be the number of pre-intervention periods, that is 15 and be between the number of periods observed, which are 16 (from 2000 and 2015). Let Y_{it}^1 be the outcome that would be observed for Russia (from unit $i = 23$) at time t when Russia is exposed to the sanctions between periods $T_0 + 1$ and T (in this case 2015 only). Abadie et al (2007) assume that the

intervention has no effect on the outcome before the implementation period, so for $t \in \{1, \dots, 15\}$ and all i , we have that $Y_{it}^1 = Y_{it}^0$. Then, the impact of the sanctions on Russia or the treatment effect can be defined as the difference between the GDP per capita in PPP in the absence of the sanctions and the GDP per capita in PPP when Russia is exposed to the sanctions or $\tau_{it} = Y_{it}^1 - Y_{it}^0$ in period 16 (year 2015). Therefore: $Y_{it}^1 = \tau_{it} + Y_{it}^0$. Evidently, Y_{it}^1 is observed, whereas Y_{it}^0 is not observed for 2015 (that is period 16 at the time of the imposition of the sanctions). Thus, Y_{it}^0 , the counterfactual or the synthetic, has to be estimated for 2015 in order to find the impact of the imposition of sanctions on Russia.

It should be noted that SCM depends on the following assumptions:

The sanctions imposed on Russia should have no impact on the outcome of the control units during the post-treatment period, otherwise my estimate will be biased. Second, to control for possible unobserved factors as Abadie et al. (2010) argue increasing the number of pre-intervention periods reduces the likelihood of a bias stemming from unobserved variables. Third, the synthetic control should have similar structural characteristics as the treated unit during the pre-treatment period.

4.2.2. Data

To construct Synthetic Russia, I use country-level data for Russia and other 216 countries available in World Development Indicators (which will later be reduced to 27). Given the wide use of GDP per capita in purchasing power parity for summarizing the overall economic performance of a country in SCM, I use it as my variable of interest.

As already mentioned, the period of investigation is from 2000 – 2015 and it is divided into the pretreatment period (2000 – 2013) and the post-treatment period (2015). I follow Abadie

and Gardeazabal's (2003) suggestion and incorporate a sufficiently long pre-treatment period to improve the accuracy of my estimation.

The main challenges of using Synthetic Control Method for Russia were three facts. Firstly, the economic sanctions on Russia were imposed in 2014. This did not allow me to have significant amount of post-intervention periods. Secondly, I had access to annual data only, but to have accurate results I have not divided the data into quarterly periods. Thirdly, data availability was up to 2015.

To make the appropriate synthetic Russia, I choose predictors that will best describe Russia's economic profile, as well as predict its post-treatment evolution. As already mentioned I use per capita GDP in PPP as a dependent variable, then I add population growth, agriculture value added, industry value added, trade as a percentage of GDP, investment as a percentage of GDP, Government Debt, and mean years of schooling, because it is essential for economic growth. I extracted the data for the first six variables from World Development Indicators, Government Debt from IMF and the mean years of schooling from Human Development Reports.

A last question is about the countries that will comprise the donor pool. By adding as many donors as possible I can end up with getting unreasonably large weights for some countries, which happen to be in some way similar to Russia during the pre-treatment period, but do not share many economic characteristics with Russia. Besides, to avoid bias in my selection of the donor pool countries, I start with a set of 216 countries, as mentioned earlier above. Therefore, I first exclude countries with data unavailability. Then, I exclude countries that are clearly dissimilar to Russia based on the predictor values for the period of 2000 - 2015. Afterwards, I drop countries that have experienced a certain economic shock (for example, Greece for its financial crisis). Finally, I drop those countries that have pre-treatment per

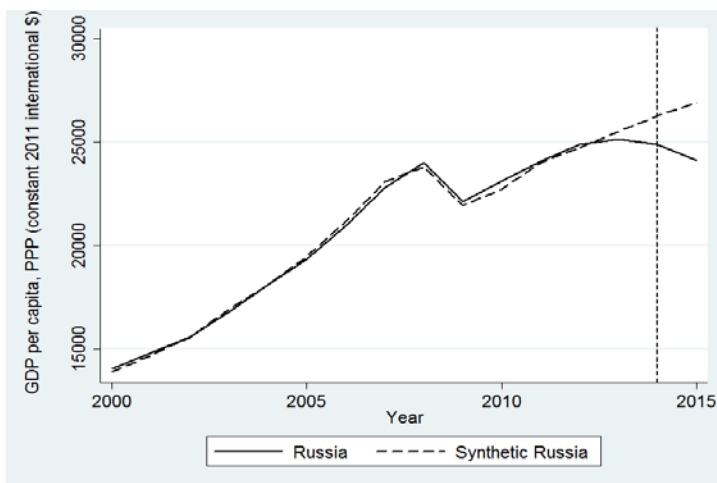
capita GDP in PPP 50% larger and 50% smaller than that of Russia. As a result, I end up with a donor pool of 27 countries.

4.2.3. Estimation Results

I used the techniques described above via STATA software to construct a synthetic version of Russia with such weights, that the resulting synthetic control best reproduces the values of the predictors of per capita GDP in PPP for Russia in the pre-sanctions (pre-intervention) period.

Figure 3 displays the per capita GDP in PPP trajectory of Russia and its synthetic counterpart for the 2000 – 2015 period. In general, Table 3 suggests that Synthetic Russia, constructed using the SCM, has almost the same economic and social structure as the actual Russia during the pre-2014 period.

Figure 3: GDP per capita, PPP: Russia vs Synthetic Russia.



Source: Author’s Calculation

Table 3: Predictor Balance for Russia and Synthetic Russia.

	Treated	Synthetic
Agriculture	4.964991	3.998329
Industry	35.1205	35.11963
Trade	54.56686	106.3269
Investment	21.7555	22.5044
Government_Debt	21.07843	29.16942
Mean_years_of_schooling	11.66429	11.66275
Population_Growth	-.1821913	-.4551081

Source: Author’s Calculation

As expected, synthetic Russia almost exactly reproduces the per capita GDP for Russia during the pre-sanctions period. Overall, synthetic Russia is similar to actual Russia in terms of population growth, agriculture value added, industry value added, investment as a percentage of GDP, and mean years of schooling. The differences in Government Debt and trade as percentage of GDP can be explained by the uniqueness of the Russian economy. Nevertheless, the paths of per capita GDP in PPP diverge significantly around the intervention point. Particularly, per capita GDP in Russia is estimated to have decreased by approximately \$2,714 in PPP (the difference between actual and synthetic Russias' GDP per capita, PPP (constant international \$) for 2015, which is 11.25% of Russia's GDP per capita, PPP (constant international \$) in 2015.

Given the results of the analysis, it can be concluded that sanctions had a negative impact on the Russian economy and held back its growth. Strictly speaking, this analysis only shows that the imposition of sanctions in 2014 had a negative impact. Alternatively, some may argue that being a major oil exporter, the decrease in oil prices that started in 2008 also contributed to the economic decline in Russia. However, regardless of the effect of the decrease in oil prices on Russia's economy, the decrease also affected the countries that are included in the control pool used to make Synthetic Russia. Therefore, the effects of the declining oil prices are incorporated in the synthetic Russia. Thus, it can be concluded that the gap between the trajectories of Russia and synthetic Russia is due to the sanctions.

Table 4 shows the list of countries used to make synthetic Russia. The countries (and the weights in the front) used to make the synthetic Russia are Lithuania (49.6%), Poland (16.3%), Kazakhstan (13.8%), Czech Republic (12.8%), and Trinidad and Tobago (7.5%). This composition is reasonably consistent with the goal of creating a synthetic Russia that looks similar to Russia, as the predictors of these countries resemble those of Russia.

Table 4: Weights for Synthetic Russia

Unit Weights:

Co_No	Unit_Weight
ARG	0
ATG	0
BHS	0
BRA	0
BRB	0
CHL	0
CZE	.128
EST	0
HRV	0
HUN	0
KAZ	.138
LTU	.496
LVA	0
MEX	0
MLT	0
MUS	0
MYS	0
PAN	0
POL	.163
PRT	0
ROU	0
SVK	0
SVN	0
SYC	0
TTO	.075
URY	0
VEN	0

Source: Author's Calculation

4.2.4. Placebo Studies

Since I do not have a “p value” to make statistical inferences about the model, I follow Abadie et al (2015) and use “Placebo or Falsification Tests,” which are also known in the statistical literature by the name of “Randomization Inference Tests.”

I run the test for constructing Synthetic Russia on its major donors to make sure that the formation of Synthetic Russia was not random and repeating Synthetic control analysis for countries that were not subject to sanctions would not show similar economic results to synthetic Russia. Besides, it is expected that the countries that received the major weights for making the Synthetic Russia will not significantly diverge and will follow similar trajectory of economic evolution regardless of the pre-treatment or post treatment periods. Otherwise,

the observed drop in Russia's per capita GDP in PPP can be attributed to factors other than the presence of sanctions.

The units or countries that got the major weights for the construction of the Synthetic Russia are Lithuania, Poland, Kazakhstan, and Czech Republic. After running Synthetic Control Method on these countries, without the inclusion of Russia, as an affected unit, it can be concluded from Figure 4, Figure 5, Figure 6, and Figure 7 (see Appendix, Figures) that Synthetic Lithuania, Synthetic Poland, Synthetic Kazakhstan, and Synthetic Czech Republic follow similar trajectory of economic development regardless of the pre- and post-intervention periods. These results suggest that the observation for Synthetic Russia is unlikely to have been driven by a factor other than the imposition of sanctions. Hence, the test run on Synthetic Russia is valid.

The final test for this analysis is a robustness test suggested by Abadie, Diamond, and Hainmueller (2014). In this test, I drop the major contributor out of the five countries that made Synthetic Russia, that is Lithuania, and re-estimate Synthetic Russia using the same period and the same set of predictors. The objective of this "leave-one-out" sensitivity test is to make sure that Lithuania, being a major contributor, does not drive the results of our analysis. The results are presented in Figure 8. As can be concluded from the figure, the results obtained for the main model are fairly robust. Even after excluding a major donor, Lithuania, we can still observe almost similar patterns: the trajectories of per capita GDP in PPP are approximately similar between Russia and the synthetic Russia until 2014, but they significantly diverge at the times of the imposition of the sanctions in 2014 giving rise to an already observed decline in per capita GDP in PPP and proving the robust results for my study.

5. Summary and Conclusions

The aim of this study was to examine the economic effects of the imposition of 2014 sanctions on the Russia Federation due to the annexation of the Crimea in March, 2014. This paper first answered the question on whether exports or imports were more affected by the sanctions, second, it tried to answer the question on how the Russian economy would have evolved if there were no sanctions imposed on the Russian economy.

In order to examine the economic effects of the targeted sanctions on Russia, the study took two approaches. The gravity model was used to distinguish whether the actions of imposing the sanctions on Russia had significant effects on Russian exports or imports. Secondly, a synthetic control method was used to study the consequences of the impositions on Russian economy were on per capita GDP in PPP.

The estimation results from the gravity model suggested that the imposition of sanctions had a significant negative impact on both imports and exports, however, the impact was more severe on the exports. The Synthetic Control Method implied that on average per capita GDP in PPP declined by \$2,714 in PPP, which is 11.25% of Russia's GDP per capita, PPP (constant international \$) in 2015.

The findings of this study may be of relevance for the kind of consequences one needs to address and be aware of when imposing sanctioning on a country like Russia.

This study, however, could have provided a more comprehensive result if the gravity model had made a distinction between all types of sanctions that were imposed on Russia. Also, additional tests can be done to verify the results of the estimation. Due to lack of advanced econometric applications, those tests were not performed. For future studies, it would be interesting to see if the result would differ if one created dummy variables for every particular type of the sanction and intensity that was levied on Russia.

Whether the sanctions failed the objective of changing Russia's policy towards Ukraine or not is outside the scope of this thesis, however, the study of its economic impact clearly showed the negative effects.

6. Bibliography

- Abadie, A. & Gardeazabal, J. (2003). The Economic Costs of Conflict: A Case study of the Basque Country. *The American Economic Review*. Retrieved from http://www.nyu.edu/gsas/dept/politics/faculty/beck/abadie_aer.pdf
- Abadie, A. et al (2014). Synthetic Control Methods for Comparative Case Studies: Estimating the Effect of California's Tobacco Control Program. *Journal of American Statistical Association*
- Aleksashenko, S. (2016). Evaluating Western Sanctions on Russia. Atlantic Council.
- Anderson, J. & can Wincoop. (2001). Gravity with Gravitas: A Solution to the border puzzle. *National Bureau of economic research*.
- Aytug, H. et al. (2015). Do countries really benefit from customs unions?
- Bershidsky, L. (2017). Deutsche Bank's Russian Scheme Isn't Needed in 2017. Bloomberg. Retrieved from <https://www.bloomberg.com/view/articles/2017-01-31/deutsche-bank-s-russian-scheme-isn-t-needed-in-2017> on March 10, 2017
- Bond. I. (2015). Frozen: The politics of economics of sanctions against Russia. *Center for European Reform*.
- Caruso, R. (2003). The Impact of International Economic Sanctions on Trade: An empirical Analysis.
- Christian et al. (2015). How Sanctions on Russia impact the economy of the European Union. DE Gruyter. *Studies in Business and Economics* no. 10(3)/2015.
- Crozet, M. & hinz, J. (2016). Collateral Damage: The Impact of the Russia Sanctions on sanctioning countries' exports. *CEPII*
- De Galbert, S. (2015). A year of sanctions against Russia – Now what? *Center for Strategic & International Studies*.
- Dreyer, I. & Luengo-Cabrera. (2015). On target? EU sanctions as security policy tools. ISSUE. Report N25
- Fidrmuc, J. (2008). Gravity models in integrated panels
- Fisher, M. (2014). Russia suspended from G8 over annexation of Crimea, Group of Seven nations says. *National Post*.
- Friedman, U. (2012). Smart Sanctions: A Short History. *Foreign Policy*. Retrieved from <http://foreignpolicy.com/2012/04/23/smart-sanctions-a-short-history/> on March 05, 2017
- Gharibnavaz, M. R. & Waschik, R. (2015). A Computable General Equilibrium Model of International Sanctions.

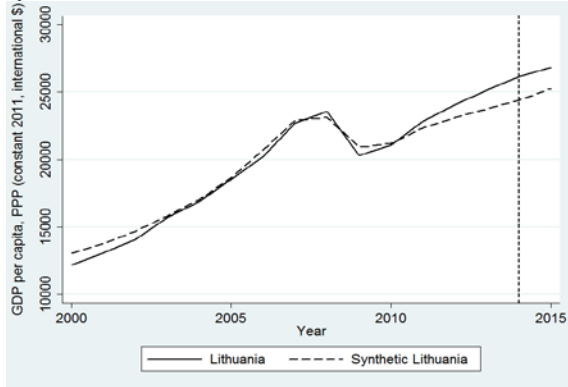
- Golovko, O. (2016). Russian capital flight reduced by two-thirds. RT. Retrieved from <https://www.rt.com/business/329417-capital-outflow-russia-central-bank/> on March 10, 2017
- Gros, D. & Mustilli, F. (2015). The Economic Impact of Sanctions against Russia: Much ado about very little. *CEPS Commentary*.
- Gurvich, E. & Prilepskiy, I. (2015). The impact of financial sanctions on the Russian economy. *Russian Journal of Economics*.
- Havlik, P. (2014). Economic Consequences of the Ukraine Conflict. Policy Notes and Reports 14. *The Vienna Institute for International Economic Studies*
- Head, K. & Mayer, T. (2013). Gravity Equations. *CEPII*.
- Horiucha, Y. & Mayerson, A. (2014). The Opportunity Cost of Conflict: Statistically Comparing Israel and Synthetic Israel.
- Hufbauer, G. C. et al (2008). Economic Sanctions Reconsidered. 3rd edition. *Peterson Institute for international economics*
- Ianchovichina, E. et al (2016). Lifting Economic Sanctions on Iran. *World Bank group*.
- Lektzinan, D. & Souva, M. (2007). An institutional theory of sanctions onset and success. *Journal of Conflict Resolution*
- Leslie, J. et al (2014). Losing Billions: The cost of Iran sanctions to the U.S. Economy. *National Iranian American Council*.
- Manktelow, A. (2014). Guide to Emerging Markets: the business outlook, opportunities and obstacles. *The Economist*. Profile Books Ltd.
- Masyutin, S. (2015). Ekonomicheskiye sanktsii v otnoshenii Rossii: Ugrozy ili vozmozhnosti dlya biznesa. *Aktual'nyye problemy ekonomiki i prava NI*
- Matta, S. (2016). The Impact of Arab Spring on the Tunisian Economy. *Policy Research Working Paper*.
- Moscow Times. (2014). Ruble's Fall and Food Import Bans Send Inflation Ever Higher. *Johnson's Russia List*. Retrieved from <http://russialist.org/rubles-fall-and-food-import-bans-send-inflation-ever-higher/> on March 10, 2017
- Nelson, R. M. (2015). U.S. Sanctions on Russia: Economic Implications. *Congressional Research Service*.
- Oxenstierna, S. & Olsson, P. (2015). The economic sanctions against Russia. *FOI*
- Pchelintsev, D. (2017). Evaluating the Effect of 2014 Sanctions against Russia Using Synthetic Control Methods. Charles University.
- Rarick, C. (2007). Economic sanctions: Failed foreign policy tool and a cost to American Business. *Economic Affairs*. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1111/j.1468-0270.2007.00757.x/abstract>

- Rutland, P. (2014). The impact of sanctions on Russia. *Russian Analytical Digest* No. 157.
- Russell, M. (2016). Sanctions over Ukraine. *European Parliament*.
- Sleptsova, E. (2007). Gravity analysis of the determinants of Ukrainian exports: the role of regional trade arrangements.
- Sören, P. et al (2014). Gravity Model estimation. Leibniz Institute of Agricultural Development in Transition Economies.
- Szczepański, M. (2015). Economic impact on the EU of sanctions over Ukraine conflict. *European Parliament*.
- The Moscow Times. (2014). Ruble's Fall Accelerates Inflation.
- Todd, S. (2010). Gravity Model. *Encyclopedia of Geography*. SAGE Publications.
- Traynor, A. (2014). The impact of Russian sanctions on Irish and global business & financial services. *International Law. Finance Dublin*.
- Vercuil, J. (2014). The impact of sanctions on the Russian economy. *L'Observatoire*.
- Ziganshin, I, et al (2015). Vliyaniye ekonomicheskikh sanktsiy na razvitiye Rossiyskogo turizma. *Aktual'nyye problemy ekonomiki i prava NI*

7. Appendix

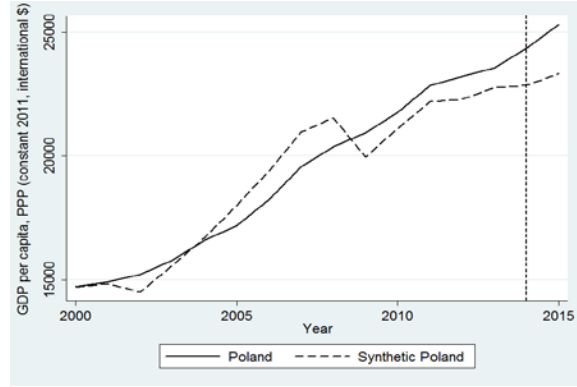
Figures

Figure 4: GDP per capita, PPP: Lithuania vs Synthetic Lithuania



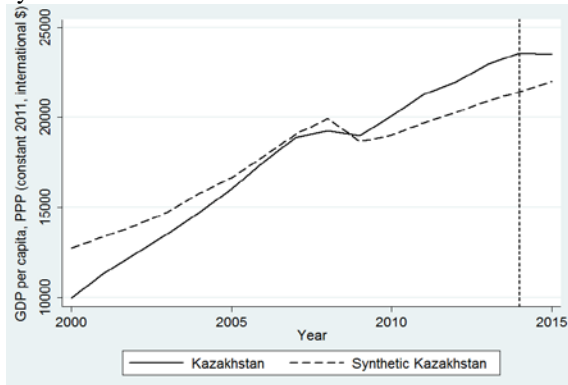
Source: Author's calculation

Figure 5: GDP per capita, PPP: Poland vs Synthetic Poland



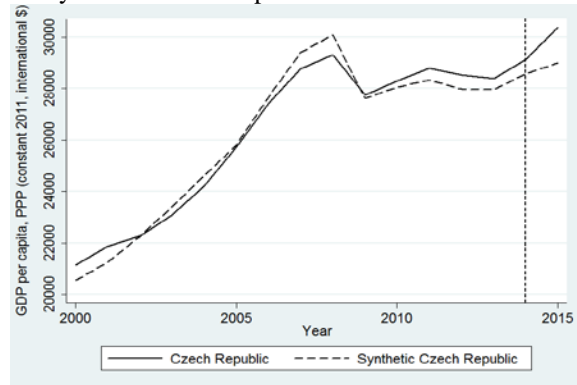
Source: Author's calculation

Figure 6: GDP per capita, PPP: Kazakhstan vs Synthetic Kazakhstan



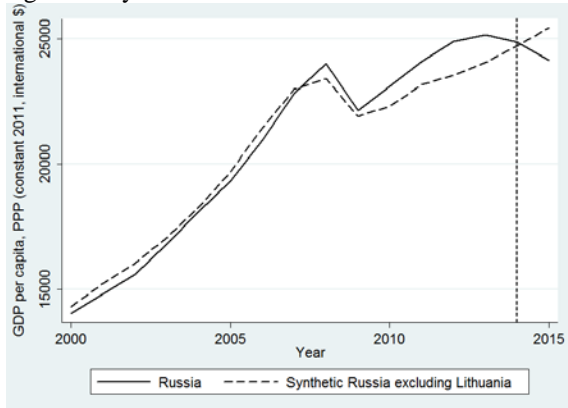
Source: Author's calculation

Figure 7: GDP per capita, PPP: Czech Republic vs Synthetic Czech Republic



Source: Author's calculation

Figure 8: Synthetic Russia without Lithuania



Source: Author's calculation

Tables

Table A1 – Summary of the previous research

Author(s) – “Topic”	Main Conclusion(s)
<p>De Galbert (2015) – “<i>A year of sanctions against Russia – Now what?</i>”</p> <p>Havlik (2014) – “<i>Economic Consequences of the Ukraine Conflict</i>”</p> <p>Oxenstierna & Olsson (2015) – “<i>The economic sanctions against Russia</i>”</p> <p>Nelson (2015) – “<i>U.S. Sanctions on Russia: Economic Implications</i>”</p> <p>Vercueil (2014) – “<i>The impact of sanctions on the Russian economy</i>”</p>	<p>The economic sanctions of the EU and the US have contributed to imposing a cost on the Russian, but have so far not persuaded Russia to change its behavior towards Ukraine.</p>
<p>Aleksashenko (2016) – “<i>Evaluating Western Sanctions on Russia</i>”</p>	<p>Western sanctions have had some effect, but it was much less than the impact of collapsing oil prices.</p>
<p>Bond et al (2015) – “<i>The politics of economics of sanctions against Russia</i>”</p>	<p>The imposition of sanctions amplifies Russia’s other problems: the falling oil price, falling currency, and the credit crunch.</p>
<p>Dreyer et al (2015) – “<i>On target? EU sanctions as security policy tools</i>”</p>	<p>Though not insignificant, the economic impact of sanctions has been overshadowed by the impact of Russia’s own structural economic slowdown and the sharp decline in oil prices. Russia’s overall financial position remains comparatively strong.</p>
<p>Gurvich & Prilepskiy (2015) – “<i>The impact of financial sanctions on the Russian economy</i>”</p>	<p>Modeling the capital flow components reveals that sanctions have directly affected sanctioned state-controlled banks, oil, gas and arms companies by severely constraining foreign funding and have indirectly affected non-sanctioned companies by reducing inflows of foreign direct investment and causing funding conditions to deteriorate.</p>
<p>Masyutin et al (2015) – “<i>Ekonomicheskiye sanktsii v otnoshenii Rossii: Ugrozy ili vozmozhnosti dlya biznesa</i>”</p>	<p>Using general scientific methods, the authors come up with a list of suggestions that when prioritized will best work at enhancing the potential of growth for the Russian economy.</p>
<p>Russell (2016) – “<i>Sanctions over Ukraine</i>”</p>	<p>Arms restrictions hurt the Russian armed forces and the defence industry. Defence industry is likely to fall behind</p>

	international competitors if access to Western technology remains blocked. With Western innovative technological input now restricted, Russia will find it hard to develop the new fields it needs to maintain output, as most of them are considerably less accessible than current ones. Russian energy companies look to Asia to replace Western financing.
Ziganshin et al (2015) – “ <i>Vliyaniye ekonomicheskikh sanktsiy na razvitiye Rossiyskogo turizma</i> ”	Doing analytical as well as historic review of the sanctions the authors find that the economic sanctions of 2014 have negatively affected Russian tourism industry and offer to reorient the focus to internal tourism.

Table A2 - Macroeconomic development in Russia, 2012 – 2015

	2012	2013	2014	2015	2016
Oil price, USD/bbl	105	104	97.6	53.2	56.9
GDP growth, %	3.4	1.3	0.6	-3.8	-0.3
Consumption growth, %	6.4	3.9	1.5	-5.3	-1.9
Gross capital formation growth, %	3	-6.6	-5.7	-15.3	1.1
General government balance, % GDP	0.4	-1.3	-1.2	-3.6	-3.1
Current account, USD billion	71.3	34.1	56.7	73.7	62.9
Current account, % GDP	3.6	1.6	3	6	4.4
Capital and financial account, USD billion	-32.3	-56.2	-143.2	-122.1	-60
Capital and financial account, % GDP	-1.6	-3	-7.7	-10	-4.2
CPI, average, %	5.1	6.8	7.7	16.5	8

Source: World Bank