Russian imports sanctions on European Agriculture and their effects on Russian imports from sanctioned and non-sanctioned countries

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Abstract

In this research the effect of the import restrictions Russia installed on the EU and other western countries will be studied. In 2014 Russia annexed the Crimea, and the EU and other western countries installed economic sanctions upon Russia. Russia banned the imports of meat, fish, dairy, fruits and vegetables from western countries as a retaliatory measure. The purpose of this thesis is to study the effects of Russia's import restrictions. The results indicate that the restrictions worked and Russia imported significantly less of the sanctioned products from the sanctioned countries. Furthermore, Russia imported significantly more sanctioned and non-sanctioned products from countries that were not subject to the import restrictions. This suggests that Russia can bypass its import restrictions by diverting its trade and importing the sanctioned products elsewhere. There was no significant difference in imports from sanctioned countries for non-sanctioned products.

Contents

1. Introduction

The conflict of Russia and the Western world started in March 2014. At that time Russia's annexation of Crimea worsened the political relations between Russia and the Western World. As disapproval of Russia's actions, the Western World issued retributory measures upon Russia. These measures included Russia's removal from the G8 and the EU, the US, and other Western countries imposing export restrictions. Russia responded in August 2014 with import sanctions against the Western countries. As of then, they would no longer import any agri-food products from these countries, which included the agricultural sectors of meat, fish, dairy, fruits and vegetables (Russian Federation, 2014). In this thesis, the effects of Russia's imposed economic sanctions on Russia will be researched. How will their import pattern be affected after the installation of the sanctions? This leads to the following research question:

What are the effects of Russia's imposed import restrictions in 2014 on the imports of Russia from sanctioned and non-sanctioned countries?

For this research question, I will examine whether the Russian import restrictions only affect the exports of sanctioned products in a sanctioned country, or if they also affect non-sanctioned products in sanctioned countries. For this research, I will look at the years 2012-2019. It will also be interesting to look at the way Russia will solve its disappearing import stream from Western countries.

Russia's imposed economic sanctions were meant to hurt the Western countries because their export markets in the agri-food sectors are relatively large. The four largest exporters of agricultural products are all Western countries, the US, the Netherlands, Germany and France (Food and Agriculture Organization of the United Nations, 2021). Another reason why Russia chose these agri-food sectors is because they wanted to develop and improve its domestic production of these sectors (Wegren, 2016).
Since the attack of Russia on Ukraine in march 2022, even more strict measures against Russia were installed by the Western countries. These measures contained asset freezes and travel bans for some influential individuals of Russia, but also economic sanctions to deteriorate Russia's trade flows. Russia in turn shut down its supply of gas to the EU.

This research will be relevant to the academic world because although the consequences of economic sanctions have been researched quite intensively in the latest decades, there is still no clear answer on the exact influence of economic sanctions. This will be discussed more extensively later. Some other studies also looked at the influence of the economic sanctions imposed by the Western world and Russia, but most of these studies were published a short period after the issued sanctions. No study looked at the longer effects of the import restrictions and it will be interesting to see how these developed over the years.

The research will be socially relevant because the outcome of this research might influence the future decision of policymakers on taking measures towards a country. The goal of these economic sanctions is to economically hurt the target country. With this research, there will be more information added on how import restrictions will affect the imposing country's imports, and thus how the target countries' exports to the country are affected. This information can be important for future-issued economic sanctions.

Firstly in this thesis existing literature on the gravity model will be discussed. This is an empirical model that is often used to estimate bilateral trade flows and will also be used in this thesis. Next, there will be looked at literature discussing the effects of economic sanctions and the import restrictions Russia imposed. This will lead to the two hypotheses that will be further researched in this paper. After the literature review, the data and the sources that will be used will be explained. Following this, the methodology that I will use in this thesis will be explained. Next, the results and the key findings will be discussed.

2. Literature review

2.1 Gravity model

The foundation of the gravity model was made by Isard (1954). He stated that the trade country i would have with country j was inversely related to the intervening distance. Tinbergen (1962) further developed Isard's take with the gravity model. This model assumes that the bilateral trade flows between countries are driven by the size of their economies and inversely by the distance between them. The size of economies of a country is positively related to bilateral trade flows because, as Tinbergen (1962) shows the imports a country

can buy are dependent on its economic size, but also the exports a country can supply are dependent on its economic size. The distance between countries has a negative impact on their bilateral trade flows. This is assumed because distance is closely related with the transportation costs and they will increase with distance between the trading countries. This results in the following basic gravity equation:

$$Fij = G * MiMj / Dij$$

In this equation, the bilateral trade flows (F) between country i and j is dependent on the constant (G), the size of the economies (M)of the countries and the distance (D) between them. An adjusted form of this equation will be used later in this research.

Over the years the gravity equation by Tinbergen was expanded by researchers adding extra variables which made the model more accurate. Oguledo and Macphee (1994) used gravity models in which both tariffs and dummy-variables that could hinder or boost trade were incorporated. Anderson (2011) also argued that adding proxies that influenced trade frictions, could improve the model. These proxies included whether countries had a common language and whether there was a border between them. These dummy-variables, that boost trade, will be added to the model and this will be explained more extensively in the methodology. Nowadays the gravity model is generally accepted and used in many empirical studies to analyze international bilateral trade (Hufbauer, et al., 2009).

The gravity model is often used in studies that look at the impact of economic sanctions. Hufbauer and Oegg (2003) discuss the effect of economic sanctions on US trade flows using the gravity model. The economic impact of the sanctions on Iran is also empirically researched following the gravity model (Rasoulinezhad, 2017). He looks at the trade divergence with the EU and trade convergence with Asia. He finds that bilateral trade between Iran and the EU significantly declined since the installation of the sanctions, while it had a positive impact on trade between Iran and Asia. In my paper, the possible trade divergence and convergence from Russia's perspective will be studied, looking at how the imports of Russia will change after they installed the sanctions. In the following section the literature on economic sanctions will be discussed.

2.2 Economic sanctions

Economic sanctions are defined as *"the deliberate, government inspired withdrawal, or threat of withdrawal, of customary trade or financial relations"* (Gavin, 1989). Since the beginning of the 20th century the issuing of sanctions became more frequent, with as main goal to alter the behavior of the target country. The sanctions try to achieve it by inflicting economic damage on the target of the sanctions, mostly by reducing their trade (Hufbauer, et al., 2009). While Levy and Van der Watt (1990) show that economic sanctions had some impact in South Africa against the Apartheid regime, other studies prove that the success rate of altering the target country's behavior is limited (Hufbauer, et al., 2009). Their study shows that less than 1 to 4 sanctions reached their intended target. An example of the limited success can be found in the paper from Torbat (2005), in which he discusses the failure of the US sanctions on Iran in transforming the Islamic regime there. The effectiveness on the economic side of sanctions is also not commonly agreed upon. Dreger, et al. (2016) explains that while the sanctions could increase the costs for the target country, imposing sanctions on a country could also negatively affect the country that installed the sanctions. The imposed sanctions by Russia make it harder for the Western countries to export their products but vice versa could also hurt themselves since importing the sanctioned goods becomes more complicated.

Caruso (2003) divides economic sanctions into three sorts: (i) financial sanctions, (ii) boycotts and (iii) embargoes. The sort of sanction Russia imposed on the Western countries is a boycott. A boycott aims to lower the demand for certain products from the target country, by restricting the imports from them. Because Russia imposed this measure on Western countries the literature on this measure will be discussed more extensively later in the next section. Embargoes work in the opposite direction and restrict exports of specific products to the target country. Broszka (2008) looks at the effectiveness of arms embargoes and finds that such an embargo can be highly effective if used multilaterally. The Western countries applied this type of economic sanction on Russia .

2.3 Russia's import restriction

The boycott Russia has on some agri-food sectors from Western countries was a reaction to the sanctions from the Western world. The export restrictions that the Western world first installed meant that the Western countries would no longer export military items and arms, dual-use products that could be used as weaponry and items that Russia used in the exploitation of oil (Dreyer & Popescu, 2014). These sanctions are very complex and product-specific.

Russia responded by banning imports of meat, dairy, fruits and vegetables (Russian Federation, 2014). All the products in these sectors have codes following the Harmonized System (HS). The Harmonized System is a numerical way of classifying traded products. The first two numbers of the HS code indicate the sector the product is part of. So the issued import restrictions contain the HS2 product codes 02 meat, 03 fish, 04 dairy products, 07 vegetables and 08 fruit (Christen, Fritz, & Streicher, 2015). This import restriction was original until 31 December 2018 but was later extended by 3 years until 31 December 2021.

Russia has always been a large importer of the boycotted goods, so in this way they could hurt the targeted countries. In 2013, one year before the boycott, Russia was the top destination for EU dairy (17% of total EU exports), vegetables (23% of EU exports), meat (18% of EU exports) and fruit (40% of EU exports). All these product sectors got sanctioned and as a consequence the Russian imports of these products almost ceased to exist in 2015-2016 (Global Trade Atlas, n.d.). Furthermore, the initial demand also fell in the EU with Russia disappearing as importer. EU's exports of fruits and cheese declined respectively 9% and 20% from 2013 to 2016 (Global Trade Atlas, n.d.). This way the EU's foreign earnings declined and simultaneously its ability to purchase goods. Another effect the sanction could induce is damage to the sanctioned sectors of the target countries (Caruso, 2003).

Another reason Russia imposed this import restriction is to benefit Russian producers of these agri-food sectors. Russia's food policy from 2014 onwards aimed to develop and improve its import substitution and self-sufficiency (Wegren, 2016). The Russian government explained that the import ban provided the country the opportunity to strengthen its own agricultural production, self-sufficiency and import substitution (Russia Insider, 2015; Moscow Times, 2015). Brooks (2002) argues that import restrictions are more likely to get political support than export restrictions, because import restrictions create

new markets for the domestic producers in the imposing country, while a ban on exports removes foreign markets for the exporters in the sanctioning country. In the next section the role non-sanctioned countries can have in providing Russia with products will be discussed.

2.4 Third country effect

There are three roles in the issuing of sanctions: (i) the sender of the sanctions, (ii) the target, the receiver of the sanctions, and (iii) third-party countries. The third-party countries denote every country that is not involved in the sending or receiving of sanctions (Early, 2015). By trading with third-party countries Russia can still import the same products as before. This way Russia is bypassing its sanctions and this is called sanction-busting. The third-party countries could potentially benefit from the import ban. The shortage of imports, by the disappearing of trade with Western countries, could be supplied by those third-party countries.

Even more interesting could be the effect the sanctions have on non-sanctioned products. Will Russia decrease its imports from sanctioned countries and import more from non-sanctioned countries or will the import pattern for non-sanctioned products not be affected?

So for my research question I will look at how Russia's imports from the sanctioned countries are affected for sanctioned and non-sanctioned products. Furthermore, the trade-diverting and sanction-busting effects will be looked at by viewing the results of the imports from third-party countries. This will be done with the following hypotheses:

- *Hypothesis 1: Russia's imports of sanctioned and non-sanctioned products from sanctioned countries will decrease after Russia imposed economic sanctions.*
- *Hypothesis 2: The imports of Russia of sanctioned and non-sanctioned products from non-sanctioned countries will be positively affected by Russia's import restrictions.*

3. Data

Import

The data on trade values for the imported goods by Russia are available on the UN Comtrade Database. Yearly data are available for imports for the sanctioned products with

the HS product codes 02 meat, 03 fish, 04 dairy products, 07 vegetables and 08 fruit and also for non-sanctioned products. The trade values are expressed in US dollars and are converted from the national currencies (Yotov, et al., 2016). Yearly figures from 179 countries will be used for the import values.

GDP

Data for GDPs of Russia and the countries it has traded with can be found on World Bank's World Development Indicators and are expressed in US dollars (World Bank Group, 2022). For the data on GDP also yearly figures will be used.

Oil Price and exchange rates

Yearly figures for the average OPEC crude oil price in US dollar per barrel are available on Statista. Data on the real exchange rates for the Russian Ruble are also available on Statista (2022).

Distance

The distance variable is measured as the population-weighted distance between the most populated cities in kilometers the distance between country i (Russia) and country j. The data for this is taken from the French Centre d'Etudes Prospectives et d'Informations Internationales (2023).

Language* and *Border

The language variable is a dummy variable that indicates whether Russia and the country it trades with, share a common language, taking value 1 if yes. Russian is considered an official language in Belarus, Kazakhstan and Kyrgyzstan. The border variable indicates if Russia and a trading partner share a border, taking value 1 if true. The following countries share a border with Russia: Azerbaijan, Belarus, China, Estonia, Finland, Georgia, Kazakhstan, Latvia, Lithuania, Mongolia, Norway, Poland and Ukraine (French Centre d'Etudes Prospectives et d'Informations Internationales, 2023).

Sanction dummies

The sanction dummies indicate whether a country is sanctioned or not and whether it's before or after Russia installed the sanctions. For my research, the after sanction period is seen as the years 2015-2019. The countries that are sanctioned are all EU member states

and the United States, Norway, Albania, Montenegro, Georgia, Ukraine, Moldavia, Canada, Australia, New Zealand, and Japan (Crozet and Hinz, 2016).

The following figure shows the sanctioned countries, where the darker countries are sanctioned and the grey ones are not.

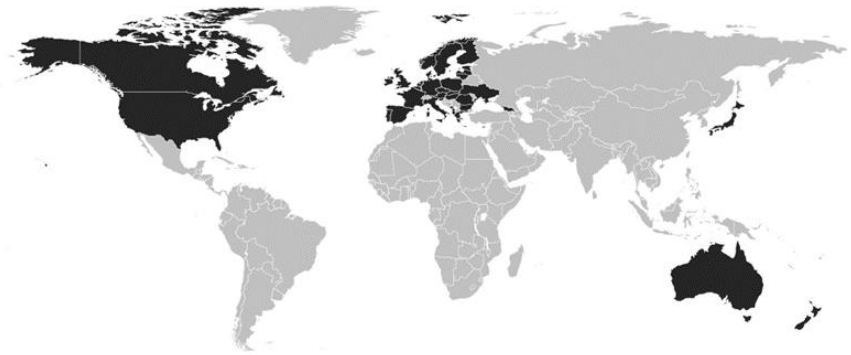

Figure 1. Taken from Crozet and Hinz (2016): showing the countries that are sanctioned by Russia

Descriptive statistics

In table 1 the mean, standard deviation, minimum and maximum of every variable is displayed. For the variables on import and distance, which are transformed into the natural logarithmic form in my model, the statistics of the original form are also displayed.

Table 1. Descriptive statistics for all variables in the panel dataset.

Variable	Mean	Std. Dev.	Min.	Max.
ImportSP	$90,141,154	$291,240,603	$1	$3,097,664,866
LNimportSP	10.421	7.818	0	21.854
ImportnonSP	$1,325,026,867	$4,766,984,479	$1	$55,861,809,129
LNimportnonSP	16.476	4.652	0	24.746
*LNGDPRUS*GDPj*	52.612	2.255	46.217	58.916
CSAS	0.143	0.350	0	1
CNAS	0.482	0.500	0	1
Distance	6502 km	3634 km	1418 km	15644 km
LNDistance	8.599	0.632	7.257	9.658
Border	0.073	0.260	0	1
Language	0.017	0.128	0	1
OilPrice	$68.77	$21.27	$43.29	$97.98
RubleDollar	0.022	0.008	0.014	0.033

4. Methodology

4.1 The method

The sample for this research consists of all countries that Russia has imported products from during 2012-2019. For some countries the data on GDP or the export was not available for all years and these countries have been left out of the sample. In the appendix is a list of all 179 countries that are included in this research. Looking at the period 2012-2019 allows the variables to change over time and so a panel dataset will be used. The panel dataset has dimensions in time, which is observed in yearly units. The constructed panel dataset uses yearly values of imported products by Russia from the world in the period 2012-2019. A distinction has been made between the import of sanctioned products and the import of non-sanctioned products. All the import values are expressed in US dollars and converted from national currencies (UN Comtrade Database, 2023).

This study will use the gravity model to analyze the effects of the import sanctions of Russia on the Western countries. The basic gravity model as described earlier is:

$Fij = G * MiMj \,/\, Dij$, this can also be written as $\mathrm{Trade}ij = G * \mathrm{GDP}i\mathrm{GDP}j \,/\, Dij$.

In empirical research, the gravity equation is often transposed into its logarithmic form in order to make it easier to work with, because then the equation becomes linear and this leads to the following gravity equation: $\ln TRADEijt = \mathrm{lnG} + \beta 1 \ln GDPi\mathrm{t} + \beta 2 \ln GDPj\mathrm{t} - \beta 3 \ln Dij$.

For my research, this basic gravity model has to be altered so the research question can be answered. Because we are interested in the imports of Russia and how these are affected by the import sanctions we will use Russian imports as the dependent variable. Furthermore, country i will constantly denote Russia and country j will denote a country Russia has traded with during the years 2012 – 2019.

Some variables that should also be considered are the oil price and the real exchange rate. Because Russia is very dependent on oil, and with the oil price collapse in 2014 in mind, this could heavily influence the purchase power of people in Russia, and thus trade. For multicollinearity issues it has to be tested if GDP, Oil price and or the real exchange rate are not correlated (Wooldridge, 2015). The use of these variables will later be discussed with the potential issues. To test if there is any multicollinearity between the variables, a correlation matrix is computed (Appendix A). This correlation matrix shows that the

correlation between the GDP and the oil price and the real exchange rate is indeed worrying with values all above 0.8 (Franke, 2010). A solution that can deal with this multicollinearity is leaving the variables out. According to Studenmund (2017) however this could lead to specification bias, but because the fixed effects model is used the global and Russia-specific trends like the oil price collapse and the development of the exchange rate are captured in the time fixed effects. So leaving the Oil price and exchange rate variable out will not lead to any specification bias.

Also, we have to make a distinction between trade for sanctioned products and non-sanctioned products, trade with sanctioned countries and non-sanctioned countries and if the trade is before or after the installment of the import sanctions. This is important to see the effects the import restrictions have on the imports. To create this distinction there will be two regressions performed. The first regression will be performed with the natural logarithmic of the import of sanctioned products as the dependent variable. Thus in this regression the imports of the products meat, fish, dairy products, vegetables and fruit will be the dependent variable. The second regression will be performed with the natural logarithmic of the import of non-sanctioned products as the dependent variable. Non-sanctioned products are determined as the total imports minus the imports of sanctioned products. In both regressions dummy-variables will be added that indicate whether a country is sanctioned or not and whether it is before or after the sanctions were installed. For this there are three scenarios:

(i) it is before sanctions are installed (BS)

(ii) the country is sanctioned and it is after sanctions(CSAS)

(iii)the country is not sanctioned and it is after sanctions(CNAS)

The CSAS dummy will thus take value 1 if the country Russia imports from is sanctioned and if it is after Russia installed the sanctions, and 0 otherwise. The CNAS dummy takes value 1 if the country Russia imports from is not sanctioned and it is after sanctions, and 0 otherwise. The dummy for before sanctions will be excluded as dummy variables express an effect relative to something else, so one category of dummies always has to be excluded (Kraemer & Blasey, 2004).

While working with gravity models an ordinary least squares (OLS) regression is a viable method to analyze the trade data. With an OLS regression the independent effect of each

variable is measured, while holding the other variable effects constant (Hufbauer et al., 1997). One of the problems of using OLS with the panel dataset is that the country specific effects are not captured. A way of dealing with the country specific effects, is using the fixed effects (FE) method. This method is often preferred when dealing with a panel dataset. For robustness checks both the fixed effects and the OLS model will be used. First the OLS model will be explained and secondly the fixed effects model will be discussed.

4.2 OLS regression

The OLS regressions that will be performed are the following:

(1) $\text{Ln ImportSP}_{RUSjt} = \beta 0 + \beta 1 \ln (GDP_{RUSt} * GDP\_jt) + \beta 2\text{CSAS}t + \beta 3\text{CNAS}t + \beta 4 \ln DIST\_j + \beta 5\text{Border} + \beta 6\text{Language} + \text{u}ijt$

(2) $\text{Ln ImportnonSP}_{RUSjt} = \beta 0 + \beta 1 \ln (GDP_{RUSt} * GDP\_jt) + \beta 2\text{CSAS}t + \beta 3\text{CNAS}t + \beta 4 \ln DIST\_j + \beta 5\text{Border} + \beta 6\text{Language} + \text{u}ijt$

This regression will be performed for the sanctioned as well as the non-sanctioned import stream. The equations are the same except in equation (1) the dependent variable is the natural logarithmic of the import of sanctioned products between Russia and country j in year t and in equation (2) the dependent variable is the natural logarithmic of the import of non-sanctioned products between Russia and country j in year t. Other variables with ln before it are also the natural logarithmic form, and j constantly denotes a specific country, whereas t indicates the year. So ln ($GDP_{RUSt} * GDPjt$) is the natural logarithmic of Russia's gross domestic product (GDP) in year t multiplied by GDP of country j in year t. This variable can be seen as the economic mass of the two countries combined. Earlier research showed that this variable is expected to have a positive sign (Caruso, 2003., Hufbauer, 1997).

The interaction dummy-variables CSAS and CNAS, that were discussed earlier, indicate whether the country is sanctioned or not and if it is after the sanctions were installed. The expected signs for these dummy-variables in each of the regressions will be discussed more extensively in the fixed effects model. The DIST variable indicates the distance between Russia and country j. The economic theory is that distance is negatively correlated with trade, so the sign for this variable is expected to be negative. *Language* and *Border* are dummy variables that serve as control variables for the gravity model. The Language dummy indicates whether Russia and country j have a common language, so Russian in this case.

The Border dummy indicates whether Russia and country j have a common border. Both dummies take value 1 if true and 0 otherwise. Both these dummies are expected to have a positive sign according to the study of Anderson (2011), which shows that countries with the same language or shared border significantly trade more. The theory behind this is that having the same language or a shared border as a trading partner reduces the barriers of trade.

4.3 Fixed effects

For the fixed effects model two regressions will be performed: One for the imports of sanctioned products by Russia and one for the imports of non-sanctioned products. With the fixed effects model all time unvarying variables are excluded from the model. So the variables *Distance, Border* and *Language* will be excluded from the model due to fixed effects.

For the sanctioned products

(3) $\text{Ln ImportSP}_{RUSjt} = \beta 0 + \beta 1 \ln (GDP_{RUSt} * GDP\_jt) + \beta 2\text{CSAS}t + \beta 3\text{CNAS}t + \text{u}ijt$

Ln ImportSP$_{RUS\,j}$t is the import stream of sanctioned products from country j to Russia at time t. CSAS is an interaction dummy variable that takes value 1 if the country Russia imports from is sanctioned and if it is after Russia installed the sanctions, and 0 otherwise. The coefficient for this variable is expected to be negative since Russia has banned the import stream of these products from these countries. The CNAS dummy takes value 1 if the country Russia imports from is not sanctioned and it is after sanctions, and 0 otherwise. This coefficient is expected to be positive since Russia probably still wants to import the sanctioned products, but then they will do it from other countries. This is called sanction busting and they are then bypassing their own import sanctions.

For the non-sanctioned products

(4) $\text{Ln ImportnonSP}_{RUSjt} = \beta 0 + \beta 1 \ln (GDP_{RUSt} * GDP\_jt) + \beta 8\text{CSAS}t + \beta 9\text{CNAS}t + \text{u}ijt$

Ln ImportnonSP$_{RUS\,jt}$ is the imports to Russia from country j at time t for products that are not sanctioned. The coefficient for the interaction dummy variable CSAS indicates the effect on the imports from sanctioned countries for non-sanctioned products after the sanctions

were installed. This is expected to be negative according to the research of Crozet and Hinz (2016). They found that a significant part of lost trade from sanctioned countries was because of a decline in imports of non-sanctioned products. The coefficient of CNAS shows the effect on imports of non-sanctioned products from non-sanctioned countries after sanctions were installed. There is no evidence on information about the sign for this coefficient. The coefficients of these interaction dummies show the effect of the sanctions for all scenarios. To see the interaction effect is important because this way we can easily see the difference in imports for sanctioned products from sanctioned countries and non-sanctioned countries. And thus also the difference in imports for non-sanctioned products from sanctioned and non-sanctioned countries.

4.4 Potential issues

The Russian import restrictions were installed in August 2014, but for some countries monthly trade data are not available and that is why yearly trade data are taken for the data on imports. The years 2015-2019 are seen as the after sanctions period in my research, and the years 2012-2014 as the years before sanctions. This might create bias because the imports from the sanctioned countries for the sanctioned products can be lower already due to the sanctions, while the model still counts it as the period before sanctions. So the coefficient of CSAS might be upward biased, because not the whole effect of the decreasing imports is captured in this variable.

One of the other issues arises with the use of the natural logarithmic form and its failure to deal with zero observations in the panel dataset. In the panel dataset not all 179 countries import products to Russia, let alone sanctioned products. One solution is to drop all zero values, but this will lead to endogenous sample selection problems (Heckman, 1979). Another common solution is censoring the data and changing all zero trade flow observations to a small value, like 1 (Kareem, 2013). In my panel dataset to all observations the value 1 is added before the natural logarithmic is calculated. So for the data on import the formula $\ln(x+1)$ will be used for all values. So for the zero trade flows observations the natural logarithmic takes a value of zero. However, this strategy also comes with its flaws. King (1988) showed that there is substantial bias for the parameter estimates. Since the import data in my dataset almost in all cases is in millions, if not billions, the influence of adding a small value of 1 to all observations will not be as substantial.

The export sanctions the EU installed, banned the export of military items and arms, dual-use products that could be used as weaponry and items that Russia used in the exploitation of oil (Dreyer & Popescu, 2014). Because of the complexity of these sanctions and the difficulty in obtaining the relevant data for these imports, they are not part of my dataset. For the first regression this does not influence the results, since we are interested only in the effect of the sanctions on the Russian sanctioned products. However, for the second regression, where we look at the non-sanctioned products, this might lead to a bias, since the products the Western countries sanctioned are seen as non-sanctioned in the model. This means that the imports of sanctioned countries for non-sanctioned products will be lower because of the Western sanctions. This can create a downward bias for the CSAS dummy in the second regression.

5. Results

5.1 Empirical analysis

As discussed earlier, for both the import of sanctioned products and for the import of non-sanctioned products a model with fixed effects (FE) and an ordinary least squares (OLS) regression will be performed. The FE will be estimated with country fixed effects in column (1) and in column (2) year fixed effects will be added to the estimate. For robustness checks an OLS regression is performed in column (3). In column (4) the OLS regression is performed with year dummies to add time fixed effects and can be compared with the fixed effects model with time fixed effects. For the OLS regression, the natural logarithmic of distance is added as well as dummy-variables that indicate whether the country has a common border or common language with Russia respectively. However, it should be noted that the OLS estimate is likely biased and inconsistent because they do not account for the unobserved country-specific effects and endogeneity. This is why the FE estimates are preferred to the OLS estimate. The coefficients of interest in my research are the ones for the interaction dummy-variables CSAS and CNAS, because they indicate how the Russian imports have developed after they installed the import restrictions. The coefficients should be interpreted the following way: Stock and Watson (2003) show that in the model ln(Y) = $\beta 1$*X, a change in X by one unit is associated with a $(e\text{^}\mathrm{B1}\text{ -}1) * 100\%$ change in Y. This model is comparable

to the equations I use, were ln(Y) is ln(Imports) and the $\beta 1$*X are the CSAS and CNAS dummies and their coefficients.

5.2 Imports of sanctioned products

First the results of the regression for the sanctioned products will be discussed. In the first column I have used country fixed effects to control for specific country fixed effects. In the second column year fixed effects are added to the model. The third column shows the results of an OLS regression with heteroskedasticity-robust standard errors and does not contain fixed effects, while in column (4) time fixed effects are added to the model. For the interpretation of the results we will look at column (2). The other columns serve as robustness checks and to support the findings. The coefficient for the variable *ln(GDPRus*GDPj)* is positive and significant. This is in line with earlier findings by Tinbergen (1962), who also found that the economic size of countries was positively related to their trade values. The coefficient for the dummy-variable *CSAS* is significantly negative. This indicates, as expected, that Russia does import fewer sanctioned products from sanctioned countries after the sanctions were installed. To be more precise, the estimation holds that Russia imports $1 - e^{-4.682} \approx 99.07\%$ less sanctioned products from the sanctioned countries. This high value is to be expected since the import restrictions banned this import stream. The coefficient for CNAS is positive and significant. This means that Russia imports more sanctioned products from non-sanctioned countries after the sanctions were installed. The estimate holds that Russia imports $e^{0.567} - 1 \approx 76.30\%$ more sanctioned products from these countries after the sanctions. This way they are bypassing their own sanctions, by importing from non-sanctioned countries.

Table 2. Panel data regression results for sanctioned products

	FE (1) lnImportSP	***FE*** (2) lnImportSP	***OLS*** (3) lnImportSP	***OLS*** (4) lnImportSP
ln(GDP*Rus**GDP*j*)	1.448 (0.222)***	1.775 (0.252)***	2.084 (0.059)***	2.091 (0.060)***
CSAS	-4.798 (0.294)***	-4.682 (0.359)***	-3.657 (0.501)***	-3.755 (0.742)***
CNAS	0.487 (0.167)***	0.567 (0.270)**	0.420 (0.348)	0.333 (0.632)
lnDistance			-2.082 (0.319)***	-2.077 (0.320)***
Language			4.063 (0.838)***	4.067 (0.844)***
Border			2.481 (0.544)***	2.480 (0.541)
Constant	-65.297 (11.703)	-82.694 (13.317)	-81.228 (4.857)	-81.768 (4.865)
Observations	1432	1432	1432	1432
No. of countries	179	179	179	179
Time period (yrs)	8	8	8	8
R^2	0.33	0.36	0.43	0.44
Fixed effects				
Country	Yes	Yes	No	No
Year	No	Yes	No	Yes

* *p*<0.1; ** *p*<0.05; *** *p*<0.01, standard error in parentheses

The results for the time invariant variables in the third column with OLS all have the same sign and are significant, except for the CNAS variable. The time varying variable *lnDistance* has the expected negative sign. Furthermore, the coefficients for *Language* and *Border* are positive, as expected.

5.3 Imports of non-sanctioned products

The coefficients of dummies CSAS and CNAS in this regression indicate the effect on imports of non-sanctioned products from countries that are sanctioned or not sanctioned,

respectively. The coefficient of the combined GDP of the two countries, as well as the coefficients for the control variables in the OLS model are consistent with earlier findings and so they will not be discussed more extensively.

Looking at column (2), the coefficient of CSAS is positive but insignificant, so no conclusion can be drawn from this result. This means the overall trade relations between Russia and sanctioned countries have not been significantly affected. The CNAS coefficient is positive and significant. This means that Russia imported more goods from non-sanctioned countries after the import restrictions were installed. The estimate holds that Russia imported $e^{0.289}$ - 1 ≈ 33.51% more from these countries.

Table 3. Panel data regression results for non-sanctioned products

	FE	***FE***	***OLS***	***OLS***
	(1) lnImportnonSP	(2) lnImportnonSP	(3) lnImportnonSP	(4) lnImportnonSP
ln(GDP*Rus**GDP*j*)	1.180 (0.108)***	1.231 (0.123)***	1.465 (0.026)***	1.467 (0.027)***
CSAS	0.168 (0.143)	0.202 (0.175)	1.138 (0.151)***	1.095 (0.265)***
CNAS	0.261 (0.081)***	0.289 (0.132)**	0.095 (0.160)	0.055 (0.259)
lnDistance			-1.438 (0.128)***	-1.437 (0.128)***
Language			2.862 (0.272)***	2.863 (0.271)***
Border			1.203 (0.173)***	1.203 (0.174)***
Constant	-45.707 (5.690)	-48.425 (6.502)	-48.586 (1.736)	-48.663 (1.745)
Observations	1432	1432	1432	1432
No. of countries	179	179	179	179
Time period (yrs)	8	8	8	8
R^2	0.62	0.62	0.71	0.71
Fixed effects				
Country	Yes	Yes	No	No
Year	No	Yes	No	Yes

* *p*<0.1; ** *p*<0.05; *** *p*<0.01, standard error in parentheses

Hypotheses

Now the results have been obtained, we can look back on the hypotheses that were formulated based on the literature review. The hypotheses were:

- *Hypothesis 1: Russia's imports of sanctioned and non-sanctioned products from sanctioned countries will decrease after Russia imposed economic sanctions.*
- *Hypothesis 2: The imports of Russia of sanctioned and non-sanctioned products from non-sanctioned countries will be positively affected by Russia's import restrictions.*

For the first hypothesis, we have to look at the CSAS dummy and its coefficient in both regressions. The coefficient was significant and negative in the first regression with sanctioned products. This was to be expected with the import restrictions Russia imposed. In the second regression, there was no significant effect found for this dummy. This suggests that there was no significant difference in imports from sanctioned countries for non-sanctioned products after the restrictions were imposed by Russia. So the first hypothesis cannot be completely accepted.

The CNAS dummy is the variable of interest for the second hypothesis. This variable has a positive and significant influence in both regressions. This indicates that Russia indeed imported more sanctioned and non-sanctioned products from non-sanctioned countries after they installed the sanctions. So the second hypothesis can be accepted.

6. Conclusion

This study discussed the following research question: *What are the effects of Russia's imposed import restrictions in 2014 on the imports of Russia from sanctioned and non-sanctioned countries?*

This question was researched by applying the gravity model with fixed effects to a constructed panel dataset. This panel dataset comprised yearly import data from every country Russia imported goods from for the years 2012-2019. To analyze the effect of the import restrictions, dummies were generated that could indicate the effect the sanctions had on their imports from sanctioned and non-sanctioned countries. One regression was performed to look at the effects the sanctions had on Russia's sanctioned products. The

results confirm that the sanctioned products were indeed less imported from the sanctioned countries. This indicates that the import restrictions were complied with in the case of Russia. Furthermore, Russia was able to import its sanctioned products from other non-sanctioned countries. This shows that it is able to boycott its target countries, while still obtaining its imports from third-party countries

For the second regression, the results showed no significant effect of the import of sanctioned countries on non-sanctioned product imports. However, the imports from non-sanctioned countries significantly increased for Russia.

The results of this research were validated by performing an OLS regression. The OLS estimates are comparable to the results computed via fixed effects estimations, confirming the robustness of the results.

So the conclusion of this paper is that the import restrictions were successful in boycotting the Western countries and their exports to Russia. Russia imported these from third-party countries and even imported more of the products that were not subject to the import restrictions from these countries. So this indicates that non-restricted products will be imported more from countries that are not sanctioned and have a better overall relationship with the imposing country.

7. Limitations and future research

The limitations of this research are discussed earlier in the potential issues chapter. These comprised data limitations, where the monthly trade data was not available for certain countries. Because of this yearly trade data were used and the instant effect of the restrictions could not be analyzed. This might have led to a bias in the estimates. Another data limitation is the missing data on the imports of products sanctioned by the Western countries. The sanctions were product-specific with a list of 116 pages with codes banned by the Western countries, and trade data was not available on this specific level. The omission of this data could have caused a downward bias in the estimate of the CSAS dummy, because the lower expected imports, because of the sanctions, are not controlled for.

As the goal of economic sanctions is to economically hurt the target country, future research could look at the effects the import restrictions have on the exports of the Western

countries and to what extent they are hurt. It could also be interesting to see how the domestic markets in Russia of the sanctioned products have developed.
Now, the current relationship between Russia and the Western world is very damaged because of the conflict between Ukraine and Russia. The Western world imposed further economic sanctions on Russia since this started. Russia responded with a retaliative measure, by completely cutting off its supply of gas to the EU (European Council, 2022). This was the main reason why gas prices skyrocketed last year. Future research could look into how the Western countries manage to 'bust' these sanctions and how and if Russia can divert their trade.

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9. Appendix

Appendix A: Correlation matrix of the variables

```
. cor lnTotalImports lnGDPj lnGDPRussia OilPrice RubleDollar RubleEuro CSAS CNAS lnDist comborder comlang
(obs=1,432)
```

	lnTota~s	lnGDPj	lnGDPR~a	OilPrice	RubleD~r	RubleE~o	CSAS	CNAS	lnDist	combor~r	comlang
lnTotalImp~s	1.0000										
lnGDPj	0.7853	1.0000									
lnGDPRussia	0.0324	0.0008	1.0000								
OilPrice	0.0283	-0.0031	0.9642	1.0000							
RubleDollar	0.0235	-0.0091	0.9125	0.9646	1.0000						
RubleEuro	0.0222	-0.0111	0.8773	0.9080	0.9620	1.0000					
CSAS	0.3182	0.2713	-0.2821	-0.3034	-0.3144	-0.3050	1.0000				
CNAS	-0.2455	-0.1810	-0.6655	-0.7157	-0.7417	-0.7195	-0.3942	1.0000			
lnDist	-0.4647	-0.2694	0.0000	0.0000	0.0002	0.0002	-0.3744	0.2623	1.0000		
comborder	0.2711	0.1255	-0.0000	-0.0000	0.0000	-0.0000	0.1929	-0.1352	-0.4222	1.0000	
comlang	0.1342	0.0046	-0.0000	-0.0000	-0.0000	0.0000	-0.0534	0.0374	-0.2017	0.2988	1.0000

Appendix B: List of all 179 countries included in the dataset

Afghanistan
Albania
Algeria
American Samoa
Andorra
Angola
Antigua and Barbuda
Argentina
Armenia
Australia
Austria
Azerbaijan
Bahamas
Bahrain
Bangladesh
Barbados
Belarus
Belgium
Belize
Benin
Bermuda
Bolivia
Bosnia Herzegovina
Brazil
Brunei Darussalam
Bulgaria
Burkina Faso
Burundi
CÃ´te d'Ivoire
Cabo Verde
Cambodia
Cameroon
Canada
Cayman Isds
Central African Rep.
Chile
China
China, Hong Kong SAR
China, Macao SAR
Colombia
Comoros
Congo
Costa Rica
Croatia
Cuba
CuraÃ§ao
Cyprus
Czechia
Dem. Rep. of the Congo
Denmark
Dominica
Dominican Rep.
Ecuador
Egypt
El Salvador
Estonia
Eswatini
Ethiopia
Faeroe Isds
Fiji
Finland
France
Gabon
Georgia
Germany
Ghana
Greece
Greenland
Grenada
Guatemala
Guinea
Guinea-Bissau
Guyana
Haiti
Honduras
Hungary
Iceland
India
Indonesia
Iran
Iraq
Ireland
Israel
Italy
Jamaica
Japan
Jordan
Kazakhstan
Kenya
Kuwait
Kyrgyzstan
Lao People's Dem. Rep.
Latvia
Lebanon
Lesotho
Liberia
Lithuania
Luxembourg
Madagascar
Malawi
Malaysia
Maldives
Mali
Malta
Marshall Isds
Mauritania
Mauritius
Mexico
Mongolia
Montenegro
Morocco
Mozambique
Myanmar
Namibia
Nauru
Nepal
Netherlands
New Caledonia
New Zealand
Nicaragua
Niger
Nigeria
North Macedonia
Norway
Oman
Pakistan
Panama
Papua New Guinea
Paraguay
Peru
Philippines
Poland
Portugal
Qatar
Rep. of Korea
Rep. of Moldova
Romania
Rwanda
Saint Kitts and Nevis
San Marino
Sao Tome and Principe
Saudi Arabia
Senegal
Serbia
Seychelles
Sierra Leone
Singapore
Slovakia
Slovenia
Solomon Isds
South Africa
Spain
Sri Lanka
State of Palestine
Sudan
Suriname
Sweden
Switzerland
Syria
Tajikistan
Thailand
Timor-Leste
Trinidad and Tobago
Tunisia
Turkey
Turkmenistan
Turks and Caicos Isds
Uganda
Ukraine
United Arab Emirates
United Kingdom
United Rep. of Tanzania
Uruguay
USA
Uzbekistan
Vanuatu
Viet Nam
Zambia
Zimbabwe