ERASMUS UNIVERSITY ROTTERDAM

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Master Thesis [International Economics]

Title: **Impact of the 2014 Russian Agricultural Import Ban on Export flows of prominent European producers: A case for France, Spain, Italy and Germany**

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ABSTRACT

This paper aims to evaluate the impact of the 2014 Russian import ban on export flows of prominent European agricultural producers. The difference-in-difference model is utilized to draw results. Sanction busting behavior is also evaluated, at the Intra-EU and Extra-EU level separately. This paper also aims to determine whether sanction effectiveness is dependent on importance of the sanctioning country as an export market. Effects vary across the chosen countries. Exports to Russia reduced for all countries, but employment of sanction busting behavior fluctuates, at the country level and the product level. All-in-all, impact on aggregate world export flows is limited.

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1. INTRODUCTION

Sanctions have been into effect since the 20th century (Coates, 2020). Countries aim to introduce political and economic influence through these economic measures and many at times it can be a retaliatory response to past coercion (Radcliffe, 2020). This explains the Russia import ban of 2014. Following the annexation of Crimea, a large share of the Western hemisphere wanted to show its disapproval to the blatant violation of human rights. Strong measures targeted at the Russian economy to majorly institute political correction, led to a proportionate response, shifting the onus on the agricultural producers of the EU (Rankin, 2014). Although sanctions have a political and an economic aspect, this paper aims to focus on the economic impact, by analyzing the effect of the import ban on export flows of prominent European agricultural producers.

The Russian import ban constituted of an absolute restriction on certain agricultural commodities entering the Federation from the EU. Initially it was planned to be into effect until the end of 2016, but it has been regularly amended, with increased product scope, to be in place until December 2020 (European Commission, 2019). The evaluation is complemented with taking into account the extent to which Russia is a prominent export market for the EU, based on the metrics put forward by Early (2009). Compared to past academic work, this paper is one of the only few cases which empirically evaluates the impact of the Russian import ban in isolation, on critical European agricultural producers. This paper employs the difference-in-difference model rather than the gravity framework which is extensively used in past work. This allows better understanding on the economic effects of sanctions, as results from different methodologies can be studied to see whether they converge to the same general conclusion. Furthermore, it throws light on whether sanctions lead to economic effects, considering the increased globalization and subsequent integration of the world economies, which in turn provides numerous sanction busting opportunities.

It is imperative to note some key terms used consistently in the analysis. Sender country is the Russian federation, the country that imposes the economic sanctions. Target country is the economy that is the focus of the imposed measures, here, European Union. Trade diversion refers to the movement of trade from Russia to other countries. This term is mainly used when analyzing sanction busting behavior, indicating that export loss to Russia has been mitigated by improved export environment with other countries, either within or outside the EU.

The paper is structured as follows; Section 2 will comprise of the literature review. Section 3 highlights the theoretical framework. Section 4 provides details on data collection and sources. Section 5 brings to light the empirical methodology used. Section 6 discusses results. Section 7 concludes the paper. Following section 7 there is Bibliography and Appendix, which includes all the tables of this thesis.

2. LITERATURE REVIEW

The literature review aims to give a broad understanding on how the past work highlights the effectiveness of sanctions, their economic impacts on sender and target economies, and underscores the presence of sanction busting behavior. Multiple countries and cases are analyzed, with the purpose of providing a comprehensive picture.

Porter (1979) evaluates the impact of embargoes, another form of economic coercion, on the South African economy. The import restriction is supplemented with financial sanctions, limiting capital flows into the country. Using a static linear programming, the economic impact of these measures are evaluated in the short-term and long-term. This is where the significance of this paper arises as it is one of the few literatures on economic sanctions which differentiate between short-run and long-run effects on the target economy. There is a negative significant effect in the long-run on the growth rate of the South African economy, whereas short-run effects are harder to calculate on account of impacts being related to the intensity of sanctions introduced. Small-scale measures have low economic consequences, and larger-scale impositions can lead to grave output losses, followed by unemployment and relocation of labour.

There has been much debate on the trade consequences of economic sanctions on target economies. Winston et. al. (1997) on the other hand, while accounting for target countries, also throws light on the costs borne by sanctioning countries. 30 target economies of US sanctions are considered, from a time period of 1993-1996. One of the major ideas put forward in this paper is that since most of the sanctions put in place were unilateral in nature, their effectiveness is limited. This can be attributed to globalisation resulting in increased integration of the world economies, allowing countries to find trade partners with unprecedented ease. Moreover, third-parties which are on unfavourable terms with the US can use the imposed economic coercion as an opportunity to substitute in place of the sanctioning country. All this points towards the concept of sanction busters. This paper makes use of the gravity equation complemented with OLS estimation techniques, finding that combined US exports to targeted economies falls from $15 billion to $9 billion. This confirms high costs to the sanctioning economy. Here, when evaluating bilateral trade flow effects, the sanctions are classified as limited, modified and extensive measures. Extensive measures result in an approximate 90% decline in bilateral flows, whereas the other two classification have much lesser impacts, without robust results. Therefore, impact on target economies also vary, wherein overall success of sanctions can be deemed inconclusive, and highly dependent on the intensity of imposed measures. Another key element shown in this study is that limited sanctions have more effect on exports than imports for bilateral trade flows of the sender country, and extensive measures have the opposite effect. Hence, sender country faces higher costs when sanction intensities are low, and target economies bare larger consequences when intensities are high.

Another paper that employs the gravity equation and keeps US sanctions as the centre of focus is put forward by Teegen et. al. (2004), accounting for the time period 1980-1999. They analyse the impact of US sanctions on bilateral trade flows between the sender country and the target country. Similar to Winston et. al. (1997), in this paper, identifying the type of sanction is imperative. A distinction is made between selective and comprehensive sanctions, underlining that results are dependent on this discrepancy. The assessment is broken down into three categories; US bilateral flows, US exports and US imports. In each case the results are sensitive to whether the sanctions are selective or comprehensive. Selective sanctions result in insignificant effects on all categories, as they are too constricted to lead to an overall general impact. Comprehensive sanctions on the other hand lead to negative significant effects on all three categories of analysis. Therefore, both the sender and the target country bare costs in terms of reduced exports. The power of comprehensive sanctions sticks around in the long-term, with trade flows affected due to a change in economic and political policies of target countries who are subject to sustained sanctions. This paper also takes into account trade between target economies and third parties, in turn analysing sanction busting abilities. With respect to trade diversion, only comprehensive sanctions resulted in sanction busting behaviour as these sanctions resulted in increased trade between the target economies and the EU or Japan.

Caruso (2015) builds on the same lines laid down by Winston et. al. (1997) and Teegen et. al. (2004). Again, measures imposed by the United States are put into focus, evaluated through the lens of the gravity framework. Furthermore, the sanctions imposed are broken down into three categories on the basis of intensity; limited, moderate and extensive. The author studies the relationship between the US and 49 target economies, over a time period of 1960 – 2000. Extensive sanctions degrade bilateral trade between the sanctioning and the target country, but limited and moderate sanctions result in insignificant effects. A second estimation is used to detect "negative network effects" and "sanction busting." Specifically, the effect of US sanctions is estimated on trade between the other G-7 countries and the target economies. Limited and moderate sanctions show a slight positive effect that highlights sanction busting and extensive coercion leads to negative significant results, in turn strengthening the argument for negative network effects.

History brings to light that a vital dimension of sanctions is to enforce political influence, by either changing enforced policies or stimulate future policies. Sanctions imposed by the EU, USA, Canada and other countries against Russia was predominantly aimed at showing their disapproval of Russia's actions of annexing Crimea. Fischer (2015) demonstrates that even though the Russian economy is gravely affected, and the EU has also borne a significant indirect impact, the ultimate purpose of changing Russia's behaviour with Ukraine has not shown any conclusive evidence. Therefore, the political outlook of sanctions, one of the main reasons for deploying this measure has shown to have limited success.

Wang (2015) also account for the power of western sanctions on political decisions of Russia. Citing the annexation of Crimea as the chief motive for the imposed actions, the author concludes significant impacts on the Russian economy. However, apart from the economic consequences, the political structure is unencumbered, with the citizens undivided. As the political position with Ukraine remains unchanged, Russia is expected to face future sanctions too, and the cycle of retaliation is deemed to continue for a considerable period of time. The paper draws attention to the adverse aftereffect faced by the EU, largely by European agricultural producers, wherein the Russian market was a lucrative space for few prominent countries. Moreover, the author also makes a case for sanction busting, bringing to light the improved diplomatic relationship between Russia with Asian countries, and the Eastern world hemisphere in general. Having greater allies in the East has allowed the Russian economy to soften the economic blow of the western sanctions. Connolly et. al.

(2015) strengthens the proposition that sanction busting allowed Russia to mitigate adverse economic consequences. This has been attributed to the proposition of "my enemy's enemy is my friend". Globalisation has resulted in increased integration of the world economies, making trade partner substitutes readily available. However, this paper mentions that empirical estimation has been burdensome on account of various economic factors at play over the course of the sanction period.

Similar to Caruso (2015), Winston et. al. (1997) and Teegen et. al. (2004), Van Acoleyen (2015) uses the gravity model to investigate the economic effects of sanctions. This paper focuses on the impact of the European-Russian sanctions on the export flows of the EU. Both, the Russian import ban and the EU coercion measures are considered when evaluating the impact of sanctions on the European export patterns. This paper is imperative in depicting the sanctions busting argument, as it additionally aims to evaluate the impact of the Russian import ban on trading behaviour between the EU and third countries. The Russian ban has a much deeper impact compared to European embargoes on the export flows of the EU. Confirming the common economic logic and theoretical predictions, exports of banned commodities to Russia reduced. For sanction busters, the author takes a two-way approach, by analysing sanction busting to neighbouring countries of Russia, and third countries separately. This paper finds strong conclusive evidence for Russia's neighbours and few countries belonging to the Eurasian Customs Union in becoming a stronger trading partner as exports from the EU increased following the boycott. Exports to third-countries also improved, providing an overall support to the presence of sanction busting behaviour carried out by the EU.

Năsulea et. al. (2015) intends to zero in on the direct consequences of the sanctions imposed by Europe on the Russian economy. There are some similarities drawn to Van Acoleyen (2015) as the authors also aspire to draw attention to the indirect consequences of these economic measures, on the EU economy itself. France and Germany are shown to be one of the essential trading partners with Russia, in terms of both imports and exports, and through this the case of indirect impacts can be drawn. The paper finds a long-standing impact on the Russian economy. With the Rouble losing value, poor stock market performance and depleted foreign exchange reserves, Russia enters a dire recession with rising inflation. Complementing these effects with external shocks of falling oil prices, the economy might head towards eventual collapse with increased propensity of default. Moving on to the inverse outcomes of these measures, they have both a negative and a positive side. Consequent bans from Russia as a response to EU restrictions resulted loss of revenue for the common market. Due to this, there was subsequent increased unemployment. On the positive side, capital flight from Russia lead to capital inflow in the EU, providing much needed liquidity in grim times. The EU also benefits in terms of the cost of buying Russian oil, by which the authors conclude a net positive effect on the European economy.

Boulanger et. al. (2015) utilize the specific factors' Computable General Equilibrium model to establish the aftermath of the Russian import ban on the EU. Alongside this, the authors underline the impact these measures have on the Russian economy itself. This paper also draws a line to sanction busting as the EU is shown to relieve some of the economic pressure of the sanctions by diverting trade to other countries. By being able to export to other trade partners, and possibly establish newer relationships, Europe is able to restore 25% of lost exports. Russia is shown to incur the largest income and welfare losses.

Seeberg et. al. (2015) help in showing the significance of the relative importance of the trading partner in determining the success of any sanctions imposed. Firstly, they mention that effectiveness of sanctions is questionable, as there are numerous confounding factors at play. There are only few cases of success of economic coercion and one major reason needs to be high pre-sanction trade levels for impacts to be significant.

Kapsdorferová et. al. (2016) carry out simple statistical analysis on trade data between Russia and the EU, pre and post-ban to determine the impact on EU exports of the imposed agricultural sanctions. The paper considers the importance of Russia as a trading partner, being the second most prominent destination for European producers, after USA. For this, the ban was hypothesised to have grave impacts as it accounted for 4.2% of total EU agricultural exports. Moreover, it is critical to note that the timing of the ban coincided with the harvest season, for which the possibility of grave impacts rises even further. However, through diverting trade to other destinations, EU has been able to protect the agricultural sector to some extent. USA, Arab nations, and the Eastern region have seen an increase in EU exports, drawing attention to how the effectiveness of sanctions is limited by sanction busting opportunities. Overall the EU has been able to increase trade within the EU, and externally, to strengthen its economy against Russian sanctions.

To take on another outlook on the economic impacts of sanctions Netsunajeve et. al. (2016) consider the effect on aggregate growth rate of the target economies. This paper considers the bilateral sanctions imposed between Russia and the Euro Area following the Crimean annexation. One major element that makes this paper stand out from rest of the literature is that it considers the real side of the economy. Structural vector autoregression is employed for estimation, while using an index that further accounts for the intensity of the sanctions, as per Dreger et. al. (2016). There is an adverse statistically significant effect on the growth rate of the Russian GDP, but sanctions imposed on the Euro Area result in no significant effect on the common market's GDP growth. However, there is an indirect negative impact through exchange rates. Overall, this study shows adverse economic consequences in both countries.

One major economic argument for the imposition of sanctions is the protection of domestic producers, to shield them from fierce international competition in order to improve output, and move the imposing economy a step closer towards self-sufficiency. Richard et. al. (2016) take on this approach, arguing that the Russian import ban was not established to wound specific European countries, but to defend Russian agricultural producers. The sample in this paper revolves around critical agricultural product categories of the EU, with focus on Russian imports rather than EU exports. There is a significant reduction in import volumes of Russia, but the improved competitiveness of domestic producers is limited, with positive evidence shown in only a few specific categories. Basic time series analysis is used, and this simple evaluation does conclude that individual countries and industries of the EU were in deed negatively affected. Categories fruits and fresh vegetables faced the largest impact.

Luo et. al. (2016) aim to evaluate the effectiveness of sanctions, in determining whether the target economies are actually impaired by the resulting economic coercion. The areas analysed are international trade, foreign direct investment and foreign portfolio investment. By considering 133 countries and a time period of 1997-2005, they find no significant effect of the sanctions on any of the considered economic areas for the target economies. To carry out the analysis, the authors employ different measurements of economic sanctions. For example, they consider US sanctions separately from multilateral sanctions, and disaggregate their analysis further to consider financial sanctions against travel bans. Here, the authors also include multiple controls, ranging from accounting for international conflicts to political and economic factors. Using the fixed-effects method, results are drawn. One major inference in this paper is that economic entities (here, countries) are more inclined towards profits than political motivations, for which third-parties carry on business with sanctioned countries. This throws light on sanction busting as a possible explanation on the insignificant conclusions drawn of sanctions on depreciating trade conditions in the target country.

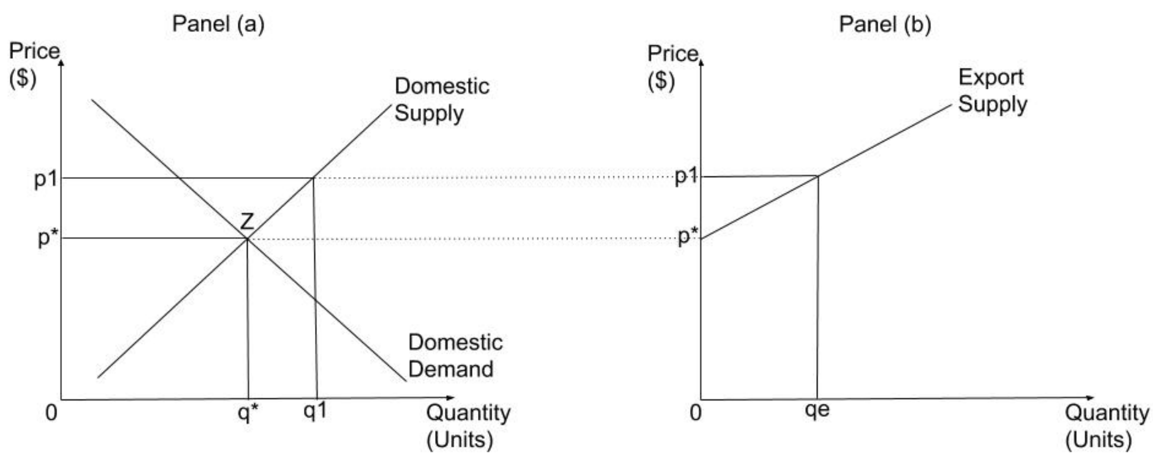
Comparing my model with the past literature, one major similarity I find is that like all the other prominent papers discusses, I too aim to account for sanction busting when evaluating the overall impact of sanctions. Like Kutlina-Dimitrova (2017), I venture out to view whether the sanction led to different effects in in the sanctioned categories. Moreover, I attempt to link these fluctuating influences on the relative importance of the sender country as an export market, working on the lines of Seeberg et. al (2015). Furthermore, all my sanction denoting variables are binary in nature, which is also the case in Luo et. al. (2016).

There are also numerous differences with the past work. Predominantly, major share of authors in the literature review utilize the gravity framework, where-in I use the DID model. Moreover, the authors also evaluate at the country-level, but I analyze at the category-level, sticking to a singular case of Russian agricultural import ban on the EU. Moreover Van Acoleyen (2015) gauges sanction busting behavior of EU countries to neighboring countries of Russia, and other third-party economies separately. I do not take this difference and evaluate the Extra-EU case in general. Peksen and Peterson (2016) aims to show that countries impose sanctions on targets that are highly trade dependent with the sanctioning country, provided that trade diversion abilities of the target country are low. This paper consider sanction-busting opportunities to be an exogenous factor in their empirical model, hypothesising higher sanction-busting opportunities to be correlated with lower sanctions imposed on the target. On the other hand, I use the concept of sanction-busting to explain any insignificant effects on exports at the total world aggregate level. This paper employs the probit model on account of binary explanatory variables compared to the difference-in-difference model I employ. This paper measures trade partner significance by evaluating both imports and exports between the sender and target country whereas I only base my measure on proportion of exports.

3. THEORY

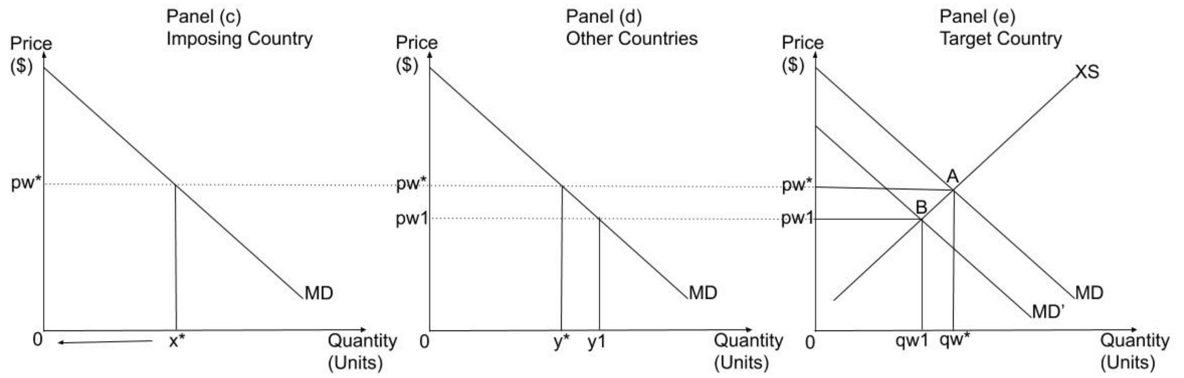
An import ban is a form of economic sanction, where-in the term is self-explanatory. It is when a government imposes restrictions on the imports of certain products from a particular country or group of countries (WebFinance, Inc). Masters (2019) explains that economic sanctions are majorly politically motivated, usually based on security concerns where the imposing country withdraws customary trade and financial relations from the target country. When explaining the theoretical foundation behind my analysis, I use the term trade diversion in the sense that trade is diverted from Russia to other countries.

All prominent trade models, whether be it Krugman (1980) or Melitz (2003) or any further extension, highlights that countries benefit from mutual trade, compared to operating in the autarky position. The gains can come in various forms, through intensive or extensive margins, but in each case, it is beneficial to engage in open market situations. Any impediments to free trade and efficient market operations results in welfare loss. Using a simple demand and supply diagram it is possible to show the adverse consequences of import bans on target countries.



`The diagrams are based on a two-country setting. Panel (a) highlights that point Z is the closed economy equilibrium, at which the country is producing at the point where demand is equal to supply, at price level p* and quantity level q*. Usually in basic economic theory it is inferred that any excess supply in the market is exported. Therefore, at price level p*, corresponding to panel (b) we see exported quantity at 0. Now consider world price level *p1*, where there is an excess supply in the domestic market, and domestic output increases to *q1*. At this price, in panel (b), exported quantity shifts to *qe* and the two countries are now engaging in trade. In a two-country model, import bans equaling export quantity *qe* are another way of signifying a decrease in targeted country's output from *q1* to *q**. Hence, assuming no additional new outlets to divert lost trade to the imposing country, the targeted country loses in domestic output. Here, import bans have a net trade reducing effect.

As in the real world every country has numerous trading partners, there are multiple opportunities to divert trade lost to the imposing country. Jildenbäck (2017) provides a graphical representation that throws light on how trade can be diverted to other trading partners. This method involves a panel of three diagrams that highlights the imposing country [panel (c)], other countries [panel (d)] and target country [panel (e)]. In this case, other countries are trading partners, old and new, with which the target country can engage to reduce the economic adversities caused by an import ban. We make use of import-demand [MD] and export-supply functions [XS] to put forward the ideas. Note that the intersection of these two curves determines world equilibrium. The first two diagrams only have the import-demand schedule, as we are solely interested in the importing capacity of the imposing and other countries, whereas the third diagram also includes the export-supply schedule, denoting the exporting power of the targeted country.



In panel (e), *qw** and *pw** are the initial world equilibrium conditions, before the imposition of an import ban. At the world price level *pw**, the target country exports quantity level *x** to the imposing country and *y** to other countries. In this scenario $x^* + y^* = qw^*$. Now, we assume the imposition of a complete import ban, causing the exported quantity to the imposing country to reduce from *x** to *0*, as shown in panel (c). This consequently causes the import-demand schedule to shift inwards, from MD to MD' in panel (e), reducing the world price level to *pw1*. At this reduced-price level, corresponding to panel (d) we can see that the imported quantity of the neutral countries increases from *y** to *y1*, highlighting how trade was diverted from the imposing country to other countries. For the target country, there is a net decrease in output, as the world equilibrium has shifted from point *A* to point *B*, reducing output from *qw** to *qw1*. The target country is unable to mitigate the adverse impacts completely.

Bown and Crowley (2007) construct a three-country model, with firms in each country facing increasing marginal costs of production, who compete in quantities and employ the same technology. Markets are segmented and firms are profit maximizing. The model relies on the calculation of best response functions that determine output exported to one country, given levels for the other two countries. It is not essential to formally derive the model here to understand the theory of trade deflection arising through economic sanctions, but this concept can be strengthened by looking at the ideas of Haidar (2013), which extends on Bown and Crowley (2007).

Haidar (2013) throws light on the concepts of trade destruction, trade creation and trade diversion. Considering three countries A, B and C, where A imposes an economic sanction on B, the first result is of trade destruction as the amount of trade flows from B to A reduces. Now, assuming the sanction is isolated to country B, exporters from C would experience trade creation as any demand not met by A through domestic production would have to be compensated for via import source diversion to C. To counteract the loss of exports to A, country B would try to establish stronger bilateral relationships with C, to improve trade flows, experiencing trade diversion. Note that the explanation here is in general terms, whereas Haidar (2013) formally derives these results through differentiation, with different notations, but the idea is the same.

If third parties provide export opportunities to sanctioned countries, the economic impacts of trade sanctions reduce. This is the ideology behind sanction busters. Following the Russian import ban on the EU, agricultural producers within the EU would have had to find alternate trade partners in order to maintain output and income levels, in turn mitigating adverse consequences. First, let us understand how the busting opportunities differ in the case of the EU, as compared to a single country such as India. Countries within the EU benefit from a single market, where-in most of the trade barriers within this trade bloc is removed. Therefore, a producer such as France, could divert any loss in exports much easily to countries within the EU. Therefore, as a result of the ban, intra-EU trade for European agricultural producers should increase, resulting in trade diversion. Moreover, each member in a trade bloc has a common external tariff. Hence, third-party countries would probably step in to take up the place of Russia. This is because through new negotiations or re-negotiations, they would look to have a better access to the lucrative EU market, on the behest of its large size and an exceptionally large customer base. This would in turn allow EU agricultural producers to find new markets for exporting the goods denied by Russia. Through this, extra-EU trade to countries other than Russia would increase, further resulting in trade diversion. Furthermore, European producers can target strategic and trade rivals of Russia, to improve their trade flows as these countries would probably provide stronger busting opportunities. With the presence of multiple trade partners, this again highlights an increase in extra-EU exports to countries other than Russia, reducing the impact of the import ban and resulting in trade diversion.

The theoretical framework helps in providing a strong foundation to the hypotheses. Following the agricultural import ban of Russia; EU producer's exports to Russia should reduce, intra-EU exports should increase, and extra-EU exports to countries other than Russian should also increase. If loss of exports to Russia are proportionately compensated for by a rise in export flow to countries outside the EU, aggregate Extra-EU export levels should remain unaffected. Moreover, if the outlets of trade diversion are strong enough to successfully and equally counter the loss in trade to Russia, there would be an overall insignificant effect on the total aggregate world export flows of agricultural products for all the EU producers in question.

4. DATA

To analyze the impact of the Russian Import ban on aggregate world exports of France, Germany and Italy, it is crucial to first determine the agricultural areas the sanctions targeted. The import ban was imposed on 6th August 2014, on the behest of applying certain economic measures to uphold the security of the Russian Federation (Decision No. 778, 2014). The next day, a detailed decree was released wherein, certain product categories falling under the agricultural sector were banned from entering Russia, from the EU. The sanctions were imposed at 4, 6, 8 and 10-digit level according to the Combined Nomenclature (CN), but due to the limited availability of data, I carry out my analysis at the 2-digit level. The database used in this paper is "EU trade since 1988 by HS2-HS4" (Eurostat, 2020). The similarity between the HS code and CN code allows us to use this data in comparison with the Russian decree signed on 6th August. In constructing the panel data, export values are expressed in Euros, and are taken at the yearly level, over the time period 2010-2019. This specific period is chosen to give sufficient time before and after the ban to account for the effects, whilst limiting the influence caused by the 2008 financial crisis.

In **Appendix A**, from **Table 1**, the decree banned product categories **[02]**, **[03]**. **[04]**. **[07]**, **[08]**, **[16]**, **[19]** and **[21]**. However, in 2017, Russia revised its decree to sanction additional product categories (D. G. R. F. No. 1292, 2017). This decree targeted groups **[01]**, **[02]** and

[15]. To avoid any discontinuity, I decide to only include groups Fish **[03]**, Dairy Produce **[04]**, Edible Vegetables **[07]**, Edible Fruits and Nuts **[08]**, Preparations of Meat **[16]**, Preparations of Cereals **[19]** and Miscellaneous Edible Preparations **[21]** in my treatment group as only these product categories were solely banned in 2014, which is my treatment year in the difference-in-difference model employed.

For the control group, firstly I choose to drop category **[22]** as in my opinion beverages fall very far from agricultural commodities and including it would reduce the applicability of the control group. Moreover, I do not consider **[01]**, **[02]**, and **[15]** as these categories were influenced in 2017, and I aim to analyse the impact of the ban from 2014. Apart from these 4 categories and the treatment group, all remaining product classifications are included as the control. Therefore, specifically the control group comprises of categories **[05]**, **[06]**, **[09]**, **[10]**, **[11]**, **[12]**, **[13]**, **[14]**, **[17]**, **[18]**, **[20]**, **[23]** and **[24]**. As the dataset is directly related to the agricultural produce of the EU (Eurostat, 2019), it was possible to consider all remaining product categories as a valid counterfactual.

EU publishes annual agricultural data in the form of a factsheet, highlighting key aspects on a per country basis (European Commission, 2019). According to the latest factsheet produced in 2019, France leads in agricultural industry output, contributing approximately 18% to total EU production in 2018, and approximately 17% in 2017. Italy is in second place, followed by Spain and these two southern countries have similar contributions in 2017 and 2018, with Italy leading marginally. Germany falls in the fourth place. Post-Germany, there is a huge decline in contribution to total output, and therefore, via this measure these four countries are most prominent agricultural producers in the EU.

In relation to capital expenditure by member countries in 2018, France is again leading, followed by Spain then Italy and finally Germany. Here also, there is a marginal difference between Spain and Italy, and after Germany, each subsequent country is much lower in terms of capital expenditure. Hence, even by this measure, these four countries are the most important in terms of agriculture in the EU. The level of capital expenditure can gauge the level of investment and determine whether the specific country aims to improve the strength of the agricultural sector in the future. If high amounts of capital is invested, this can signal that for the foreseeable future, the country expects its agricultural industry to hold greater economic importance. Therefore, any bans imposed, should lead to costly impacts on these countries, as it would be harder to realise return on investment

From the above information, it becomes clear that it is imperative that the four mentioned countries should all be included in the analysis. We are able to include all essential agricultural producers and still have some variation in size allowing for a much valid analysis to take place. The variation comes on account of France being the leader in capital expenditure and contribution to total country output, with the other countries being significantly lower in both metrics. As per 2018, France spent €9,467,117,000 on capital expenditure, whereas Italy spent €5,811,582,000, almost 40% lower. Furthermore, France accounted for almost 18% of industry output in 2018, whereas Germany contributed less than 12% (European Commission, 2019). From Năsulea et. al. (2015), my justification for the chosen countries gets even stronger as France and Germany are shown to be critical trading partners of Russia.

In the empirical methodology section, I extensively explain how I plan to complement my analysis by determining whether the relative importance of Russia as a trading partner influenced the success of the sanctions imposed. To establish significance, I make use of the criteria in Early (2009). From this paper, if a nation comprises of 5% of the overall target's trade, that country is a significant trading partner. However, I do make the case that I only consider this evaluation at the Extra-EU trade level and not the aggregate world level. This is because when I take into account Intra-EU countries, then the total amount of trade volume exponentially increases on account of no trade barriers within Europe, distorting the analysis.

From **tables 2**, **3**, **4** and **5**, it becomes clear that at the aggregate world export level, Russia is an insignificant trading partner. The only exception is Germany in product category **[21]**, which is also significant at a highly marginal level.

From **tables 6**, **7**, **8** and **9**, when we limit the analysis to Extra-EU exports, Russia holds significance for trade for all chosen countries in at least one sanctioned product category. For France, it is product categories **[04]**, **[08]**, **[16]** and **[21]**. For Spain it is **[07]**, **[08]** and **[16]**. For Italy it is **[04]**, **[07]**, **[08]**, **[16]** and **[19]**. With respect to Germany, Russia is significant in all except category **[03]**, highlighting that in terms of Extra-EU exports, Germany and Russia have the strongest relationship. Note that any value greater than 5.00% is accepted from the point of view of Early (2009). 2014 is not included because the decree was signed on 6th August, and I consider yearly data. Therefore, for 2014, it is not possible to split the data pre and post-ban, for which the year is dropped in the calculations for **tables 2**,**3**,**4**,**5**,**6**,**7**,**8** and **9**. The other categories that proved to be insignificant in trade in relation to Russia would work as a suitable counterfactual to confidently ascertain whether the relative importance of the sender country as a trading partner influences the success of the sanctions imposed.

Early (2009) employs singular countries like China and USA and not a common market like the EU. This is to say that in Early (2009), intra-country trade is not taken into account. Therefore, when drawing parallels to my analysis from this paper, taking only the Extra-EU case allows me to consider the entire EU as one block, such as countries like China and USA. This allows me to use the 5% criteria in Early (2009) as my threshold value in determining the significant of a trading partner. Moreover, by considering the EU as one block, this way of narrowing the analysis allows us to draw conclusions on the ability of the selected European producers to negotiate/re-negotiate favourable contracts with third parties without the inherent support provided in a common market.

It is key to mention that trade of sanctioned categories to Russia does not reach 0 post-ban. The only exception is Spain in category **[03]** and this is solely on account of missing data points. For all remaining product groups and countries, this is because the sanction was imposed at the 4,6,8,10 – digit level whereas I conduct the analysis at the 2-digit level. Hence, specific sub-products in the broad 2-digit categories that were unaffected might still be exported to Russia. Also, I have taken EU-28 rather than EU-27 in my data collection, because Brexit occurred on 01/02/2020 (BBC, 2020), which is outside my evaluated time-period.

5. METHODOLOGY

The past literature clearly demonstrates that the economic effects of imposed sanctions are limited, mainly through target economies engaging in sanction busting behavior. Although this paper primarily aims to evaluate the trade consequences faced by the EU following the agricultural import ban enforced by Russia, it also intends to account for any sanction busting opportunity exploited by the analyzed European producers. For this, the paper endeavors to estimate the following hypotheses:

1. Agricultural exports to Russia reduced following the import ban of 2014.
2. Agricultural exports to intra-EU countries increased following the import ban of 2014.
3. Agricultural exports to extra-EU countries excluding Russia increased following the import ban of 2014.
4. Aggregate Extra-EU (including Russia) agricultural exports were unaffected following the import ban of 2014.
5. Total aggregate world agricultural exports were unaffected following the import ban of 2014.

Note: For hypothesis 5, total aggregate world agricultural exports equal Intra-EU and Extra-EU exports, including Russia.

To evaluate the above hypotheses, I employ the Difference-In-Difference [DID] model. One of the key requirements of this model is for the analyzed time period to experience a sudden exogenous change, dividing it into two sections. This would also create two groups, the treatment and control, where-in the treatment group is affected by the exogenous force, and the counterfactuals remain unaffected. Here, the import ban acts as the exogenous effect, the sanctioned categories become the treatment group and the non-sanctioned categories form the control group. One noteworthy advantage of this model is DID automatically controls for time-invariant omitted variable bias (OVB). Also, time varying OVB is only an issue in this model if the effect of the omitted variable differs on the treatment and control group. As we limit our analysis to agricultural products, differing effects seem improbable.

With reference to the above-mentioned model, following is the empirical estimation I employ to evaluate all the hypotheses:

$$LnExport_{xit} = \alpha + \beta_1 Banned_{xi} + \beta_2 Period_{xt} + \beta_3 Interaction_{xit} + \varepsilon_{xit}$$

Where,

$$Interaction_{xit} = Banned_{xi} * Period_{xt}$$

Table 10 sheds light on the information that each variable represents in the above regression equation. To explain further, ‘x’ is a country index, and it denotes the exporting country. Specifically, as the impact of the ban is estimated on exports of prominent EU producers, “x” represents; France, Spain, Italy or Germany. ‘i’ represents the product category at the 2-digit level and ‘t’ signifies the time period in question. Taking log values assists in dampening the effect of outliers, in turn improving the accuracy of the analysis. Additionally, I employ the use of robust standard errors, clustered at the product-ID level, to account for presence of heteroskedasticity and serial correlation in the error term. This further improves the validity of the analysis conducted. Connolly et. al. (2015) mention the strain in conducting empirical estimations when evaluating sanctions of the US and EU on Russia, attributing it to the inability to distinguish the various confounding economic factors at play. Here, by using the above estimation centered on the DID model, and limiting the product spectrum to agricultural commodities, I am able to isolate the impact of the Russian ban on the EU economy to an acceptable extent. Moreover, by the advantage of the DID model mentioned above, in accounting for OVB, I do not add any additional controls to my empirical estimation.

The above regression equation would be run for each of the countries chosen for analysis. Here, France, Spain, Italy and Germany. The reason to run the model separately for each country is twofold. Firstly, it allows cross-comparison of results between countries, to determine if effects are similar across all prominent producers. Secondly, in past published work, most of the analysis is done on the export flows of the EU, and not specific economies within the common market. To take a new approach, and better understand trade consequences of sanctions, it becomes critical to divert from established patterns. The same regression equation would be used to test for all 5 hypotheses for each of the chosen countries. However, the data on exports would be adjusted in accordance to the hypothesis in question. Our main focus lies on the estimate of β_3, which reflects the interaction term, encapsulating the treatment effect. This demonstrates the post-ban change in export levels of sanctioned commodities, against the non-sanctioned products. As the export value is expressed in log terms, this difference in export levels, captured by the interaction term, is interpreted in percentages. A negative value signifies that after the ban, export levels of sanctioned products decreased compared to the control group, and positive values denote the opposite outcome.

One major result in Kutlina-Dimitrova (2017) is selective significant impact of embargoes against all considered product categories. I also study whether the impact of the Russian import ban was inconsistent across the treatment group, where-in if any significant effects can be attributed to the sender country being a relatively important trading partner in that category. As mentioned in the data section, if the share of exports to Russia accounted for more that 5% of total Extra-EU exports, then for that category the sender country was a noteworthy trade partner. This should be the case when pre-sanction trade levels are deliberated. **Tables 6**, **7**, **8** and **9** notify the product groups for which this is applicable. To explain clearly how these differing effects will be evaluated, for each country and each hypothesis, first I would analyze the impact on exports when considering all the treatment product categories together. Then, I would analyze the impact on the exports of each treatment product category in isolation. In both cases, the control group remains the same. By studying the treatment groups in isolation, I can draw lines between relative trade importance of the sender country and any differing effects across the sanctioned categories.

In the data section, it is mentioned that to evaluate whether the significance of the sender country as a trading partner influences the success of sanctions imposed, I limit the view to the Extra-EU case, not accounting for Intra-EU trade. For this reason, hypothesis 4 plays a key role as it determines whether the two opposing hypotheses, hypothesis 1 and hypothesis 3 negate each other. More so if the value of β_3 in hypothesis 1 is negative, exports to Russia reduced, and positive values mean exports increased. Similarly, a positive value of β_3 in hypothesis 2 and 3 point towards successful sanction busting at the intra and extra-EU level respectively. A negative value in hypothesis 3 can point towards "negative network effects" as shown in Caruso, R. (2015). Insignificant estimates with respect to hypothesis 1, 2 and 3 denotes that export behaviour was unaffected.

Therefore, if the value of β_3 in hypothesis 4 is negative, it shows that sanction busting behavior, if present was not enough to counter losses experienced by the ban. A positive value offset the loss more than proportionately and insignificant values can indicate towards trade diversion, of approximately equal levels to the loss of exports to Russia. Moreover, by analyzing the treatment groups in isolation, results can be attributed to the conclusions in Seeberg et. al. (2015). For categories in which trade importance of Russia is present, negative values would suggest sanction effectiveness is possibly linked. With regards to hypothesis 5, a positive value of β_3 points towards the idea that the benefits of the overall sanction busting behavior (intra and extra-EU opportunities) was greater than the costs faced by the Russian import ban. Negative values highlight the opposite outcome.

To obtain unbiased estimates from the DID model, the common trend assumption needs to hold. This assumption states that for each time period before the exogenous change comes into effect, here, 2014, the treatment and control group should move along parallel paths. To test for this necessity, I exercise the Lead Variables method. This involves adding lead variables of the interaction term to the regression specification. Statistically insignificant coefficients on all lead variables confirm the presence of the common trend assumption. In my case, I employ three lead variables; f1, f2 and f3. “f1” tests whether trends are analogous between 2012- 2013, “f2” for the period 2011-2012 and finally “f3” for 2010-2011. Usually, this assumption is tested through visual methods, via graphical representation. The outcomes of the treatment and control group are plotted for the entire time frame, and prior to the treatment effect, the two lines identifying the treatment and control group should be parallel. In my model, with numerous treatment and control groups, the graphs appear chaotic and disorganised, making visual analysis inaccurate. Hence, I stick to the lead variables method for all hypotheses, to argue for the validity of my estimates, and consequently my analysis. This would be used when the treatment groups are studied together, and in isolation.

With everything considered, one major area where my model stands out is that whereas most of the work is done on the EU in general, I analyse the impact on prominent European agricultural producers. This subsequently allows me to account for intra-EU trade as a possible sanction busting opportunity, an aspect not widely studied in other works.

6. RESULTS AND DISCUSSION

Using difference in difference estimation to test for all hypotheses, for each of the countries, following are the results obtained. Before moving into the specifics, it is imperative to note that for all subsequent analysis, the panel variable is strongly balanced, in turn bringing to light the overall accuracy of our discussion. To reiterate, the regression is run with the dependent variable being in logarithmic form, allowing the analysis to be conducted in percentage terms. Moreover, through the lead variables approach, evaluations are robust following insignificant estimates on all the employed lead variables. This section is further divided into subsections for better presentation and understanding.

6.1 – Effect of the import ban on exports to Russia – Combined treatment group

From **Table 11**, analyzing for all sanctioned products together, the import ban caused exports to Russia to reduce significantly for all countries. The loss in exports of France was 234%, Spain 273%, Italy 242% and Germany 154%. From prevalent theory and common knowledge, it is safe to assume that exports from target to sender country will reduce following sanctions. Hence, in this case, the model is following the lines of widespread economic concepts. From **Table 12**, the robustness of the estimates can be confirmed, with only Germany denying parallel trends between 2012-2013. However, as already mentioned, on the norms of dominant trade notions, loss of exports to Russia can be understood. All in all, hypothesis 1 can be accepted for all countries, where-in agricultural exports to Russia reduced following the import ban of 2014. One thing to note from **Table 11** is that the significance of the negative estimates for each country varies, and deeper analysis of each banned category might be able to provide further insight.

6.1.1 – Treatment categories analyzed in isolation – France, Spain, Italy and Germany

Tables 13, **15**, **17** and **19** analyze the impact of the Russian import ban on each sanctioned category in particular, for France, Spain, Italy and Germany respectively. From **Table 13**, for France, the results are negatively significant for all categories, except **[21]**. This outcome is puzzling as from **Table 6**, for category **[21]** Russia is a significant trading partner, and this category should have experienced a grave loss in exports. Therefore, from here, conducting analysis on relative importance of trading partner becomes bungling, as for categories such as **[03]** and **[07]** for which Russia is an insignificant trading partner, there are negative significant estimates but for category **[21]** it is insignificant. From **Table 14**, significant estimates prevail for one period for two categories, but on a general level the estimates can be taken to be valid, at least for the majority of categories.

Table 15 shows that for Spain, three out of seven categories had insignificant estimates. This gives a plausible explanation for Spain having the least significant estimate in **Table 12**. Moreover, the results are in line with the ideas put forward by Richard et. al. (2016) where-in categories fruits and vegetables were shown to bare the highest impact. Again, lines to relative importance of trading partner cannot be drawn, as category **[03]** has a negative significant estimate. For category **[03]**, from **Table 7** it is clear that Russia is an insignificant trading partner. **Table 16** highlight the robustness of the estimates, which is limited from a statistical point of view. This is on account of four out of seven categories having significant lead variable estimates.

Table 17 demonstrates the results for Italy, with significant estimates on all except category **[21]**. From **Table 8**, with a highly significant negative estimate on **[03]**, conclusions on relative importance of trading partner cannot be drawn. From **Table 18**, it can be viewed that the results are valid to a large extent, with only category **[16]** defaulting on the common trend assumption, albeit strongly. With Germany also the applications of significance of the sender country as a trading partner cannot be employed, by comparing the results of **Table 19** with **Table 9**. Moreover, from **Table 20**, it becomes clear that the estimates of export loss to Russia from Germany must be treated with care, as the statistical accuracy is extremely limited.

6.2 – Effect of the import ban on Intra-EU Exports – Combined treatment group

Moving on to the intra-trade aspect of this paper, **Table 21** focuses on the estimates for Intra-EU exports, for each of the countries, when all treatment products are considered together. None of the chosen countries are showing statistically significant estimates, in turn rejecting hypothesis 2 for all considered European agricultural producers. From a theoretical point of view, grave export loss to Russia, as shown in **Table 11**, should have been countered with increased trade between members of the common market. This reasoning lies on the principles of free trade areas, where-in members can benefit with unrestricted access to each other's markets. Intra-EU sanction busting opportunities would help the European producers to divert exports and insulate its economy from coercion. Yet **Table 21** makes it clear that the Intra-EU trade patterns remain unchanged. From a robustness perspective, the validity of these estimates can be questioned through the breakdown of the parallel trend assumption in period 2010-2011, for Spain and Germany. For the rest, validity holds. This is shown in **Table 22**.

6.2.1 – Treatment categories analyzed in isolation – France, Spain, Italy and Germany

In retrospect, relative importance of the sender country as a trading partner should not have any direct consequences on intra-EU trade. However, indirectly, if any particular category is disproportionately impinged on, Intra-EU trade for that group of products specifically should increase. This is again based on the ideas of free trade, assuming that members would look at all possible solutions to limit adverse economic consequences of sanctions. Considering, France, insignificant estimates on the treatment variable in all columns of **Table 23** limits any conclusions that can be drawn in the case of the significance of the sender country. **Table 24** does show that some of the results need to be taken with a pinch of salt, but as none of the estimates have shown any concrete value, this loss in accuracy is not of any major concern.

With respect to Spain, there is only one significant estimate, that too on category **[19]** for which Russia is an insignificant trading partner, as shown in **Table 25**. Moreover, going back to **Table 15**, it is shown that for category **[19]**, there is no significant loss in exports to Russia. Therefore, from this it becomes hard to draw any trends that a loss in exports to Russia is compensated by a rise in Intra-EU trade for the same products, as these results clearly show that such causality is not present. **Table 26** strengthens this view further, as even though for some categories parallel trends are absent, for category **[19]**, results are robust.

Italy also disregards any inference on sender country trade importance because firstly, significant estimates are not on all key categories, and secondly, category **[21]**, an unimportant product group for the sender country, is also shown to have statistically significant effects. This is shown in **Table 27**. From **Table 28**, although for some categories the legitimacy of the estimates is reduced, for category **[21]**, the corresponding conclusions can be accepted. Moreover, as shown for Spain, even for Italy by looking back at **Table 17**, for category **[21]**, there is no significant loss in exports to Russia. Therefore, again any relationship between trade deterioration with Russia and trade improvement with European states cannot be established. Nevertheless, for categories **[04]** and **[16]** for which Italy points in the direction of improved Intra-EU trade, there is a loss in exports to Russia for those product groups, as shown by **Table 17**. Even though from **Table 18** the validity of estimates of category **[16]** is negated, from category **[04]**, there is slight evidence of trade diversion from Russia to European members, possibly to counter trade consequences of sanctions.

For Germany, through **Table 29**, all important categories from the sender country's perspective are not shown to have prominent effects. Looking at **Table 19** and **20** together shows that for Germany for category **[08]**, there is a significant loss in exports to Russia and the estimate can be statistically accepted. From **Table 29**, only product group **[08]** is shown to have a significant increase in Intra-EU trade, equal to 21%. Nonetheless, from **Table 30**, it becomes clear that four out of seven categories in this case violate the common trend assumption, including category **[08]**. Hence, even though for Germany there is some evidence of trade diversion to the Intra-EU side, this finding needs to be treated with care.

6.3 – Effect of the import ban on Extra-EU Exports excluding Russia – Combined treatment group

As sanction busting in the Intra-EU case has been extremely poor, it becomes essential to evaluate the Extra-EU case excluding Russia, to see whether trade to third party countries outside the EU improved or not. **Table 31** throws light on the findings for this case. For France and Germany, there is an increase in trade to third parties, by 9% and 19% respectively. For the other two countries results are statistically insignificant. Using **Table 32**, these estimates can be accepted as parallel trends hold for all periods prior to the treatment effect, for all countries. Therefore hypothesis 3 is valid for France and Germany but is invalid for Italy and Spain.

6.3.1 – Treatment categories analyzed in isolation – France, Spain, Italy and Germany

Table 33 conducts the analysis for this particular case for France by taking each treatment category in isolation. A positive significant estimate for category **[19]** limits the possibility to use these results to throw light on impact sensitivity based on trade significance of sender country. This is because as mentioned before, for category **[19]**, the share of exports to Russia as a ratio to total aggregate Extra-EU exports is less than 5%. Moreover, from **Table 34**, parallel trends are violated for product group **[19]** between 2012-2013, making any inferences with respect to these specific products inconclusive. The other categories that have significant results are **[04]** and **[08]**, which show an increase in third country exports of 18% and 9% respectively, with all corresponding lead variables having insignificant estimates. This points towards France exploiting sanction busting behavior in a few banned groups, which possibly hold so much importance in the agricultural industry of the country that it led to an indication of sanction busting behavior at the combined level.

By seeing isolated impacts within Spain, through **Table 35**, an interesting idea comes into focus. Six out of seven categories have statistically significant estimates, with only one out of the six showing a reduction in exports. Other product groups that experience a rise in exports in turn point towards the direction of engaging in sanction busting behavior. However, with categories **[04]**, **[07]**, **[08]**, **[16]** and **[19]** showing an increase in exports to third parties, the insignificant result at the combined level (**Table 33**) is viewed as confusing. One plausible explanation is that the significance of each category in Spain's agricultural industry can be of importance too. Moreover, as the analysis here is conducted at the 2-digit level and the ban was imposed on further sub-categories of products, the share of banned sub-categories in overall 2-digit broad categories should also be focused on.

To explain further, category **[03]** shows a negative impact and for category **[21]** there is an insignificant effect. To obtain an insignificant effect at the combined treatment group level, it would have to be the case that for Spain, categories **[03]** and **[21]** together account for a higher or equal production share in the agricultural industry, compared to **[04]**, **[07]**, **[08]**, **[16]** and **[19]** combined. Moreover, for category **[03]**, the loss in exports is of 17% whereas for category **[04]** and **[07]**, the increase is of 42% and 40% respectively. Therefore, it is possible that the banned sub-category in **[03]** accounted for a large share in aggregate 2-digit level category **[03]**, for which a loss of 17% was able to match increases of greater than 17%. Even though the relative importance of the sender country is accounted for, the share of each product category in total agricultural output and exports of the European producers are not considered. Moreover, the share of banned sub-categories in 2-digit level categories is also not accounted for. If any one category is relatively produced more than other categories, or faces higher capital investment than others, results would be affected. Possibly sanctions would then be more impactful if focused on areas which are prominent in the agricultural industry of the target country. With regard to the trade significance of the sender country, again conclusions are hard to formulate. Although all categories for which Russia is a major market show a significant increase in exports, categories for which Russia is insignificant also show a rise in export levels. Therefore, any causal relationship cannot be derived here. **Table 36** features that only one out of seven categories violate the common trend assumption. For product group **[07]**, parallel trends are absent for periods 2012-2013 and 2010-2011. Although at the combined level this loss in accuracy is not grave, any inferences with respect to category **[07]** need to be treated with care.

Table 37 throws light on the case for Italy, when all treatment categories are evaluated in isolation. Caruso (2015) mentions "negative network effects", which implies that due to sanction impositions by any economy, other countries tend to follow suit, in turn aggravating the economic consequences of measures enforced. Here, the loss of 37% in exports of category **[03]** help in strengthening the propositions of Caruso (2015), whereby third parties worsened trade relations for this product group, rather than promote sanction busting behavior. Even Spain shows some applicability of Caruso (2015), with a negative estimate on **[03]**, as described above. For Italy, there are some sanction busting opportunities exploited with regards to category **[21]**, whereby there is an increase in exports of 25%, and the remaining treatment categories draw insignificant estimates. Yet again, two opposite effects of varying intensity indicate similar conclusions illustrated in the case for Spain above. In this analysis it is implicitly assumed that each category holds equal significance in the agricultural industry of all countries, and all banned sub-categories have uniform contributions across all 2-digit level groups. However, the results obtained do provide some evidence towards the invalidity of this assumption. From **Table 38**, the robustness of this analysis is confirmed, whereby all estimates which are employed to make inferences uphold the common trend assumption.

Germany shows the strongest involvement in sanction busting behavior, at the combined level of 19% and at the isolated level, as shown in **Table 39**. Five out of seven categories have statistically significant estimates, all showing a rise in export levels to third party countries. The accuracy of a few estimates is questionable from **Table 40** but there is moderate proof of Germany engaging in sanction busting behavior. This is because for category **[19]** and **[21]**, exports increased by 28% and 10% respectively, with all corresponding lead variables having insignificant estimates. All in all, when evaluating at the combined level, two out of the four countries were actively engaged in exploiting sanction busting opportunities. However, diving deeper into the isolated analysis, each country was shown to make use of sanction busting behavior in at least one treatment item.

6.4 – Effect of the import ban on Aggregate Extra-EU Exports – Combined treatment group

Now that export loss to Russia has been quantified, and trade to third party countries outside the EU have been gauged, it now becomes crucial to assess the impact of the import ban at the aggregate Extra-EU level, to see whether loss to Russia has been proportionately compensated for. **Table 41** provide results that help in accepting hypothesis 4 for all countries. **Table 42** confirm the robustness of the estimates, and in turn of any conclusions formulated. From **Table 11** it was clear that each country faced grave losses of exports to Russia, all effects north of 150%. **Table 32** shows that at the overall view, only France and Germany underwent a rise in exports to Extra-EU countries excluding Russia, thereby being the only two countries engaging in sanction busting behavior at the combined level. Now, if exports to all extra-countries apart from Russia become stronger, it can be enough to counter losses to Russia, thereby explaining the insignificant estimate for France and Germany in **Table 41**. Meanwhile, insignificant estimates on Spain and Italy at the combined level are much harder to explain. One possible reason can be that a loss of exports to one country cannot be strong enough to depress overall Extra-EU trade. Isolated analysis of the treatment group can help in better understanding the estimates drawn in **Table 41**, and throw some light on the applicability of the relative importance of the trading partner

6.4.1 – Treatment categories analyzed in isolation – France, Spain, Italy and Germany

Looking at **Table 43**, which conducts the isolated analysis for France, few critical ideas come into focus. The negative estimate on category **[16]** of a loss in exports of 4% brings to light that possibly, sanctions can affect countries differently across product groups. For **[16]**, there is a severe loss in exports to Russia, but no subsequent improvement at the Extra-EU excluding Russia level. Hence, the loss in exports to Russia was so severe that it resulted in adverse consequences at the aggregate Extra-EU level. Some lines can be drawn to the trade significance shared by Russia, as for category **[16]**, share of exports to Russia is more than 5% of total aggregate Extra-EU exports. However, with a positive estimate of 14% in category **[04]**, it becomes clear that for all product groups in accordance to the criteria set by Early (2009), the overall impact is not negative. For **[04]**, France engages in sanction busting behavior with third parties, as seen from **Table 32**, and this pursuit was so aggressive that it led to overall improvement in exports of category **[04]** at the aggregate Extra-EU level following the import ban of 2014. With respect to **[08]**, the insignificant estimate at the aggregate Extra-EU level further reduces the applicability of trade significance of sender country. Sanction busting behavior was enough to mitigate losses to Russia, even for a category that confirms to the ideas of Early (2009). For category **[19]**, there too is an improvement of 31%, but forming any inferences on this reduces the validity of the overall analysis as from **Table 44**, **[19]** violates parallel trends between 2012-2013. Results are robust for **[04]**, **[08]** and **[16]**.

Table 45 brings forward the results for Spain, when treatment groups are evaluated in isolation, and with it puts into light some interesting insights. Firstly, lets focus on the negative significant estimate of 13% on category **[08]**. Looking back, for **[08]**, there was a significant loss of exports to Russia, and an increase in exports at the Extra-EU level excluding Russia. From **Table 7**, Russia is a significant trading partner for product group **[08]**. Therefore, taking all these results together, it becomes clear that there is some applicability of the relative trade importance of the sender country. The sanction busting opportunities were not strong enough to completely counter the losses to the sender country, resulting in overall loss in export flows at the aggregate Extra-EU level. Here, the loss in exports to one country was in fact significant enough to depress trade at the aggregate Extra-EU level. The negative estimate on **[03]** is easier to understand, as it can be a direct consequence of the negative network effects mentioned in the preceding analysis. The insignificant estimate on **[16]** limits the evidence on the relevance of Russia as an export market. It proves that even for a particular product group where the sender country is relatively important in terms of trade, if sanction busting behavior is aggressively pursued, the negative economic consequences can be successfully mitigated. For **[04]**, there is an improvement at the Extra-EU excluding Russia level, with no significant loss in exports to Russia. This is the reason why there as a significant export improvement of 40% at the aggregate Extra-EU level. With respect to **[19]**, there as an improved export flow of 17%, which can again be credited to an improved third-party trade relationship, with no significant loss in exports to Russia. With the analysis of **[04]** and **[19]**, it becomes evident that countries might not only focus on significantly affected categories but use all outlets available to nullify the trade consequences of sanctions. Looking at category **[07]**, applicability of trade significance of Russia becomes restrained as the import ban lead to an overall improvement in exports at the aggregate Extra-EU level. This can be attributed to a highly aggressive pursuit of sanction busting opportunities. However, any deductions based on the estimates of **[07]** and **[19]** need to be treated with care on account of violated parallel trends, as highlighted by **Table 46**. For the rest of the categories, results are robust. By a deeper analysis of the isolated treatment items, it can be depicted that positive and negative impacts counteracted each other to result in insignificant changes at the combined level.

Moving on to Italy**, Table 47** brings confounding concepts forward. The negative estimate of 35% on **[03]** can be viewed through the understanding of "negative network effects". Italy lost exports to Russia and to third party countries in this product group, for which a loss at the aggregate level seems plausible. Considering category **[07]**, there was no change at the Extra-EU level barring Russia. However, there was a significant loss in exports to the sender country, and this effect was so grave that it led to a loss at the aggregate Extra-EU level. From **Table 8**, for **[07]**, Russia is a significant trade partner. However, complementing this result with insignificant estimates on **[04]**, **[08]**, **[16]** and **[19]** limits any confirmations for the relative importance of the trading partner. This is because for these categories Russia is a major export market, and there are is no statistical proof of engaging in sanction busting behavior to third party countries outside the EU. Regardless, the estimates for these product groups are insignificant in **Table 47**, even after a significant loss in exports to Russia. This shows that results across product groups do vary, and loss to Russia, whilst an important export market, might or might not have an impact at the aggregate Extra-EU level. For category **[21]**, there is no loss in exports to Russia but an increase in trade with third-party countries, for which the positive estimate of 24% at the aggregate Extra-EU level is understandable. **Table 48** confirms the robustness of the estimates, and subsequently the applicability of the drawn analysis. Only **[08]** violates parallel trends between 2010-2011, but overall the inferences can be accepted, by treating the assessment of category **[08]** with care. Again, varying impacts with differing intensities across the treatment group must have cancelled out, resulting in an insignificant estimate at the combined level.

Looking at **Table 49** and **Table 50** together, one thing becomes clear that making deductions for Germany is troublesome, as majority of the estimates violate the common trend assumption. The only two categories with robust results are **[08]** and **[21]**. For **[08]**, Russia is a critical export market, and there is a significant loss in exports to the sender country. There is no statistical proof of improved third-party trade relations outside the EU, for which the negative estimate of 16% at the aggregate Extra-EU level can be acknowledged. Therefore, with respect to category **[08]** some evidence for improved sanction effectiveness when the sender country is a significant trading partner is provided.

6.5 – Effect of the import ban on Aggregate World EU Exports – Combined treatment group

Finally, after taking into account all the illustrations made above, it becomes pivotal to evaluate the impact of the import ban at the world aggregate level, where-in exports to Russia, Intra-EU and Extra-EU trade are all accounted for together. **Table 51** allows us to accept hypothesis 5 for all countries, on the behest of insignificant estimates on the treatment variable for all chosen European producers. However, from **Table 52,** it becomes imperative to only account for France in formally and strongly accepting hypothesis 5, as for the remaining countries parallel trends are violated in at least one time period before the treatment effect comes into play.

6.5.1 – Treatment categories analyzed in isolation – France, Spain, Italy and Germany

When analyzing in isolation, **Table 53** puts into light that for France, none of the treatment product categories faced any statistically significant loss in exports at the world level. Therefore, even if product group **[16]** experienced a significant loss at the aggregate Extra-EU level, with no improvement in trade relations with other EU member states, this effect dissipates at the aggregate world level. Same applies for positive impacts too, as shown by the estimates on **[04]** and **[19]**. **Table 54** largely confirms the robustness of the estimates, with only **[07]** violating the common trend assumption in period 2011-2012.

In the case of Spain, represented by **Table 55**, product **[19]** experienced improved Intra-EU flows and Extra-EU flows, with no concrete loss in exports to Russia. Therefore, this led to an increased export flow of 15% at the world level. For rest of the categories, all other effects described above disintegrate at the aggregate world level. From **Table 56**, the robustness of majority of the estimates becomes questionable, including **[19]**. This subsequently imposes limitations on the validity of any inferences drawn with respect to Spain when treatment groups are considered in isolation at the world aggregate level.

Taking into account **Table 57** which paints the picture for Italy, the negative estimate on **[08]** of 13% becomes hard to explain. It proves that the estimate in **Table 47** should be taken with a pinch of salt, as the violated common trend assumption did lead to spurious results. For this category there is no improved Intra and Extra-EU trade conditions. Hence, it is possible that the loss in exports to Russia were so grave that it led to depressed export flows at the world aggregate level. Moreover, as mentioned, for this product category Russia is an important export market, in turn providing some evidence towards sanction effectiveness being dependent on the trade significance of the sender country. Drawing conclusions on rest of the estimates becomes troublesome, on account of reduced robustness as shown by **Table 58**. The only other categories apart from **[08]** that portray valid results are **[04]** and **[16]**. For these two categories, there is a loss in exports to Russia, and an improvement in Intra-EU trade following the import ban of 2014. This must have led to the insignificant estimates drawn in **Table 57**. Hence, this confirms that at some level, sanction busting was also engaged at the Intra-EU level. Further this highlights that for an economic entity such as a common market, there are additional opportunities of mitigating adverse trade consequences of sanctions, as compared to singular country cases. Combining **Tables 59** and **60**, concluding anything with respect to

Germany is troublesome, as the robustness of the estimates are highly poor, with six out of seven categories violating parallel trends in minimum one time period prior to 2014.

7. CONCLUSION

The above analysis shows how impacts of sanctions are not consistent across countries and products. For each country different hypotheses are accepted. There is a significant loss in exports to Russia for all countries, but employment of sanction busting behavior is inconsistent. Even though the Extra-EU case is found to be a disproportionately greater area to exploit sanction busting opportunities as compared to the Intra-EU case, degree of engagement varies across countries and treatment product groups. Kapsdorferová et. al. (2016), using simple statistical analysis, find that trade within the EU improved considerably to mitigate sanction consequences. However, here, there is no strong evidence provided for this case. This discrepancy can be attributed to different models being employed. Van Acoleyen (2015) and Boulanger et. al. (2015), along with most mentioned papers find a case for sanction busting behaviour, which to some extent is also proved in this paper. Therefore, different models in various scenarios converging to similar results improves the overall evidence on sanction busters. Here, at the aggregate world level, only few specific products for few countries show significant effects, but in general the impact of the 2014 import ban is highly limited. However, this statement can only be strongly accepted for France, as for the rest of the countries, the model employed fails to provide robust results at the world aggregate level. The breakdown of the DID model can be one of the reasons for the divergence in results found, as compared to the works of Wang (2015), Netsunajeve et. al. (2016) and a few other papers which found grave impacts on the EU.

From the literature review, looking back at the ideas of Porter (1979), Winston et. al (1997) and Teegen et. al. (2014), there is a mention of how the intensity of imposed sanctions can influence economic effects. Looking at the collective picture of the obtained results, it can be concluded with good certainty that the sanctions imposed on the EU were moderate, and comparatively small-scale in nature. The first strong evidence towards this is that the ban was imposed on sub-categories, and on a select few. Secondly, at the aggregate world level, combining all treatment groups together, none of the countries witnessed a deteriorated trade environment. Only Italy experience a loss in category **[08]**, but on the grand scale of things, the effect of the sanction was either mitigated, or not grave in itself. Lastly, as mentioned in

Caruso (2015), limited and moderate sanctions resulted in sanction busting opportunities, which was experienced by few countries at the combined level and by all countries in minimum one treatment category. Extensive sanctions result in negative network effects, shown to be applicable far less than sanction busting behavior. Following on the path laid out by Seeberg et. al. (2015) in relation to trade significance of sender country is difficult. This lies on the behest of finding limited evidence supporting the claim that sanction effectiveness is improved when the imposing country is a major export market for the target country. Few product categories in a few cases were shown to adhere to this pattern, but the results pertaining to this claim were highly inconsistent, leading to inconclusive inferences.

The usefulness of the model employed in this paper to make interpretations itself varied across countries. Although it was highly effective in painting the picture for France, the model missed its mark on Germany. Moreover, Difference-In-Difference is shown to have worked well when analyzing treatment groups together, but its validity breaks down in some cases when affected categories are analyzed in isolation. Moreover, as mentioned before, at the world aggregate level, this model is poor in drawing results, except for France. This is one major limitation, and a good solution would be to complement the ideas in this paper with the gravity framework, based on the widespread use of the model in past work. If similar conclusions are found, then the results in this paper can be much better accepted. Areas to conduct further research would be to account for share of banned subcategories in 2-digit level product groups, and the extent to which importance of each treatment group varies in the agricultural industry of the target country. Moreover, here, analysis was conducted by taking prominent European producers in isolation. For broadening the grasp on this subject, the top producers can be grouped together and evaluated against the least prominent agricultural producers of the EU, to view how effects vary.

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APPENDIX A: TABLES FOR DATA AND METHODOLOGY

Table 1 – List of all agricultural product categories in the "EU trade since 1988 by HS2-HS4" database

Category name	**Category code**
Live animals	[01]
Meat and edible meat offal	[02]
Fish and crustaceans, molluscs and other aquatic invertebrates	[03]
Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included	[04]
Products of animal origin, not elsewhere specified or included	[05]
Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage	[06]
Edible vegetables and certain roots and tubers	[07]
Edible fruit and nuts; peel of citrus fruits or melons	[08]
Coffee, tea, maté and spices	[09]
Cereals	[10]
Products of the milling industry; malt; starches; inulin; wheat gluten	[11]
Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder	[12]
Lac; gums, resins and other vegetable saps and extracts	[13]
Vegetable plaiting materials; vegetable products not elsewhere specified or included	[14]
Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes	[15]
Preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates	[16]
Sugars and sugar confectionery	[17]
Cocoa and cocoa preparations	[18]
Preparations of cereals, flour, starch or milk; pastrycooks' products	[19]
Preparations of vegetables, fruit, nuts or other parts of plants	[20]
Miscellaneous edible preparations	[21]
Beverages, spirits and vinegar	[22]
Residues and waste from food industries; prepared animal fodder	[23]
Tobacco and manufactured tobacco substitutes	[24]

Table 2: Share of Exports to Russia in Total EU World Exports of the Sanctioned Goods, Before and After the Import Ban - France

Product Category	2010-2013	2015-2019
[03] – Fish	0.88%	0.01%
[04] - Dairy Produce	1.44%	0.32%
[07] – Edible Vegetables	0.59%	0.05%
[08] - Edible Fruits and Nuts	1.53%	0.01%
[16] – Preparations of Meat	1.94%	0.08%
[19] – Preparations of Cereals	0.94%	0.11%
[21] – Miscellaneous Edible Preparations	2.14%	1.28%

Note: To calculate the above values, we first find export data for each product category and time period from the EU to Russia. Then we calculate the shares as a percentage of total EU world exports (Intra+Extra-EU trade). Finally, we take an average of the percentages calculated for each product category over the time period specified in the column headings, [2010-2013] and [2015-2019].

Table 3: Share of Exports to Russia in Total EU World Exports of the Sanctioned Goods, Before and After the Import Ban - Spain

Product Category	2010-2013	2015-2019
[03] – Fish	0.95%	0.00%
[04] - Dairy Produce	0.35%	0.40%
[07] – Edible Vegetables	0.97%	0.001%
[08] - Edible Fruits and Nuts	2.58%	0.002%
[16] – Preparations of Meat	1.76%	0.10%
[19] – Preparations of Cereals	0.30%	0.20%
[21] – Miscellaneous Edible Preparations	1.45%	0.44%

Note: To calculate the above values, we first find export data for each product category and time period from the EU to Russia. Then we calculate the shares as a percentage of total EU world exports (Intra+Extra-EU trade). Finally, we take an average of the percentages calculated for each product category over the time period specified in the column headings, [2010-2013] and [2015-2019].

Table 4: Share of Exports to Russia in Total EU World Exports of the Sanctioned Goods, Before and After the Import Ban – Germany

Product Category	2010-2013	2015-2019
[03] – Fish	0.15%	0.002%
[04] - Dairy Produce	3.60%	0.33%
[07] – Edible Vegetables	2.19%	0.47%
[08] - Edible Fruits and Nuts	1.83%	0.06%
[16] – Preparations of Meat	0.71%	0.03%
[19] – Preparations of Cereals	2.00%	1.30%
[21] – Miscellaneous Edible Preparations	5.24%	3.59%

Note: To calculate the above values, we first find export data for each product category and time period from the EU to Russia. Then we calculate the shares as a percentage of total EU world exports (Intra+Extra-EU trade). Finally, we take an average of the percentages calculated for each product category over the time period specified in the column headings, [2010-2013] and [2015-2019].

Table 5: Share of Exports to Russia in Total EU World Exports of the Sanctioned Goods, Before and After the Import Ban – Italy

Product Category	2010-2013	2015-2019
[03] – Fish	0.16%	0.002%
[04] - Dairy Produce	1.39%	0.07%
[07] – Edible Vegetables	0.58%	0.001%
[08] - Edible Fruits and Nuts	2.59%	0.03%
[16] – Preparations of Meat	1.33%	0.84%
[19] – Preparations of Cereals	1.75%	1.11%
[21] – Miscellaneous Edible Preparations	1.292%	1.291%

Note: To calculate the above values, we first find export data for each product category and time period from the EU to Russia. Then we calculate the shares as a percentage of total EU world exports (Intra+Extra-EU trade). Finally, we take an average of the percentages calculated for each product category over the time period specified in the column headings, [2010-2013] and [2015-2019].

Table 6: Share of Exports to Russia in Aggregate Extra-EU Exports of the Sanctioned Goods, Before and After the Import Ban - France

Product Category	2010-2013	2015-2019
[03] – Fish	3.70%	0.06%
[04] - Dairy Produce	5.89%	1.03%
[07] – Edible Vegetables	4.04%	0.32%
[08] - Edible Fruits and Nuts	7.30%	0.03%
[16] – Preparations of Meat	10.64%	0.46%
[19] – Preparations of Cereals	3.51%	0.34%
[21] – Miscellaneous Edible Preparations	5.38%	3.15%

Note: To calculate the above values, we first find export data for each product category and time period from the EU to Russia. Then we calculate the shares as a percentage of Aggregate Extra-EU Exports. Finally, we take an average of the percentages calculated for each product category over the time period specified in the column headings, [2010-2013] and [2015-2019].

Table 7: Share of Exports to Russia in Aggregate Extra-EU Exports of the Sanctioned Goods, Before and After the Import Ban - Spain

Product Category	2010-2013	2015-2019
[03] – Fish	3.33%	0.00%
[04] - Dairy Produce	2.13%	1.37%
[07] – Edible Vegetables	18.16%	0.01%
[08] - Edible Fruits and Nuts	24.98%	0.03%
[16] – Preparations of Meat	11.81%	0.64%

[19] – Preparations of Cereals	1.16%	0.70%
[21] – Miscellaneous Edible Preparations	4.12%	1.14%

Note: To calculate the above values, we first find export data for each product category and time period from the EU to Russia. Then we calculate the shares as a percentage of Aggregate Extra-EU Exports. Finally, we take an average of the percentages calculated for each product category over the time period specified in the column headings, [2010-2013] and [2015-2019].

Table 8: Share of Exports to Russia in Aggregate Extra-EU Exports of the Sanctioned Goods, Before and After the Import Ban – Italy

Product Category	**2010-2013**	**2015-2019**
[03] – Fish	1.12%	0.02%
[04] - Dairy Produce	5.25%	0.26%
[07] – Edible Vegetables	5.92%	0.01%
[08] - Edible Fruits and Nuts	13.82%	0.14%
[16] – Preparations of Meat	6.00%	3.77%
[19] – Preparations of Cereals	5.20%	3.15%
[21] – Miscellaneous Edible Preparations	4.94%	3.84%

Note: To calculate the above values, we first find export data for each product category and time period from the EU to Russia. Then we calculate the shares as a percentage of Aggregate Extra-EU Exports. Finally, we take an average of the percentages calculated for each product category over the time period specified in the column headings, [2010-2013] and [2015-2019].

Table 9: Share of Exports to Russia in Aggregate Extra-EU Exports of the Sanctioned Goods, Before and After the Import Ban – Germany

Product Category	**2010-2013**	**2015-2019**
[03] – Fish	1.58%	0.01%
[04] - Dairy Produce	24.25%	1.98%
[07] – Edible Vegetables	18.98%	4.02%
[08] - Edible Fruits and Nuts	22.76%	0.98%
[16] – Preparations of Meat	14.03%	0.80%
[19] – Preparations of Cereals	11.35%	6.37%
[21] – Miscellaneous Edible Preparations	18.32%	12.84%

Note: To calculate the above values, we first find export data for each product category and time period from the EU to Russia. Then we calculate the shares as a percentage of Aggregate Extra-EU Exports. Finally, we take an average of the percentages calculated for each product category over the time period specified in the column headings, [2010-2013] and [2015-2019].

Table 10: Description of variables used in the empirical estimation

Variable Name	Variable Description	Measurement Units
LnExport	Exports of the treated and control product categories, exported from the chosen country to; Russia, Intra-EU countries, Extra-EU countries excluding Russia, aggregate extra-EU exports, and aggregate total world exports	Log value of yearly figures. The yearly figures are reported in Euros.
Banned	Dummy Variable denoting whether a product category is sanctioned by Russia by taking value of 1, or 0 otherwise	0 or 1
Period	Dummy Variable taking value of 1 is time period is 2014 and onwards, 0 otherwise	0 or 1
Interaction	Variable of interest. This is the interaction term of the Difference-In-Difference model that captures the average treatment effect on the treated	0 or 1

APPENDIX B: TABLES FOR RESULTS SECTION

Table 11: Regression results for exports only to Russia [Combined Treatment Group]

LnExports	**France**	**Spain**	**Italy**	**Germany**
Interaction	-2.34*** (-3.69)	-2.73* (-2.09)	-2.42** (-2.64)	-1.54** (-2.67)
Observations	196	170	196	199
R-Squared	0.84	0.76	0.81	0.91

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 12: Lead Variables results for exports only to Russia [Combined Treatment Group]

LnExports	**France**	**Spain**	**Italy**	**Germany**
f1	-0.57 (-1.12)	-0.03 (-0.11)	0.05 (0.27)	-0.41* (-1.84)
f2	0.36 (0.69)	-0.02 (-0.12)	-0.11 (-0.67)	-0.09 (-0.53)
f3	-0.17 (-0.87)	-0.07 (-0.16)	0.15 (0.76)	0.25 (1.23)
Observations	137	135	140	139
R-Squared	0.85	0.80	0.84	0.92

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 13: Regression results for exports only to Russia [France – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
Interaction	-3.63*** (-15.70)	-1.23*** (-5.35)	-2.22*** (-9.66)	-4.81*** (-25.53)	-2.79*** (-12.10)	-1.63*** (-7.09)	-0.20 (-0.87)
Observations	137	137	137	136	137	137	137
R-Squared	0.86	0.88	0.87	0.85	0.87	0.87	0.88

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 14: Lead Variables results for exports only to Russia [France – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
f1	-0.26 (-0.57)	-0.002 (-0.01)	-0.24 (-0.52)	-0.80 (-1.71)	-1.68*** (-3.65)	-0.59 (-1.27)	-0.38 (-0.82)
f2	0.58 (1.09)	0.35 (0.66)	0.14 (0.26)	0.18 (0.34)	0.26 (0.48)	0.54 (1.01)	0.47 (0.87)
f3	-0.30 (-1.60)	-0.49** (-2.63)	-0.14 (-0.77)	0.03 (0.15)	-0.04 (-0.24)	-0.13 (-0.67)	-0.11 (-0.61)
Observations	96	96	96	95	96	96	96
R-Squared	0.87	0.89	0.88	0.86	0.88	0.88	0.89

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 15: Regression results for exports only to Russia [Spain – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
Interaction	-3.84*** (-6.39)	0.53 (1.02)	-6.19*** (-11.88)	-5.42*** (-10.40)	-4.15*** (-7.95)	0.37 (0.52)	-0.68 (-1.29)
Observations	130	135	135	135	135	135	135
R-Squared	0.89	0.88	0.85	0.87	0.85	0.88	0.88

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 16: Lead Variables results for exports only to Russia [Spain – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
f1	-0.69** (-2.84)	0.22 (0.92)	0.50* (2.09)	-0.02 (-0.07)	-0.64** (-2.66)	0.38 (1.57)	0.001 (0.00)
f2	-0.06 (-0.40)	-0.22 (-1.53)	0.17 (1.22)	-0.24 (-1.67)	-0.17 (-1.18)	-0.01 (-0.09)	0.04** (2.70)
f3	0.11 (0.32)	-0.18 (-0.50)	0.48 (1.33)	0.54 (1.50)	0.03 (0.09)	-0.22 (-0.60)	-1.23*** (-3.42)
Observations	93	95	95	95	95	95	95
R-Squared	0.88	0.88	0.85	0.86	0.88	0.87	0.88

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 17: Regression results for exports only to Russia [Italy – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
Interaction	-3.85*** (-24.75)	-2.98*** (-16.39)	-5.54*** (-30.43)	-4.22*** (-28.65)	-0.37* (-2.02)	-0.41** (-2.28)	0.04 (0.23)
Observations	138	140	140	138	140	140	140
R-Squared	0.92	0.91	0.89	0.91	0.93	0.94	0.94

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 18: Lead Variables results for exports only to Russia [Italy – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
f1	-0.25 (-1.56)	0.20 (1.27)	0.17 (1.08)	-0.41 (-1.62)	0.48** (3.01)	0.15 (0.93)	0.03 (0.19)
f2	0.22 (1.49)	-0.10 (-0.68)	0.07 (0.46)	-0.22 (-1.47)	-0.46*** (-3.11)	-0.10 (-0.71)	-0.19 (-1.29)
f3	0.002 (0.01)	0.19 (1.17)	0.11 (0.71)	-0.14 (-0.90)	0.75*** (4.73)	-0.01 (-0.09)	0.14 (0.85)
Observations	98	98	98	98	98	98	98
R-Squared	0.94	0.93	0.90	0.93	0.95	0.96	0.95

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 19: Regression results for exports only to Russia [Germany – Isolated Treatment Groups]

LnExports	[03]	[04]	[07]	[08]	[16]	[19]	[21]
Interaction	-3.33*** (-13.18)	-1.87*** (-7.25)	-1.00*** (-3.87)	-2.55*** (-9.90)	-2.39*** (-9.27)	0.12 (0.47)	0.13 (0.51)
Observations	139	140	140	140	140	140	140
R-Squared	0.93	0.94	0.93	0.93	0.93	0.93	0.94

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 20: Lead Variables results for exports only to Russia [Germany – Isolated Treatment Groups]

LnExports	[03]	[04]	[07]	[08]	[16]	[19]	[21]
f1	-0.55*** (-5.39)	-0.50*** (-4.88)	-0.60*** (-5.86)	-0.24 (-1.31)	-1.27*** (-12.41)	0.23** (2.21)	0.06 (0.61)
f2	-0.53 (-1.50)	0.11 (1.27)	-0.62 (-1.27)	-0.07 (-0.80)	0.14 (1.69)	0.18 (1.14)	0.18 (1.10)
f3	1.07*** (13.18)	-0.28*** (-3.43)	0.26*** (3.25)	-0.03 (-0.43)	0.66*** (8.19)	0.06 (0.80)	0.01 (0.07)
Observations	97	98	98	98	98	98	98
R-Squared	0.93	0.95	0.95	0.94	0.94	0.95	0.96

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 21: Regression results for Intra-EU Exports [Combined Treatment Group]

LnExports	France	Spain	Italy	Germany
Interaction	0.01 (0.15)	0.04 (0.70)	0.01 (0.25)	0.05 (0.70)
Observations	200	200	200	200
R-Squared	0.99	0.995	0.996	0.99

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 22: Lead Variables results for Intra-EU Exports [Combined Treatment Group]

LnExports	France	Spain	Italy	Germany
f1	-0.03 (-0.54)	-0.01 (-0.30)	0.05 (1.24)	0.10 (1.12)
f2	-0.04 (-1.15)	0.01 (0.14)	-0.05 (-1.06)	-0.04 (-1.13)
f3	-0.04 (-0.93)	-0.09* (-1.83)	-0.10 (-1.65)	-0.07** (-2.59)
Observations	140	140	140	140
R-Squared	0.99	0.996	0.997	0.996

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 23: Regression results for Intra-EU Exports [France – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
Interaction	0.09 (0.97)	-0.11 (-1.22)	-0.03 (-0.33)	-0.05 (-0.54)	0.07 (0.81)	0.06 (0.69)	0.06 (0.70)
Observations	140	140	140	140	140	140	140
R-Squared	0.99	0.99	0.99	0.99	0.99	0.99	0.99

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 24: Lead Variables results for Intra-EU Exports [France – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
f1	-0.02 (-0.34)	-0.04 (-0.83)	0.10 (1.04)	-0.07 (-1.35)	-0.04 (-0.83)	-0.05 (-0.96)	-0.09 (-1.85)
f2	-0.11*** (-3.38)	-0.05 (-1.63)	-0.11*** (-3.40)	-0.02 (-0.62)	-0.01 (-0.46)	0.01 (0.37)	-0.005 (-0.14)
f3	-0.01 (-0.18)	-0.03 (-0.84)	-0.06 (-1.64)	-0.11 (-0.85)	-0.04 (-0.95)	0.01 (0.17)	-0.02 (-0.58)
Observations	98	98	98	98	98	98	98
R-Squared	0.99	0.99	0.99	0.99	0.99	0.99	0.99

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 25: Regression results for Intra-EU Exports [Spain – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
Interaction	0.07 (1.62)	-0.08 (-1.75)	0.04 (0.97)	0.08 (1.76)	0.05 (1.03)	0.16*** (3.40)	-0.05 (-1.19)
Observations	140	140	140	140	140	140	140
R-Squared	0.99	0.99	0.99	0.99	0.99	0.99	0.99

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 26: Lead Variables results for Intra-EU Exports [Spain – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
f1	-0.05 (-1.17)	-0.03 (-0.65)	0.03 (0.78)	0.02 (0.44)	-0.04 (-1.03)	0.03 (0.75)	-0.06 (-1.31)
f2	-0.11 (-1.62)	-0.01 (-0.20)	0.05 (0.79)	0.09 (1.33)	-0.02 (-0.25)	0.06 (0.90)	0.01 (0.08)
f3	-0.03 (-1.05)	-0.18*** (-5.61)	-0.17*** (-5.36)	-0.15*** (-4.67)	0.05 (1.52)	-0.03 (-1.05)	-0.08** (-2.39)
Observations	98	98	98	98	98	98	98
R-Squared	0.99	0.99	0.995	0.996	0.994	0.994	0.994

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 27: Regression results for Intra-EU Exports [Italy – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
Interaction	-0.07 (-1.71)	0.09* (2.03)	-0.07 (-1.64)	-0.07 (-1.71)	0.10** (2.35)	0.02 (0.56)	0.10** (2.34)
Observations	140	140	140	140	140	140	140
R-Squared	0.99	0.995	0.99	0.995	0.99	0.995	0.99

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 28: Lead Variables results for Intra-EU Exports [Italy – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
f1	0.07 (1.43)	0.06 (1.65)	0.08** (2.26)	0.02 (0.49)	0.05 (1.38)	0.03 (0.77)	0.01 (0.39)
f2	-0.25* (-1.99)	0.005 (0.22)	-0.04 (-1.75)	-0.02 (-1.11)	0.01 (0.34)	0.01 (0.32)	-0.03 (-1.12)
f3	-0.08 (-1.02)	-0.05 (-1.69)	-0.22 (-1.34)	-0.13 (-0.12)	-0.06** (-2.24)	-0.06 (-2.38)	-0.08 (-2.97)
Observations	98	98	98	98	98	98	98
R-Squared	0.997	0.997	0.997	0.997	0.997	0.997	0.997

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 29: Regression results for Intra-EU Exports [Germany – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
Interaction	0.05 (0.77)	-0.06 (-1.03)	-0.05 (-0.80)	0.21*** (3.61)	0.003 (0.05)	0.08 (1.36)	0.10 (1.69)
Observations	140	140	140	140	140	140	140
R-Squared	0.99	0.99	0.99	0.99	0.99	0.99	0.99

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 30: Lead Variables results for Intra-EU Exports [Germany – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
f1	0.10 (1.50)	0.15*** (3.57)	0.21*** (5.12)	0.12 (1.53)	0.05 (1.20)	0.04 (0.87)	0.04 (1.02)
f2	-0.12 (-0.71)	-0.06** (-2.30)	-0.04 (-1.64)	-0.07 (-0.88)	0.01 (0.54)	0.01 (0.40)	0.01 (0.55)
f3	-0.04 (-1.70)	-0.03 (-1.10)	-0.13*** (-5.23)	-0.13* (-2.05)	-0.05 (-1.16)	-0.08*** (-3.27)	-0.06 (-1.60)
Observations	98	98	98	98	98	98	98
R-Squared	0.996	0.996	0.996	0.996	0.996	0.996	0.996

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 31: Regression results for Extra-EU Exports excluding Russia [Combined Treatment Group]

LnExports	**France**	**Spain**	**Italy**	**Germany**
Interaction	0.09* (1.98)	0.15 (1.43)	-0.04 (-0.43)	0.19** (2.49)
Observations	200	200	200	200
R-Squared	0.99	0.99	0.98	0.99

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 32: Lead Variables results for Extra-EU Exports excluding Russia [Combined Treatment Group]

LnExports	**France**	**Spain**	**Italy**	**Germany**
f1	-0.01 (-0.15)	0.02 (0.23)	0.02 (0.47)	-0.03 (-0.41)
f2	0.05 (0.81)	0.07 (0.84)	-0.03 (-0.29)	0.02 (0.49)
f3	0.07 (1.29)	-0.05 (-0.57)	-0.11 (-1.32)	0.03 (0.46)
Observations	140	140	140	140
R-Squared	0.995	0.99	0.99	0.995

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 33: Regression results for Extra-EU Exports excluding Russia [France – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
Interaction	-0.05 (-0.82)	0.18** (2.82)	-0.06 (-1.01)	0.09* (1.90)	0.06 (0.93)	0.33*** (5.24)	0.07 (1.05)
Observations	140	140	140	140	140	140	140
R-Squared	0.99	0.99	0.99	0.99	0.99	0.99	0.99

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 34: Lead Variables results for Extra-EU Exports excluding Russia [France – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
f1	-0.01 (-0.22)	0.03 (0.65)	-0.13*** (-3.36)	-0.04 (-0.95)	-0.05 (-1.21)	0.10** (2.47)	0.05 (1.28)
f2	0.18*** (3.17)	0.03 (0.55)	0.01 (0.22)	0.02 (0.34)	0.03 (0.47)	0.10 (1.68)	-0.02 (-0.27)
f3	-0.03 (-0.75)	0.11 (0.42)	0.08 (1.73)	0.12 (0.53)	0.07 (1.44)	0.13 (1.73)	-0.01 (-0.12)
Observations	98	98	98	98	98	98	98
R-Squared	0.995	0.995	0.995	0.995	0.995	0.996	0.996

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 35: Regression results for Extra-EU Exports excluding Russia [Spain – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
Interaction	-0.17** (-2.94)	0.42*** (7.17)	0.40*** (6.79)	0.14** (2.42)	0.10* (1.79)	0.18*** (3.14)	-0.06 (-0.97)
Observations	140	140	140	140	140	140	140
R-Squared	0.99	0.99	0.99	0.99	0.99	0.99	0.99

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 36: Lead Variables results for Extra-EU Exports excluding Russia [Spain – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
f1	-0.12 (-1.46)	-0.01 (-0.07)	0.15* (1.85)	0.04 (0.46)	-0.02 (-0.30)	0.07 (0.88)	0.02 (0.30)
f2	0.03 (0.30)	0.14 (1.58)	0.06 (0.68)	0.04 (0.43)	0.10 (1.16)	0.14 (1.59)	0.01 (0.17)
f3	0.03 (0.34)	0.01 (0.10)	-0.22** (-2.58)	-0.10 (-1.17)	-0.04 (-0.51)	-0.003 (-0.04)	-0.03 (-0.30)
Observations	98	98	98	98	98	98	98
R-Squared	0.99	0.99	0.99	0.99	0.99	0.99	0.99

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 37: Regression results for Extra-EU Exports excluding Russia [Italy – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
Interaction	-0.37*** (-4.89)	-0.03 (-0.40)	-0.08 (-1.05)	-0.01 (-0.19)	-0.01 (-0.15)	-0.06 (-0.74)	0.25*** (3.33)
Observations	140	140	140	140	140	140	140
R-Squared	0.97	0.98	0.97	0.98	0.97	0.98	0.98

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 38: Lead Variables results for Extra-EU Exports excluding Russia [Italy – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
f1	-0.02 (-0.53)	-0.02 (-0.51)	0.06 (1.29)	0.03 (0.58)	0.05 (1.03)	-0.02 (-0.51)	0.10 (1.16)
f2	-0.28 (-1.04)	-0.05 (-0.53)	-0.01 (-0.08)	0.05 (0.56)	0.07 (0.79)	0.01 (0.11)	0.0003 (0.00)
f3	0.01 (0.08)	-0.13 (-1.52)	-0.17* (-2.00)	-0.15* (-1.80)	-0.15 (-1.76)	-0.12 (-1.43)	-0.08 (-0.90)
Observations	98	98	98	98	98	98	98
R-Squared	0.99	0.99	0.99	0.99	0.99	0.99	0.99

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 39: Regression results for Extra-EU Exports excluding Russia [Germany – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
Interaction	0.47*** (9.77)	0.28*** (5.72)	0.15*** (3.20)	0.05 (1.05)	0.02 (0.40)	0.28*** (5.75)	0.10** (2.18)
Observations	140	140	140	140	140	140	140
R-Squared	0.99	0.99	0.99	0.99	0.99	0.99	0.99

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 40: Lead Variables results for Extra-EU Exports excluding Russia [Germany – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
f1	-0.33*** (-5.76)	0.01 (0.17)	0.06 (1.06)	-0.08 (-1.38)	0.03 (0.54)	0.06 (1.00)	0.02 (0.39)
f2	0.04 (1.26)	0.07** (2.36)	-0.003 (-0.09)	0.10 (0.34)	-0.05 (-1.57)	0.05 (1.52)	-0.002 (-0.08)
f3	0.27*** (7.49)	0.13*** (3.74)	-0.07* (-1.76)	-0.14 (-1.70)	-0.02 (-0.57)	-0.004 (-0.12)	0.04 (1.07)
Observations	98	98	98	98	98	98	98
R-Squared	0.996	0.996	0.996	0.996	0.996	0.996	0.997

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 41: Regression results for Aggregate Extra-EU Exports [Combined Treatment Group]

LnExports	**France**	**Spain**	**Italy**	**Germany**
Interaction	0.05 (0.56)	0.08 (0.75)	-0.07 (-0.69)	0.08 (0.87)
Observations	196	190	196	199
R-Squared	0.99	0.98	0.98	0.99

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 42: Lead Variables results for Aggregate Extra-EU Exports [Combined Treatment Group]

LnExports	**France**	**Spain**	**Italy**	**Germany**
f1	-0.01 (-0.12)	0.06 (0.89)	0.02 (0.39)	-0.09 (-1.19)
f2	0.04 (0.65)	0.07 (0.87)	-0.03 (-0.33)	-0.01 (-0.26)
f3	0.06 (1.08)	-0.06 (-0.67)	-0.10 (-1.20)	0.05 (0.80)
Observations	137	135	140	139
R-Squared	0.995	0.99	0.99	0.995

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 43: Regression results for Aggregate Extra-EU Exports [France – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
Interaction	-0.07 (-1.23)	0.14** (2.34)	-0.09 (-1.49)	0.01 (0.21)	-0.04* (-1.86)	0.31*** (5.17)	0.06 (0.96)
Observations	137	137	137	136	137	137	137
R-Squared	0.99	0.99	0.99	0.99	0.99	0.99	0.99

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 44: Lead Variables results for Aggregate Extra-EU Exports [France – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
f1	0.01 (0.23)	0.06 (1.34)	-0.11** (-2.58)	-0.05 (-1.10)	-0.12 (-0.85)	0.10** (2.42)	0.06 (1.43)
f2	0.18*** (3.14)	0.03 (0.44)	0.00 (1.00)	-0.003 (-0.05)	0.0002 (0.00)	0.10 (1.67)	-0.01 (-0.24)
f3	-0.04 (-0.97)	0.07 (1.61)	0.07 (1.50)	(0.11) (0.46)	0.06 (1.36)	0.12 (1.67)	-0.01 (-0.21)
Observations	96	96	96	95	96	96	96
R-Squared	0.996	0.996	0.996	0.996	0.996	0.996	0.996

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 45: Regression results for Aggregate Extra-EU Exports [Spain – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
Interaction	-0.16*** (-3.40)	0.40*** (7.14)	0.21*** (3.77)	-0.13** (-2.39)	-0.02 (-0.41)	0.17** (2.98)	-0.10 (-1.74)
Observations	130	135	135	135	135	135	135
R-Squared	0.98	0.98	0.98	0.99	0.98	0.98	0.98

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 46: Lead Variables results for Aggregate Extra-EU Exports [Spain – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
f1	-0.08 (-1.36)	0.06 (1.00)	0.24*** (4.30)	0.03 (0.61)	-0.03 (-0.59)	0.13** (2.38)	0.08 (1.40)
f2	0.03 (0.33)	0.13 (1.54)	0.11 (1.27)	0.005 (0.05)	0.09 (1.00)	0.14 (1.59)	0.03 (0.32)
f3	0.01 (0.07)	-0.02 (-0.19)	-0.18* (-1.93)	-0.03 (-0.32)	-0.09 (-0.98)	-0.02 (-0.25)	-0.11 (-1.15)
Observations	93	95	95	95	95	95	95
R-Squared	0.99	0.99	0.99	0.99	0.99	0.99	0.99

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 47: Regression results for Aggregate Extra-EU Exports [Italy – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
Interaction	-0.35*** (-6.96)	-0.08 (-1.07)	-0.14* (-1.81)	-0.06 (-1.16)	-0.04 (-0.50)	-0.08 (-1.02)	0.24*** (3.12)
Observations	138	140	140	138	140	140	140
R-Squared	0.97	0.98	0.97	0.98	0.97	0.98	0.98

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 48: Lead Variables results for Aggregate Extra-EU Exports [Italy – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
f1	-0.03 (-0.68)	-0.01 (-0.27)	0.06 (1.36)	-0.03 (-0.57)	0.07 (1.52)	-0.02 (-0.36)	0.09 (1.95)
f2	-0.27 (-1.04)	-0.04 (-0.50)	0.01 (0.06)	0.03 (0.37)	0.05 (0.52)	0.01 (0.12)	-0.003 (-0.03)
f3	0.01 (0.07)	-0.12 (-1.37)	-0.16 (-1.66)	-0.16* (-1.86)	-0.11 (-1.24)	-0.11 (-1.39)	-0.07 (-0.81)
Observations	98	98	98	98	98	98	98
R-Squared	0.99	0.99	0.99	0.99	0.99	0.99	0.99

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 49: Regression results for Aggregate Extra-EU Exports [Germany – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
Interaction	0.51*** (9.44)	0.04 (0.92)	0.01 (0.17)	-0.16*** (-3.50)	-0.10 (-2.14)	0.25*** (5.42)	0.07 (1.54)
Observations	139	140	140	140	140	140	140
R-Squared	0.99	0.99	0.99	0.99	0.99	0.99	0.99

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 50: Lead Variables results for Aggregate Extra-EU Exports [Germany – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
f1	-0.34*** (-6.09)	-0.10 (-1.76)	-0.03 (-0.49)	-0.12 (-1.24)	-0.13** (-2.41)	0.07 (1.24)	0.02 (0.33)
f2	0.04 (1.22)	0.05* (1.78)	-0.16*** (-5.48)	-0.04 (-1.24)	-0.03 (-1.09)	0.06* (1.86)	0.01 (0.39)
f3	0.29*** (7.77)	0.02 (0.46)	0.02 (0.51)	-0.11 (-0.93)	0.08** (2.26)	0.01 (0.15)	0.04 (0.96)
Observations	97	98	98	98	98	98	98
R-Squared	0.996	0.996	0.996	0.996	0.996	0.996	0.996

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 51: Regression results for Aggregate World Exports [Combined Treatment Group]

LnExports	**France**	**Spain**	**Italy**	**Germany**
Interaction	0.01 (0.07)	-0.01 (-0.22)	-0.04 (-0.57)	0.05 (0.80)
Observations	200	200	200	200
R-Squared	0.99	0.996	0.99	0.99

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 52: Lead Variables results for Aggregate World Exports [Combined Treatment Group]

LnExports	**France**	**Spain**	**Italy**	**Germany**
f1	-0.02 (-0.55)	0.03 (1.18)	0.04 (1.04)	0.08* (1.81)
f2	-0.02 (-0.61)	0.01 (0.17)	-0.06 (-1.08)	-0.04 (-1.28)
f3	-0.02 (-0.60)	-0.09** (-2.18)	-0.11* (-1.95)	-0.05* (-1.97)
Observations	140	140	140	140
R-Squared	0.99	0.997	0.997	0.997

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 53: Regression results for Aggregate World Exports [France – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
Interaction	0.03 (0.37)	-0.06 (-0.85)	-0.07 (-0.89)	-0.05 (-0.73)	0.03 (0.39)	0.12 (1.59)	0.05 (0.65)
Observations	140	140	140	140	140	140	140
R-Squared	0.99	0.99	0.99	0.99	0.99	0.99	0.99

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 54: Lead Variables results for Aggregate World Exports [France – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
f1	-0.02 (-0.46)	-0.02 (-0.58)	0.06 (1.46)	-0.07 (-1.65)	-0.06 (-1.47)	-0.01 (-0.31)	-0.04 (-1.02)
f2	-0.04 (-1.12)	-0.03 (-0.89)	-0.10** (-2.56)	-0.02 (-0.46)	-0.01 (-0.38)	0.04 (0.94)	-0.002 (-0.06)
f3	-0.02 (-0.50)	-0.01 (-0.34)	-0.05 (-1.23)	-0.07 (-0.80)	-0.02 (-0.60)	0.03 (0.77)	-0.03 (-0.64)
Observations	98	98	98	98	98	98	98
R-Squared	0.99	0.99	0.99	0.99	0.99	0.99	0.99

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 55: Regression results for Aggregate World Exports [Spain – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
Interaction	-0.25 (-6.49)	0.01 (0.27)	0.02 (0.51)	0.03 (0.77)	0.01 (0.34)	0.15*** (3.84)	-0.07 (-1.68)
Observations	140	140	140	140	140	140	140
R-Squared	0.99	0.99	0.99	0.995	0.99	0.99	0.99

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 56: Lead Variables results for Aggregate World Exports [Spain – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
f1	-0.04 (-1.77)	0.02 (1.02)	0.09*** (4.38)	0.06** (2.94)	-0.01 (-0.41)	0.09*** (4.35)	0.01 (0.70)
f2	-0.08 (-1.28)	-0.004 (-0.06)	0.03 (0.52)	0.06 (1.01)	-0.02 (-0.33)	0.07 (1.20)	0.01 (0.18)
f3	-0.03 (-0.93)	-0.17*** (-5.85)	-0.20*** (-6.72)	-0.16*** (-5.37)	0.01 (0.45)	-0.04 (-1.29)	-0.08** (-2.88)
Observations	98	98	98	98	98	98	98
R-Squared	0.996	0.996	0.997	0.997	0.996	0.996	0.996

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 57: Regression results for Aggregate World Exports [Italy – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
Interaction	-0.17** (-2.82)	0.02 (0.28)	-0.13** (-2.28)	-0.13** (-2.18)	0.04 (0.61)	-0.02 (-0.39)	0.12* (2.02)
Observations	140	140	140	140	140	140	140
R-Squared	0.99	0.99	0.99	0.99	0.99	0.99	0.99

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 58: Lead Variables results for Aggregate World Exports [Italy – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
f1	0.05 (1.24)	0.04 (1.09)	0.07* (1.95)	0.01 (0.15)	0.05 (1.45)	0.02 (0.44)	0.04 (0.99)
f2	-0.27 (-1.12)	-0.02 (-0.51)	-0.06 (-1.50)	-0.02 (-0.79)	0.0002 (0.01)	0.002 (0.04)	-0.03 (-0.80)
f3	-0.08* (-2.15)	-0.07 (-1.70)	-0.24 (-1.33)	-0.15 (-0.87)	-0.08 (-1.99)	-0.07* (-1.97)	-0.08* (-2.07)
Observations	98	98	98	98	98	98	98
R-Squared	0.996	0.996	0.996	0.996	0.996	0.996	0.996

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 59: Regression results for Aggregate World Exports [Germany – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
Interaction	0.08 (1.76)	-0.06 (-1.16)	-0.05 (-1.10)	0.18*** (3.69)	-0.01 (-0.28)	0.10* (2.14)	0.08 (1.72)
Observations	140	140	140	140	140	140	140
R-Squared	0.99	0.995	0.99	0.99	0.99	0.99	0.99

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*

Table 60: Lead Variables results for Aggregate World Exports [Germany – Isolated Treatment Groups]

LnExports	**[03]**	**[04]**	**[07]**	**[08]**	**[16]**	**[19]**	**[21]**
f1	0.06 (1.47)	0.11** (2.79)	0.18*** (4.78)	0.097 (1.55)	0.04 (0.93)	0.04 (0.99)	0.03 (0.84)
f2	-0.11*** (-4.69)	-0.05* (-1.95)	-0.06*** (-2.73)	-0.08*** (-3.38)	-0.001 (-0.05)	0.01 (0.57)	0.02 (0.66)
f3	-0.01 (-0.36)	-0.01 (-0.68)	-0.11*** (-4.82)	-0.12*** (-5.33)	-0.04* (-1.83)	-0.06** (-2.78)	-0.03 (-1.45)
Observations	98	98	98	98	98	98	98
R-Squared	0.997	0.997	0.997	0.997	0.997	0.997	0.997

*Note: t-statistic in brackets. Significance determined by p-value, wherein: * p < 0.1, ** p < 0.05, *** p < 0.01.*