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DATA ROOM REPORT 3/2023

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DATA ROOM

Data Room is an internationally unique pilot project for the promotion of data-driven policymaking. It is an independent part of the VATT Institute for Economic Research, and its purpose is to combine the latest unit-level registry data sets to produce fast-paced accurate analysis to better support decision making and to evaluate the effects of political decisions. VATT Data Room works in close cooperation with Statistics Finland and the Helsinki Graduate School of Economics.

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DESCRIPTION SHEET

Russian Invasion of Ukraine: Effect on Finnish Companies Trading in Goods with Russia

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Abstract

The Russian invasion of Ukraine in February 2022 triggered the imposition of major economic sanctions on Russia and several firms cut their economic ties with the country. We estimate the economic effects of the war on Finnish companies that traded in goods with Russia before the war (treatment group) compared to other firms engaged in international trade in goods (control group). Our main findings can be summarized as follows:

1. The war has had only minor economic effects on the business of firms that used to export to Russia. Their total exports decreased compared to the control group immediately after the war began but their turnover has been almost unaffected. The Russian market was probably relatively unimportant for them, or they were able to replace their exports to Russia with other markets.
2. Firms that used to import from Russia have experienced more difficulties; both their total imports and turnover decreased considerably compared to the control group when the war started, and the negative difference has gradually deepened. Additionally, several of these firms have completely ceased their import activity. The total imports and turnover of firms that used to import from Russia grew considerably compared to the control group in 2021, probably fueled by increases in their input and output prices. Therefore, part of the decline in total imports and turnover in 2022 could be explained by the fading of the price hikes.
3. No effect was found on the number of employees or the sum of wages and salaries of firms that used to trade with Russia. This suggests that their real output has not been affected much by the war and they have not been forced to resort to layoffs to a wide extent. This observation holds for both exporters and importers in the treatment group.
4. Based on our findings, there is no need to subsidize firms that used to trade with Russia because the economic effects of the war on them have been only moderate, on average. The war has mostly affected companies that were highly dependent on trade with Russia. These companies took large business risks which have now been realized.

KUVAILULEHTI

Sota Ukrainassa: Vaikutus Venäjän kanssa tavarakauppaa käyneisiin suomalaisyrityksiin

Datahuone-raportti 3/2023 (26.9.2023)
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Tiivistelmä

Venäjä hyökkäsi Ukrainaan helmikuussa 2022, minkä takia sitä vastaan on asetettu merkittäviä talouspakotteita. Yritykset ovat myös vapaaehtoisesti vähentäneet taloudellisia yhteyksiään Venäjään. Tässä raportissa tutkitaan sodan taloudellisia vaikutuksia suomalaisiin ennen sotaa Venäjän kanssa tavarakauppaa käyneisiin yrityksiin verrattuna muihin tavaroiden ulkomaankauppaa käyneisiin yrityksiin. Raportin päätulokset voi tiivistää seuraavasti:

1. Sota on vaikuttanut vain vähän aiemmin Venäjälle vieneiden yritysten liiketoimintaan. Niiden kokonaisvienti väheni suhteessa vertailuryhmän yrityksiin heti sodan alettua, mutta vaikutusta niiden liikevaihtoon ei juuri ollut. Venäjän-vienti on luultavasti ollut vain suhteellisen pieni osa näiden yritysten kokonaisliiketoimintaa, tai ne ovat kyenneet korvaamaan sen vähentymistä muilla markkinoilla.
2. Sota on vaikuttanut enemmän Venäjältä aiemmin tuoneisiin yrityksiin, joiden kokonaistuonti ja liikevaihto vähenivät selvästi suhteessa vertailuryhmään sodan alettua. Negatiivinen ero vertailuryhmään on vähitellen kasvanut sodan jatkuessa. Lisäksi moni näistä yrityksistä on lopettanut tuontitoiminnan kokonaan. Venäjältä aiemmin tuoneiden yritysten kokonaistuonti ja liikevaihto kuitenkin kasvoivat merkittävästi suhteessa vertailuryhmään vuoden 2021 aikana, luultavasti osittain niiden tuotantopanosten ja lopputuotteiden hinnannousun takia. Näin ollen osa Venäjältä tuoneiden yritysten kokonaistuonnin ja liikevaihdon vähentymisestä vuoden 2022 aikana voi johtua edeltävän vuoden hintapiikin taittumisesta.
3. Vaikutusta Venäjän-kauppaa käyneiden yritysten palkansaajien määrään tai palkkasummaan ei havaittu. Tämä viittaa siihen, että sota ei ole juurikaan vaikuttanut näiden yritysten tuotantomääriin, eivätkä ne ole joutuneet turvautumaan irtisanomisiin suurissa määrin. Päätelmä koskee sekä vienti- että tuontiyrityksiä.
4. Tutkimuksen perusteella erityiset tuet Venäjän-kauppaa käyneille yrityksille eivät ole tarpeellisia, koska sodan taloudelliset vaikutukset niihin ovat keskimäärin pienet. Sota on haitannut eniten merkittävästi Venäjästä riippuvaisia yrityksiä, joiden kohdalla kyse on osittain liiketoimintariskin realisoitumisesta.

PRESENTATIONSBLAD

Rysslands anfallskrig i Ukraina: Effekterna på finländska företag som bedrivit varuhandel med Ryssland

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Sammanfattning

Den ryska invasionen av Ukraina i februari 2022 utlöste stora ekonomiska sanktioner mot Ryssland och många företag klippte sina ekonomiska band med landet. Vi bedömer de ekonomiska effekterna av kriget på finska företag som handlade med Ryssland före kriget (behandlingsgruppen) jämfört med andra företag som ägnar sig åt internationell handel (kontrollgruppen). Våra huvudsakliga slutsatser kan sammanfattas som följer:

1. Kriget har endast haft mindre ekonomiska effekter på verksamheten för de företag som tidigare exporterade till Ryssland. Deras totala exporter minskade jämfört med kontrollgruppen omedelbart efter krigsutbrottet, men deras omsättning är nästan opåverkad. Troligen har de ryska marknaderna varit av relativt liten vikt för dem, eller så har de kunnat ersätta exporterna till Ryssland med andra marknader.
2. De företag som brukade importera från Ryssland har upplevt fler svårigheter; både deras totala importer och omsättning minskade avsevärt jämfört med kontrollgruppen vid krigsutbrottet, och den negativa skillnaden har gradvis ökat. Dessutom har flera av dessa företag helt upphört med sin importaktivitet. De totala importerna och omsättningen för företag som brukade importera från Ryssland växte avsevärt jämfört med kontrollgruppen under 2021, troligen underblåst av ökningar i deras in- och utpriser. Därför skulle en del av nedgången i totala importer och omsättning under 2022 kunna förklaras genom den avtagande prishöjningen.
3. Ingen inverkan på antalet anställda eller summan av lönerna hittades för företag som tidigare handlade med Ryssland. Denna observation rör både exportörer och importörer. Detta antyder att deras faktiska prestation inte har påverkats mycket av kriget och att de inte i någon stor utsträckning har tvingats till permitteringar.
4. Baserat på våra resultat finns det inga behov av att subventionera de företag som tidigare handlade med Ryssland eftersom de ekonomiska följderna av kriget för dem i genomsnitt endast varit måttliga. Kriget har främst påverkat företag som var starkt beroende av handel med Ryssland. De företagen tog stora affärsrisker som nu har förverkligats.

Contents

1. Introduction

Russia invaded Ukraine on February 24, 2022. In response, the European Union, the United States, and their allies imposed severe economic sanctions on Russia, limiting trade and financial flows to and from the country. The sanctions have been gradually tightened to put more economic pressure on the invader. Western companies have also voluntarily cut their economic ties with Russia because the war has increased transaction costs and business risks and operating in the country could damage their corporate image.

The economic sanctions and the flight of Western firms from Russian markets have devastated Finland's trade with Russia. This can be clearly seen in Figure 1, where the value of Finland's monthly trade in goods with Russia from January 2019 to June 2023 is depicted. The data are retrieved from the ULJAS database of Finnish Customs. The red vertical line is drawn to mark February 2022, the month in which Russia invaded Ukraine. Exports to Russia started to decline immediately in March 2022, whereas imports collapsed in April 2022. In particular, the decline in imports was fast and drastic. Since the initial shock, both exports and imports have continued to decline steadily, probably due to the ever-tightening economic sanctions and trade bans imposed on Russia.

However, it should be noted that imports in the second half of 2021 were at a very high level, mainly driven by the hike in the price of fossil fuels, the main import goods from Russia. On the other hand, the decline in the price of oil in 2020, the first year of the COVID-19 pandemic, meant a considerable decline in imports from Russia. Nevertheless, the war has clearly caused a major collapse in both Finland's exports to and imports from Russia.

Figure 1: The value of Finland's monthly trade in goods with Russia from January 2019 to June 2023

The collapse in Russian trade can be considered a major economic shock for Finland because Russia was one of country's most important trade partners before the war. Total annual trade in goods with Russia in the years 2010–2022 is illustrated in Figure 2. The data are retrieved from the ULJAS database of Finnish Customs. Both exports to and imports from Russia have decreased from the peak values reached in the early 2010s. A drastic decline in trade was experienced in 2014 and 2015, mostly because of Russia's annexation of Crimea in March 2014, which already made Western countries impose economic sanctions on Russia, subsequently triggering retaliation from the Russian side. Nevertheless, Russia remained an important trade partner for Finland. In 2021, exports of goods from Finland to Russia totaled €3.7 billion (fifth largest export partner, 5.4% of total exports) and imports of goods from Russia were €8.6 billion (second largest import partner, 11.8% of total imports).

In 2022, Finland's imports from Russia were €6.2 billion (6.8% of total imports) and exports to Russia €2.1 billion (2.6% of total). The annual figures mask the drastic collapse in trade with Russia, because the first months of the year were still business as usual and the decline in trade was gradual. Moreover, the high prices of energy and other commodities kept particularly the value of imports at a high level despite a decline in volume. But as sanctions have begun to bite and firms have been increasingly abandoning trade connections with Russia,

trade values have gone down. In the last quarter of 2022, imports and exports were only €0.84 billion and €0.45 billion, respectively, compared to imports of €3.1 billion and exports of €1.0 billion in the last quarter of 2021. In the early months of 2023, trade with Russia has declined even further. However, Finland's trade with Russia is far from coming to a complete stop. In the first half of 2023, imports from and exports to Russia amounted about €700 million and €325 million, respectively.

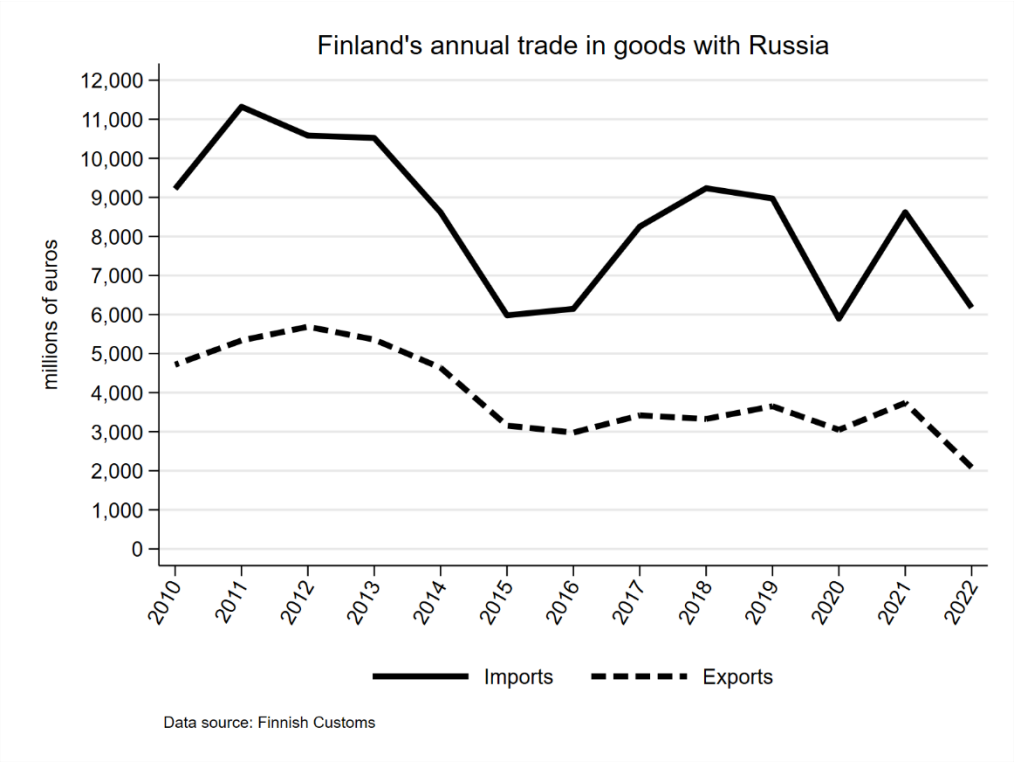

Figure 2: The value of Finland's annual trade in goods with Russia, 2010–2022

Evidently, the Russian invasion of Ukraine (hereafter "the war") has been a major trade shock for Finnish firms. We estimate how the war has affected the business of Finnish companies that used to trade with Russia. The effects are estimated with event study regressions in which we compare the development of firms that traded with Russia (treatment group) to other firms engaged in international trade but not with Russia (control group). Several indicators are used as dependent variables: total exports/imports of goods, turnover, sum of wages and salaries, number of employees and the propensity to export/import. We use data up to June 2023, allowing us to identify both the initial trade shock and the prolonged effects of the war.

The regression results presented in this report are not necessarily the exact causal effects of the Russian invasion of Ukraine because the analysis performed is rather simple, with a limited ability to identify the counterfactual development of firms that used to trade with Russia. However, the research

design is convincing enough to provide at least qualitative evidence of how the war has affected Finnish companies that used to trade with Russia.

The rest of this paper proceeds as follows. Section 2 explains the data and the empirical approach used. Section 3 presents the main results and section 4 discusses more detailed heterogeneity analyses based on subsamples of firms. Section 5 concludes. Those regression results that are not displayed in this report are available in the online appendix https://bit.ly/3Rrxj0j.

2. Empirical strategy, data, and variables

2.1 Defining the treatment and control groups

The effects of the war on Finnish firms that used to trade with Russia before the war (treatment group) are estimated with event study regressions in which the development of the treatment group is compared to a control group of firms that have been engaged in international trade but not with Russia. The assumption is that the war may have affected the treatment group more negatively than the control group, although an effect on the latter through the general economic situation or value chains cannot be ruled out.

The analysis is carried out separately for export and import firms: companies that used to export to Russia are compared to other export firms and companies that used to import from Russia are compared to other import firms.

Before we define the treatment and control groups, the following sample selection is made. First, we include only firms with Finnish Business IDs and income statement information for the year 2021 in Statistics Finland's dataset.[1] Secondly, we exclude firms that were considered as microenterprises in 2021 according to the classification used by the European Union and Statistics Finland. These are companies with less than 10 employees and annual turnover of at most €2 million. We drop microenterprises because they would dominate the unweighted regressions because there are large numbers of them, whereas their economic importance is small. According to the statistics of Finnish Customs (2022), microenterprises accounted for only 0.9% of Finnish exports and 3.7% of Finnish imports in 2021.

After the abovementioned sample selection, the treatment and control groups of export firms are defined as follows. A firm belongs to the treatment group of export firms if it had exports to Russia worth at least €10,000 in each of the

[1] The dataset of income statements includes about 380,000 companies and excludes only the tiniest firms and those that are inactive.

years 2019, 2020 and 2021. A firm belongs to the control group of export firms if it had exports worth at least €10,000 in each of the years 2019, 2020 and 2021, but no exports to Russia between January 2019 and February 2022. Similarly, the treatment group of import firms includes companies that had imports from Russia worth at least €10,000 in each of the years 2019, 2020 and 2021 and the control group of import firms consists of companies that had imports worth at least €10,000 in each of the years 2019, 2020 and 2021, but no imports from Russia between January 2019 and February 2022. A company can belong to both the sample of export and import firms.

The minimum values for exports and imports are set to exclude the most negligible traders, although the thresholds still allow rather small exporters and importers to enter the sample. By requiring that the firms included in the sample exceeded the minimum thresholds in each of the years 2019, 2020 and 2021, we ensure that the sample firms traded frequently internationally in the prewar years, making it reasonable to assume that they would have continued doing so in the absence of the war.

The sample of export firms comprises 691 companies in the treatment group and 1,617 companies in the control group. The sample of import firms comprises 338 companies in the treatment group and 3,606 companies in the control group. In general, Finnish exports are more concentrated than imports, which is why the control group of importers is so much larger than that of exporters. But when it comes to imports from and exports to Russia, it is the other way round: imports from Russia used to be more concentrated than exports to Russia, which can be seen from the lower number of treated import firms.

2.2 Data and variables

The effects of the war are estimated on several dependent variables: total exports/imports of goods, turnover, sum of wages and salaries, number of employees and propensity to export/import.[2] All the variables are in logarithms except the binary indicator for the propensity to export/import. Total exports/imports and the propensity to export/import concern only trade in goods; information on exports and imports of services are not available in the dataset we use.

We use firm-level data from several administrative registers, comprising almost all Finnish companies. The data on exports and imports are provided by Finnish Customs. The data on turnover are from value-added tax filings and the data

[2] The effect on the propensity to export (import) is estimated with a dummy variable that takes the value 1 if the firm had exports (imports) in the observation month and takes the value 0 if the firm had no exports (imports) in the observation month.

on the sum of wages and salaries and the number of employees are from the Incomes Register, both supplied by the Finnish Tax Administration. The data on firm characteristics, for example, industry and firm size, are provided by Statistics Finland. All the datasets are compiled by Statistics Finland, and they are used in their protected remote access environment. The data are confidential and therefore a replication package cannot be provided.

The study period stretches from January 2019 to June 2023. The dependent variables are observed at a monthly level. Thus, the observation unit is a firm in a given month. This allows us to identify the possible effects of the war at a very granular level.

The summary statistics of the dependent variables for the pretreatment observation months (January 2019 to December 2021) for the sample of export firms are reported in Table 1, separately for the treatment and control groups. Similarly, the summary statistics for the sample of import firms are reported in Table 2. All the summary statistics except the propensity to export/import are natural logarithms of the original values because these transformed variables are used in the regressions.

Both the treated export and import firms were on average larger in terms of the continuous variables than the firms in their control groups. Also, the treated firms were more frequent exporters/importers than the control group firms. The difference in average sizes between the treatment and control firms is larger for the group of import firms than for the group of export firms. Imports from Russia are predominantly commodities and utilities, such as energy products, metals, timber, and fertilizers, which are more likely to be the business of large companies. Exports to Russia used to be more varied but still concentrated in capital-intensive products, such as machinery, paper products and chemicals. Also, doing business with Russia might involve high transaction costs and risks and require well-established connections, which favors large companies. Trade with the Soviet Union was dominated by large state-owned enterprises (also on the Finnish side), and the tradition may have continued.

Table 1: Summary statistics of the dependent variables for the period from January 2019 to December 2021: the sample of export firms

Variable	Treatment			Control		
	mean	median	sd	mean	median	sd
Turnover	14.41	14.26	1.80	13.58	13.48	1.49
Total exports	13.02	13.12	2.39	11.34	11.66	2.38
Propensity to export	0.94	1	0.24	0.85	1	0.36
Number of employees	4.11	4.03	1.53	3.41	3.33	1.27
Sum of wages and salaries	12.41	12.34	1.61	11.69	11.61	1.28

Table 2: Summary statistics of the dependent variables for the period from January 2019 to December 2021: the sample of import firms

Variable	Treatment			Control		
	mean	median	sd	mean	median	sd
Turnover	14.63	14.32	2.01	13.36	13.20	1.41
Total imports	13.26	13.15	2.06	11.73	11.93	1.93
Propensity to import	0.95	1	0.22	0.91	1	0.29
Number of employees	3.83	3.69	1.96	3.08	3.00	1.36
Sum of wages and salaries	12.15	12.06	2.00	11.39	11.27	1.38

2.3 Empirical strategy

The effects of the war are estimated with the following event study equation:

$$Y_{it} = \alpha + \Sigma month_t + \Sigma \beta_t * month_t * treatment_i + \eta_i + \varepsilon_{it}$$

in which Y_{it} is the value of the dependent variable observed for firm *i* in observation month *t*. Common trends are controlled for with month-year indicators $month_t$ (e.g., September 2022) that take the value 1 for observation month *t* and the value 0 otherwise. $treatment_i$ is the binary indicator for the treatment group; it takes the value 1 if firm *i* belongs to the treatment group and the value 0 if it belongs to the control group. η_i are firm-specific fixed effects, α is the constant and ε_{it} are the stochastic mean-zero error terms. Standard errors are clustered at the level of two-digit industry classification (NACE) in the main

analyses, which include the total sample of firms. In the heterogeneity analyses with smaller subsamples, robust standard errors are used.

The coefficients of interest are β_t. They estimate the difference in the dependent variable between the treatment and control groups, relative to the omitted base month of December 2021 that is normalized to zero for both groups. This month is used as the baseline since the threat of the war was increasing already before the February 24 invasion as Russia was issuing growing political demands and concentrating its troops near the Ukrainian border. This tense situation may have had anticipation effects on firms trying to avoid ending up in the middle of a conflict. Anticipation effects may have existed even in the last months of 2021, and thus this choice of base period may lead to conservative estimates.

The estimated regression coefficients and their 95% confidence intervals are reported graphically. The point estimates and their confidence intervals, except for those of the propensity to export/import, were transformed from logarithmic points to percentages by exponentiation.[3] The regression coefficients estimate how the development of the dependent variable differs between the treatment and control groups relative to December 2021. December 2021, to which the other months are compared, is normalized to zero and highlighted with a red dashed line in the figures.

3. Main regression results

The results presented in this section concern the whole sample of export and import firms that satisfy the sampling criteria explained in the previous section. Firms that exported to Russia before the war (treatment group of export firms) are compared to other export firms (control group of export firms). Firms that imported from Russia before the war (treatment group of import firms) are compared to other import firms (control group of import firms).

Figure 3 shows that the total exports of the Finnish companies that used to export to Russia decreased by about 10–15% compared to the control group of other export firms in March 2022, right after the war had started, and this effect has persisted up to June 2023. The difference between the treatment and control groups relative to December 2021 was negative in some prewar observation months, but it was statistically insignificant and of smaller magnitude than after the start of the war. Thus, the sharp drop in the total exports of

[3] The formula of the transformation is: $\Delta\% = 100 * (e^{\beta_t} - 1)$, in which β_t is the estimated regression coefficient (or the estimated boundary of the confidence interval)

the treatment group appears to be caused by the war. While the magnitude of the negative effect is not small, most of the point estimates are noisy.

Based on Figure 4, the total imports of companies that used to import from Russia have decreased considerably since the start of the war. In spring 2022, their total imports fell by about 15% relative to the control group of other import firms. The difference between the treatment and control groups has grown after summer 2022, and in the first half of 2023 it was about −25% to −30%. However, the causal effect of the war is difficult to gauge, since the total imports of the treatment group increased considerably relative to the control group in 2021 and the difference between them relative to December 2021 was negative already in 2019 and 2020. A probable reason for the increase in the total imports of the treatment group in 2021 is the increase in the prices of their import goods. Therefore, the decline after the start of the war may be partially explained by decreased import prices. Nevertheless, the drastic reversal, coinciding with the start of the war, in the trend of the treatment group's total imports in spring 2022 suggests that the war had a major impact on the treatment group's imports even if the subsequent slide was partially explainable by price changes.

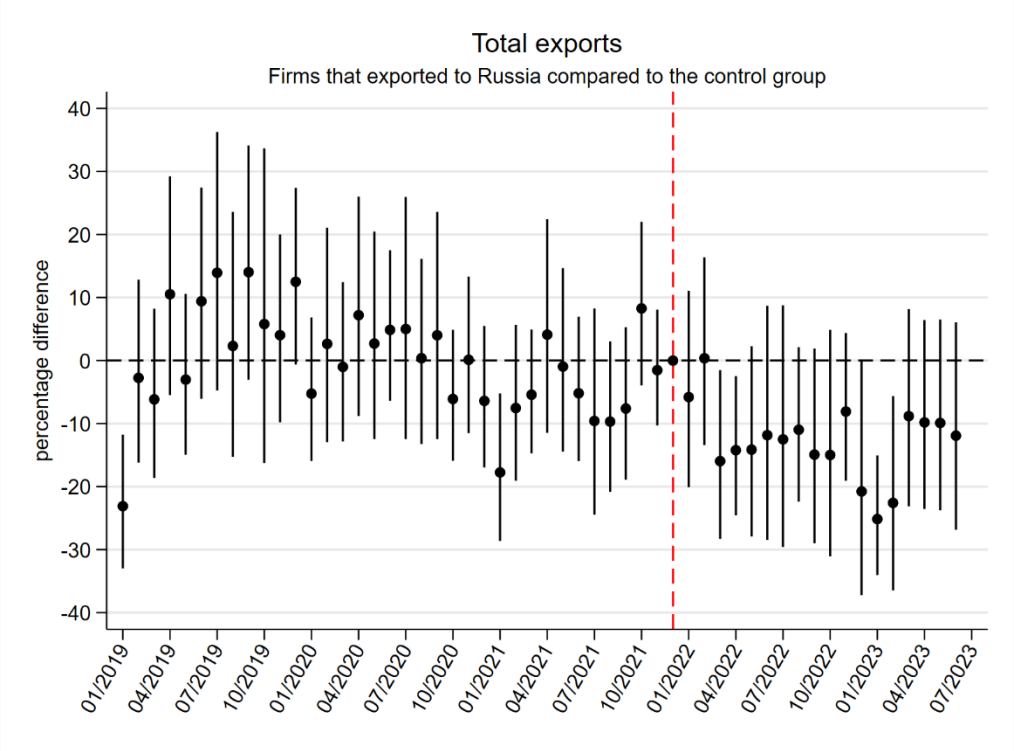

Figure 3: Total exports of firms that exported to Russia compared to other export firms

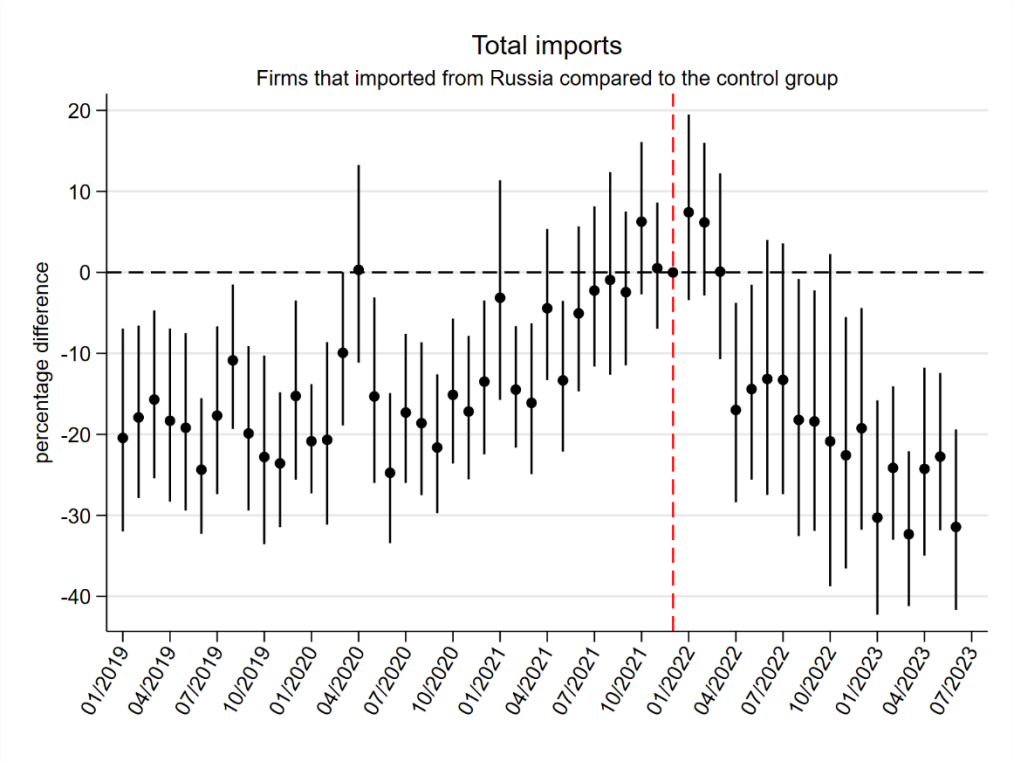

Figure 4: Total imports of firms that imported from Russia compared to other import firms

The results in Figures 3 and 4 concern only firms that had some exports or imports during the observation month. Thus, they estimate the effects at the intensive margin. However, some companies that traded with Russia might have completely stopped trading internationally if they had to abandon the Russian market and were not able to substitute Russian trade with other markets. In Figures 5 and 6, we estimate how the war affected the propensity to export and the propensity to import of companies that traded with Russia. Propensity to export (import) is a dummy variable that takes the value 1 if the company had any exports (imports) during the observation month and the value 0 if it did not have any exports (imports) during the observation month. In this way, we capture the effects of the war on the extensive margin of exports and imports.

Based on Figure 5, the propensity to export of firms that used to export to Russia fell by a few percentage points compared to the control group immediately after the war started. A small though statistically insignificant negative effect has persisted, but when compared to the treatment group's baseline export propensity of 0.94 in December 2021, the relative magnitude of the effect is economically unimportant. Thus, most of the firms that used to export to Russia have remained active in export markets.

Figure 6 shows that the propensity to import of firms that used to import from Russia fell by about five percentage points compared to the control group in

the early months of the war. From summer 2022 onwards, the difference has widened, being about −10 percentage points, and settled at that level. The pre-war trends in the propensity to import did not differ between the treatment and control groups, suggesting that the observed effect was caused by the war. The mean of the dependent variable in December 2021 was 0.93 in the treatment group, so the −10 percentage point effect corresponds to about a 10% decrease in relative terms. This means that quite a few of the firms that used to import from Russia have completely stopped importing. The enlarged negative effect on the propensity to import in the second half of 2022 resembles the effect on total imports at the intensive margin (Figure 4).

Based on Figures 3–6, the Russian invasion of Ukraine has had negative effects on total exports and imports and the propensity to export/import of firms that used to trade with Russia before the war. This means that the treatment group has not been able to fully replace the lessened trade with Russia with other export/import markets and several of them have totally stopped trading internationally. The effect on the import activity of the treated import firms has been more pronounced than the effect on the export activity of the treated export firms.

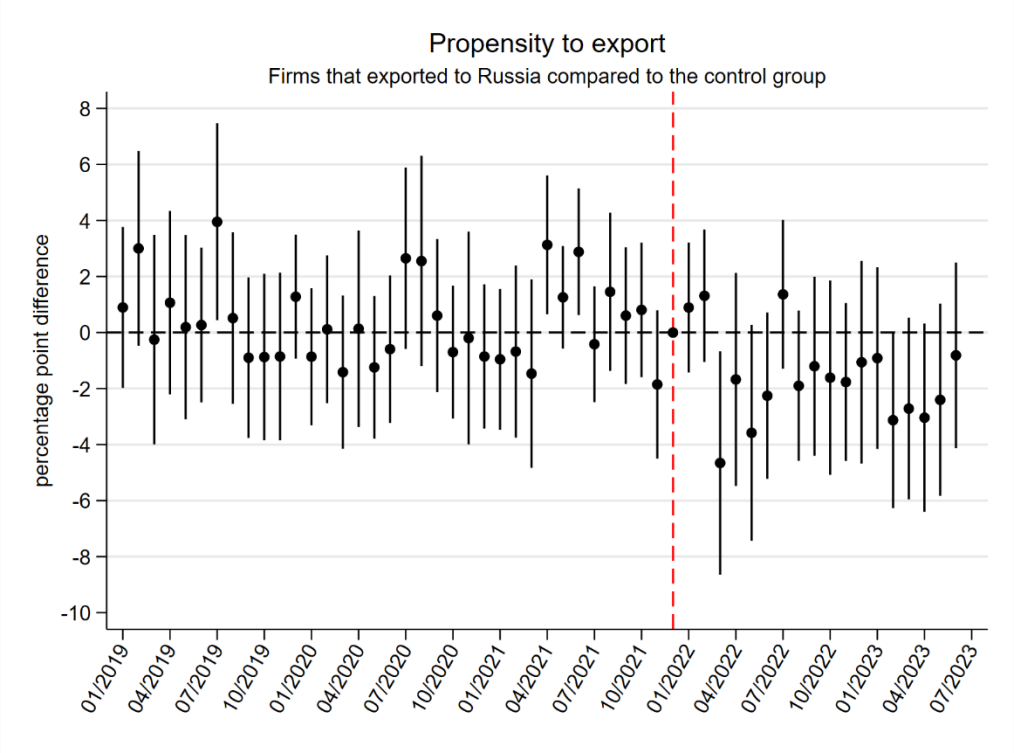

Figure 5: Propensity to export of firms that exported to Russia compared to other export firms

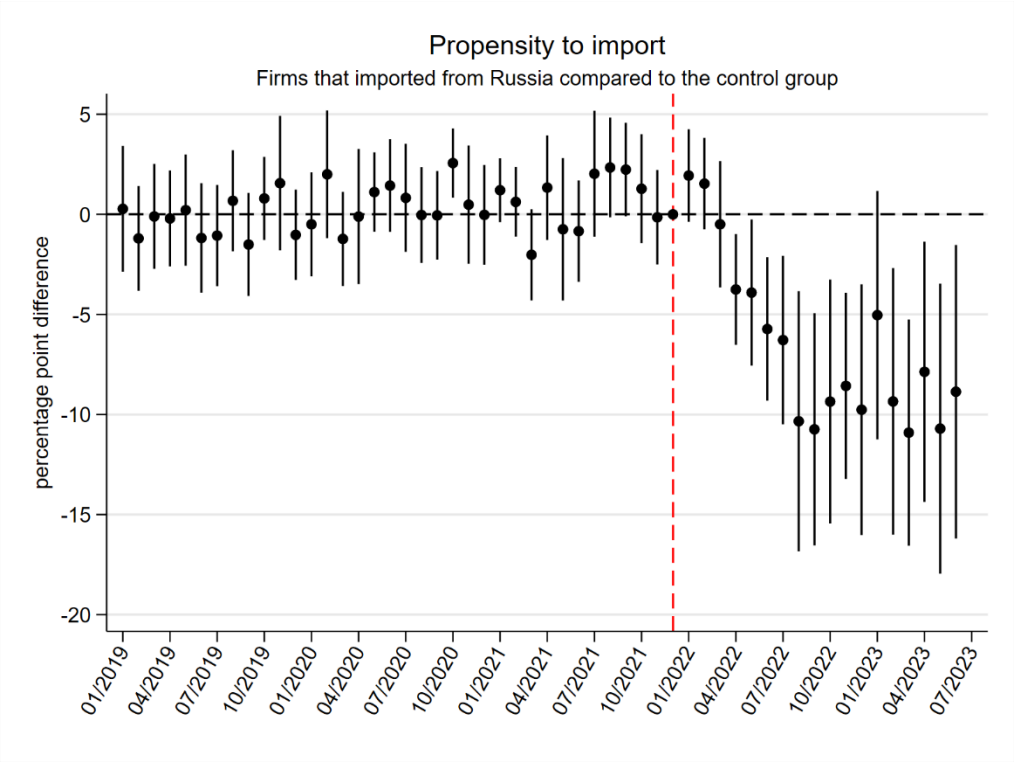

Figure 6: Propensity to import of firms that imported from Russia compared to other import firms

The estimated effects on the turnover of the treated firms are presented in Figures 7 and 8. Based on Figure 7, the turnover of firms that used to export to Russia was not affected by the war. Their turnover may have decreased a little compared to the control group immediately after the start of the war, but the effect was short-lived if it existed at all. For most of the wartime period, the difference between the treatment and control groups has been positive. Even though the war has had a negative effect on the total exports of the treated exporters (Figure 3), the effect on turnover appears nonexistent. This suggests that exports to Russia were only a relatively small part of their operations.

In Figure 8 we see that the turnover of the firms that used to import from Russia has decreased compared to the control group since the start of the war. The difference between the treatment and control groups turned sharply from 20% positive in January–March 2022 to zero in April 2022 and negative in subsequent months. The decline has been gradual and the difference between the treatment and control groups was about −10% in the first half of 2023, though most of the point estimates are not statistically significant. However, the difference was almost as negative in 2019 and 2020, but the increase in the turnover of the treatment group in 2021 took their baseline turnover of December 2021 to a high level. This development could be explained by increases in the prices of the goods sold by the treatment group, following a probable increase in their

input prices. Therefore, the wartime development could be partially explained by a decrease in their selling prices. Therefore, at least the prolonged effect of the war on the treatment group's turnover might be smaller than Figure 8 suggests. However, given the sharp reversal of the existing trend in April 2022, which resembles the effect on total imports, the economic effects of the war are likely to be the major reason for the development.

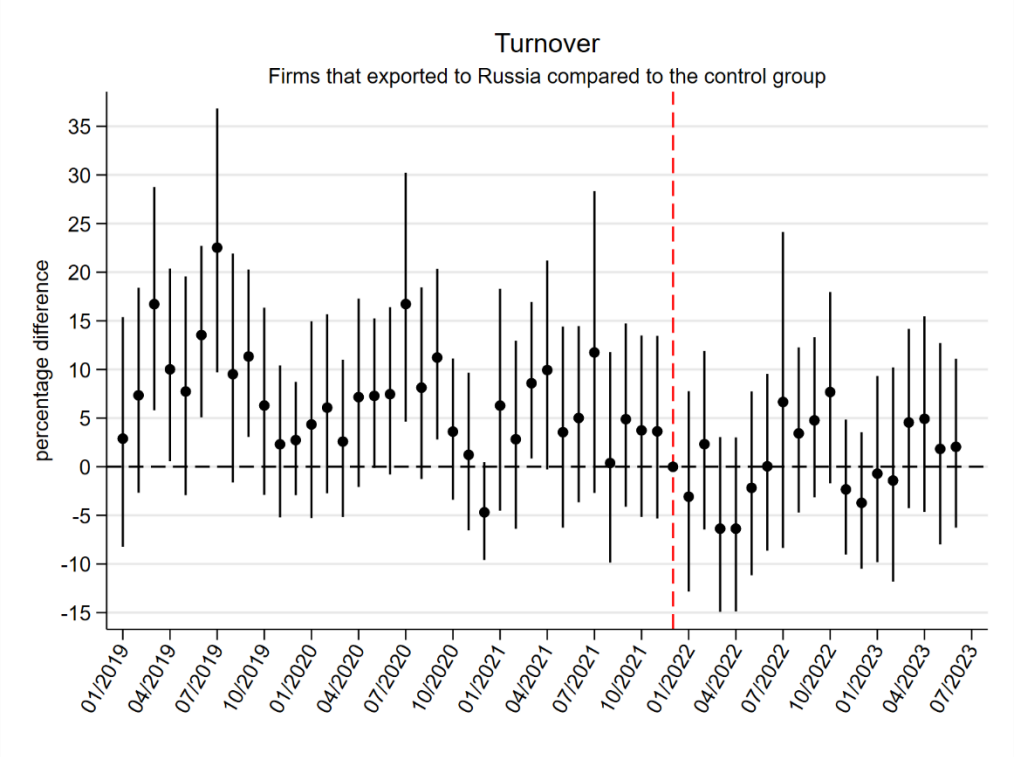

Figure 7: Turnover of firms that exported to Russia compared to other export firms

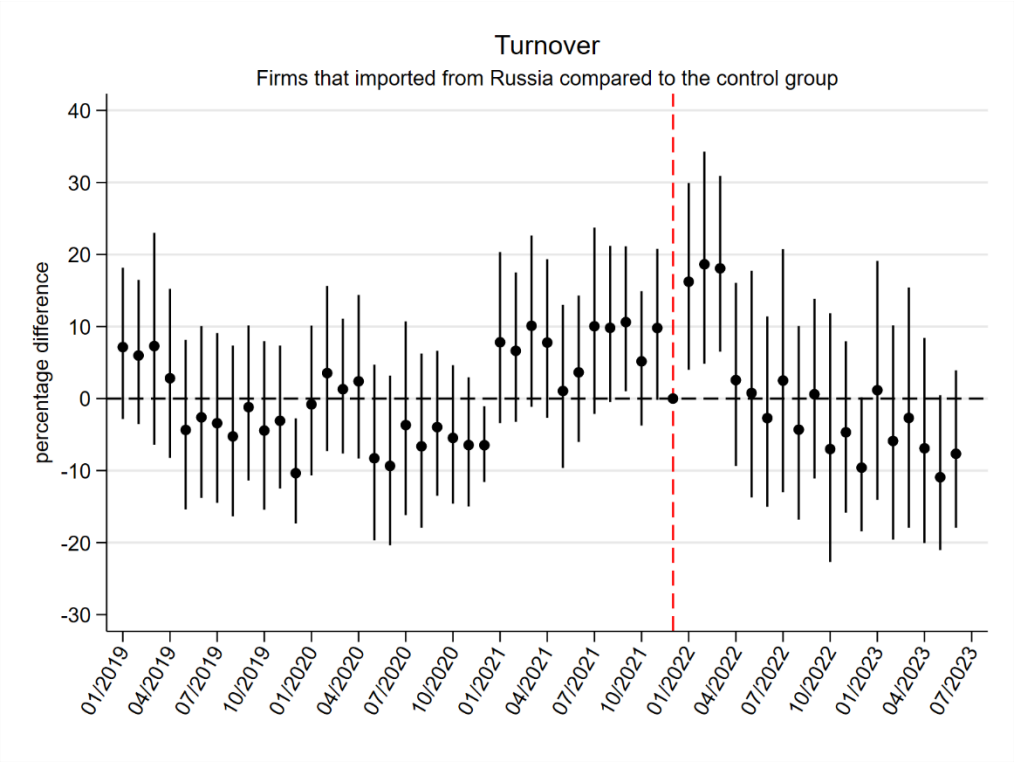

Figure 8: Turnover of firms that imported from Russia compared to other import firms

Based on Figures 9 and 10, the war has not affected the number of employees of firms that used to trade with Russia. The number of employees of the treated importers has declined a little compared to the control group since the start of the war. However, negative differences between the treated import firms and the control group existed already before the war. Even if there were causal effects, they would in any case be small in magnitude.

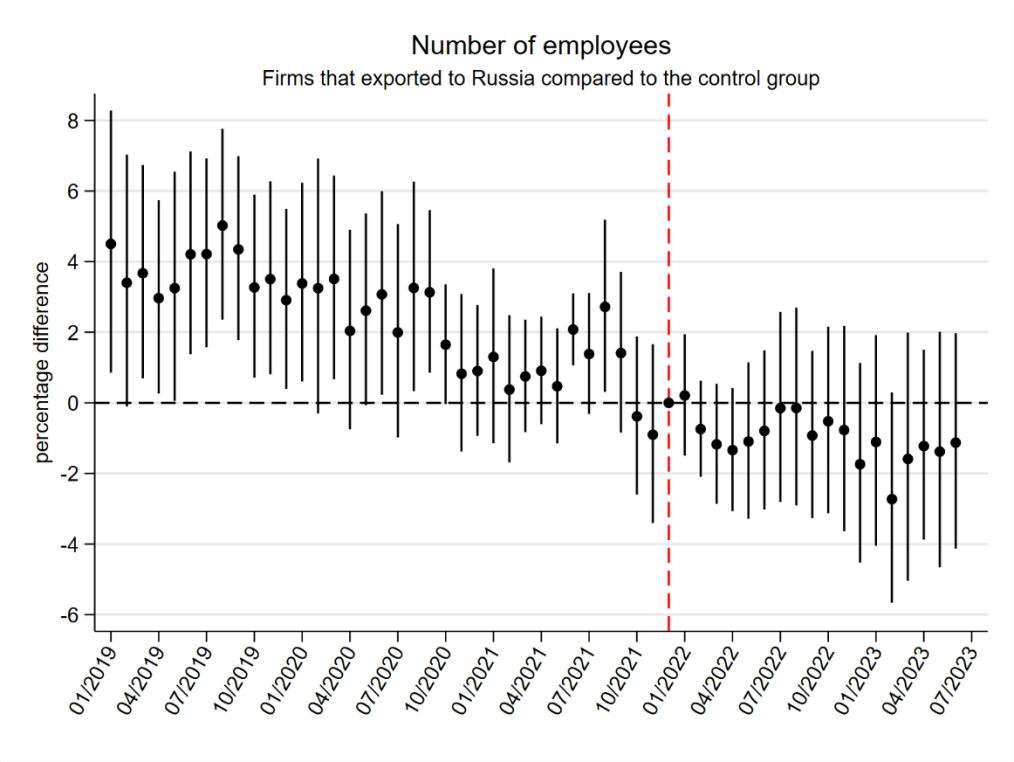

Figure 9: Number of employees of firms that exported to Russia compared to other export firms

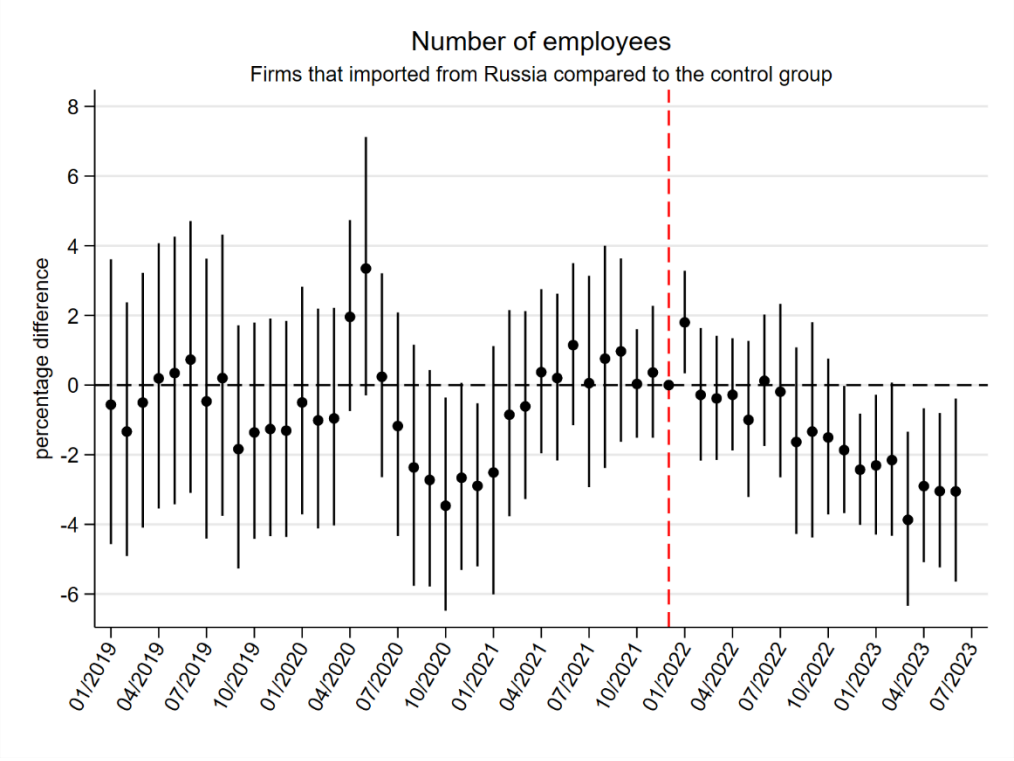

Figure 10: Number of employees of firms that imported from Russia compared to other import firms

Firms might be unable or unwilling to lay off employees in response to negative business shocks if the layoff rules were rigid or the shock was considered short-term. Instead, firms could reduce hours worked, especially overtime hours. Difficulties faced by an employer may decrease its employees' bargaining power and consequently hinder wage growth. The salaries of employees with performance-based compensation may decline when their employer's business is hit. Unfortunately, we cannot observe hours worked in our data, so we instead estimate the effect on the sum of wages and salaries, which somewhat proxies for the intensive margin of labor force adjustment.

Figures 11 and 12 show that the war has not affected the sum of wages and salaries paid by the treated firms, although seasonal variation complicates interpretation of the results. For the treated export firms, spring 2022 appears a little less positive compared to the control group than the corresponding months in preceding years (Figure 11), but it is hard to claim that this would be an effect of the war. It is likely that the war has not had a meaningful effect on labor compensation paid by firms that used to trade with Russia.

It appears that the treated import firms have not reduced their labor force despite a possible negative effect on their turnover (Figure 8). On the other hand, their number of employees and labor compensation did not really increase in 2021 when their turnover was increasing. This suggests that changes in selling prices instead of output volumes are driving turnover in Figure 8. However, slack during normal times may enable output increases without additional workforce during good times and firms may hold on to their employees during temporary struggles in the fear of losing them permanently and to avoid costly layoffs and re-recruiting. In any case, the workforce usually responds to economic ups and downs less than output and profits do.

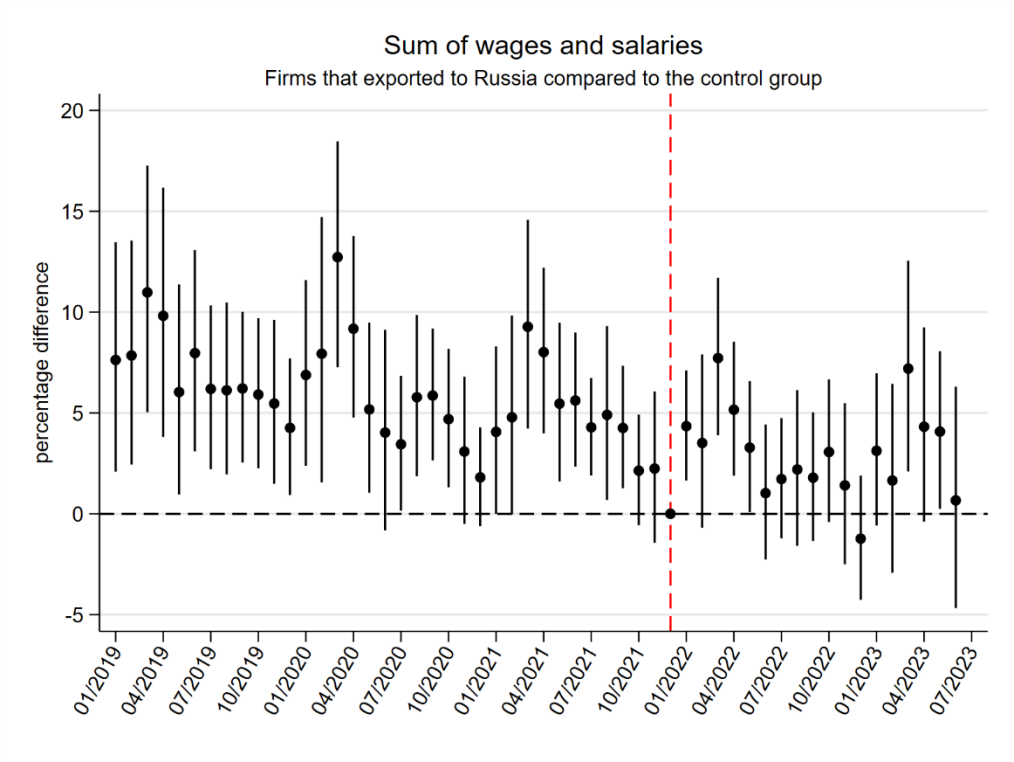

Figure 11: Sum of wages and salaries of firms that exported to Russia compared to other export firms

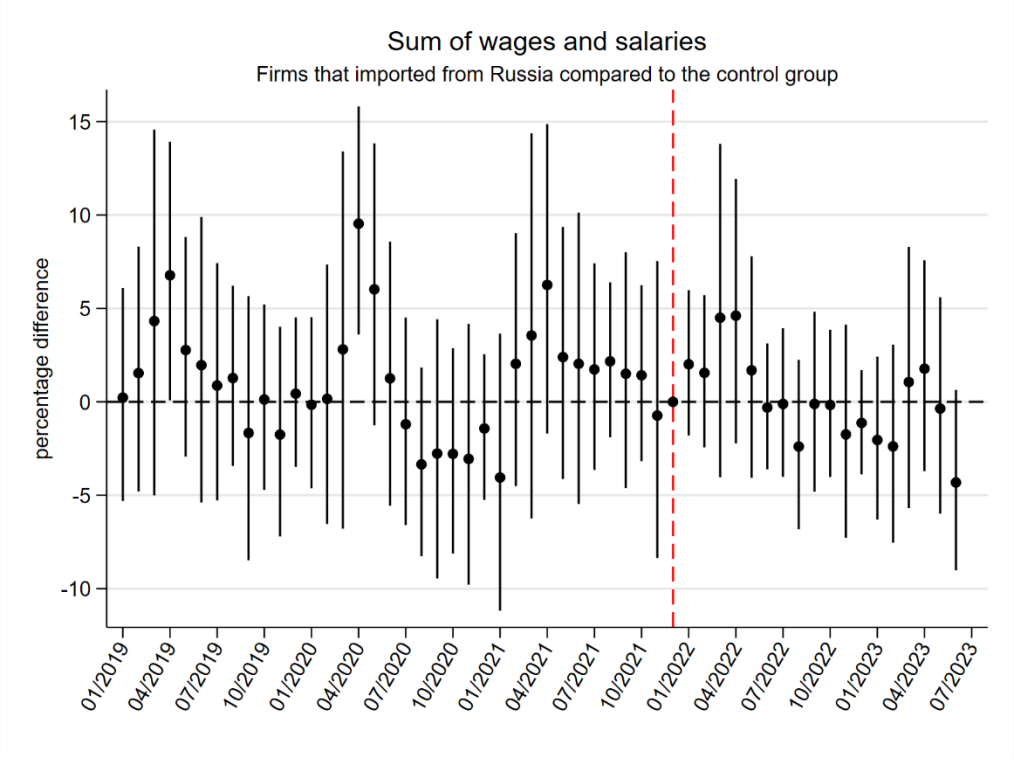

Figure 12: Sum of wages and salaries of firms that imported from Russia compared to other import firms

Based on the main regression results, the 2022 Russian invasion of Ukraine was a negative shock for the total imports and exports of firms that used to trade with Russia before the war. These companies have not been able to fully replace their trade with Russia with other export and import markets. However, the decrease in the total exports of firms that used to export to Russia was moderate and consequently the effect on their turnover was small or nonexistent. The war has had a larger negative effect on the import activity of firms that used to import from Russia. Their turnover has declined relative to the control group after the war began, although it is unclear how large a share of this can be explained by the economic effects of the war.

Importantly, no effect on the number of employees or sum of wages and salaries of firms that used to trade with Russia was found. This observation holds for both exporters and importers in the treatment group. This suggests that the real output of firms that used to trade with Russia has not been affected much by the war and they have not been forced to resort to layoffs to a large extent.

In conclusion, the effects on the business activity of firms that used to trade with Russia have been limited, despite a decline in their total foreign trade. For most of these firms, trade with Russia has probably represented only a small share of their total operations or they have been able to replace their decreased international trade with domestic markets. The importance of trade with Russia for the treatment groups is illustrated in Tables 3 and 4. Table 3 shows the $10^{th,}$ 25^{th}, 50^{th}, 75^{th}, and 90^{th} percentiles of exports to Russia relative to total exports and relative to turnover among the treated exporters in 2021. Table 4 shows the $10^{th,}$ 25^{th}, 50^{th}, 75^{th}, and 90^{th} percentiles of imports from Russia relative to total imports and relative to total purchases among the treated importers in 2021.

Table 3 shows that the median share of exports to Russia relative to total exports was only 8.7% among the treated exporters. Some of the exporters traded almost entirely with Russia, as the 90^{th} percentile share of 97.7% shows, but most of them were not significantly reliant on Russian markets. Exports to Russia relative to turnover is a better measure of dependence on Russia, since exports to Russia might be large relative to total exports even if they were unimportant relative to total revenues. The median share of Russian exports to turnover was about 2% in 2021. Thus, even if the treated exporters had lost all their exports to Russia with no compensation from other markets, half of these firms would have seen their revenues decline by less than 2%. Trade with Russia represented a moderate share of total operations even for the firms that were the most dependent on exports to Russia.

Table 4 shows that firms that used to import from Russia were relatively more dependent on the trade with Russia compared to the treated export firms. There was also more dispersion in the dependence on trade with Russia among the

treated importers. For the lowest quartile, imports from Russia were under 2% and 1% of their total imports and total purchases, respectively. But for the highest quartile, imports from Russia were 74.1% or more of their total imports and at least 13.7% of their total purchases, and the highest decile was very dependent on Russian imports.

Tables 3 and 4 may help explain why the estimated effects of the war on firms that used to trade with Russia are small. Most of them were not very exposed to Russian markets and the collapse in trade with Russia may be comparable to the annual fluctuation in their trade prices and volumes and international trade. The regression results showed that firms that used to import from Russia may have been more affected, on average, than the treated exporters. This seems reasonable, given that the former group had relatively more firms that were very reliant on trade with Russia.

Table 3: Importance of exports to Russia for the treated exporters

	p10	p25	p50	p75	p90
Exports to Russia relative to total exports	0.8%	2.3%	8.7%	36.1%	97.7%
Exports to Russia relative to turnover	0.2%	0.5%	1.9%	6.1%	17.5%

Table 4: Importance of imports from Russia for the treated importers

	p10	p25	p50	p75	p90
Imports from Russia relative to total imports	0.2%	1.8%	15.5%	74.1%	100%
Imports from Russia relative to total purchases	0.1%	0.7%	3.2%	13.7%	44.8%

It is worth noting that the war may also have affected the business of the control groups of exporters and importers via the general economic situation and interdependencies, although they did not trade with Russia before the war. If the war also had negative effects on the control group, the negative effects on the treatment group would be underestimated. On the other hand, the bias could be of a positive sign if the control group had been able to exploit their existing trade relationships to benefit from the increased demand for non-Russian imports and exports. If the troubles of some firms turned into gains for others, the total economic effect would be only reallocative, calling for no intervention from public authorities, who should not be picking winners.

Additionally, not all firms whose products were exported to Russian markets or that purchased Russian goods export or import by themselves but may instead

use intermediaries or wholesalers to carry out cross-border transactions. The possible effects on these firms cannot be identified since they do not belong to the treatment group.

4. Additional regression results

In this section we carry out more detailed analyses by estimating the effects of the war on different subsamples of firms classified according to industry, firm size, and prewar dependence on trade with Russia. To save space, the results are only discussed, but the figures with the estimated regression coefficients and their confidence intervals are available in the online appendix. The number of firms in the different subgroups and their share of the total sample are shown in Table 5 for exporters and in Table 6 for importers.

4.1 Effects on manufacturers and wholesalers and retailers

The effects of the war are estimated separately for two roughly defined industry groups using the NACE classification: manufacturing industries and wholesale and retail trade. Manufacturing industries include two-digit NACE codes 10–33, and wholesale and retail trade includes codes 45–47. Manufacturing could be divided into smaller industries that differ from each other considerably, but we choose to pool them together to get more power, since some of the important subcategories would only have a few observations. Other industries than manufacturing and trade are not assessed because they are of minor importance for Finnish international trade in goods and the number of firms representing these industries is small for statistical inference.

From Tables 5 and 6 we see that there are relatively more manufacturers in the treatment groups than in the control groups. Especially among the treatment group of importers, the group of manufacturers (wholesalers and retailers) is relatively much larger (smaller) than in the control group of importers. The differing industrial composition could be explained by the fact that imports from Russia to Finland are concentrated in commodities and manufacturing inputs, whilst consumer goods are more important for many other importers.

The firms in the treatment group of a certain industry are compared to the control group firms representing the same industry. That is, treated manufacturing firms are compared to untreated manufacturing firms and the same for wholesalers and retailers. Due to the differing industrial composition between the treatment and control groups in the pooled sample, it is important to compare treatment and control groups that represent the same industry.

Manufacturing firms that used to export to Russia saw their total exports decline by about 10–15% compared to the control group immediately in March 2022.

The negative effect has persisted but the difference between the treatment and control groups was already negative in most of the prewar observation months, which makes it difficult to assess whether the war has had a causal effect. The propensity to export of the treated exporting manufacturing firms was not affected, nor can a clear effect on their turnover, number of employees or sum of wages and salaries be found. Therefore, the war has affected manufacturers that used to export to Russia only little.

In spring 2022, after the start of the war, the total exports and the propensity to export of wholesalers and retailers that used to export to Russia decreased by about 20–30% and 10–15 percentage points, respectively, compared to the control group. Total exports declined more in the summer of 2022 and were about −40% lower compared to the control group in the second half of 2022. However, in spring 2023, both the total exports and the propensity to export of the treated wholesalers and retailers have recovered somewhat, albeit remaining lower than those of the control group. The turnover of these firms declined by about 10% relative to the control group soon after the war began but rapidly returned to the level of the control group. The labor side was not affected.

The total imports and the propensity to import of manufacturing firms that used to import from Russia declined by about 15% and 5 percentage points, respectively, when the war began. The difference in total imports between the treatment and control groups has gradually widened and was −20% to −30% in the second half of 2022 and the first half of 2023. Also, the treatment group's turnover may have declined, since the difference to the control group was clearly positive before the war, but in the second half of 2022 and the first half of 2023 the positive difference has become smaller or even gone to zero. No effect on the labor side was found. The treated manufacturing import firms appear to be more affected by the war than the exporting firms.

Wholesale and retail firms that used to import from Russia were clearly affected by the war. As a first response in spring 2022, their total imports fell by about 10% compared to the control group. The difference continued widening in the second half of 2022 and has been about −20 to −30% relative to the control group in the first half of 2023. The propensity to import of the treated wholesale and retail firms declined by about 5 percentage points as a first response, and in the first half of 2023 the difference to the control group was about −10 percentage points. The turnover of these firms has also declined considerably since the start of the war, by about 10–15% compared to the control group, or even more if the positive difference between the groups just before the war is considered. However, as was the case with the total sample of importers, the total imports and turnover of the treated wholesale and retail firms increased considerably in 2021 compared to the control group, possibly fueled by increases in their input and output prices. Therefore, the decline after the start of

the war may be partially explained by imports and revenues returning to a more normal level. Nevertheless, after the start of the war the negative difference to the control group has been larger than in the years 2019 and 2020, suggesting that the war has indeed had an effect on the treatment group. Still, no effect on the number of employees and the sum of wages and salaries of the treated wholesalers and retailers can be found.

The negative effects of the war on manufacturing firms that used to trade with Russia have been limited but wholesalers and retailers in the treatment group have experienced more difficulties. However, it is possible that some manufacturing industries do not export or import by themselves, but use their subsidiaries classified as wholesalers or intermediaries outside their corporate group to access international markets. The businesses of these kinds of firms may have been hit by the war if their products were previously exported to Russia or they used Russian inputs, but the possible effects cannot be observed in this exercise, since those firms are not classified as firms having exported to or imported from Russia.

4.2 Effects by firm size

In this subsection, firms are divided into three different size groups: small enterprises, medium-sized enterprises, and large enterprises. Microenterprises are not included in the sample at all, as already explained. The division follows that used by the European Union[4]. Small enterprises are those with at least 10 but less than 50 employees and turnover of at most €10 million **or** less than 10 employees and turnover over €2 million but at most €10 million. Medium-sized enterprises have at least 50 but less than 250 employees and turnover at most €50 million **or** less than 50 employees and turnover over €10 million but at most €50 million. Large enterprises have at least 250 employees **or** turnover exceeding €50 million. Firm sizes are defined based on year 2021 values. Again, treatment group firms of a certain size are compared to control group firms of the same size.

The number of firms in different size groups is shown in Tables 5 and 6. In the treatment groups, there are roughly the same number of firms in each size group. In the control groups, the share of small (large) enterprises is much higher (lower) than in the treatment group, but the groups of medium-sized firms are relatively about the same size. The differences in the shares of small and large firms between the treatment and control groups is consistent with the

[4] We use only the criteria for turnover and number of employees of this size classification and ignore the balance sheet criterion, which is an alternative to turnover, for simplicity.

firms in the treatment groups being on average much larger than those in the control groups in terms of the dependent variables used in the regressions.

We do not observe any effect on large enterprises that used to export to Russia. The total exports of the treated medium-sized exporters declined by about 20% compared to the control group right after the start of the war and the effect has persisted in most of the subsequent observation months. However, no clear effect on the other business indicators of medium-sized exporters is found. The effects on small exporters are unclear; their total exports have been about 20–30% below the control group after the start of the war but a similar difference existed already in most of the prewar observation months. Their propensity to export may have declined by about five percentage points and turnover decreased by about 10% during the first months of the war but has recovered from the short-term drop. Interpreting the estimated effects of the war on different size groups of exporters is challenging because the confidence intervals are wide and the prewar differences between the treatment and control groups vary month by month.

Based on the regression results, large enterprises that used to import from Russia were not affected by the war. The only possible small effect is a decline of a couple of percentage points in the propensity to import. However, the latest observation months of April–June 2023 show that the total imports of the treated large enterprises may be decreasing, but it is too early to conclude if this trend will continue. And since this development has emerged over a year after Russia's invasion, other reasons than war might be behind it.

The total exports and the propensity to export of medium-sized firms that used to import from Russia decreased by about 20% and 5 percentage points compared to the control group when the war started, but the differences have later widened to about −30% and −10 percentage points, respectively. The difference in turnover between the treatment group and the control group remained strongly positive in the first half of 2022 but came down to zero by the end of 2022. This could be an effect of the war, like the deepening of the negative effect on total imports or could be caused by decreases in the prices of their outputs. Also, the number of employees in the treatment group may have decreased by about 5% relative to the control group.

Small enterprises that used to import from Russia were considerably harder hit by the war. Their total imports and the propensity to import declined by about 20–30% and 10–15 percentage points, respectively, compared to the control group in the first months of the war and the effect has gradually grown in magnitude. The difference in total imports between the treatment and control group has been −40% to −60% since the second half of 2022 and the propensity to import of the former has been about 20–25 percentage points lower relative to the latter. The turnover of the treated small enterprises has fallen by about 10–

20% compared to the control group and there may also have been an effect of about −5% on their number of employees and the sum of wages and salaries. Clearly, small enterprises that used to import from Russia have felt the negative economic consequences of the war: several of them have completely stopped importing and those that have continued doing so have seen their total imports collapse, suggesting an inability to find substitutes for imports from Russia.

The war appears to have affected mostly small firms, whereas no effect on large enterprises that used to trade with Russia can be observed. The negative effects on small importers were especially large. Small companies may be more specialized and dependent on certain markets, whilst large enterprises may have diversified their operations better and may be able to substitute drawbacks in one market with advances in others via existing trade connections or by establishing new ones.

4.3 Effects by dependence on trade with Russia

It is reasonable to expect that companies that were more dependent on trade with Russia may have suffered more from the collapse in trade with the country. We measure export firms' dependence on trade with Russia by relating their exports to Russia to their turnover. Import firms' dependence on Russia is measured by relating their imports from Russia to their total purchases during the accounting period (including purchases of both goods and services). The treatment group of export firms is divided into those whose exports to Russia were over 10% and at most 10% of their turnover in 2021. The treatment group of import firms is divided into those whose imports from Russia were over 10% and at most 10% of their total purchases in 2021. In both cases, the first group comprises firms whose exports (imports) were very dependent on Russia and the second group firms whose exports (imports) were moderately dependent on Russia. From Tables 5 and 6 we see that most of the firms in the treatment group were only moderately dependent on trade with Russia. Among the treated exporters, 17% of the firms belong to the group of very dependent firms and among importers that share is 30%.

The total exports of the firms whose exports to Russia were over 10% of their turnover fell by about 30–40% compared to the control group right after the war started and the difference has remained 20–30% negative since that. The turnover of these firms decreased by about 10–15% relative to the control group in the first months of the war but recovered fast to the level of the control group. Also, the number of employees in the treatment group may have declined by about 5% compared to the control group.

The total exports of the firms whose exports to Russia were at most 10% of their turnover declined by about 10% compared to the control group when the

war started, and the effect deepened to −20% by the end of 2022 until it returned to the level of the initial drop in spring 2023. The propensity to export of these firms decreased by about five percentage points when the war started, and the effect has persisted at about that level. No effect on turnover or labor indicators is found.

The war has had large negative economic effects on firms whose imports from Russia were over 10% of their total purchases. The total imports, propensity to import and turnover of these firms have decreased by about 40–60%, 25 percentage points and 20%, respectively, compared to the control group. For each variable, the initial shock was smaller but grew gradually in the second half of 2022. There might have been a small negative effect on the number of employees, but the difference between the treatment and control groups was already slightly negative during most of the pretreatment period.

Since the start of the war, the total imports and the propensity to import of companies whose imports from Russia were at most 10% of their total purchases have declined by about 10–15% and 5 percentage points, respectively, compared to the control group. No effects on their turnover, number of employees or sum of wages and salaries can be observed. Thus, firms whose imports from Russia were at most 10% of their total purchases have been affected by the war to a much smaller extent than firms that were very dependent on Russian imports.

The results of this subsection emphasize that being considerably reliant on a certain market imposes a great business risk. Finnish import firms that were very dependent on Russian imports have experienced major economic challenges due to the collapse in Russian trade. Firms whose business was very dependent on exports to Russia were also more affected than less dependent firms, but the negative effects of the war on the former have still been limited. These firms have apparently been able to find new markets for their products.

Table 5: Number of firms in different subgroups and their shares of the total sample: export firms

Subgroup	Treatment		Control	
	N	Share of total	N	Share of total
Industry				
Manufacturers	491	0.71	674	0.55
Wholesalers and retailers	150	0.22	370	0.30
Firm size				
Small enterprises	201	0.29	596	0.49
Medium-sized enterprises	276	0.40	448	0.37
Large enterprises	214	0.31	173	0.14
Exports to Russia relative to turnover				
Over 10%	118	0.17		
At most 10%	573	0.83		

Table 6: Number of firms in different subgroups and their shares of the total sample: import firms

Subgroup	Treatment		Control	
	N	Share of total	N	Share of total
Industry				
Manufacturers	165	0.49	1145	0.32
Wholesalers and retailers	144	0.43	1866	0.52
Firm size				
Small enterprises	105	0.31	2118	0.59
Medium-sized enterprises	113	0.33	1109	0.31
Large enterprises	120	0.36	379	0.11
Imports from Russia relative to total purchases				
Over 10%	102	0.30		
At most 10%	236	0.70		

5. Conclusions

The Russian invasion of Ukraine in February 2022 triggered the imposition of major economic sanctions on Russia and several firms cut their economic ties with the country. This has caused a major trade shock for Finnish companies that used to trade with Russia as the exchange of goods with the country has more than halved and continues to decline. In this report, we use firm-level data and event study regressions to estimate how the war has affected Finnish firms that used to trade with Russia (treatment group) compared to other Finnish companies engaged in international trade (control group).

Based on our findings, the total exports and imports of firms that used to trade with Russia decreased compared to the control groups of other export and import firms almost immediately after the war started. The subsequent trajectories of the export and import firms differ. The negative effect on the total exports of firms that used to export to Russia has remained moderate and their turnover has been almost unaffected. This suggests that Russian exports were, on average, of minor importance for their total operations or they have been able to replace exports to Russia by domestic and other foreign markets.

Instead, the total imports of firms that used to import from Russia have decreased even further compared to the control group after the initial shock with no sign of recovery and their turnover has also decreased significantly. Also, several of the treated importers have completely ceased their import activities.

Importantly, no effect was found on the number of employees or sum of wages and salaries of firms that used to trade with Russia. This observation holds for both exporters and importers. This suggests that the real output of firms that used to trade with Russia has not been affected much by the war and they have not been forced to resort to layoffs to a wide extent.

More detailed analyses show that wholesalers and retailers, especially importing firms, in the treatment group have been more negatively affected than manufacturing firms. Large enterprises that used to export to or import from Russia have not been affected by the war, whereas its negative impact on small enterprises has been more pronounced. The negative economic effects have especially concerned small enterprises that used to import from Russia.

Companies that were highly reliant on trade with Russia before the war have been much more negatively affected by the economic consequences of the war than firms that relied on Russian markets only moderately. This shows that being reliant on a specific market imposes a large business risk and emphasizes the importance of diversification; a lesson that should be learned to prepare for future crises.

Our results are obtained by comparing Finnish companies that used to trade with Russia to a control group of other companies engaged in international trade. However, the war may also have affected the control group via the general economic situation and value chains, in which case our results would underestimate the negative effects on the treatment group. On the other hand, the bias could be of a positive sign if the control group had been able to exploit their existing trade relationships to benefit from the increased demand for non-Russian imports and exports.

Some firms that produce export goods or use import goods in their production do not export or import by themselves, but use their subsidiaries classified as wholesalers or intermediaries outside their corporate group to access international markets. The business of these kinds of firms may have been hit by the war if their products were previously exported to Russia or they used Russian inputs, but the possible effects cannot be observed in this exercise, since those firms are not classified as firms having exported to or imported from Russia.

Our analysis concerns only companies trading in goods. The war may also have affected Finnish service sector companies, especially those located in Eastern Finland, near the Russian border, because the entry of Russian citizens to Finland has been considerably restricted, with a ban on leisure travel. Also, companies in transport and logistics may have suffered from the decline in trade with Russia. Firms in these sectors are included in our analysis only if they have been identified as exporters or importers by Customs. We excluded microenterprises from our sample because they only represent a very small share of total imports and exports. However, some of the tiniest firms that traded with Russia may have experienced large difficulties if their businesses were mainly built on trade relationships with the country.

On average, the Russian invasion of Ukraine has had only small economic effects on Finnish companies included that used to trade with Russia. Trade with Russia probably represented only a small share of their total operations even before the war or they have been able to find substitutes for Russian markets, either domestic or foreign ones. Therefore, there is no need to subsidize firms that used to trade with Russia. The negative effects of the war mainly concern firms that were highly reliant on Russian markets before the war. For them, the war has meant a realization of a large business risk that could have been partially foreseen given Russia’s aggressive foreign politics and structural economic problems.

References

Finnish Customs (2022). *Tavaroiden ulkomaankauppa yritystyypeittäin vuonna 2021*. Available at https://tulli.fi/-/tavaroiden-ulkomaankauppa-yritystyypeittain-vuonna-2021. Published 29.8.2022. Retrieved 31.7.2023.

Finnish Customs. ULJAS - International Trade in Goods Statistics. Available at https://uljas.tulli.fi/v3rti/. Retrieved 6.9.2023.

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