ANALYSIS

The collapse of trade with Russia has had a limited effect on Finnish manufacturing

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Finland's bilateral trade with Russia, as well as the Russia trade of many other European countries, collapsed with the invasion of Ukraine. Over 2,000 Finnish firms exported to Russia in 2019, but that number had fallen to around 100 by the end of 2023. While the withering of trade has had limited effect on most sectors or the Finnish economy as a whole, prices of Russian inputs on which Finnish producers have heavily relied have increased faster. The overall impacts on the Finnish economy are similar to those of other EU countries.

Russia's full-scale invasion of Ukraine in February 2022 triggered a toughening of economic sanctions on Russia that significantly disrupted production chains throughout Europe and led to

radical reductions in Russia trade for most European countries. While Russia was not a major export market for most European countries, Russia has been a significant import source of certain key commodities. Russia's share has been larger in the trade of neighbouring countries such as the Baltics and Finland than in other EU countries.

The collapse of Finland's trade with Russia

Even if its significance as a trading partner has faded in recent decades, Russia was still an important trading partner for Finland in 2021, serving mainly as a raw-material supplier (particularly energy commodities such as crude oil and natural gas). Finnish exports to Russia had been in decline long before the full-blown invasion of Ukraine. Bilateral trade ceased almost completely with the outbreak of war.

Figures from Finnish Customs show that Russia's share of Finnish goods exports was 5 % in 2021. About 40 % of Finland's goods exports to Russia in 2021 consisted of machinery, equipment and vehicles. Other significant export categories included chemical products, metals and paper. The drying up of Finnish goods exports in 2022 was immediate. By the fourth quarter of 2023, the value of Finnish goods exports had fallen to just 180 million euros, about 0.9 % of the value of Finland's total goods exports in 4Q23. Copper represented 65 % of exports, with the rest consisting mostly of machinery, equipment, pharmaceuticals and cosmetics. Over 2,000 Finnish companies exported to Russia in 2019. That number had dwindled to around 100 by the end of 2023.

Finnish Customs figures show that about 12 % of Finnish goods imports came from Russia in 2021. Finland mostly imported energy commodities or raw materials from Russia: crude oil, petroleum products, natural gas, coal, electricity, wood, metals and chemical products. In the final three months of 2023, the value of Russian imports amounted to roughly 340 million euros, or less than 2 % of Finland's total goods imports. Nearly all goods imports from Russia at end-2023 were industrial inputs (nickel matte and ammonia) for individual production facilities. Finnish Customs reports that nickel matte and ammonia accounted for 90 % of imports from Russia. At the end of 2023, just 21 Finnish firms were engaged in importing goods from Russia.

Impacts of reduced Russia trade on Finnish goods trade

The impacts of diminished Russian trade on Finland's overall goods exports and imports can be clarified with statistical analysis.[1] The following analysis considers the extent to which trends for product groups with previously large Russia shares in Finland's goods exports and imports have been weaker compared to other product groups since the outbreak of war.

Most Finnish goods exports unaffected by waning of Russia trade

Our analysis indicates that the trend for Finnish goods exports since the start of the war has been weaker on average in categories where Russia's share of Finnish exports has been large. Compared to Finnish goods with only a small share of exports to Russia, the exports of goods with large Russian export share has fallen by 22 % (Table1).[2] The trend for exports of goods with a moderate pre-war share of Russia also appears on average slightly weaker. For this group of goods, however, the effect is marginal and not statistically significant.

The impact of Russia dependence on Finnish total goods exports

Explanatory variable: Ln ($Exports_{it}$)	***Coefficient***
Large Russia share	*-0.26*** (0.10)*
Moderate Russia share	*-0.02 (0.05)*
N	*70,488*
R^2	*0.85*

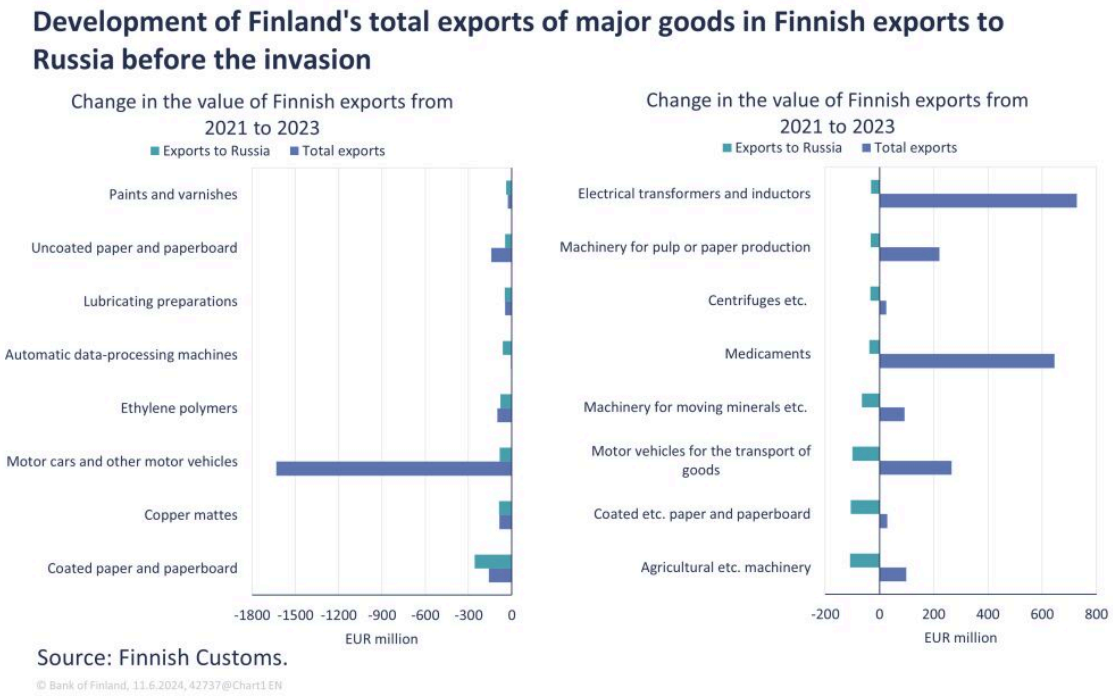
*Estimations include goods-specific and time-specific fixed effects. Statistical significance at the *** 1%, **5% and *10% levels, respectively. Heteroscedasticity-robust standard errors clustered by goods classifications are shown in parentheses.*

Source: calculations by the author.

A comparison of trends for certain product groups that were the most important in Finnish exports to Russia before the invasion yields interesting variations. Led by the contraction in exports to Russia, the total exports of Finland have decreased between 2021–2023 e.g. for certain types of machinery, chemical products and paper goods (Chart 1).

On the other hand, the decline in exports to Russia had little impact on total exports of many other goods because most losses have been offset with increased exports to other markets. For example, total 2023 exports of many types of machines were clearly larger than in 2021 even with the collapse of Russian exports. The growth of total exports of these goods, of course, might have been even larger if exports to Russia had not ended.

Chart 1.



Increased Finnish exports to Central Asian and Caucasus countries

Recent literature suggests that exports to Russia may have been rerouted via Central Asian and Caucasus countries in a search for new transport channels and to evade sanctions (Chupilkin et al., 2023; Penttilä, 2024; Toikka et al., 2023a). The value of Finland's exports to Central Asian and Caucasus countries nearly tripled between 2021 and 2023.[3]

Finnish exports to Central Asia and Caucasus countries grew by about 380 million euros between 2021 and 2023, while the value of Finnish exports to Russia fell by about 3.1 billion euros. Thus, even if all the increase in exports to Central Asian and Caucasus countries went to Russia, it would have only been sufficient to offset about 12 % of the drop in Finland's exports to Russia. This suggests that most the loss in Russian exports has been compensated for by penetration of new markets. The growth in the total value of Finnish exports in 2021–2023 was about 7.4 billion euros, implying that only about 5 % of the growth was due to increased exports to Central Asian and Caucasus countries.

Exports of certain goods to Central Asian and Caucasus countries, however, have made up a significantly larger shares of lost Russian exports. Only for few large product categories Central Asia and Caucasus completely cover the growth in Finland's total exports (e.g. certain tool parts

and equipment for testing the mechanical properties of materials).

Total imports of Russia-dependent goods have developed weakly, but substitute imports have been found in some cases

Statistical analysis also suggests that Finnish imports of goods for which Russia was a large provider before the invasion have diminished over the past two years much more than imports of other goods.[4] Compared to imports with smaller shares, the import volumes of such heavy-dependence goods shrank by 56 % after Russia's invasion (Table 2).[5] The imports of such goods where Finnish companies had a moderate dependence on Russian imports also appear to have performed slightly more poorly than other imports, but the effect is not statistically significant.

Impact of Russia dependence on total goods imports to Finland	
Explanatory variable: Ln (Imports$_{it}$)	***Coefficient***
Heavy dependence on Russia	*-0.81*** (0.21)*
Moderate dependence on Russia	*-0.16 (0.10)*
N	*78,168*
R^2	*0.88*
*Estimations include goods-specific and time-specific fixed effects. Statistical significance at the ***1%, **5% and *10% level, respectively. Heteroscedasticity-robust standard errors clustered by goods classifications shown in parentheses.*	

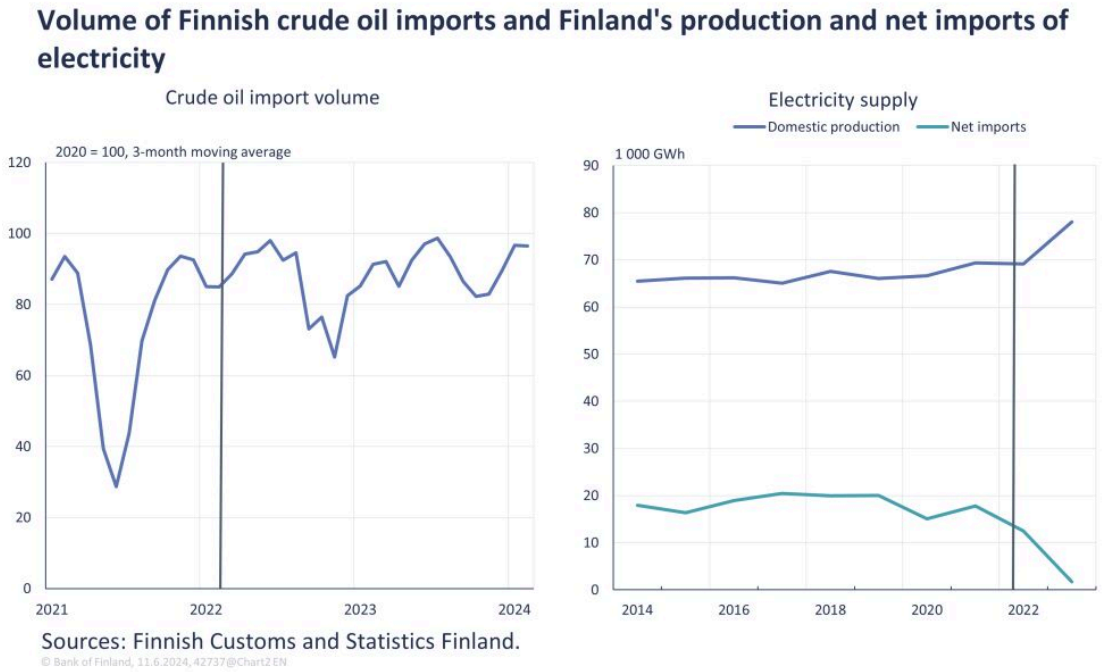
Source: calculations by the author.

Success has varied in finding alternative sources for goods on which Finnish companies were heavily dependent on Russia. For major import goods such as crude oil, Finland has simply shifted to importing oil from other countries. Russia accounted for 80 % of Finland's total crude oil imports in 2021. With the announcement of EU plans to ban crude oil imports in December 2022, crude oil imports from Russia to Finland dropped drastically and ceased altogether already by August 2022. Finland moved quickly in sourcing crude oil imports from elsewhere. By early 2024, Finland's crude oil import volumes were back to pre-invasion levels (Chart 2).

Russia provided a third of Finland's electricity imports in 2021, when about 10 % of Finland's electricity consumption was satisfied with imported electricity. In spring 2022, Russia cut all

electricity supplies to Finland. Since early 2023, in particular, Finland has made up for its lost imports by increasing domestic electrical power production (Chart 2). In late 2023, Finland was at times even a net electricity exporter.

Chart 2.



Russia accounted for 70 % of Finland's roundwood imports in 2021, and represented 12 % of the wood supply for Finnish forest industries. Wood imports from Russia to Finland ended in spring 2022. Finnish companies only managed to make up for a fraction of the Russian wood imports from other countries. As of end-2023, the entire volume of imported wood was only about 40 % of the 2019 average. The forest industry's use of wood contracted as the lost imports were not replaced by domestic supply either. The costs for certain woods increased sharply.

Finland has succeeded in finding alternate suppliers for many goods previously imported from Russia, but such goods typically come at a higher price. Average prices for many important goods imported from Russia in 2017–2019 were significantly cheaper than goods in the same product category imported from elsewhere (sometimes dozens of percent lower). This reflects transportation costs but in some cases also differences in quality. In any case, the costs for end-users likely increased at least in short-term as companies sought for alternative sources for lost Russian imports.

The impact of lost Russia trade on Finnish manufacturers

We next assess the impact of the Russia shock on the production and turnover of various manufacturing branches.[6] Our analysis focuses on whether there are discernible trends for branches dependent on Russia trade (exports or imports) performing more poorly relative to other branches after the invasion of Ukraine.

The dependence of a branch on exports to Russia is defined according to the share of its production devoted to Russian exports in 2016 (the start of our observation period).[7] Branches most dependent on Russian exports were the chemical industry (includes oil refining), the paper industry, as well as manufacturers of electronics and electrical equipment. A branch's dependence on imports from Russia is measured as the share of Russian imports used in the branch's production. Branches most dependent on Russian imports were the chemicals industry (includes oil refining), metals refining and wood processing.

The statistical analysis is similar to that as for foreign trade. Our results show that branches most dependent on exporting to Russia experienced slightly weaker production trends than other branches, but the impact was marginal and not statistically significant (Table 3). The turnover of companies in branches more dependent on Russian exports was also practically unaffected by the loss of Russian exports.

The results are similar to those for import dependence. The differences in the trends for branches most dependent on Russian imports have on average been small and they are not statistically significant (Table 3). The impact on turnover in import-dependent branches is mildly positive (probably a reflection of commodity price trends), but again not statistically significant.

Effect of Russia trade dependence on production and turnover of Finnish manufacturers

	Ln (production$_{it}$)	*Ln (turnover$_{it}$)*
Heavy dependence on Russian exports	*-0.12 (0.10)*	*0.00 (0.12)*
Heavy dependence on Russian imports	*0.02 (0.06)*	*0.02 (0.09)*
N	*1,358*	*1,358*
R^2	*0.37*	*0.65*

Source: calculations by the author.

Effect of Russia trade dependence on production and turnover of Finnish manufacturers
*Estimations include branch-specific and time-specific fixed effects. Statistical significance at the ***1%, **5% and *10% level, respectively. Heteroscedasticity-robust standard errors clustered by branch in parentheses.*

Source: calculations by the author.

This aggregate level assessment suggests that branches dependent on Russia trade before the war do not seem to have experienced relatively weaker development than other branches. Russia has been an extremely important supplier for Finland only with respect to a few types of products, and at least some of those are available from other sources. These findings comport with results from earlier studies with company-level data (Toikka et al., 2023b) and respondent companies' own estimations from a corporate survey conducted in the early months of the war (Mäki-Fränti & Vanhala, 2022).

Producer prices of key Russian goods have risen faster than producer prices generally

Although Finland found substitutes for some Russian imports, either from other countries or domestic substitutes, the Russia shock (as discussed above) raised prices of input-dependent producers. To assess the price impact more systematically we conduct a similar statistical analysis for producer prices as earlier for industrial production and turnover. The developments of product-group specific price indices of those goods most dependent on imports from Russia are compared to other product groups.[8] Import dependence is defined in the same way as in the previous analyses of industrial production and turnover.

Our statistical analysis suggests that basic price index for domestic supply rose faster in product groups that used to be most dependent on Russian imports (Table 4). In these product classifications, price increases have been 16 % higher on average than in other product categories. This suggests that prices of those inputs that were previously imported from Russia have increased faster and thus increased the production costs for those companies that need these inputs in their production. Rising costs may have also eroded the profitability of these companies.

The effect of dependence on Russian imports on producer prices of manufactured goods in Finland	
	Ln (basic price index for domestic supply$_{it}$)
Dependence on Russia	*0.15*** (0.05)*
N	*1,764*
R^2	*0.79*
*Estimations include product-classification-specific and time-specific fixed effects. Statistical significance at the ***1%, **5% and *10% level, respectively. Heteroscedasticity-robust standard errors clustered by product group in parentheses.*	

Source: calculations by the author.

Effect on Finland compared to other EU countries

Because Russia accounted for a significantly larger share of trade than for most EU countries, the Baltic countries and Finland were more exposed to the Russia shock. Russia's share of Baltic and Finnish goods imports was 10–12 % in 2021, well above the 3 % EU average. Russia accounted for 12 % of Latvian and Lithuanian total exports, 4–5 % of Finnish and Estonian exports, but only an average of 1 % for other EU countries. Finland experienced one of the steepest declines in Russia trade of any EU country.

Loss of Russia trade has had limited impacts on EU manufacturing output and company turnover

Following the same statistical analysis as for Finland, we now consider the impact of Russia dependence at the branch level for production and turnover in all EU countries since the outbreak of war.[9] We now examine if the post-invasion production volumes and turnover trends for country-branch pairs with either heavy or moderate dependence on Russia are weaker compared to other country-branch pairs.[10]

The results show that output trends of Russia-dependent branches do not generally deviate from those of other branches (Table 5).[11] To capture possible special effects for Finland, we add a Finland-specific dummy variable to our model. The effect in Finland is mildly negative, but the dummy variable coefficient is not statistically significant in any estimation.

The effect of dependence on Russia trade on EU manufacturing production			
	Ln (production$_{ijt}$)	***Ln (production$_{ijt}$)***	***Ln (production$_{ijt}$)***
Heavy dependence on Russian exports	*0.04 (0.04)*		*0.04 (0.04)*
Moderate dependence on Russian exports	*0.03 (0.03)*		*0.03 (0.03)*
Heavy dependence on Russian imports		*0.00 (0.05)*	*0.01 (0.51)*
Moderate dependence on Russian imports		*-0.03 (0.03)*	*-0.03 (0.03)*
Baltic countries	*0.12** (0.05)*	*0.15*** (0.05)*	*0.13** (0.05)*
Finland	*-0.02 (0.03)*	*-0.023 (0.04)*	*-0.04 (0.03)*
N	*34,702*	*34,702*	*34,702*
R^2	*0.36*	*0.36*	*0.36*
*Estimations include country-branch-pair-specific and time-specific fixed effects. Statistical significance at the ***1%, **5% and *10% level, respectively. Heteroscedasticity-robust standard errors clustered by country-branch pairings in parentheses.*			

Source: calculations by the author.

The results of a similar analysis for turnover are in line with the results for export-dependence in production, but quite different for import-dependence in production. Somewhat surprisingly, turnover has developed more positively in those branches that were the most dependent on Russian imports before the war (Table 6). The result shows strong statistical significance. This could reflect commodity price trends as imports from Russia are typically destined for oil- or metal-refining processes, or for the chemical industries.

The post-invasion turnover performances of Finnish branches appear to be poorer than those of their other EU counterparts. This may reflect the decisive exit of Finnish firms from the Russian market and the costly losses incurred from abandonment of production facilities in Russia.

The impact of Russia trade dependency on turnover of EU manufacturers			
	Ln (turnover$_{ijt}$)	*Ln (turnover$_{ijt}$)*	*Ln (turnover$_{ijt}$)*
Heavy dependence on Russian exports	*0.00 (0.04)*		*0.02 (0.04)*
Moderate dependence on Russian exports	*-0.03 (0.03)*		*-0.02 (0.03)*
Heavy dependence on Russian imports		*0.24*** (0.05)*	*0.24*** (0.51)*
Moderate dependence on Russian imports		*0.03 (0.03)*	*-0.03 (0.03)*
Baltic countries	*0.12** (0.05)*	*0.08* (0.05)*	*0.07 (0.05)*
Finland	*0.07** (0.03)*	*-0.10*** (0.03)*	*-0.10*** (0.02)*
N	*32,748*	*32,748*	*32,748*
R^2	*0.52*	*0.52*	*0.52*
*Estimations include country-branch-pair-specific and time-specific fixed effects. Statistical significance at the ***1%, **5% and *10% level, respectively. Heteroscedasticity-robust standard errors clustered by country-branch pairings in parentheses.*			

Source: calculations by the author.

The previous literature also finds no exceptionally large impact on Finnish GDP relative to the rest of the EU. Simulations with general equilibrium models find that the economic losses suffered by Finland from the demise of Russia trade are about the same as the EU average (Blagov et al., 2024; Borin et al., 2023; Javorcik et al., 2024).

EU producer prices in branches dependent on imports from Russia have risen faster than prices of other goods

As a final analysis, we consider whether dependence on imports from Russia has affected producer prices in EU countries.[12] In our statistical analysis, producer prices display distinct increases in those country-branch pairs where dependence on Russian imports has been large or moderate (Table 7). Compared to branches without dependence on imports from Russia, producer prices in branches heavily dependent on Russian imports have risen 20 % more on average and 8 % more on average for branches with moderate dependence on Russian imports. Again, this suggests

that production costs have risen for firms that need as inputs for their production goods from branches reliant on Russian imports.

Slightly higher-than-average price rises are seen in EU countries that are not part of the Eurozone. The results for Russia dependence, however, are quite similar to those for a sample solely comprising Eurozone countries. No statistically significant Finland-specific effect is detected for producer prices.

The impact of dependency on Russian imports on producer prices of EU and Eurozone manufacturing branches

	Ln (producerpriceindex$_{ijt}$) EU countries	***Ln (producerpriceindex$_{ijt}$) Eurozone***
Heavy dependence on Russian imports	*0.20*** (0.04)*	*0.17*** (0.05)*
Moderate dependence on Russian imports	*0.07*** (0.02)*	*0.08*** (0.02)*
Non-Eurozone	*0.08*** (0.01)*	
Finland	*0.02 (0.02)*	*0.01 (0.02)*
N	*34,664*	*21,680*
R^2	*0.69*	*0.65*

*Estimations include country-branch-pair-specific and time-specific fixed effects. Statistical significance at the ***1% level. Heteroscedasticity-robust standard errors clustered by country-branch pairings in parentheses.*

Source: calculations by the author.

Conclusion

Since Russia's full-scale invasion of Ukraine, the trend in Finnish goods exports has been slightly weaker and in goods imports significantly weaker in products where Russia accounted for a large share of trade before the invasion. The production and turnover trends in Finnish manufacturing branches more dependent on Russian trade have not been distinctly weaker than in other branches. Russia's share in the output of most branches was generally relatively small before the

war and many Finnish companies have found alternative markets to replace Russia. On the other hand, prices for some production inputs earlier provided on a large scale from Russia have increased sharply. This adjustment may have increased company production costs and eroded their profitability.

The developments are similar also at the level of the EU. Neither production nor turnover of Russia-dependent manufacturers appear to have been weaker on average than in other branches since the start of the war. Producer prices, however, have risen significantly more in manufacturing branches with greater dependence on imports from Russia.

The Russia shock does not appear to have affected Finnish manufacturing output significantly more than other EU countries. Even so, it appears that there might have been an additional adverse shock on the turnover of Finnish manufacturers. This could reflect the particularly active retreat of Finnish companies from the Russian market and costly abandonment of production facilities within Russia.

Overall, our analysis indicates that the aggregate level impacts on Finnish manufacturing industry from the loss of Russian trade have been limited. Many Finnish firms had reduced their Russia exposure before the invasion of Ukraine and post-invasion have managed to adjust rather effectively to disruptions caused by the conflict. This analysis did not, however, address the impacts of war on Finland's service industries such as tourism, which has clearly lost export earnings from the withering of Russian trade, and its focus stayed at a relatively aggregate level. The negative effects could be larger for particular regions, more narrowly defined branches or specific corporations.

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Footnotes

1. In the statistical analysis, the export value of good i in period t is regressed on interaction dummy variables. The dummy variable "heavy dependence on Russian exports" is given a value of 1 if Russia's share of goods exports exceeded 25 % in 2018. For "moderate dependence on Russian exports" the dummy variable takes a value of 1 if Russia's share of goods exports fell in the range of 10–25 % in 2018. The value of exports is regressed on the interactions of these variables and the time period after Russia's invasion. The examination is based on monthly data and covers the period 2018–2023. The analysis is based on figures for level 4 classification of the Combined Nomenclature (CN4). EU foreign trade is reported under the CN classification, with CN2 the most general level and CN8 the most detailed. ↑

2. The percentage impact of the dummy variable is [exp(Coefficient)-1)]*100. ↑
3. ”Central Asia and Caucasus countries” comprises Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan and Uzbekistan. ↑
4. Import volumes are used here to eliminate the effects from commodity price fluctuations. ↑
5. The percentage impact of the dummy variable is calculated as: [exp(coefficient)-1)]*100. ↑
6. The assessment comprises monthly product volumes and turnover of 14 manufacturing branches from January 2016 to January 2024. ↑
7. Shares vary slightly depending on whether gross output volume and exports or Russian value added are used in determining final demand. In any case, the branches most dependent on Russian exports stay the same no matter which definition is used. ↑
8. The basic price index for domestic supply measures development in the prices of goods used in Finland as they enter the market. The index includes both domestic and imported goods. Due to slightly different statistical classification, the assessment includes 18 product classification categories. “Oil refining” is not included in the analysis due to missing data. ↑
9. The dependent variable is the monthly index of production volume or turnover for branch j of country i. The production volume data are available for 20 EU countries and the turnover data for 19 EU countries. Our assessment covers 20 branches, because data for all countries (including Finland) are not available for every branch at the most detailed level. Some countries, for example, do not release figures on oil refining. The dataset covers a total of 364 country-branch pairs. The observation period runs from 2016 to 2023. ↑
10. Heavy-dependence country-branch pairs are those with Russia trade exceeding 2 % of the branch’s output in 2016. Moderate dependence pairs are those with exports to Russia of 1–2 % and imports of 0.5–2 % in 2016. ↑
11. The Baltic countries are the exception: output in Russia-dependent branches shows more positive trends. ↑
12. The data cover 21 countries and 20 branches. The explanatory variable is the monthly branch-specific producer price index calculated in the national currency. The data cover 363 country-branch pairs from January 2016 to December 2023. ↑

Key words

Finland, foreign trade, industry, Russia, sanctions