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In Search of Upcoming Supply Chain Surprises

THE WORLD EXPORT MARKET SHARES OF BELARUS, RUSSIA AND UKRAINE

Jyrki Ali-Yrkkö
ETLA Economic Research
jyrki.ali-yrkko@etla.fi

Johannes Hirvonen
ETLA Economic Research
johannes.hirvonen@etla.fi

Petri Rouvinen
VTT Technical Research Centre of Finland
petri.rouvinen@vtt.fi

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Abstract

This brief considers the world export market shares of Belarus, Russia and Ukraine across over five thousand commodities (the full dataset is provided online at the same web address as this brief). The aim is to provide a tool for gauging where supply chain disruptions might emerge next.

Earlier discussion regarding the international trade presence of the three countries has largely revolved around crude oil and natural gas. While they also prominently appear in our analysis, foodstuffs and fertilizers (and the materials thereof) appear to be even more important. With the La Niña weather pattern affecting North American crops in the same time window, a global food catastrophe after the coming autumn, if not sooner, seems imminent.

The three countries account for about 70% of sunflower oil exports globally. Their corresponding share for colza and rape oils, popular substitutes for sunflower oil, is over 25%. There are also several narrow and globally minor categories in which the three countries have huge markets shares and in which they might cause disruptions in specific supply chains; examples include specific types of fish and other seafoods.

Finland is highly exposed to the consequences of the war (it should be noted, however, that the role of domestic provision in is not considered in this brief). For example, practically all of Finland's nickel imports come from Russia, as do a significant share of methanol, sawn wood, and crude oil.

Tiivistelmä

Missä tuotteissa toimitusketjujen häiriömahdollisuuksia voi ilmetä? – Ukrainan, Venäjän ja Valko-Venäjän maailmankaupan vientimarkkinaosuudet

Tässä muistiossa analysoidaan, millainen rooli Ukrainalla, Venäjällä ja Valko-Venäjällä on eri tuotteissa ja materiaaleissa. Tarkastelu tehdään hyvin yksityiskohtaisella tasolla perustuen tuhansiin eri tuotteisiin ja tuoteryhmiin. Tarkoitus on löytää mahdollisia tuotteita tai materiaaleja, joissa ilmenevät saatavuusongelmat voivat jatkossa aiheuttaa häiriöitä toimitusketjuihin.

Hienojakoinen analyysi paljastaa, että öljyn ja maakaasun lisäksi näillä kolmella maalla on suuria globaaleja markkinaosuuksia koskien muun muassa ruokien ainesosia, lannoitteita ja niiden raaka-aineita. Näiden saatavuusongelmien vakavuus riippuu osittain siitä, missä määrin korvaavia tuotteita ja raaka-aineita on saatavissa. Havaitsemme, että samaiset maat ovat usein keskeisiä myös lähinnä korvaavissa tuotteissa.

Tulokset osoittavat, että Suomen tuonnin kannalta erityisesti Venäjä on monissa raaka-aineissa ja materiaaleissa keskeinen. Raaka-öljyn ja maakaasun ohella nikkeliä, puuta ja metanolia tuotiin paljon Venäjältä. Lisäksi Venäjä oli merkittävä tuontimaa esimerkiksi lannoitteiden raaka-aineissa (mm. urea, kalium ja fosfori). On kuitenkin syytä huomata, että kauppatilastoja hyödyntävä analyysimme ei huomioi kotimaista tarjontaa.

Sekä Ukrainan sota että koronakriisi ovat tuoneet esiin globaaleihin toimitusketjuihin liittyvät riskit. Vaikka nämä ketjut ovat toimineet hyvin useamman vuosikymmenen, nyt niihin sisältyvät epävarmuudet ovat realisoituneet. Tämän takia sekä yritysten että kansantalouden näkökulmista on tunnistettava kriittisiä tuoteryhmiä, jotka voisivat aiheuttaa merkittäviä yhteiskunnallisia häiriöitä.

Ph.D. **Jyrki Ali-Yrkkö** is a Research Director at Etla Economic Research and CEO of Etlatieto Oy.

M.Sc. **Johannes Hirvonen** is a Researcher at Etla Economic Research.

Ph.D. **Petri Rouvinen** is Professor of Practice at VTT.

KTT **Jyrki Ali-Yrkkö** on Elinkeinoelämän tutkimuslaitoksen tutkimusjohtaja ja Etlatieto Oy:n toimitusjohtaja.

KTM **Johannes Hirvonen** on Elinkeinoelämän tutkimuslaitoksen tutkija.

Ph.D. **Petri Rouvinen** on VTT:n työelämäprofessori.

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Key words: Ukraine, Russia, Economy, Exports, Dependency, Imports, Trade, War

Avainsanat: Ukraina, Venäjä, Talous, Tuonti, Vienti, Riippuvuus, Kauppa, Sota

JEL: F14, F1, F51, F52

1 Background

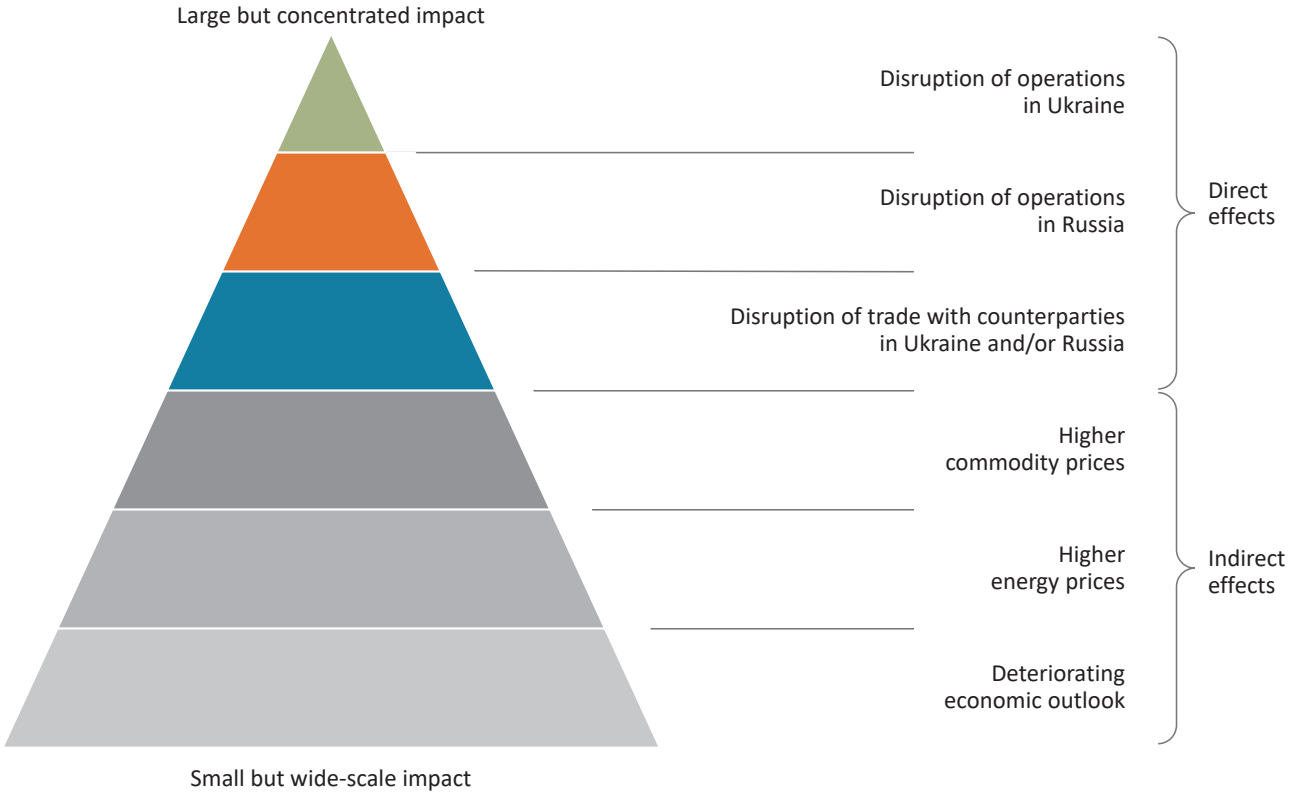
The most important aspect of Russia's offensive warfare in Ukraine is the humanitarian one – tens of millions of lives have been unnecessarily disrupted, shattered or lost. While all economic aspects are far secondary to the humanitarian one, in this brief we concentrate on exports at the most detailed available level.

In just days after the beginning of Russia's offence, Volkswagen announced that, since it could no longer source wiring from Ukraine, it was being forced to close two of its plants elsewhere in Europe. Our motivation for this brief is to provide tools for gauging where this kind of surprise might emerge next.

There are many angles to thinking about in regard to the economic consequences of the crisis. ING, a Dutch bank, suggests a few broad types of impact that are depicted in Figure 1. ING's pyramid is an apt metaphor. From the vantage point of the global economy, impacts towards the top are intense but concentrated. Impacts towards the bottom are diluted but, due to their wider reach, are potentially more significant for near-term global growth prospects. On this scale, what we touch upon – the impact on counterparties via international trade linkages – is of medium intensity and reach.

In this brief, we look at world export market shares – defined as a country's net exports in a specified category, divided by the sum of all countries' net exports in the same category – of Belarus, Russia and Ukraine at the most detailed level possible. When attempting to determine impacts, we focus on the relatively short term with a rather pessimistic view: we assume the cessation of all exports from the three countries, at least in the short term. The six-digit level of the harmonized system (HS)

Figure 1 The impact channels of the Russia–Ukraine war



Source: The authors' adaptation of a figure by ING.

covers cross-border trade in 5,074 commodities, goods and materials (services are not covered and thus we do not consider them in this brief). We will consider the top few categories in which the three countries are globally significant. In order to provide a better overview, we first consider the more aggregate two-digit level of the same system with 96 categories. We also study some further details for the case of Finland. For those interested, we provide Excel files with the full data, along with the labels of each category in Finnish.

2 Things to consider when analysing the data

When looking at export data with the goal of identifying products at risk of large supply reduction due to the war, an immediate trade-off arises between detailed and aggregated levels. On the one hand, detailed exploration can reveal product markets where the three countries have a dominant market position that would have been missed by using aggregated data. On the other hand, too much detail can make drawing useful insights difficult. Therefore, we try to tackle these problems by providing listings of important export measures by each product code, both at an aggregated level (an HS 2-digit level) and at a detailed level (an HS 6-digit level).

Another challenge comes from identifying products of which the global supply largely depends on Belarus, Russia and Ukraine. One is tempted to list the product codes, either sorting them by the three countries' export value or by the share of world exports the three countries hold. Both sorting methods have potential pitfalls which need to be considered when determining the importance of a given category.

To give an example, the largest export of the three countries in monetary value, crude oil, amounted to nearly 73 billion dollars in 2020.[1] While a massive amount in monetary terms, it accounts for less than 17% of total crude oil exports globally. In line with that observation, recent reports exhibit confidence in alternative sources of crude oil supply emerging in place of Russia's oil, highlighting that the pure monetary value of exports can overstate the importance of a product. Similarly, the top export product of the three countries when sorting by market share within the product's exports worldwide is frozen Alaskan pollack. The export market size of the said fish is slightly less than a billion dollars, of which the exports of the three countries account for 91%. While the cessation of fish exports in the three countries might bear significant negative consequences locally for the exporting countries and the respective markets, it clearly will not affect the world economy and food supply drastically.

These two examples serve to underline the need for careful and detailed exploration of the world trade statistics when predicting the potential impacts of a halt in trading between the countries at war and other countries. In practice, the importance of a product's export is a function of both its export value and market share. We omit attempts to identify this function exactly[2] in this brief and instead highlight products with high export value and market share, and let the reader draw his or her own conclusions from our clearly and transparently presented open-source data.[3]

Furthermore, various sources have cited world export market shares that are not fully consistent with ours. In this brief, our logic has been to provide simple numbers from a well-regarded international source (World Bank) and make some simple calculations in a fully transparent manner.

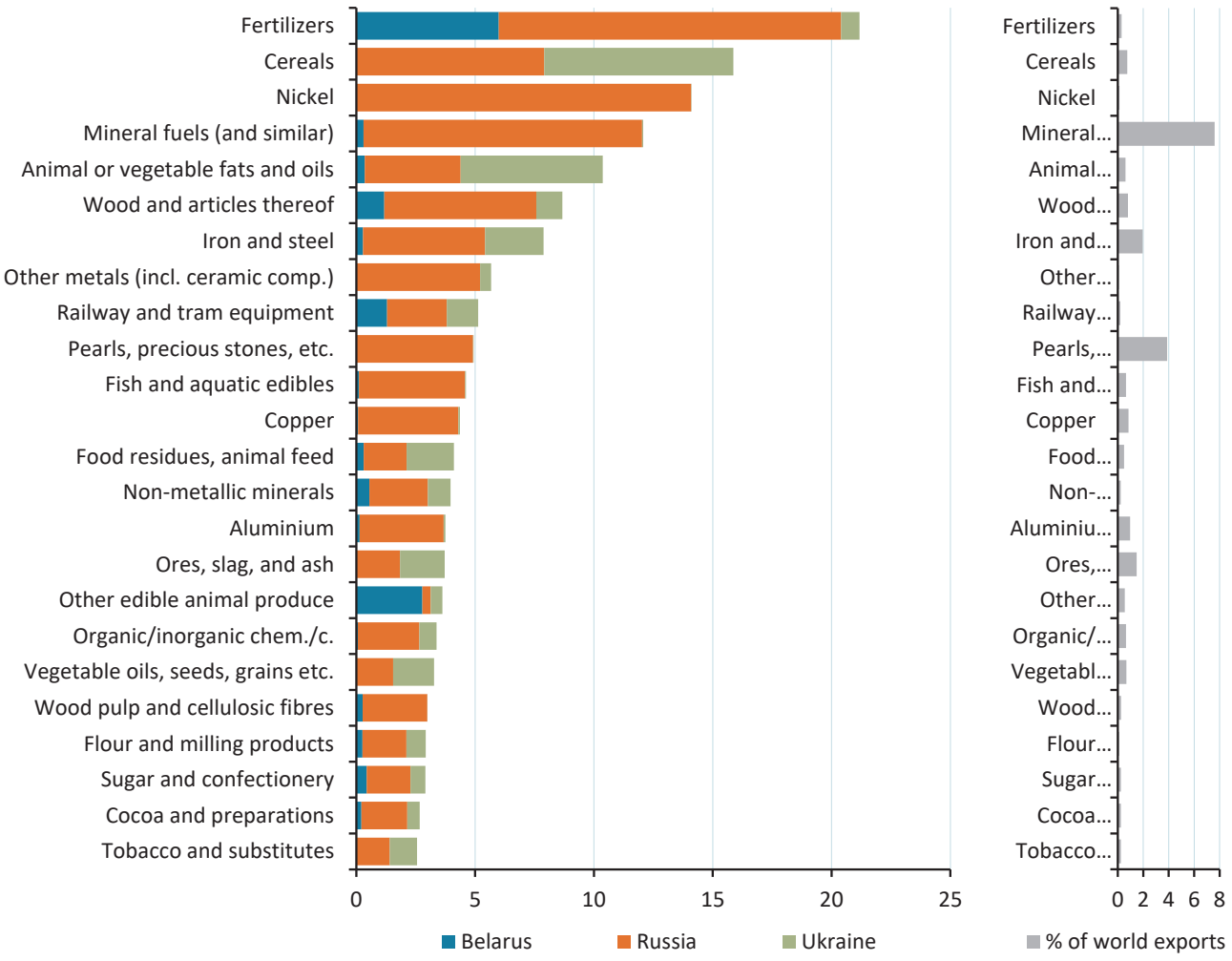
We also emphasise that we calculate world export market shares based on the net exports defined in our primary data source. The share that we calculate is different from a country's share of world production since items that do not go across national borders are not included in our calculations. This distinction is likely to be especially important in regard to, for example, perishable foodstuffs that tend to be locally produced and consumed. Unfortunately, national production volumes are not available at the same level of aggregation, so the most desirable measure is infeasible.

3 Potential disruption sources of supply chains by product

Despite fertilizers accounting for a small share of aggregate international trade, their role is vital for human life. In total, the parties (Ukraine, Russia and Belarus) account for 21% of fertilizers' global exports (see Figure 2). Among these three countries, Russia is the most important, but the significance of Belarus is also surprisingly high. Cereals are directly vital products for human life, but also indirectly vital because grain is also used to feed cows, pigs and other animals. Ukraine and Russia export huge amounts of cereals. Together, they account for one-sixth of the world exports of cereals.

Mineral fuels are a product category that has been central in public discussion relating to the war, so we will only comment on it briefly. The three countries account for about 12% of the world's exports of mineral fuels. This is an especially important group of products as they

Figure 2 The world export market shares of Belarus, Russia and Ukraine in selected *broad* (HS2) commodity categories (on the left) and the commodity's share of total world exports (on the right)



Note: The commodity classes at the two-digit level of the HS (a) with over 10 billion US dollars in world exports in 2020 and (b) in which the combined world export market share of Belarus, Russia and Ukraine was over 2%. Class 99, 'Commodities not specified according to kind', is excluded.

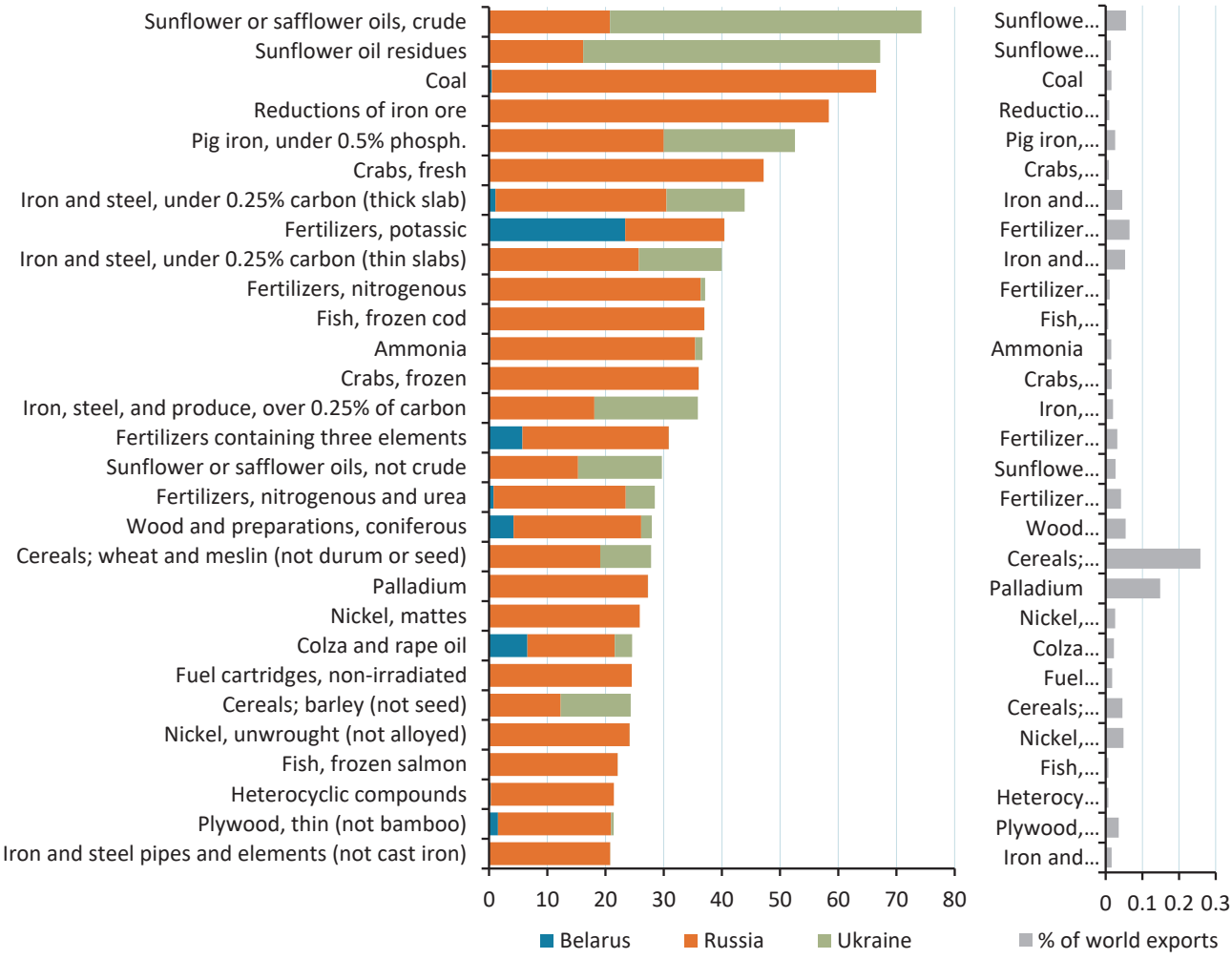
Source: World Integrated Trade Solution, World Bank.

amount to almost 8% of the total world exports. Most of these exports in the three countries come from Russia, mainly due to oil and natural gas being Russia's central export items. The importance of mineral fuel supply to the world goes without saying – not only does it have a direct impact on the fuel and heating prices of consumers, but many businesses (in manufacturing and logistics, for example) depend on it. Nonetheless, the consensus among experts and researchers appears to be that the mineral fuel exports of Russia can be replaced by other sources. This might take some time, as is evident from the quick rise of gasoline prices globally, for example.

Our analysis shows that these three countries have surprisingly high market shares in certain product groups. Even though the shares in Figure 2 are high, some dominant market positions can be missed by using these still rather aggregated figures. Thus, the reliance on some important products is potentially unnoticed. Therefore, it is important to consider the role of these three countries on a more detailed product level (see Figure 3).

A more detailed analysis reveals significantly higher market shares than presented before. Ukraine accounts for nearly half of sunflower oil's world exports and Russia's

Figure 3 The world export market shares of Belarus, Russia and Ukraine in selected *narrow* (HS6) commodity categories (on the left) and the commodity's share of total world exports (on the right)



Note: The commodity classes at the two-digit level of the HS (a) with over one billion US dollars in world exports in 2020 and (b) in which the combined world export market share of Belarus, Russia and Ukraine was over 20%.

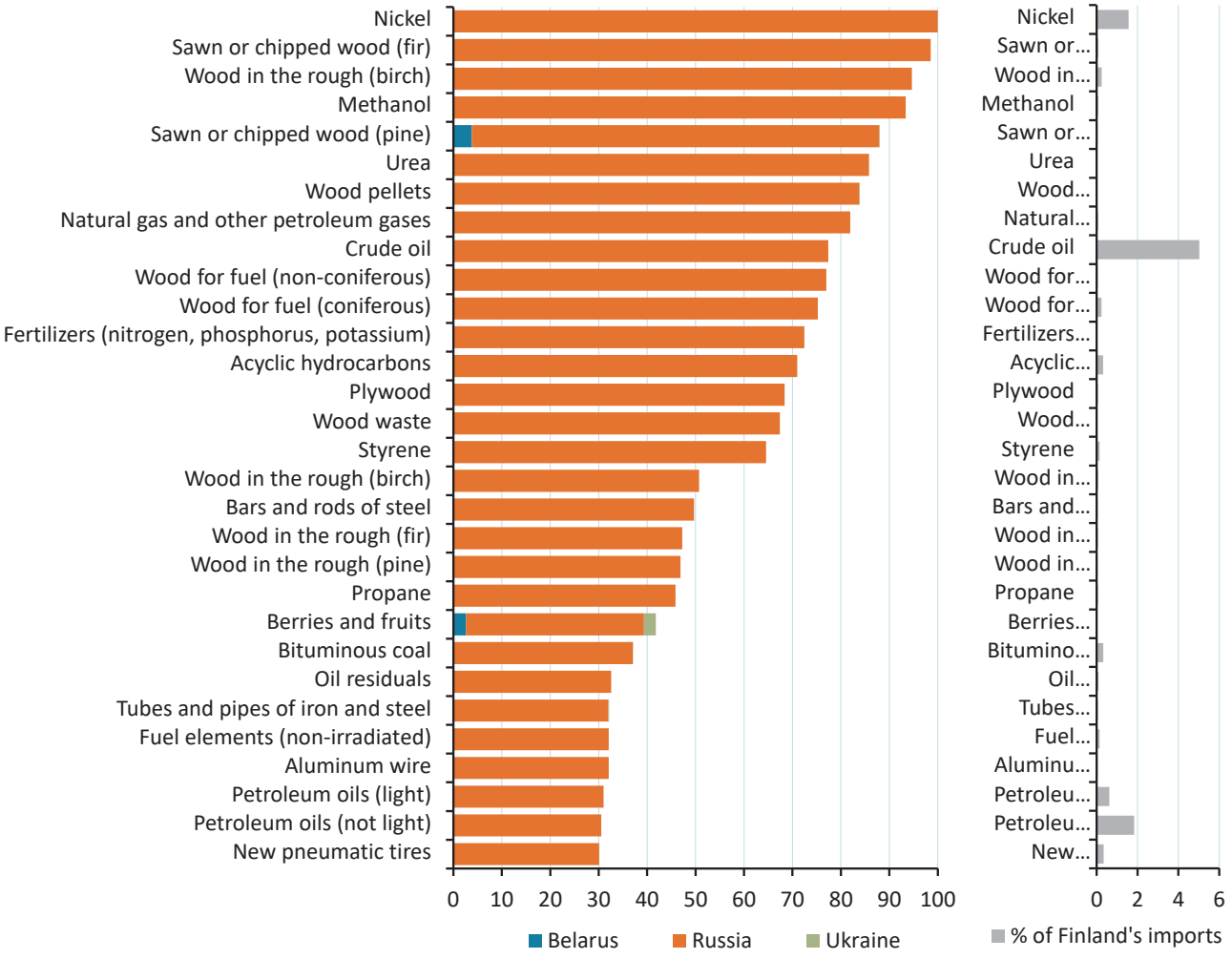
Source: World Integrated Trade Solution, World Bank.

share is almost one-fifth. Taken together, the market share of these two countries reaches three-fourths of world exports. Sunflower seed oil is a popular cooking oil in many countries and is also important for the food industry but can be replaced with other vegetable oils, such as colza. However, the detailed consideration reveals that in total, Belarus, Ukraine and Russia are also important producers and exporters of colza and rape oil. Hence, even though it is possible to find substitutes for some raw materials or products, they may also come from these same countries. This should be taken into account when looking at the resilience in different economies.

A fine-grained breakdown also shows that, in addition to fertilizers, Russia plays an important role as an exporter of the raw materials (e.g. potassic, urea and ammonia) needed in fertilizers. The lack of raw materials or other intermediates causes disruptions downstream in value chains. This finding highlights the importance of considering the reliance not only at the aggregate level but also at the detailed level.

An important aspect regarding the disruptions in world trade is their effects on specific industries or countries. For example, the exports of the three countries (main-

Figure 4 The import market shares of Belarus, Russia and Ukraine to Finland in selected *narrow* (HS6) commodity categories (on the left) and the commodity's share of total imports in Finland (on the right)



Note: The commodity classes at the two-digit level of the harmonised system (a) with over one 10 million US dollars in imports from Belarus, Russia and Ukraine to Finland in 2020 and (b) in which the combined market share of Finland's imports was over 30%.

Source: World Integrated Trade Solution, World Bank.

ly Russia) amount to a significant share of global fish and crustacean (äyriäiset in Finnish) exports. While seafood per se is neither vital for the global economy nor to an individual's diet, a large drop in its supply can cause negative effects in specific food processing plants and restaurants across the globe (especially those specialising in seafood); in any case, alternative sources of calories, protein and nutrients are needed.

We would like to point out that from the viewpoint of a single economy, the market shares of Ukraine, Russia and Belarus in certain products or materials can be remarkably higher than the analyses suggest. During a crisis, such as the war in Ukraine, there may be a global shortage of some products or materials. If some country has relied entirely on the production of one country, it might be extremely challenging to find alternative sources at a time of a global shortage. This calls for considering how dependent a specific country is on the countries involved in a war. In Figure 4, we provide the example of Finland.[4]

As can be seen in Figure 4, Russia especially is hugely important for Finland in several key categories. More than 90% of imported nickel, sawn wood and methanol come from Russia. There are also many other imported products and materials, such as crude oil and natural gases, where Russia accounts for a large share of Finnish imports.[5] Most categories in Figure 4 are raw materials or other relatively simple and low-value added commodities. Notwithstanding this, they might play an important role in production stages located in Finland. Specific examples of disruptions covered in media in recent times include AdBlue, which is used in diesel fuel and is produced from urea (imports from Russia cover over 85% of urea imports) and new pneumatic tires (Russia has a share of about 30% of imports) that are specifically related to Nokian Tyres' extensive manufacturing in Russia. These supply problems often reach the consumers after a delay or, in some cases, they do not reach them in a directly noticeable way.

It should be noted, however, that our figures do not include domestic supply. For instance, in the Finnish case, a great majority of wood raw material is of domestic origin, and this has not been taken into account in the brief. This is a major caveat and should be tackled in future work.

4 Conclusions

This study focused on the world export market shares of Belarus, Russia and Ukraine by using fine-grained data covering several thousand products and product groups. We aim to provide a tool for gauging where supply chain disruptions might emerge next.

According to our results, in some product groups these three countries (Ukraine, Belarus and Russia) have remarkably high market shares globally, and some of these are vital for human life. In total, the parties (Ukraine, Russia and Belarus) account for 21% of fertilizers' global exports. Russia is a very important exporter of fertilizers, but our results show that the significance of Belarus is also surprisingly high. Cereals are directly vital products for human life but are also indirectly vital because grain is also used as feed for animals. Our analysis revealed that Ukraine and Russia are important exporters of cereals as, together, they account for one-sixth of the world exports of cereals.

In addition to global market shares, it is important to look at the role of these three countries at the country level. Even though a global market share might be low, it might be high from the viewpoint of a specific country. Our analysis focusing on Finland highlights this. Russia has very large market shares of Finnish imports of nickel, methanol, wood and crude oil; Russia is also important in regard to fertilizers and their raw materials (e.g. potassic, urea and ammonia).

As the war disrupts supply chains, the severity of the disruption depends on substitution potential. If companies from other countries are able to supply the necessary intermediates and final products, the impact will be limited. However, the ability of these alternative sources to increase their capacity varies. For instance, the increase of oil supply capacity takes 4–6 months to materialise (Golding, 2019). Another way to solve the disruption challenge concerns the replacement of some material or product by another. Based on a fine-grained analysis, our results show that even though it is possible to find substitutes for some raw materials, they may also come from the same warring countries.

Upon writing this (28 March 2022), the war in Ukraine continues full scale. After active warfare ends, societies and their economies start to recover and to re-enter the international stage (sanctions permitting). On one hand, Ukraine's productive capacity will be shattered, but its re-entry will be very much welcomed; for Belarus and Russia, the opposite seems likely for quite some time. Regardless, re-entry will happen after supply chains have been reconfigured, so customers have to be won over again – this time, they will be very aware of risks of international sourcing. At least in economic terms, Russia has inflicted a severe and long-lasting problem on itself by attacking Ukraine.

Endnotes

1 This amount is almost entirely exported by Russia.

2 There are many different measures of export dependency and exposure in the international trade literature. One simple example would be the Herfindahl-Hirschman Index.

3 To access the raw data used in this brief, create a free account to the World Bank's World Integrated Trade Solution platform.

4 For a broader analysis of Russia's significance for Finnish companies, see Ali-Yrkkö et al. (2022).

5 Note that the export data is from 2020. Finland's natural gas imports have become even less concentrated in the last year, with a launch of a new gas pipe between Estonia and Finland.

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Appendix

Table A1 HS Codes (two-digit codes) and descriptions for the products appearing in Figure 2

HS Code	Description (short)	Description	Description (in Finnish)
31	Fertilizers	Fertilizers	Lannoitteet
10	Cereals	Cereals	Vilja
75	Nickel	Nickel and articles thereof	Nikkeli ja nikkelitavarat
27	Mineral fuels (and similar)	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes	Kivennäispolttoaineet, kivennäisöljyt ja niiden tislaustuotteet; bitumiset aineet; kivennäisvahat
15	Animal or vegetable fats and oils	Animal or vegetable fats and oils and their cleavage products; prepared animal fats; animal or vegetable waxes	Eläin-, kasvi- ja mikrobirasvat ja -öljyt sekä niiden pilkkoutumistuotteet; valmistetut ravintorasvat; eläin- ja kasvivahat
44	Wood and articles thereof	Wood and articles of wood; wood charcoal	Puu ja puusta valmistetut tavarat; puuhiili
72	Iron and steel	Iron and steel	Rauta ja teräs
81	Other metals (incl. ceramic comp.)	Metals; n.e.c., cermets and articles thereof	Muut epäjalot metallit; kermetit; niistä valmistetut tavarat
86	Railway and tram equipment	Railway, tramway locomotives, rolling-stock and parts thereof; railway or tramway track fixtures and fittings and parts thereof; mechanical (including electro-mechanical) traffic signalling equipment of all kinds	Rautatieveturit, raitiomoottorivaunut ja muu liikkuva kalusto sekä niiden osat; rautatie- ja raitiotieradan varusteet ja kiinteät laitteet sekä niiden osat; kaikenlaiset mekaaniset (myös sähkömekaaniset) liikennemerkinantolaitteet
71	Pearls. Precious stones, etc.	Natural, cultured pearls; precious, semi-precious stones; precious metals, metals clad with precious metal, and articles thereof; imitation jewellery; coin	Luonnonhelmet ja viljellyt helmet, jalo- ja puolijalokivet, jalometallit, jalometallilla pleteroidut metallit ja näistä valmistetut tavarat; epäaidot korut; metallirahat
3	Fish and aquatic edibles	Fish and crustaceans, molluscs and other aquatic invertebrates	Kalat sekä äyriäiset, nilviäiset ja muut vedessä elävät selkärangattomat
74	Copper	Copper and articles thereof	Kupari ja kuparitavarat
23	Food residues, animal feed	Food industries, residues and wastes thereof; prepared animal fodder	Elintarviketeollisuuden jätetuotteet ja jätteet; valmistettu rehu
25	Non-metallic minerals	Salt; sulphur; earths, stone; plastering materials, lime and cement	Suola; rikki; maa- ja kivilajit; kipsi, kalkki ja sementti
76	Aluminium	Aluminium and articles thereof	Alumiini ja alumiinitavarat
26	Ores, slag, and ash	Ores, slag and ash	Malmit, kuona ja tuhka
4	Other edible animal produce	Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included	Maito ja meijerituotteet; linnunmunat; luonnonhunaja; muualle kuulumattomat eläinperäiset syötävät tuotteet
28	Organic/ inorganic compounds	Inorganic chemicals; organic and inorganic compounds of precious metals; of rare earth metals, of radio-active elements and of isotopes	Kemialliset alkuaineet ja epäorgaaniset yhdisteet; jalometallien, harvinaisten maametallien, radioaktiivisten alkuaineiden ja isotooppien orgaaniset ja epäorgaaniset yhdisteet
12	Vegetable oils, seeds, grains etc.	Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit, industrial or medicinal plants; straw and fodder	Öljysiemenet ja -hedelmät; erinäiset siemenet ja hedelmät; teollisuus- ja lääkekasvit; oljet ja kasvirehu
47	Wood pulp and cellulosic fibres	Pulp of wood or other fibrous cellulosic material; recovered (waste and scrap) paper or paperboard	Puusta tai muusta kuituisesta selluloosa-aineesta valmistettu massa; keräyspaperi, -kartonki ja -pahvi (-jäte)
11	Flour and milling products	Products of the milling industry; malt, starches, inulin, wheat gluten	Myllyteollisuustuotteet; maltaat; tärkkelys; inuliini; vehnägluteeni
17	Sugar and confectionery	Sugars and sugar confectionery	Sokeri ja sokerivalmisteet
18	Cocoa and preparations	Cocoa and cocoa preparations	Kaakao ja kaakaovalmisteet
24	Tobacco and substitutes	Tobacco and manufactured tobacco substitutes	Tupakka ja valmistetut tupakankorvikkeet; tuotteet, myös nikotiinia sisältävät, jotka on tarkoitus hengittää sisään ilman polttamista; muut nikotiinia sisältävät tuotteet, jotka on tarkoitettu ihmisten nikotiininsaantiin

Table A2 HS Codes (six-digit codes) and descriptions for the products appearing in Figure 3

HS Code	Description (short)	Description	Description (in Finnish)
151211	Sunflower or safflower oils, crude	Vegetable oils; sunflower seed or safflower oil and their fractions, crude, not chemically modified	Raaka auringonkukkaöljy ja safloriöljy
230630	Sunflower oil residues	Oil-cake and other solid residues; whether or not ground or in the form of pellets, resulting from the extraction of sunflower seed oils	Öljykakut ja muut kasvirasvojen tai -öljyjen erottamisessa syntyneet kiinteät jätetuotteet, auringonkukansiemenistä saadut, myös jauhetut tai pelleteiksi valmistetut
270111	Coal	Coal; anthracite, whether or not pulverised, but not agglomerated	Antrasiitti, myös jauhettu, (paitsi yhteenpuristettu)
720310	Reductions of iron ore	Ferrous products; obtained by direct reduction of iron ore, in lumps, pellets or similar forms	Rautamalmista suoraan pelkistämällä saadut rautapohjaiset tuotteet, säännöttöminä kappaleina, pelletteinä tai niiden kaltaisessa muodossa
720110	Pig iron, under 0.5% phosph.	Iron; non-alloy pig iron containing by weight 0.5% or less of phosphorus, in pigs, blocks or other primary forms	Seostamaton harkkorauta, harkkoina, möhkäleinä tai muussa alkumuodossa, jossa on <= 0,5 painoprosenttia fosforia
30633	Crustaceans, fresh	Crustaceans; live, fresh or chilled, crabs, whether in shell or not	Taskuravut, kuorineen tai ilman kuorta, elävät, tuoreet tai jäähdytetyt
720711	Iron and steel, under 0.25% carbon (thick slab)	Iron or non-alloy steel; semi-finished products of iron or non-alloy steel; containing by weight less than 0.25% of carbon, of rectangular (including square) cross-section, width less than twice thickness	Välituotteet, rautaa tai seostamatonta terästä, joissa on < 0,25 painoprosenttia hiiltä, poikkileikkaukseltaan suorakaiteen tai neliön muotoiset, leveys < kaksi kertaa paksuus
310420	Fertilizers, potassic	Fertilizers, mineral or chemical; potassic, potassium chloride	Kaliumkloridi, lannoitteeksi (paitsi tabletteina tai niiden kaltaisessa muodossa, tai pakkauksissa, joiden bruttopaino on <= 10 kg)
720712	Iron and steel, under 0.25% carbon (thin slabs)	Iron or non-alloy steel; semi-finished products of iron or non-alloy steel; containing by weight less than 0.25% of carbon, of rectangular (other than square) cross-section	Välituotteet, rautaa tai seostamatonta terästä, joissa on < 0,25 painoprosenttia hiiltä, poikkileikkaukseltaan suorakaiteen mutta ei neliön muotoiset, leveys >= kaksi kertaa paksuus
310230	Fertilizers, nitrogenous	Fertilizers, mineral or chemical; nitrogenous, ammonium nitrate, whether or not in aqueous solution	Ammoniumnitraatti, myös vesiliuoksena (paitsi tabletteina tai niiden kaltaisessa muodossa, tai pakkauksissa, joiden bruttopaino on <= 10 kg)
30363	Fish, frozen cod	Fish; frozen, cod (Gadus morhua, Gadus ogac, Gadus macrocephalus), excluding fillets, fish meat of 0304, and edible fish offal of subheadings 0303.91 to 0303.99	Jäädytetyt turskat "gadus morhua, gadus ogac, gadus macrocephalus"
281410	Ammonia	Ammonia; anhydrous	Ammoniakki, vedetön
30614	Crustaceans, frozen	Crustaceans; frozen, crabs, in shell or not, smoked, cooked or not before or during smoking; in shell, cooked by steaming or by boiling in water	Jäädytetyt taskuravut, myös savustetut, kuorineen tai ilman kuorta, myös höyrytetyt tai keitetyt
720720	Iron, steel, and produce, over 0.25% of carbon	Iron or non-alloy steel; semi-finished products of iron or non-alloy steel, containing by weight 0.25% or more of carbon	Välituotteet, rautaa tai seostamatonta terästä, joissa on >= 0,25 painoprosenttia hiiltä
310520	Fertilizers containing three elements	Fertilizers, mineral or chemical; containing the three fertilizing elements nitrogen, phosphorus and potassium	Lannoitteet, kivennäiset tai kemialliset, joissa on kolmea lannoittavaa ainetta: typpeä, fosforia ja kaliumia (paitsi tabletteina tai niiden kaltaisessa muodossa, tai pakkauksissa, joiden bruttopaino on <= 10 kg)
151219	Sunflower or safflower oils, not crude	Vegetable oils; sunflower seed or safflower oil and their fractions, other than crude, whether or not refined, but not chemically modified	Auringonkukkaöljy ja safloriöljy ja niiden jakeet, myös puhdistetut, mutta kemiallisesti muuntamattomat (paitsi raaka)
310210	Fertilizers, nitrogenous and urea	Fertilizers, mineral or chemical; nitrogenous, urea, whether or not in aqueous solution	Virtsa-aine "urea", myös vesiliuoksena (paitsi tabletteina tai niiden kaltaisessa muodossa, tai pakkauksissa, joiden bruttopaino on <= 10 kg)
440711	Wood and preparations, coniferous	Wood; coniferous species, of pine (Pinus spp.), sawn or chipped lengthwise, sliced or peeled, whether or not planed, sanded or finger-jointed, of a thickness exceeding 6mm	Mänty "pinus spp.", sahattu tai veistetty "chipped" pituussuunnassa, tasoleikattu tai viiluksi sorvattu, myös höylätty, hiottu tai päistään jatkettu, paksuus > 6 mm (paitsi spf-puuta (kuusta (picea spp. ja abies spp.) ja mäntyä (pinus spp.))
100199	Cereals; wheat and meslin (not durum or seed)	Cereals; wheat and meslin, other than durum wheat, other than seed	Vehnä sekä vehnän ja rukiin sekavilja (paitsi siemenvilja ja durumvehnä)
711021	Palladium	Metals; palladium, unwrought or in powder form	Palladium, muokkaamaton ja jauhe
750110	Nickel, mattes	Nickel; nickel mattes	Nikkelikivi
151411	Colza and rape oil	Vegetable oils; low erucic acid rape or colza oil and its fractions, crude	Niukasti erukahappoa sisältävä rapsi- ja rypsiöljy "rasvaöljy, jonka erukahappopitoisuus on < 2 painoprosenttia", raaka

840130	Fuel cartridges, non-irradiated	Fuel elements (cartridges); non-irradiated	Ydinreaktorien säteilyttämättömät polttoaine-elementit, kannattimin varustetut (euratom)
100390	Cereals; barley (not seed)	Cereals; barley, other than seed	Ohra (paitsi siemenvilja)
750210	Nickel, unwrought (not alloyed)	Nickel; unwrought, not alloyed	Seostamaton nikkeli, muokkaamaton
30312	Fish, frozen salmon	Fish; frozen, Pacific salmon (Oncorhynchus gorbuscha/keta/tschawytscha/ kisutch/masou/rhodurus) other than sockeye salmon (Oncorhynchus nerka), excluding fillets, fish meat of 0304, and edible fish offal of subheadings 0303.91 to 0303.99	Jäädytetyt tyynenmerenlohet (paitsi punalohi)
293371	Heterocyclic compounds	Heterocyclic compounds; lactams; 6-hexanelactam (epsilon-caprolactam)	6-heksaanilaktaami "epsilon-kaprolaktaami"
441233	Plywood, thin (not bamboo)	Plywood; with sheets of wood only; not bamboo; each ply 6mm or less, with at least one outer ply of alder, ash, beech, birch, cherry, chestnut, elm, eucalyptus, hickory, horse chestnut, lime, maple, oak, plane, poplar, aspen, robinia, tulipwood or walnut	Ristiinliimattu vaneri, yksinomaan <= 6 mm paksuisista puuviiluista koostuva, jossa ainakin yksi pintaviiluista on lehtipuuta: leppää, saarnia, pyökkiä, koivua, kirsikkapuuta, kastanjaa, jalavaa, eukalyptuspuuta, hikkoria, hevoskastanjaa, limettiä, vaahteraa, tammea, plataania, poppelia, haapaa, valeakaasiaa, tulppaanipuuta tai saksanpähkinäpuuta (paitsi. bambua, joissa pintaviilu on trooppista puulajia ja tiivistettyä puuta olevat levyt, solulevyt, upotekoristeinen puu ja huonekalujen osiksi tunnistettavat levyt)
730511	Iron and steel pipes and elements (not cast iron)	Iron or steel (excluding cast iron); line pipe of a kind used for oil or gas pipelines (not seamless), longitudinally submerged arc welded, having circular cross-sections, external diameter exceeds 406.4mm	Putket, jollaisia käytetään öljy- tai kaasuputkijohdoissa, poikkileikkaukseltaan ympyrän muotoiset, ulkoläpimitta > 406,4 mm, rautaa tai terästä, jauhekaarihitsauksella pituussaumahitsatut

Table A3 HS Codes (6-digit) and descriptions for products appearing in Figure 4

HS Code	Description (short)	Description	Description (in Finnish)
401110	New pneumatic tires	Rubber; new pneumatic tyres, of a kind used on motor cars (including station wagons and racing cars)	Uudet pneumaattiset ulkorenkaat, kumia, henkilöautoissa käytettävät, ml. farmariautoissa ja kilpa-autoissa käytettävät
271019	Petroleum oils (not light)	Petroleum oils and oils from bituminous minerals, not containing biodiesel, not crude, not waste oils; preparations n.e.c, containing by weight 70% or more of petroleum oils or oils from bituminous minerals; not light oils and preparations	Keskiraskaat öljyt, maaöljystä tai bitumisista kivennäisistä saadut, muualle kuulumattomat (paitsi biodieseliä sisältävät)
271012	Petroleum oils (light)	Petroleum oils and oils from bituminous minerals, not containing biodiesel, not crude, not waste oils; preparations n.e.c, containing by weight 70% or more of petroleum oils or oils from bituminous minerals; light oils and preparations	Kevyet öljyt ja valmisteet, maaöljystä tai bitumisista kivennäisistä saadut, joista >= 90 tilavuusprosenttia "hävikki mukaan lukien" tislautuu 210°c:n lämpötilassa "astm d 86-menetelmä" (paitsi biodieseliä sisältävät)
760511	Aluminum wire	Aluminium; (not alloyed), wire, maximum cross-sectional dimension exceeds 7mm	Lanka, seostamatonta alumiinia, poikkileikkauksen suurin läpimitta > 7 mm (paitsi nimikkeen 7614 kerrattu lanka, kaapeli, palmikoitu nauha ja muut niiden kaltaiset tavarat ja eristetty sähkölanka)
840130	Fuel elements (non-irradiated)	Fuel elements (cartridges); non-irradiated	Ydinreaktorien säteilyttämättömät polttoaine-elementit, kannattimin varustetut (euratom)
730661	Tubes and pipes of iron and steel	Iron or steel (excluding cast iron); tubes, pipes and hollow profiles (not seamless), welded, of square or rectangular cross-section, n.e.c. in chapter 73	Putket ja profiiliputket, hitsatut, poikkileikkaukseltaan neliön tai suorakaiteen muotoiset, rautaa tai terästä
230641	Oil residuals	Oil-cake and other solid residues; whether or not ground or in the form of pellets, resulting from the extraction of low erucic acid rape or colza seed oils	Öljykakut ja muut kasvirasvojen tai -öljyjen erottamisessa syntyneet kiinteät jätetuotteet, myös jauhetut tai pelleteiksi valmistetut, niukasti erukahappoa sisältävistä rapsin- tai rypsinsiemenistä saadut
270112	Bituminous coal	Coal; bituminous, whether or not pulverised, but not agglomerated	Bituminen kivihiili, myös jauhettu (paitsi yhteenpuristettu)
81190	Fruits and berries	Fruit, edible; fruit and nuts n.e.c. in heading no. 0811, uncooked or cooked, frozen whether or not containing added sugar or other sweetening matter	Jäädytetyt hedelmät ja marjat, keittämättömät tai vedessä tai höyryssä keitetyt, myös lisättyä sokeria tai muuta makeutusainetta sisältävät (paitsi mansikat, vadelmat, karhunvatukat, mulperinmarjat, loganinmarjat, musta-, valko,- ja punaherukat sekä karviaismarjat
271112	Propane	Petroleum gases and other gaseous hydrocarbons; liquefied, propane	Propaani, nesteytetty
440321	Wood in the rough (pine)	Wood; coniferous species, of pine (Pinus spp.), in the rough, whether or not stripped of bark or sapwood, or roughly squared, untreated, of which any cross-sectional dimension is 15 cm or more	Raakapuu, mäntyä "pinus spp.", jonka poikkileikkauksen vähimmäisläpimitta on vähintään 15 cm, myös jos siitä on poistettu kuori tai pintapuu tai karkeasti syrjätty puu (paitsi rata- tai raitiopölkyiksi muotoiltu puu; lankuiksi, parruksi jne. sahattu puu; maalilla, petsillä, kreosootilla tai muilla suoja-aineilla käsitelty puu)
440323	Wood in the rough (fir)	Wood; coniferous species, of fir (Abies spp.) and spruce (Picea spp.), in the rough, whether or not stripped of bark or sapwood, or roughly squared, untreated, of which any cross-sectional dimension is 15 cm or more	Raakapuu, kuusta "abies spp." ja "picea spp.", jonka poikkileikkauksen vähimmäisläpimitta on vähintään 15 cm, myös jos siitä on poistettu kuori tai pintapuu tai karkeasti syrjätty puu (paitsi rata- tai raitiopölkyiksi muotoiltu puu; lankuiksi, parruksi jne. sahattu puu; maalilla, petsillä, kreosootilla tai muilla suoja-aineilla käsitelty puu)
722830	Bars and rods of steel	Steel, alloy; bars and rods, hot-rolled, hot-drawn or extruded	Tangot, seosterästä muuta kuin ruostumatonta terästä, ainoastaan kuumavalssatut, kuumavedetyt tai kuumapursotetut (paitsi pikateräksestä tai piiseosteisesta sähköteknisestä teräksestä valmistetut tuotteet sekä välituotteet, levyvalmisteet ja kuumavalssatut tangot, säännöttömästi kiepitetyt)
440396	Wood in the rough (birch)	Wood; of birch (Betula spp.), in the rough, whether or not stripped of bark or sapwood, or roughly squared, untreated, of which any cross-sectional dimension is less than 15 cm	Raakapuu, koivua "betula spp.", jonka poikkileikkaus on kaikilta kohdin alle 15 cm, myös jos siitä on poistettu kuori tai pintapuu, tai karkeasti syrjätty puu (paitsi karkeasti muotoiltu puu kävelykeppien sateenvarjojen, työkalujen varsien tai niiden kaltaisten valmistukseen; rata- ja raitiotiepölkyiksi muotoiltu puu; lankuiksi, parruksi jne. sahattu puu; maalilla, petsillä, kreosootilla tai muilla suoja-aineilla käsitelty)
290250	Styrene	Cyclic hydrocarbons; styrene	Styreeni
440140	Wood waste	Wood; for fuel, sawdust and wood waste and scrap, not agglomerated	Ei saatavilla, kuvaus englanniksi: Wood; for fuel, sawdust and wood waste and scrap, not agglomerated

441233	Plywood	Plywood; with sheets of wood only; not bamboo; each ply 6mm or less, with at least one outer ply of alder, ash, beech, birch, cherry, chestnut, elm, eucalyptus, hickory, horse chestnut, lime, maple, oak, plane, poplar, aspen, robinia, tulipwood or walnut	Ristiinliimattu vaneri, yksinomaan <= 6 mm paksuisista puuviiluista koostuva, jossa ainakin yksi pintaviiluista on lehtipuuta: leppää, saarnia, pyökkiä, koivua, kirsikkapuuta, kastanjaa, jalavaa, eukalyptuspuuta, hikkoria, hevoskastanjaa, limettiä, vaahteraa, tammea, plataania, poppelia, haapaa, valeakaasiaa, tulppaanipuuta tai saksanpähkinäpuuta (paitsi. bambua, joissa pintaviilu on trooppista puulajia ja tiivistettyä puuta olevat levyt, solulevyt, upotekoristeinen puu ja huonekalujen osiksi tunnistettavat levyt)
290110	Acyclic hydrocarbons	Acyclic hydrocarbons; saturated	Asykliset hiilivedyt, tyydyttyneet
310520	Fertilizers (nitrogen, phosphorus, potassium)	Fertilizers, mineral or chemical; containing the three fertilizing elements nitrogen, phosphorus and potassium	Lannoitteet, kivennäiset tai kemialliset, joissa on kolmea lannoittavaa ainetta: typpeä, fosforia ja kaliumia (paitsi tabletteina tai niiden kaltaisessa muodossa, tai pakkauksissa, joiden bruttopaino on <= 10 kg)
440121	Wood for fuel (coniferous)	Wood; for fuel, in chips or particles, coniferous, whether or not agglomerated	Havupuu lastuina tai hakkeena (paitsi pääasiassa värjäykseen tai parkitukseen käytettävät)
440122	Wood for fuel (non-coniferous)	Wood; for fuel, in chips or particles, non-coniferous, whether or not agglomerated	Lehtipuu lastuina tai hakkeena (paitsi pääasiassa värjäykseen tai parkitukseen käytettävät)
270900	Crude oil	Oils; petroleum oils and oils obtained from bituminous minerals, crude	Maaöljyt ja bitumisista kivennäisistä saadut öljyt, raa'at
271111	Natural gas and other petroleum gases	Petroleum gases and other gaseous hydrocarbons; liquefied, natural gas	Luonnonkaasu "maakaasu", nesteytetty
440131	Wood pellets	Wood; for fuel, sawdust and wood waste and scrap, agglomerated in logs, briquettes, pellets or similar forms; wood pellets	Puupelletit
310210	Urea	Fertilizers, mineral or chemical; nitrogenous, urea, whether or not in aqueous solution	Virtsa-aine "urea", myös vesiliuoksena (paitsi tabletteina tai niiden kaltaisessa muodossa, tai pakkauksissa, joiden bruttopaino on <= 10 kg)
440711	Sawn or chipped wood (pine)	Wood; coniferous species, of pine (Pinus spp.), sawn or chipped lengthwise, sliced or peeled, whether or not planed, sanded or finger-jointed, of a thickness exceeding 6mm	Mänty "pinus spp.", sahattu tai veistetty "chipped" pituussuunnassa, tasoleikattu tai viiluksi sorvattu, myös höylätty, hiottu tai päistään jatkettu, paksuus > 6 mm (paitsi spf-puuta (kuusta (picea spp. ja abies spp.) ja mäntyä (pinus spp.))
290511	Methanol	Alcohols; saturated monohydric, methanol (methyl alcohol)	Metanoli "metyylialkoholi"
440395	Wood in the rough (birch)	Wood; of birch (Betula spp.), in the rough, whether or not stripped of bark or sapwood, or roughly squared, untreated, of which any cross-sectional dimension is 15 cm or more	Raakapuu, koivua "betula spp.", jonka poikkileikkaus on kaikilta kohdin vähintään 15 cm, myös jos siitä on poistettu kuori tai pintapuu, tai karkeasti syrjätty puu (paitsi rata- ja raitiotiepölkyiksi muotoiltu puu; lankuiksi, parruksi jne. sahattu puu; maalilla, petsillä, kreosootilla tai muilla suoja-aineilla käsitelty)
440712	Sawn or chipped wood (fir)	Wood; coniferous species, of fir (Abies spp.) and spruce (Picea spp.), sawn or chipped lengthwise, sliced or peeled, whether or not planed, sanded or finger-jointed, of a thickness exceeding 6mm	Kuusi "abies spp." ja "picea spp.", sahattu tai veistetty "chipped" pituussuunnassa, tasoleikattu tai viiluksi sorvattu, myös höylätty, hiottu tai päistään jatkettu, paksuus > 6 mm (paitsi spf-puuta (kuusta (picea spp. ja abies spp.) ja mäntyä (pinus spp.))
750110	Nickel	Nickel; nickel mattes	Nikkelikivi

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Tel. +358-9-609 900
www.etla.fi
firstname.lastname@etla.fi

Arkadiankatu 23 B
FIN-00100 Helsinki