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EQUITABLE GROWTH, FINANCE & INSTITUTIONS INSIGHT

The Impact of the War in Ukraine on Global Trade and Investment

Edited by Michele Ruta

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Executive Summary

The war in Ukraine is an immense human tragedy for the people of Ukraine, but its economic implications are global. This instant report focuses on the direct impact of the war on world trade and investment. Key questions addressed in this study are: How will trade and welfare, especially of developing countries, be affected in the short run? Which sectors are being most disrupted? What are the implications for logistics networks, FDI, and global value chains (GVCs)?

The war comes at a difficult moment for the world economy. The recovery from the pandemic-induced recession is decelerating because of continued COVID-19 flareups and diminished policy support (World Bank, 2022). Inflation is increasing in many countries, and large economies are increasing interest rates to reign it in. Disruptions in world trade and investment will curb growth in developing countries and add to price pressures, especially if governments impose trade restrictions to shield their economies.

This report identifies five direct trade and investment channels through which countries will be affected by the war in Ukraine. These encompass disruptions to: (i) commodity markets (especially food and energy), (ii) logistic networks, (iii) supply chains, (iv) foreign direct investment, (v) specific sectors. From a development perspective, it is crucial to understand how these various factors play out and how they affect individual economies.

Trade in food and energy are feeling the most immediate impact of the war. Russia and Ukraine rank among the top seven global producers and exporters of wheat, corn, barley, sunflower seeds, and sunflower oil. Russia is also a major supplier of fossil fuels, such as crude oil and natural gas, in addition to fertilizer and agricultural commodities. Disruptions of these supplies are fueling a surge in prices, with negative consequences for global trade and welfare and asymmetric effects on exporting and importing countries. Exporters gain from higher commodity prices and increase production and shipments, replacing part of the decrease in exports from Ukraine and Russia. Importers are hurt twice: They both consume these commodities and use them as inputs to produce other goods and services for export.

A Computable General Equilibrium (CGE) model quantifies these effects on trade and welfare. Global income drops by 0.7 percent, with low-income countries losing 1 percent, driven by a contraction in global exports (Figure 0.1). Manufacturing exporters such as Vietnam, Thailand, and Mexico see a sharp decline, especially in energy intensive sectors. Net exporters of crops, such as Turkey, Brazil, and India, and of fossil fuels, such as Nigeria and countries in the Middle East, see a surge in their exports, attenuating the negative effects of the war.

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FIGURE 0.1(a): Change in real income in selected countries and regions

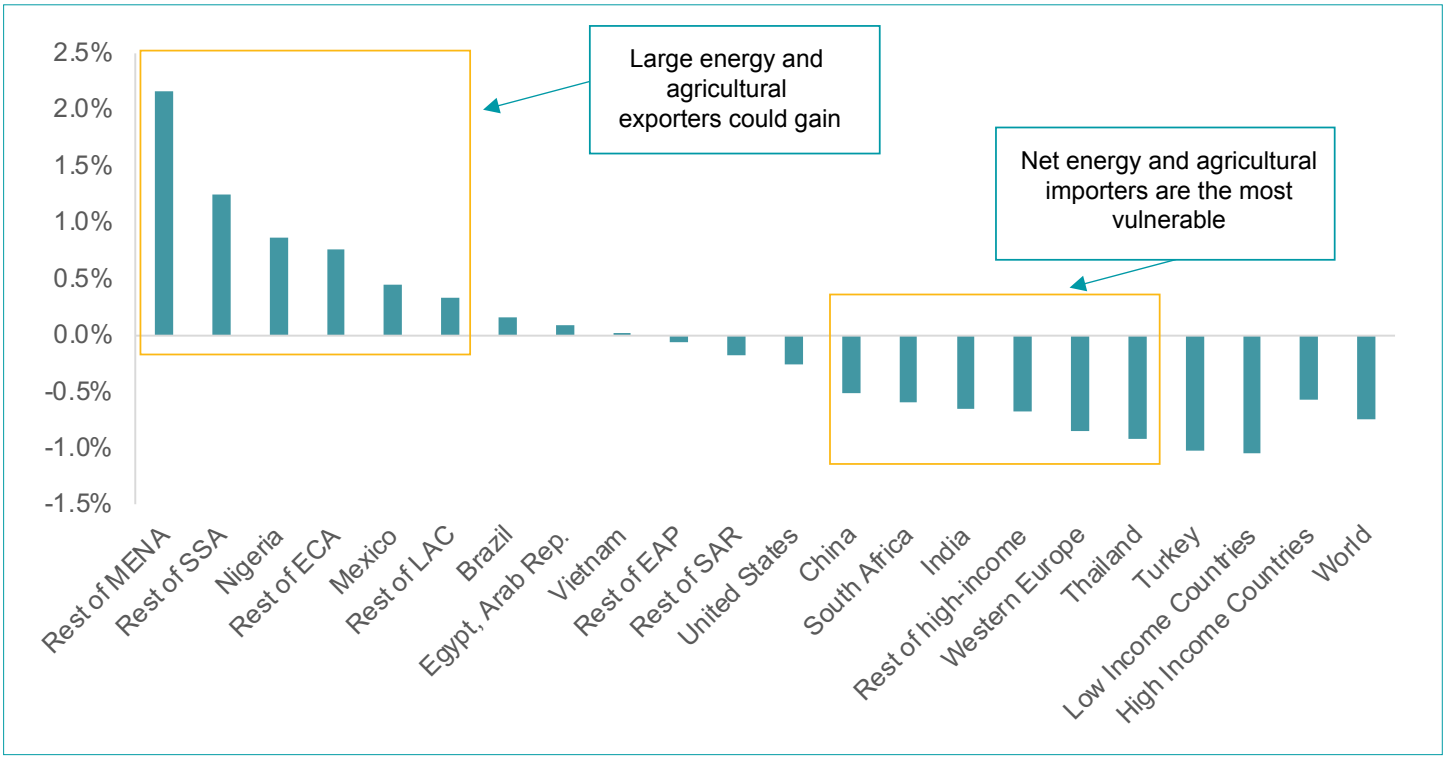

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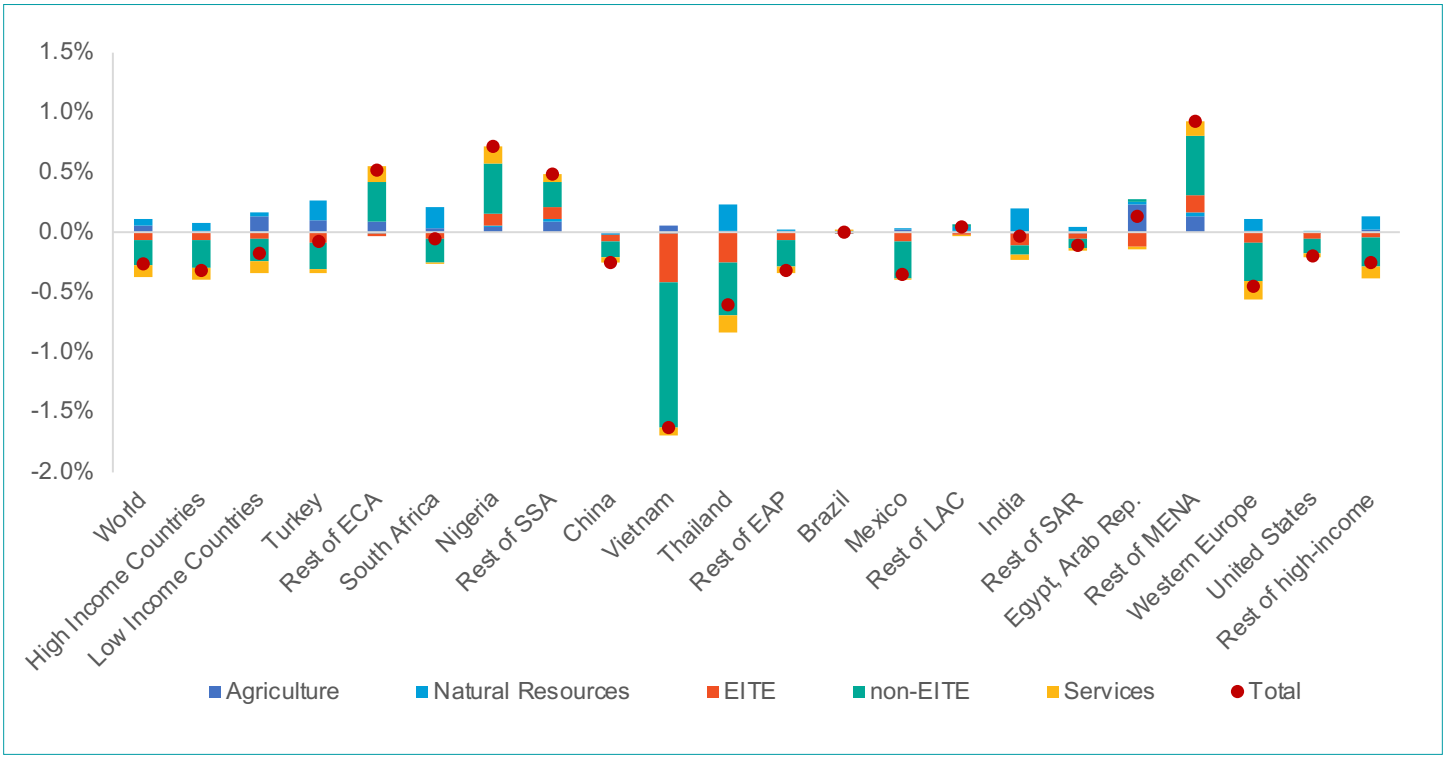
FIGURE 0.1(b): Change in exports relative to reference year as a share of real GDP in the reference year

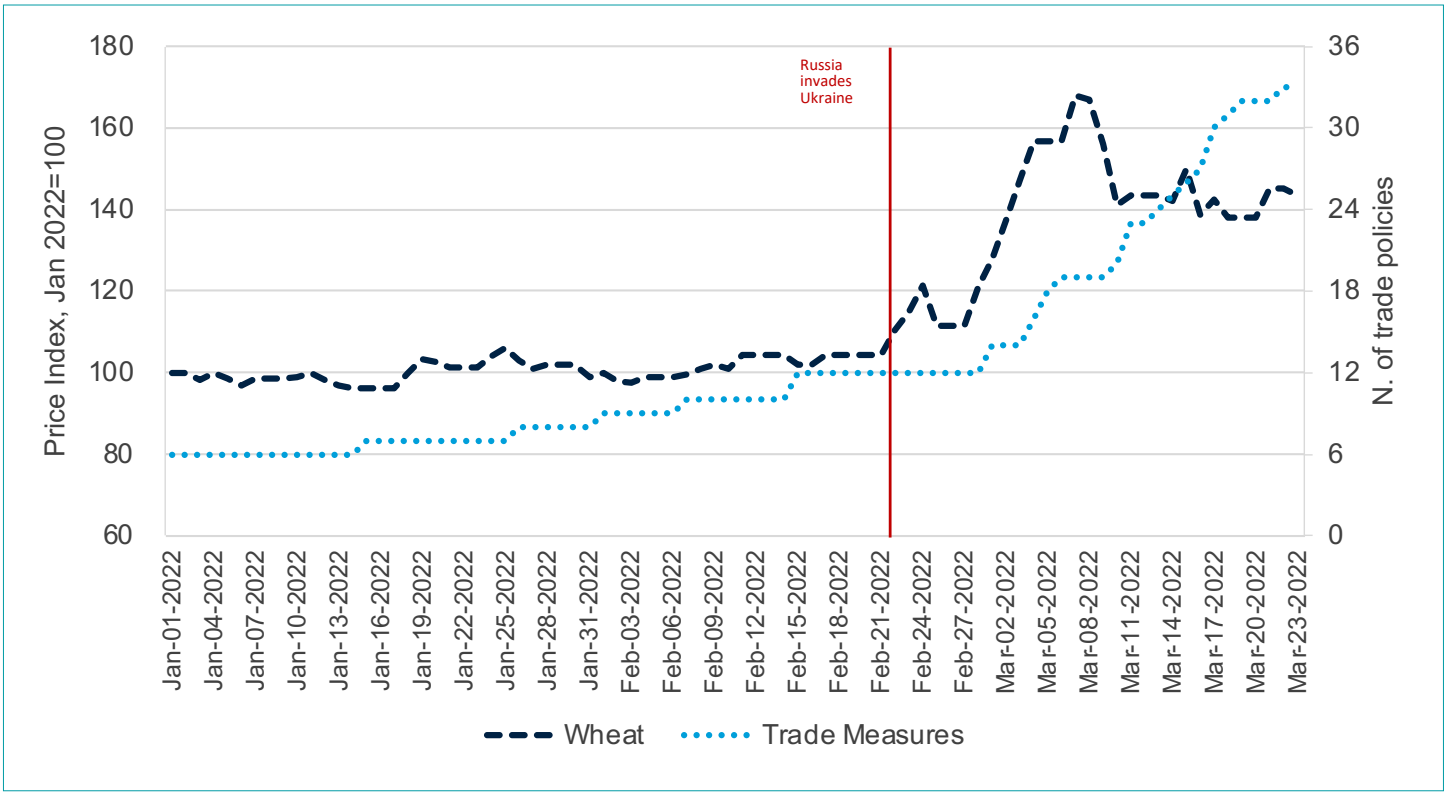


Note: ENVISAGE simulations. See chapter 1.

Trade-policy interventions risk further destabilizing food markets. Ukraine and Russia together represent roughly a quarter of global wheat exports. For corn and fertilizers, their combined pre-war share was almost 15 percent. Disruptions to supplies of these key commodities are causing prices to surge. The price of wheat, for example, has jumped by more than 40 percent since the beginning of the war in late February (with futures prices rising by more than 60 percent). Trade-policy interventions risk making a bad situation worse (Figure 0.2). Export restrictions further reduce global supply, while import liberalization measures and subsidies increase demand. Since the beginning of the war, 53 new trade policies (67 including subsidies) have been imposed or announced. Export restrictions such as outright bans or licensing requirements account for 31 new measures. Export restrictions alone have added seven percentage points to the price of wheat and risk igniting a tit-for-tat escalation that could trigger a food crisis. Higher food costs take the biggest toll on net importers—largely low and low-middle income countries in Sub-Saharan Africa (Botswana, Zimbabwe) and the Middle East (Algeria, Tunisia)—deepening world poverty.

> > >

FIGURE 0.2: International wheat prices and trade policy measures



Source: Chapter 2.

The war and resulting sanctions have disrupted Russian and Ukrainian trade connectivity affecting the logistics of the broader region. Russia's connections to European ports have been cut, and commodity exports to other destinations have been constrained. Ukraine's Black Sea ports have been blockaded or occupied, leaving the country few routes for its commodity exports. The war brought reciprocal closures of air space between Russia and 36 countries, resulting in longer routes and higher prices for air freight between Europe and East Asia. Rail transit through Russia may be slowed by additional procedures to check for sanctions compliance, and further rounds of sanctions could risk bringing it to a halt entirely. The role of rail routes in the movement of mechanical, electronics, automotive, and other goods between Europe and Asia (mainly China) is relatively small but has been growing in response to maritime shipping disruptions during the pandemic. Disruptions to global and regional supply chains have caused input shortages and price hikes.

- Sectors critically dependent on inputs from Ukraine include steel (iron ores, ferro silico manganese, and pig iron), heavy manufacturing (flat and rolled steel products), semiconductors (neon gas), cars (ignition cables), and software. European markets are the most vulnerable, with Moldova being the most dependent on imports from Ukraine. Within the European Union, Poland and the Czech Republic are most exposed to imports from Ukraine. Elsewhere, Turkey, Arab Gulf countries, Ethiopia, and Nigeria rely on Ukraine as a key supplier for some products, but overall, the exposure of non-European markets appears limited.

- Russia stands out as a supplier of primary and intermediate goods and services for other countries' exports at an early stage of production. Transport equipment, machinery, electronics, and agribusiness are especially reliant on imports of Russian metals, chemicals, fertilizers, and other commodities (Figure 0.3). Supply chain production hubs in China, Germany, and the United States are among Russia's largest trade partners, both as importers of Russian commodities and as exporters of goods produced via GVCs. The largest effects of trade disruptions would be felt by members of the Eurasian Economic Union (Armenia, Belarus, Kazakhstan, and Kyrgyzstan) and other members of the Commonwealth of Independent States.

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FIGURE 0.3: Russia as a seller, key sectors and products, and implications for supply chain partners

Russia as a seller

Sector	Key Products	Key Global / Regional Value Chains	Largest direct partners	Most dependent partners
Fuels	Crude oil	Many	CHN, DEU, NDL, POL, BLR	MNG, BLR, SVK, EST, KAZ
	Petroleum products	Many	USA, TUR, DEU, GBR, KOR	MNG, KAZ, KGZ, BLR, TJK
	Natural Gas	Many	ITA, JPN, BLR, SVK, CZE	BLR, SVK, EST, LVA, SRB
Metals	Palladium	Transp. equipment (catalytic converters)	USA, JPN, DEU, CHN, ITA	CAN, JPN, USA, ITA, KOR
	Iron and steel	Transport equipment, machinery	TUR, USA, BLR, ITA, BEL	KAZ, BLR, KGZ, AZE, UZB
	Copper, aluminum	Electronics, trans. equip, machinery	CHN, DEU, TUR, JPN, USA	BLR, KAZ, ARM, UZB, AZE
	Nickel	Metal (alloying), auto (batteries), electronic	CHN, FIN, DEU, NLD, USA	FIN, BLR, UKR, LVA, MDA
Chemicals	Fertilizers	Agribusiness	BRA, USA, CHN, IND, MEX	MNG, BLR, AZE, KAZ, MDA
Electronics	Cell phones, receivers, etc.	Electronics	BLR, KAZ, AZE, CHN, GEO	BLR, ARM, GEO, TJK, KAZ
Transport Equipment	Metal, auto parts	Transport equipment, machinery	CHN, FIN, DEU, NLD, USA	FIN, BLR, UKR, LVA, MDA
Services	Transport, business serv.	Business services, agribus., transport	DEU, NLD, JPN, AUT, USA, FIN	LIT, LVA, EST, SLV, FIN

Source: Chapter 4.

The war is expected to curb FDI in neighboring countries and in the energy sector. Armenia, Moldova, and the Kyrgyz Republic —where more than 20 percent of inward FDI is from Russia —could suffer from shrinking inflows of FDI and a contraction in their existing stock, an increase in capital outflows, and losses on their outward FDI in Russia. European countries including Finland, Germany, and Norway have large investments in Russia's energy sector, and Europe is highly

dependent on Russian oil and gas. The war's direct impact on global FDI is likely to be muted because Russia and Ukraine play a limited role in global FDI networks (Figure 0.4). Indirect effects could prove more profound and far-reaching as elevated uncertainty and geopolitical risks damp investor confidence.

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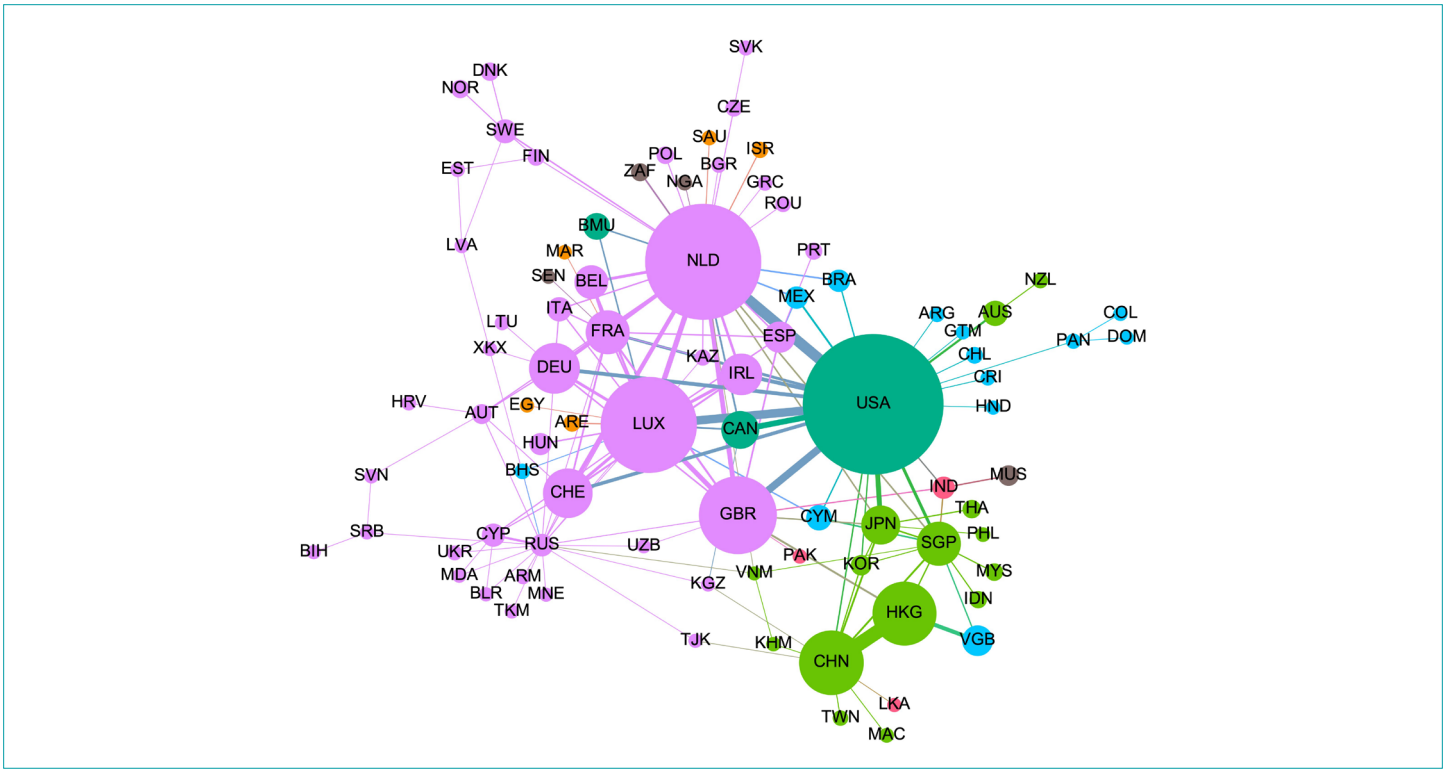
FIGURE 0.4: Russia and Ukraine in global FDI networks



Source: Chapter 5.

Tourism in developing countries will be hurt. Russia and Ukraine account for a large number of tourists in developing countries (ranked 6th and 38th globally in tourism expenditure). Countries including Georgia, Moldova, Montenegro, and Turkey are highly dependent on tourists from Russia and Ukraine. The effects will also be felt outside the region. Countries that attracted large shares of tourists from Russia and Ukraine during the pandemic include Egypt, Tunisia, Thailand, Cuba, the Maldives, and Tanzania. A decline in global tourism will at least temporarily stall the industry's post-pandemic recovery, as scheduled flights are disrupted and consumers await more certainty before booking.

The war's long-term implications for global trade and investment will largely depend on how governments respond to the changing geopolitical environment. As several observers have noted (see, among others, Posen, 2022), the risk of a fragmented world trade and investment system has suddenly increased, and with it a reversal of globalization, which has been the engine of economic growth and development in the last 30 years. Firms will respond to the shock by re-assessing security-related risks, possibly leading to changes in the structure of GVCs as firms move production away from countries they see as riskier. But given the capital in place, the cost of searching for alternatives, and factors such as wage differentials across countries, this process is likely to be gradual rather than sudden and affect different sectors and products differently. It will not result in a reversal of globalization, unless it is supported by pronounced government intervention.

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Effects on trade and income of developing countries[1]

Introduction

Many countries are suffering serious economic consequences as a result of the Russian invasion of Ukraine. Ukraine and Russia are major exporters of agricultural commodities and fossil fuels, and disruptions to supplies of these commodities and associated price spikes are already being felt across the globe. As the Black Sea region is a large exporter of fertilizers, the resulting shortages and price increases could translate into lower crop yields in many regions. This in turn could lead to food prices reaching new highs.[2] The Russian invasion has prompted an unprecedented reaction by the United States, the European Union, and other high-income economies, in the form of sanctions. These range from sanctions targeting Russian individuals and enterprises, to bans on Russian energy imports and restrictions on exports of select electronics to Russia, such as semiconductors.[3] Countries that have a high dependence on tourists from Russia and Ukraine, such as Georgia, Moldova, and the Maldives, will see significant declines in exports of tourism and accommodation services.[4] The negative impact of the conflict will also be visible in other areas of the global economy through increases in transportation costs [5], or the loss of remittances in countries that are heavily dependent on inflows[6] from Russia, such as Tajikistan and the Kyrgyz Republic. Russia itself has imposed several restrictions, including bans on exports of wheat and other food products outside of Eurasian Economic Union, and a ban on exports of electronics, motor vehicle parts and transport equipment. The likely duration of the sanctions is hard to assess.

Stylized simulations are applied to analyze the effects of the war on trade flows of developing countries. The state-of-the-art economic model is applied to take into account longer-term supply constraints on agricultural and energy commodities in the Black Sea region, as well as rising fertilizer costs and select trade restrictions. Future work should aim to expand the analysis to cover other channels through which the war is affecting other countries, such as financial sanctions, changes in tourism, remittances, and inflows of refugees.

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1. Prepared by Maksym Chepeliev, Maryla Maliszewska, Maria Seara E. Pereira with inputs from Mike Nyawo and Israel Osorio-Rodarte. We are grateful to Aaditya Mattoo, Michele Ruta and Dominique van der Mensbrugghe for their comments and suggestions. Cleared by Antonio Nucifora (Manager, ETIRI) and Mona Haddad (Director, TIC).
2. See FAO (2022) report for more information on the impact on yields.
3. For more details see: https://www.piie.com/blogs/realtime-economic-issues-watch/russias-war-ukraine-sanctions-timeline 4.
4. See Chapter 7.
5. See Chapter 5.
6. See Chapter 6.

The importance of the Black Sea region in global trade in crops, energy, and fertilizer

Countries in the Black Sea region have become key global providers of grains, oilseeds, and vegetable oils over the last three decades. Russia and Ukraine rank among the top seven global producers and exporters of wheat, corn, barley, sunflower seeds, and sunflower oil. Most of these products are shipped to North Africa and the Middle East, as well as Europe and China (corn from Ukraine). Ukraine is also a major supplier of sunflower oil, accounting for over half of global production. In 2019 Russia and Ukraine accounted for a combined 25 percent of global exports of wheat and 14 percent of exports of corn (UN Comtrade, 2022).

Aside from the direct impact on agricultural production and exports, the war is affecting fertilizer trade. Russia and Belarus, are the world's second and third-largest producers of potash fertilizer, respectively. Brazil, the world's largest soybean producer, buys about half of its potash fertilizers from these two countries. Most of Brazil's soybeans are sold to China, which uses much of the crop to feed livestock. As a result, a disruption in fertilizer supplies might affect meat prices in China and around the world. The EU has already banned all imports of potash from Belarus as of March 4th[7].

Russia is a major producer and supplier of fossil fuels, such as crude oil and natural gas, in addition to fertilizer and agricultural commodities. In 2019, Russia accounted for 14 percent of global exports of coal briquettes and 13 percent of crude petroleum (the second biggest exporter of this commodity). Russia is also a major exporter of refined petroleum products and natural gas, accounting for respectively 10 and 9 percent of global exports (Figure 1.1).[7] Petroleum is vital for transportation, and gasoline prices have already risen significantly around the world. At the same time, natural gas accounts for over half the cost of producing ammonia fertilizer, compounding the impact on fertilizer prices.

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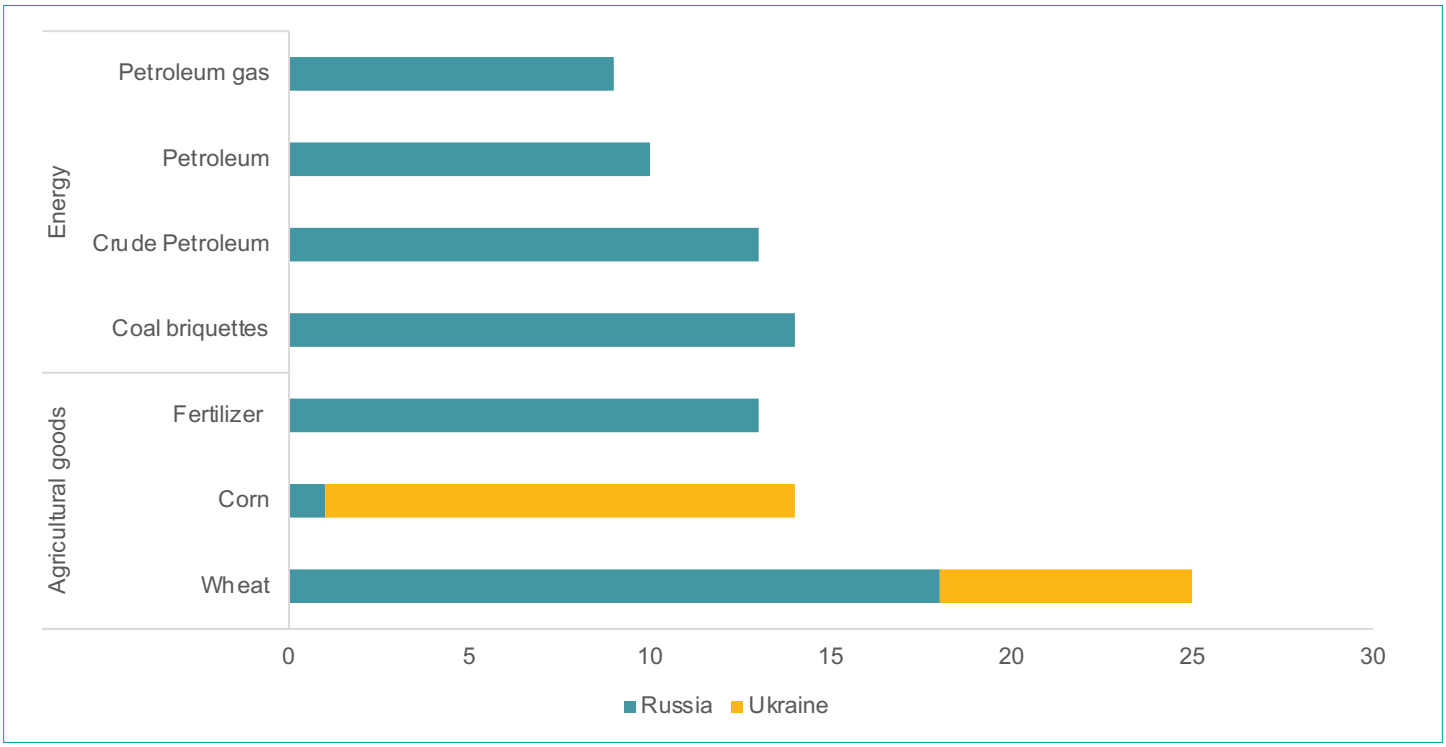
FIGURE 1.1: Ukraine's and Russia's share of global trade, 2019



Source: UN Comtrade, 2022

7. https://www.euractiv.com/section/agriculture-food/news/eu-sanctions-on-belarus-target-key-fertiliser-amid-rising-input-prices/
8. Annex 1 provides top the 10 countries relying on commodity imports from Russia and Ukraine as a share of total domestic consumption in a given sector (Figures 8a-8g).

Several developing countries rely heavily on imports of wheat from Russia and Ukraine (Annex 1, Figure 8a-h).[9] Such imports constitute a large share of domestic consumption in countries across all regions. Nicaragua imports 86 percent of the wheat it consumes from the Black Sea Region, in Sub-Saharan Africa, the most heavily dependent on imports from the region are the Republic of Congo (67 percent) and Niger (60 percent), in MENA - Lebanon (86 percent); and in South Asia - Bangladesh with 41 percent. Dependence on other cereal grains is also relatively high in many countries, but lower than in the case of wheat. Libya imports 81 percent of other grains from the region, followed by Mauritania, (78 percent), Mongolia (74 percent), and several high-income countries. Among countries from ECA region, the Netherlands imports 30 percent of its consumption from the Black Sea region and Portugal 24 percent. The dependence on imports of oil seeds is much less significant, with the highest share in consumption in ECA countries such as Georgia (63 percent), Armenia (39 percent), and Mongolia (35 percent).

Several countries in the ECA region are highly dependent on energy imports from Russia as a share of consumption. In terms of coal, the reliance on imports from Russia is relatively high in Latvia (100 percent) and Moldova (96 percent), as well as in some developing countries like Belize (99 percent) and Algeria (94 percent). Many high-income countries in the ECA region are also deeply connected with Russia in terms of crude oil, namely Slovakia (97 percent), Finland (82 percent), and Poland (71 percent). For natural gas, Kyrgyzstan's ratio of imports to total domestic consumption reaches 94 percent; it is followed by Czech Republic and Lithuania (both 90 percent). Some economies outside the ECA region, such as Taiwan, China (29 percent) and Togo (24 percent), also show a high dependence on Russia. Several developing countries in the ECA region rely on Russia for more than 60 percent of their consumption of petroleum and coal products. These include Uzbekistan (71 percent) and Tajikistan (62 percent).

Methodological approach

Simulations with a global computable general equilibrium (CGE) model illustrate the potential effects of the Ukraine war on their trading partners (see Box 7.1). The modelling exercise covers a wide range of developing countries across World Bank (WB) regions, both net exporters and net importers of crops and energy, to illustrate the potential effects of the shocks caused by the war. CGE simulations come with caveats discussed in the Box 7.1 and should be treated as illustrative scenarios on how the shocks are transmitted across countries and sectors, not as projections. The stylized scenario considers:

1. A shock to energy and crop supplies from Russia, Ukraine, and Belarus resulting in a global crude oil price increase of 7 percent and a 20 percent price rise for wheat and other cereal grains. These are annual average price estimates (details below).
2. An increase in the price of imported fertilizer used in agricultural production by 50 percent.
3. Restrictions on exports of electronics to Russia imposed by high income countries and large exporters of electronics from Asia, as well as export bans on electronics from Russia.
4. A ban on imports of fossil fuels from Russia by the United States.

Our scenario generates crop price increases in line with the upper bound of FAO (2022) findings, which estimate increases in international food and feed prices by 8 percent to 22 percent above already elevated levels. These price increases are expected over the course of a year, as CGE models operate at an annual basis. The currently recorded price hikes of 37 percent for wheat and 21 percent for corn are expected to be temporary, and prices are likely to stabilize over 2022 as other countries step up production to replace some of the production from Ukraine and Russia.

Following the effects of sanctions and the prospect of supply interruptions, all major commodity markets displayed signals of inflationary shock, worsening the mounting price pressure seen in 2021 and early 2022. The price of crude oil has risen to over US$100 per barrel[10], and gasoline prices reached new highs during the first weeks of conflict. The progression of the war will largely determine whether this growing pressure on prices will continue or undergo a mid-term correction; however, there are currently few signs of de-escalation. The price of nitrogen fertilizer in New Orleans soared 29 percent during the first week of the conflict, a record for the 45-year Green Market index, due to limitations on Belarus's fertilizer exports to the EU, rising energy prices, and concerns about future supply interruptions.

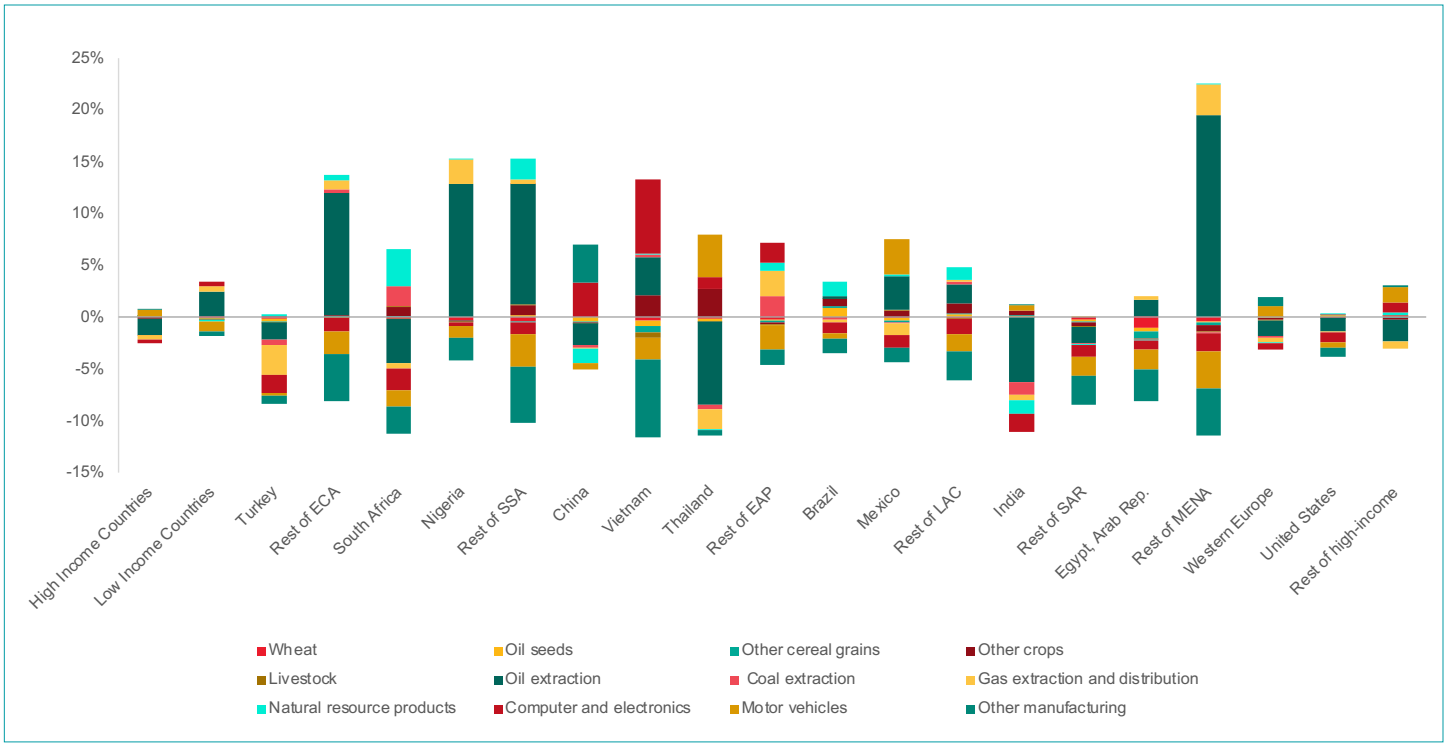
9. The calculations are based on the GTAP v. 11 data base (https://www.gtap.agecon.purdue.edu) database, which aggregates fertilizers with other chemicals.
10. Price as of April 2nd, 2022.

Our assumed supply shock to Russian energy, along with US sanctions, results in a 7 percent increase in oil prices. This should be seen as a direct effect of the shocks adding to the inflationary pressures streaming from a variety of factors beyond the scope of our modelling exercise.

The effects of various shocks to trade flows will be determined by the characteristics of trade, production, and consumption in the countries affected. Net exporters benefit as gains in the terms of trade in agricultural and energy commodities drive up exports up (if production can be scaled up or redirected from the domestic market). At the same time, higher commodity prices reduce the competitiveness of goods and services that use them as inputs and therefore make them less profitable to produce and export. In addition, the higher cost of fertilizer reduces agricultural yields, potentially reversing the terms-of-trade gains for agricultural exporters. On the other hand, net importers of agriculture and energy are worse off due to rising prices of final and intermediate products. However, they might be able to expand exports in manufacturing and services sectors if their production is relatively more competitive or less energy intensive than that of other countries. For all countries, trade costs are expected to increase as higher energy prices drive up transport costs, mostly affecting time-sensitive goods. Figure 1.2 displays net exports as a share of GDP to show the relative strength of the crops and energy exposure at the country and regional levels. A more granular representation of potential exposure to shocks across various developing countries is presented in Annex 1.

> > >

FIGURE 1.2: Net exports of commodities, percentage of GDP (2017)



Source: Author's calculations based on GTAP database data

> > >

BOX 1.1: Methodological approach

To explore the impacts of Russia-Ukraine war, we rely on a static version of the global computable general equilibrium model ENVISAGE, which distinguishes agent-based demand for imports by region of origin (Chepeliev et al., 2022). The model represents global economy with 20 aggregate regions/countries and 30 sectors (see Annex 2 for details). To capture the short-term implications of the explored policy shocks, we lower trade and labour substitution elasticities. Two broad channels of the commodity market disruptions are captured in the modelling framework. These include impacts of the conflict on international prices of food and fuel. Early evidence suggests that these commodity groups are among the most impacted amid fears of global supply tightening (JPMorgan, 2022; IMF, 2022).

The following exploratory policy shocks are implemented in the model: a reduction in the fossil fuel and crops supply in Russia, Ukraine and Belarus, and a 50 percent increase in the price of imported fertilizer used in agriculture in all represented countries/regions. Our shocks to supply and imposition of various trade restrictions through sanctions result in an increase in the global price of wheat and other cereal grains by 20 percent. Global price of oil rises by 7 percent. To simulate the sanctions that resulted from the conflict, we implement a total ban by the US on fossil fuels imports from Russia. Furthermore, we implement a ban on electronics sector's exports to Russia by high income countries (computers, electronics and optical products). Finally, Russia also imposes a ban on exports of wheat and food products, as well as all electronics, select manufacturing products, and motor vehicles, parts and transport equipment.

Three important caveats should be considered in the context of interpreting price implications in particular and modelling results in general. First, in the applied modelling framework all prices are relative and measured with respect to the global GDP deflator (indexed to "1"). Thus, nominal price changes are not captured in the applied framework. Second, an applied model provides representation of the economic flows on an annual basis, therefore observed impacts also reflect annual average implications, which are different from the short-term market volatility impacts. Finally, in the current assessment we focus on the impacts on key commodity markets – energy, crops and fertilizers, and only cover select sanctions (Russian ban on exports of electronics and machinery, restrictions on exports of electronics to Russia imposed by high income countries and ban on imports of fossil fuels from Russia to the US). The analysis does not capture the potential spill-overs from the significant and broad sanctions imposed on the Russian economy (e.g., Krugman, 2022) and the increased uncertainty in markets.

Impacts of the war on global trade

Commodity and energy price shocks reduce global trade. The crop and energy price shocks reduce global trade, with the total value of exports declining by 1 percent, exports of developing countries declining by 1.06 percent, and of developed countries by about 1 percent (Figure 1.3). It is important to distinguish between value and volume changes in trade flows. In volume terms, imports of natural resources from outside of the Black Sea region fall 2.3 percent, of energy intensive and trade-exposed goods (EITE) by 0.7 percent, and of agricultural commodities by 0.1 percent to 0.2 percent. Imports of non-EITE sectors, like light manufacturing, and service sectors increase by 0.2 percent to 0.4 percent in volume terms, reflecting the relatively low energy intensity of these activities. At the same time, rising prices of agricultural and energy commodities result in a different pattern of global trade-flow restructuring when measured in value terms. Accounting for the price effect, exports of agricultural commodities increase by 7 percent and of energy by 1.9 percent. Exports of energy intensive and trade-exposed (EITE) sectors decline[11] by 1 percent; they drop 1.8 percent for non-EITE manufacturing sectors and 2 percent for services.[12] Developing countries' imports decline by 0.7 percent, while imports of high-income countries fall by 1.1 percent. Global imports mimic exports; imports of agricultural commodities and natural resources increase slightly, while imports of services and all manufacturing sectors decline.

11. Annex 2 includes the details of sectoral and regional aggregation. EITE sectors - Wood and paper products; Refined oil; Chemical products; Non-metallic minerals; Metals.
12. In volume terms the decline of EITE exports is steeper (0.9 percent) than exports of non-EITE sectors (0.4 percent), but rising input prices (energy) slow down the decline of the value of exports of EITE sectors.

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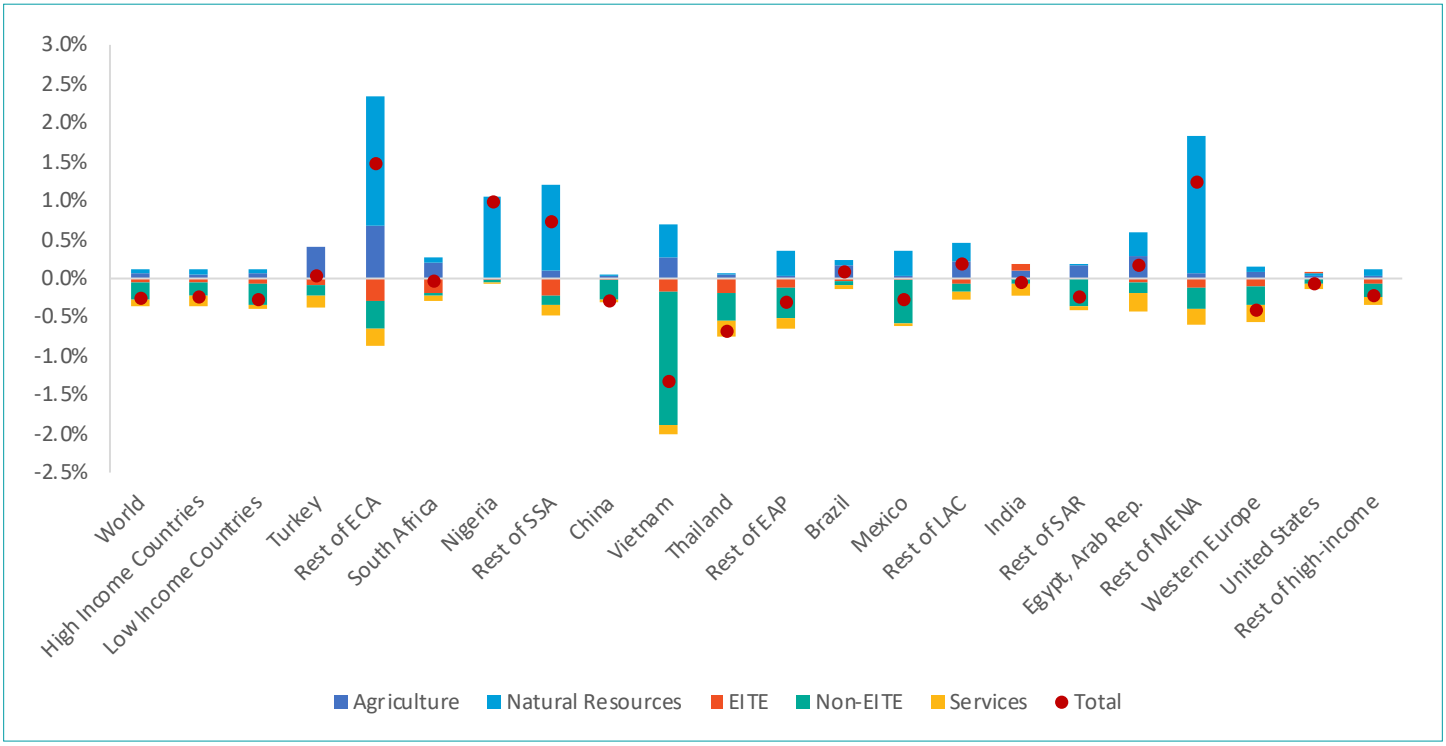
FIGURE 1.3: Change in exports relative to reference year as a share of real GDP in the reference year



Note: see Annex 2 for sectoral and regional aggregations.
Source: ENVISAGE simulations

Net exporters of agricultural commodities or energy see gains in terms of trade and expand total exports. Several countries are expected to expand the total value of exports, with the biggest growth rates recorded in the rest of ECA region (1.5 percent), rest of MENA (1.2 percent), Nigeria (1 percent) and rest of SSA (0.7 percent) with smaller gains in Turkey, Brazil, rest of LAC and Egypt. All other countries/ regions in our simulations experience total export losses, even though some observe gains in selected sectors.

Rising prices create incentives for agricultural exporters to expand production and replace some of the exports from the Black Sea region (Figure 1.4). Wheat exports from Western Europe, rest of HICs, rest of ECA region, the United States, and India expand the most. Exports of other crops that substitute wheat in consumption expand in several countries, with the biggest gains in Western Europe, rest of LAC, Turkey, China, Brazil, rest of MENA, India, and the United States. A few countries with a comparative advantage in oil seeds replace some of the lost exports from Russia and Ukraine (Western Europe, the United States, Brazil, rest of LAC). A change in the composition of agricultural trade is also observed. Large importers of wheat from the Black Sea region, such as Egypt and Turkey, increase their imports of other cereal grains and crops, substituting for declining wheat imports.

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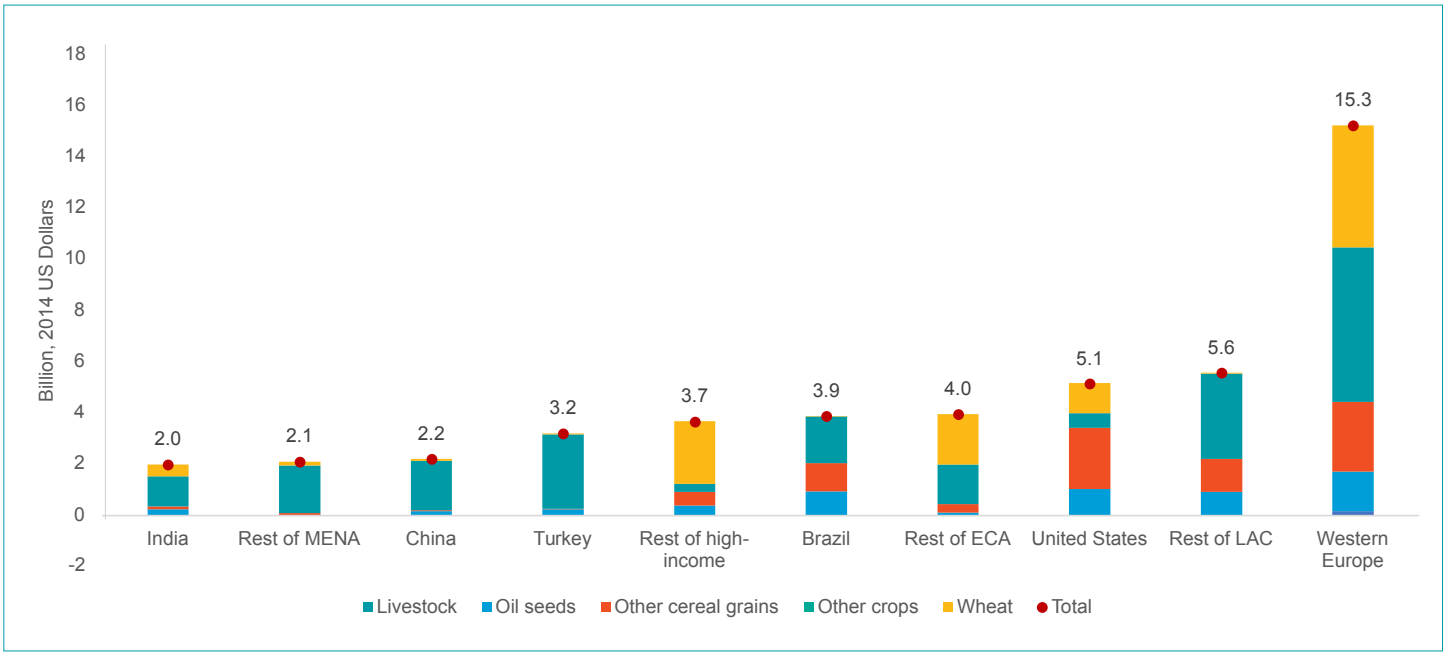
FIGURE 1.4: Value change in agricultural exports – top 10 gains



Note: see Annex 2 for sectoral and regional aggregations.
Source: ENVISAGE simulations

Exporters of fossil fuels in MENA and ECA regions, Nigeria, SSA and LAC step up production and exports in response to the negative supply shock created by the Ukraine war. Exports of natural resources from the rest of MENA and from the rest of ECA region could expand by almost 2 percent as a share of GDP. Furthermore, countries such as Nigeria and the rest of SSA also expand exports of these commodities by about 0.3 percent of GDP.

Exports of energy intensive and trade-exposed manufacturing sectors decline in most regions (Figure 1.5). In the net commodity exporters, production shifts toward agriculture and energy, therefore reducing the factors of production (capital and labor) available for other sectors. Rising prices also drive-up exports of refined oil in several countries (the United States, Western Europe, Rest of MENA). Exports of sectors such as metals, wood and paper products and non-metallic minerals decline. We would expect to see some EITE sectors expand in energy efficient countries, but the large price shock to agricultural and energy commodities substantially reduces their competitiveness.

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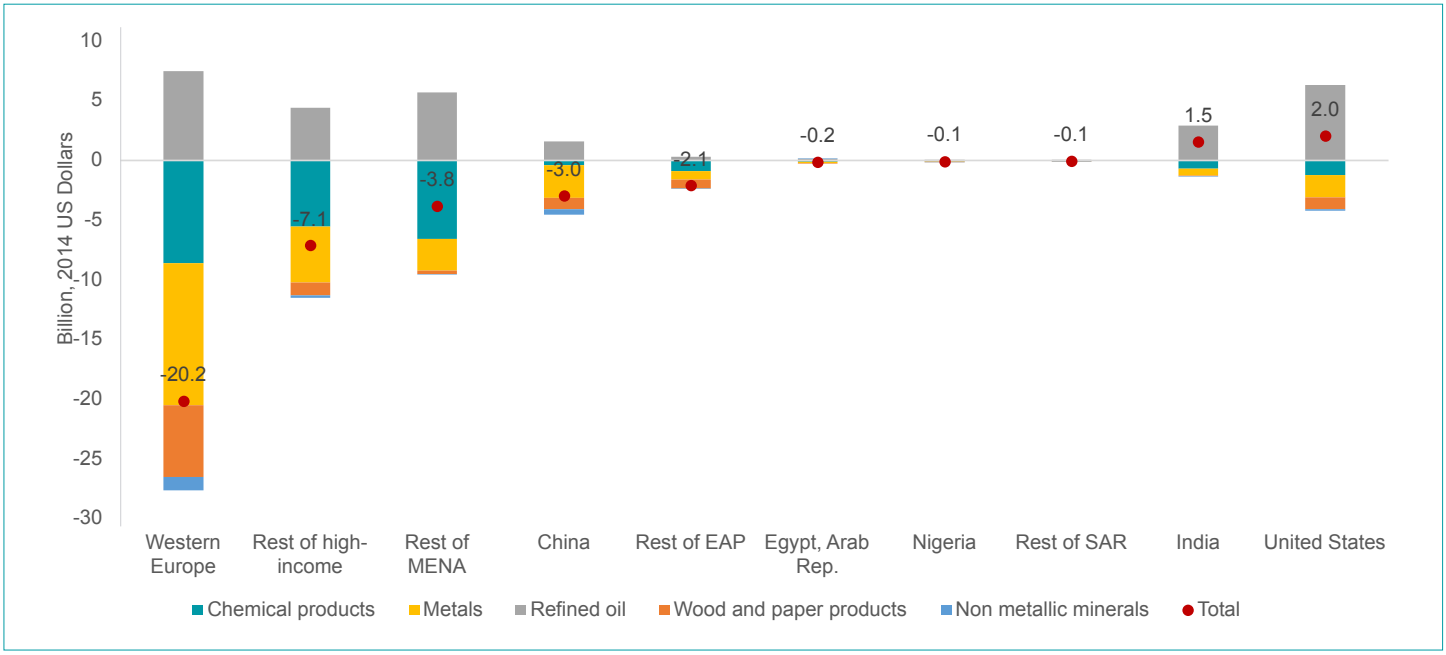
FIGURE 1.5: Value change in EITE exports - top 5 biggest losses and 5 biggest gains



Note: see Annex 2 for sectoral and regional aggregations.
Source: ENVISAGE simulations

Exports of non-EITE sectors, such as light manufacturing and electronics, decline across the board (Figure 1.3). The biggest losses in exports of non-EITE sectors are expected in countries that shift toward exports of agriculture and energy and also face export bans on electronics to Russia. The biggest exporters of electronics to Russia are China (48 percent of total Russian imports), Western Europe (33 percent) and the rest of high-income countries (6 percent) with the United States and Vietnam at about 3 percent of total imports of electronics by Russia. However, for none of these countries, is Russia a significant importer as a share of their total exports. The sanctions apply to Western Europe, the United States, and major Asian electronics producers (Malaysia, Vietnam, Indonesia) resulting in China stepping up its exports of electronics to Russia.

Services exports decline in most countries, with construction, recreation, communications, and energy intensive services such as transport declining the most. At the global level, exports of construction services decline by 3.7 percent, followed by recreation and communications at about 3 percent. Air transport exports decline the most among transport sectors at 2 percent at the global level, with other means of transportation declining by 0.8 percent. The decline of services exports is linked to shrinking global demand with lower income, as well as productive resources shifting toward expanding commodity sectors.

With the decline of energy and non-energy intensive manufacturing, and services, demand shifts towards food, energy and transport for which demand is quite inelastic. This leads to lower integration in global value chains (GVCs) for commodity rich exporters such as ECA region (Figure 1.6). Exports of agricultural and energy commodities from ECA expand and these sectors become more integrated into GVCs – primarily through increasing backward participation. At the same time, a reduction in the GVC participation for a higher-value and more GVC-integrated goods, such as motor vehicles, electronics and other manufacturing leads to an overall reduction in the GVC participation rate.

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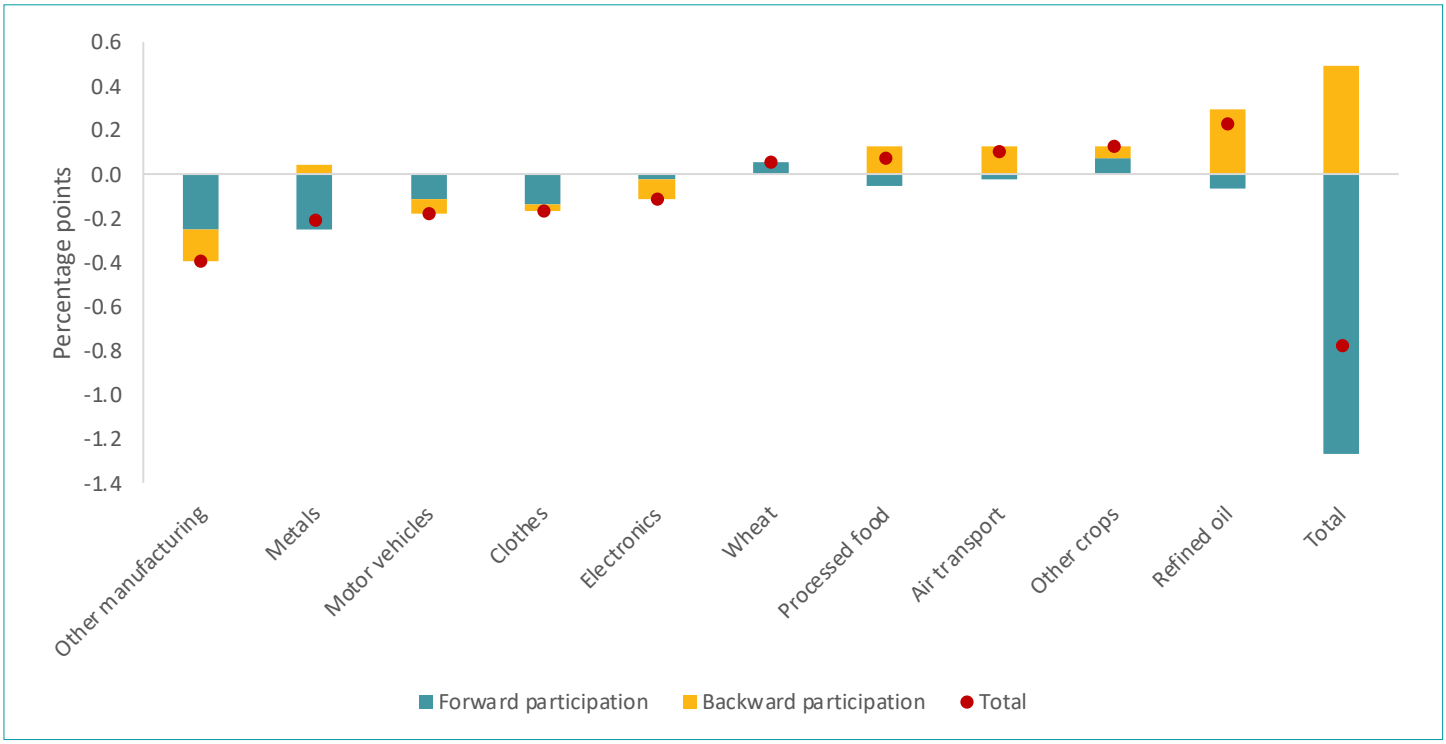
FIGURE 1.6: Change in GVC participation rate for ECA (selected sectors)



Source: ENVISAGE simulations

Total imports increase in countries benefiting from terms-of-trade gains (Figure 1.7). The value of global imports declines by 0.3 percent, with LICs decreasing imports by 0.2 precent and HICs by 0.3 percent. Several energy and agricultural exporters can afford higher imports of manufactured goods and services thanks to growing export revenues. These countries include the rest of ECA, Nigeria, rest of SSA, Egypt and the rest of MENA. They mostly increase imports of light manufacturing – non ETIRI sectors and agricultural commodities. The remaining countries reduce their imports in the light of terms-of-trade losses. Importers of energy intensive EITE commodities, especially Vietnam and Thailand, reduce their imports, mostly of manufacturing goods and services. In addition to lower export revenues, the decline is driven by lower demand among high-income countries for manufactured goods from Vietnam and Thailand, which drives down demand for imported components in GVC-intensive sectors. Most countries' import bills for agricultural products go up, especially among net importers such as Egypt, Turkey, and the rest of MENA.

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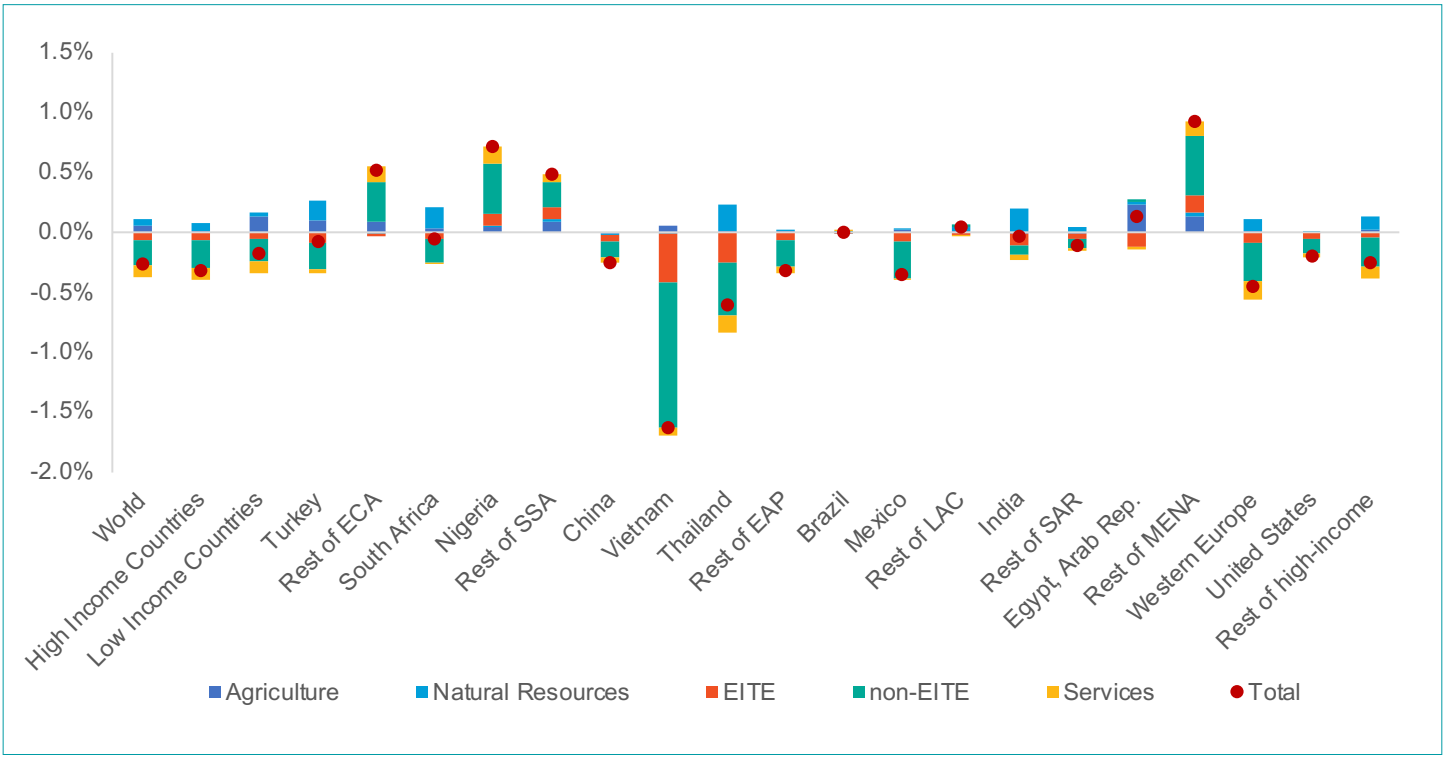
FIGURE 1.7: Change in imports relative to reference year as a share of real GDP in the reference year



Note: see Annex 2 for sectoral and regional aggregations.
Source: ENVISAGE simulations

Impacts on income are mostly driven by higher energy prices

Energy price spikes are a key driver of income changes at the country level. The effects on income are driven by the overall changes on agricultural and energy markets and by their respective shares in production and consumption. Crops account for a limited share of total household consumption (though higher for poorer households) and intermediate use, while energy constitutes a much higher share of final consumption, but also a high share of intermediate inputs in production and in services (mainly transport). Exports of energy commodities constitute a much higher share of global trade. Global exports of wheat amounted to US$44.1 billion in 2019, while total grain exports amounted to US$115 billion. By comparison, global exports of crude oil amounted to US$986 billion and those of natural gas to US$300 billion in 2019. As a share of global exports, fossil fuels from the Belarus, Russia, and Ukraine account for 4.3 percent and crops for 0.7 percent (2017 statistics from the GTAP 11p2 data base). Furthermore, the share of Belarus, Russia and Ukraine in global output of fossil fuels is 10.4 percent, and for crops it is significantly lower at 2.2 percent.

The estimated decline in global income is 0.7 percent, with low-income countries losing 1 percent and high-income countries losing 0.6 percent (Figure 1.8). Given the relative size of energy in GDP, the expected impact from the increase in energy prices as compared with the impact of prices of crops and stylized sanctions on total income are much higher.[13]

Importers of energy and agricultural commodities suffer real income losses. In particular, importers of crude oil suffer significant real income losses of 1 percent for Turkey, followed by Thailand with a 0.9 percent drop, India and South Africa with declines of about 0.6 percent each.

13. We isolate the effects of the energy supply shock alone and find that the majority of the impact on income is driven indeed by energy prices.

Countries in MENA and ECA regions could benefit from terms-of-trade gains and see their incomes expand. Crude oil producers in the rest of Middle East and North Africa region could capture the benefits of drastic reductions in crop and energy production and exports from the Black Sea region by increasing production and exporting more natural resources. The rest of MENA is likely to see the highest increase of real income, 1.9 percent relative to the reference year. Other net exporters of crude oil, such as Nigeria and Mexico, see their real income increase, by 0.9

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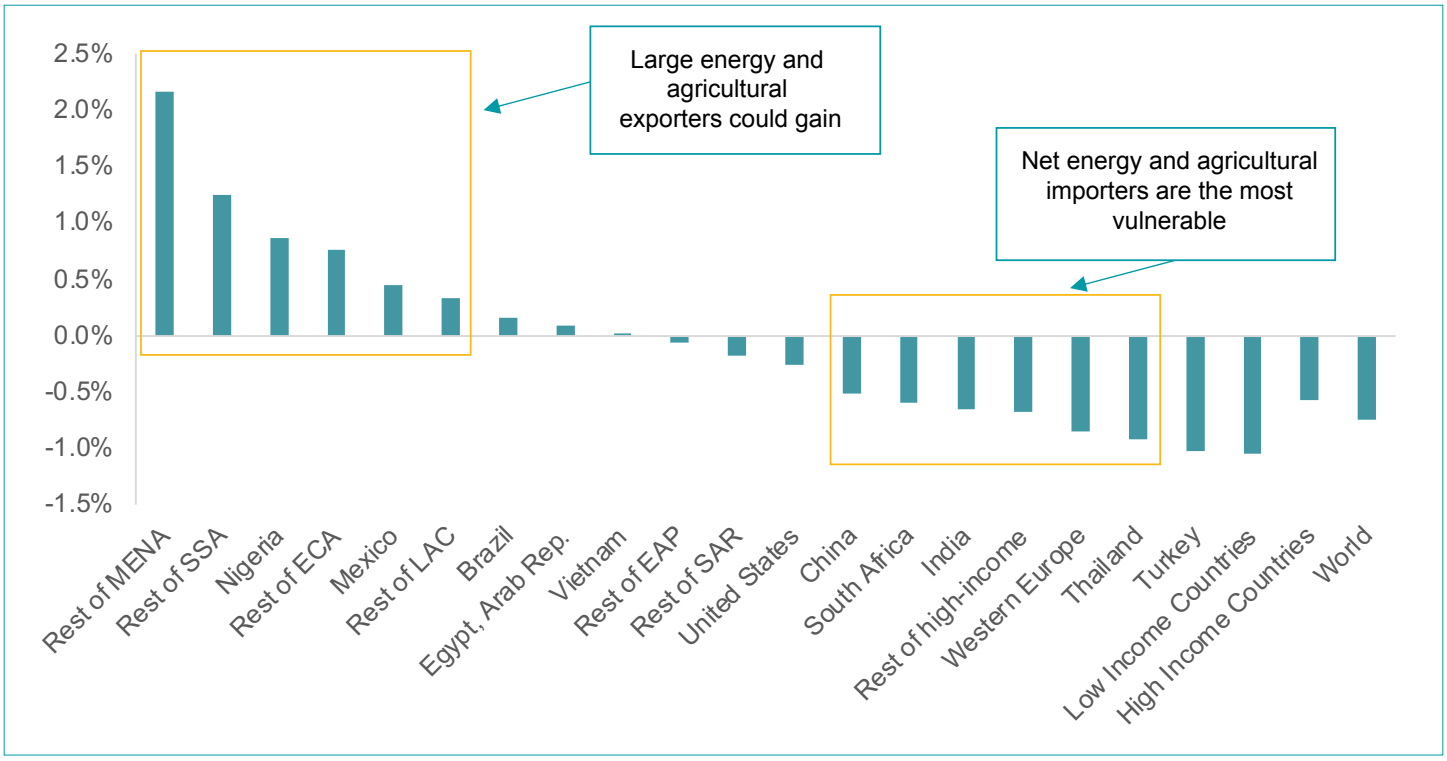
FIGURE 1.8: Change in real income in selected countries and regions



Note: see Annex 2 for sectoral and regional aggregations.
Source: ENVISAGE simulations

percent and 0.5 percent, respectively.

Households are likely to face wheat price increases of up to 10 percent. This effect is driven only by the shocks covered in our modelling framework, so it should be interpreted as 10 percentage points added to the high inflationary pressures already present in the wheat market. The highest increases in the price of wheat are recorded in the rest of ECA with 20.3 percent, and rest of SSA, and Egypt at around 9-10 percent. Depending on the substitutability across crops and availability of supply from other sources, households are likely to face higher prices of other grains of up to 16 percent for the rest of MENA, 12 percent for the rest of ECA, and around 10 percent for Egypt and Western Europe. Export restrictions on trade in food products are expanding, which will boost prices even more. Our exercise doesn't account for his ramp-up in policies (see chapter 2).

The war is adding inflationary pressures to food prices that were already high due to COVID-19 disruptions, region-specific weather events, currency devaluations, and worsening fiscal constraints.[14] Before the conflict, food prices were trending upward due to recovery in demand after the global COVID-19 recession and to temporary disruptions

14. https://blogs.worldbank.org/voices/four-paths-respond-food-price-crisis

in supply chains and logistics. Bad weather has also been harming harvests in some of the world's breadbaskets, accompanied by lowering reserves of crops. Extreme heat and downpours in West Africa have lowered crop yields for sorghum and millet, and a drought in Australia contributed to profound declines in wheat production. Supply disruptions, more due to weather conditions than to the pandemic, rising costs of fertilizers, and trade restrictions contributed to the price increases, although to a lesser extent.

Increases in crop and energy prices will add to the strain, especially on the poorest households. Higher food prices will hit poor households especially hard. The poorest households spend 54 percent of their consumption expenditures on food, 7 percent on energy and 4 percent on transport.[15] (Global Consumption database, 2010). By contrast, food accounts for just 21 percent of consumption spending in the richest households. Energy accounts for 3 percent and transport for 19 percent, making rich households relatively more vulnerable to the energy price shock and the resulting increase in transport costs.

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UN Comtrade data base, 2022, https://comtrade.un.org/

15. Households in developing countries were categorized in four consumption segments for the Global Consumption Database: lowest, low, middle, and higher. Four levels of consumption are used to segment the market in each country: lowest, low, middle, and higher. They are based on global income distribution data, which rank the global population by income per capita. The lowest consumption segment corresponds to the bottom half of the global distribution, or the 50th percentile and below; the low consumption segment to the 51th–75th percentiles; the middle consumption segment to the 76th–90th percentiles; and the higher consumption segment to the 91st percentile and above.

Annex 1. Shares of imports of selected commodities from the Black Sea region in consumption

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FIGURE 8a: Wheat imports from Russia and Ukraine as a share of consumption, 2017

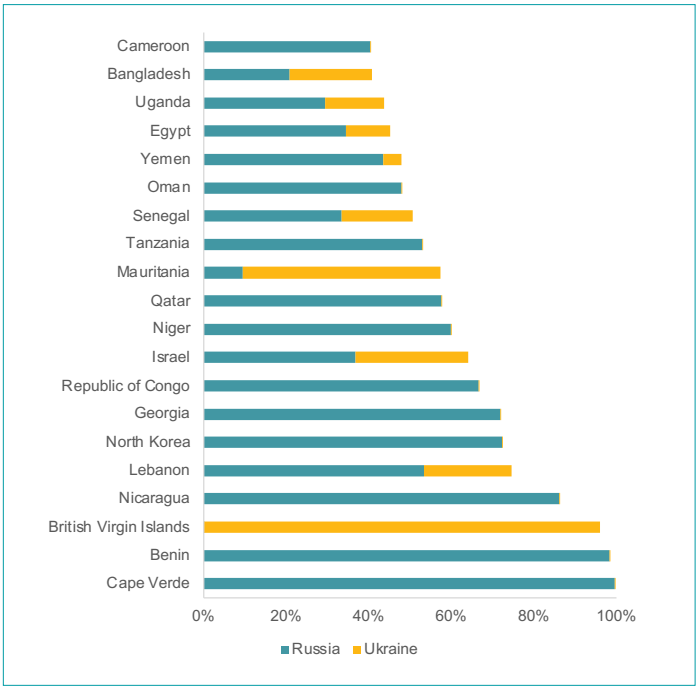

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FIGURE 8b: Cereal imports from Russia and Ukraine as a share of consumption, 2017

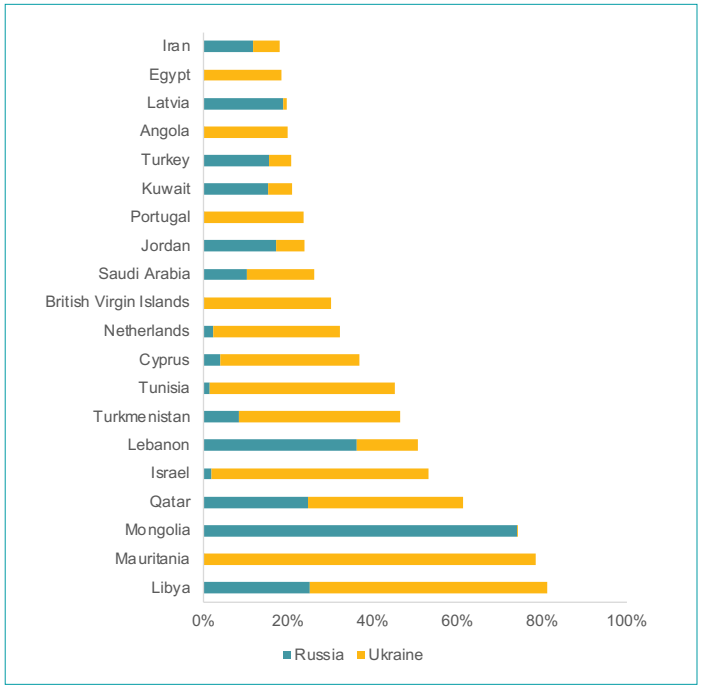

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FIGURE 8c: Seed oil imports from Russia and Ukraine as a share of consumption, 2017

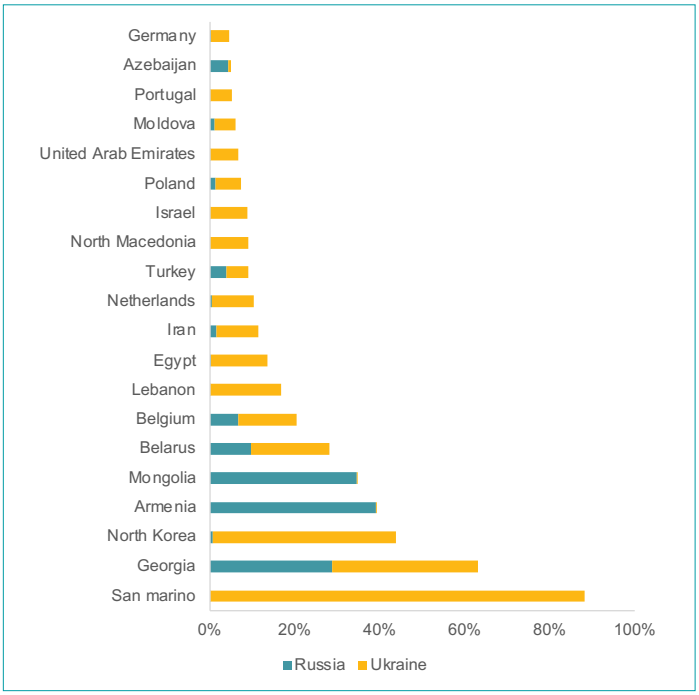

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FIGURE 8d: Coal imports from Russia and Ukraine as a share of consumption, 2017

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FIGURE 8e: Crude petroleum imports from Russia and Ukraine as a share of consumption, 2017

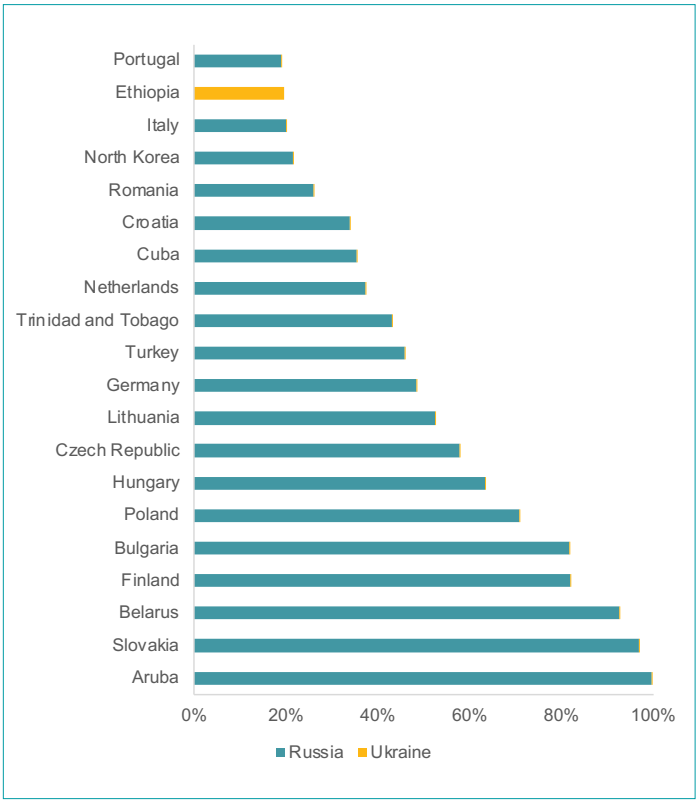

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FIGURE 8f: Petroleum and coal products imports from Russia and Ukraine as a share of consumption, 2017

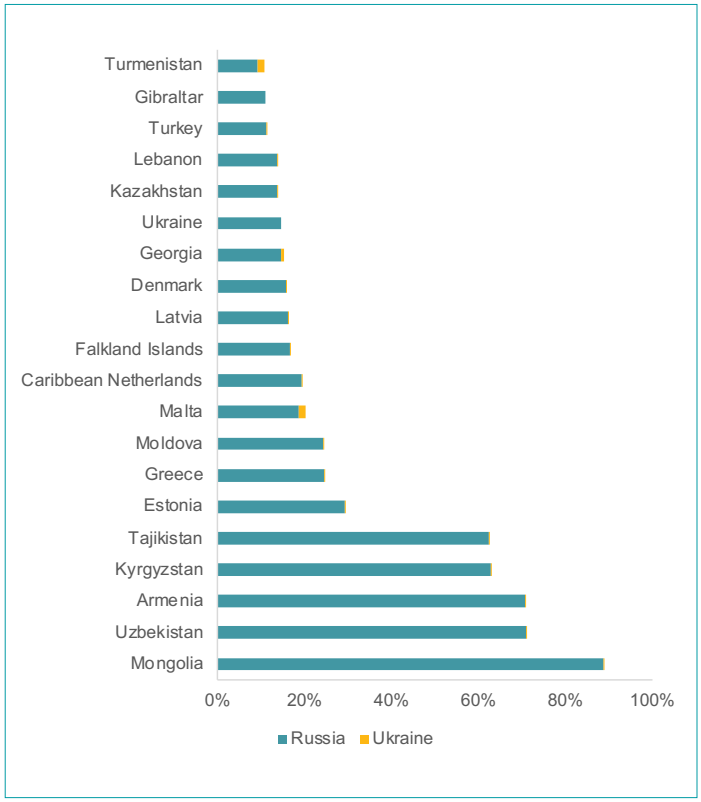

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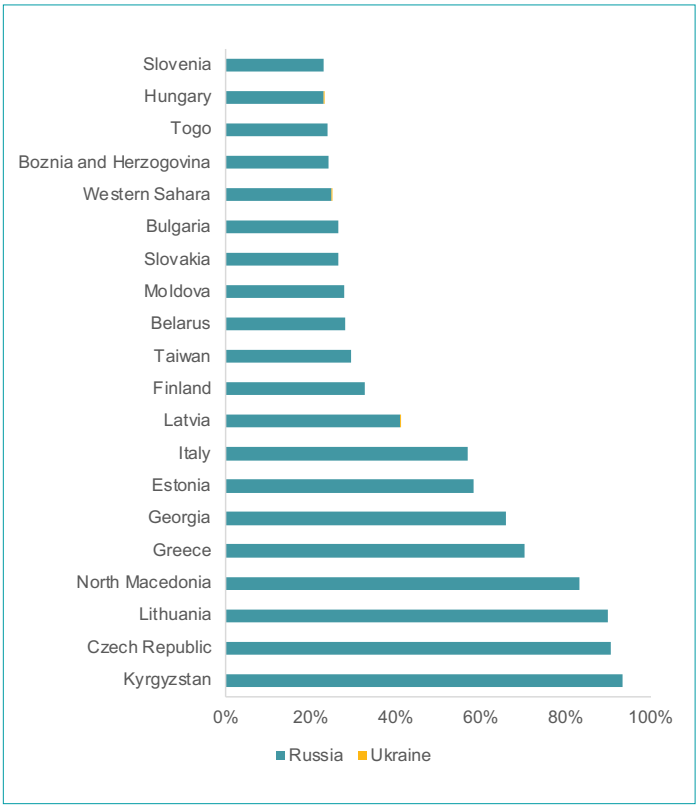
FIGURE 8g: Natural gas imports from Russia and Ukraine as a share of consumption, 2017



Note: GTAP data underestimates the imports of Russian natural gas by Germany, hence this data point has been dropped. Source: GTAP 11p2.

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Annex 2. Aggregations

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A 2.1. Regional Aggregation

No.	Region code	Region description	GTAP 10 regions
1	WER	Western Europe	Austria (AUT), Belgium (BEL), Bulgaria (BGR), Croatia (CRO), Cyprus (CYP), Czech Republic (CZE), Denmark (DNK), Estonia (EST), Finland (FIN), France (FRA), Germany (DEU), Greece (GRC), Hungary (HUN), Ireland (IRL), Italy (ITA), Latvia (LVA), Lithuania (LTU), Luxembourg (LUX), Malta (MLT), Netherlands (NLD), Poland (POL), Portugal (PRT), Romania (ROU), Slovakia (SVK), Slovenia (SVN), Spain (ESP), Sweden (SWE), Switzerland (CHE), United Kingdom (GBR), Norway (NOR), Rest of EFTA (XEF), Rest of Europe (XER), Rest of the World (XTW)
2	USA	United States	United States (USA)
3	CHN	China	China (CHN)
4	BRA	Brazil	Brazil (BRA)
5	MEX	Mexico	Mexico (MEX)
6	IND	India	India (IND)
7	TUR	Turkey	Turkey (TUR)
8	RUS	Russia	Russia (RUS)
9	UKR	Ukraine	Ukraine (UKR)
10	BLR	Belarus	Belarus (BLR)
11	ZAF	South Africa	South Africa (ZAF)
12	NGA	Nigeria	Nigeria (NGA)
13	VNM	Viet Nam	Viet Nam (VNM)
14	THA	Thailand	Thailand (THA)
15	EGY	Egypt, Arab Rep.	Egypt, Arab Rep. (EGY)
16	XSS	Rest of Sub-Saharan Africa	Benin (BEN), Burkina Faso (BFA), Cameroon (CMR), Côte d'Ivoire (CIV), Ghana (GHA), Guinea (GIN), Senegal (SEN), Togo (TGO), Rest of Western Africa (XWF), Central Africa (XCF), South-Central Africa (XAC), Ethiopia (ETH), Kenya (KEN), Madagascar (MDG), Malawi (MWI), Mauritius (MUS), Mozambique (MOZ), Tanzania (TZA), Uganda (UGA), Zambia (ZMB), Zimbabwe (ZWE), Rest of Eastern Africa (XEC), Botswana (BWA), Namibia (NAM), Rest of South African Customs Union (XSC)

No.	Region code	Region description	GTAP 10 regions
17	XHY	Rest of high-income	Australia (AUS), New Zealand (NZL), Canada (CAN), Hong Kong (HKG), Japan (JPN), South Korea (KOR), Taiwan (TWN), Singapore (SGP)
18	XLC	Rest of Latin America & Caribbean	Argentina (ARG), Bolivia (BOL), Colombia (COL), Ecuador (ECU), Venezuela (VEN), Chile (CHL), Paraguay (PRY), Peru (PER), Uruguay (URY), Rwanda (RWA), Rest of South America (XSM), Costa Rica (CRI), Guatemala (GTM), Honduras (HND), Nicaragua (NIC), Panama (PAN), El Salvador (SLV), Rest of Central America (XCA), Dominican Republic (DOM), Jamaica (JAM), Puerto Rico (PRI), Trinidad and Tobago (TTO), Rest of Caribbean (XCB), Rest of North America (XNA)
19	XEA	Rest of East Asia	Rest of Oceania (XOC), Malaysia (MYS), Mongolia (MNG), Rest of East Asia (XEA), Brunei Darussalam (BRN), Cambodia (KHM), Indonesia (IDN), Laos (LAO), Philippines (PHL), Rest of Southeast Asia (XSE)
20	XSA	Rest of South Asia	Bangladesh (BGD), Nepal (NPL), Pakistan (PAK), Sri Lanka (LKA), Rest of South Asia (XSA)
21	ECA	Rest of Europe & Central Asia	Albania (ALB), Rest of Eastern Europe (XEE), Kyrgyzstan (KGZ), Tajikistan (TJK), Rest of Former Soviet Union (XSU), Armenia (ARM), Georgia (GEO), Kazakhstan (KAZ), Azerbaijan (AZE)
22	XMN	Rest of Middle East & North Africa	Bahrain (BHR), Iran (IRN), Kuwait (KWT), Oman (OMN), Jordan (JOR), Qatar (QAT), Saudi Arabia (SAU), United Arab Emirates (ARE), Rest of Western Asia (XWS), Israel (ISR), Rest of North Africa (XNF), Morocco (MAR), Tunisia (TUN)

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A 2.1. Sectoral Aggregation

No.	Sector Aggregation	Sectors
1	Agriculture	Wheat (WHT); Oil seeds (OSD); Other cereal grains (GRO); other crops (CRP); livestock (LVS)
2	Natural Resources	Oil extraction (OIL); coal extraction (COA); Gas extraction and distribution (GAS); Natural resources products (NRS)
3	EITE	Wood and paper products (WDP); Refined oil (P_C); Chemical products (CHM); Non-metallic minerals (NMM); Metals (MET)
4	Non-EITE	Meat products and other food (PFD); Textiles (TEX); Wearing apparel and Leather products (WAL); Computer, electronic and optical products (ELE); Motor vehicles, parts and transport equipment (MVT); other manufacturing (XMN)
5	Services	Electricity (ELY); Construction (CNS); Trade incl. (TRD); Accommodation, food and service activities (AFS); Water transport (WTP); Air transport (ATP); Communications (CMN); Recreational and other services (ROS); Other services (XSV)

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Effects on Food Trade[1]

Ukraine's integration in agriculture markets

Ukraine is a large exporter of commodities and agricultural products, including staple foods. Data for the period 2018-2020 indicate that Ukraine's exports of sunflower seeds, maize and wheat account for, respectively, 38 percent, 10.6 percent and 7.2 percent of the world market (Table 2.1). In these markets, Ukraine is the first, the fourth and the fifth world exporter, respectively.

The risks of disruptions to global wheat market are particularly high, for two reasons. First, Russia and Ukraine together export roughly a quarter of the world's wheat, with Russia being the largest exporter of this staple globally. Second, on February 15 Russia implemented a new quota on exports of wheat and other cereals to countries outside the Eurasian Economic Union (EAEU). Thus, disruptions to the production and export of Ukraine's wheat would compound a situation that is already under pressure for this key staple.

Countries that are most dependent on imports of wheat from Ukraine will face the immediate trade consequences of the conflict. In the period 2018-2020, a total of 23 countries imported 10 percent or more of their wheat from Ukraine. Most are low-income economies (Table 2.2). For countries like Gambia, Lebanon, Republic of Moldova, Djibouti, Libya, and Tunisia, wheat from Ukraine accounted for well above 40 percent of their total imports of the grain. Because of their heavy reliance on Ukrainian wheat, these importers may face difficulties to switch quickly to alternative export sources, possibly causing to supply shortages in the short run.

The impact on the global wheat market will be deeper and more general, affecting many low-income economies that are net importers of wheat and leading to spillover effects on other food markets. Food prices have been on the rise, driven by weather conditions in key producing countries and the rising cost of energy. The price of wheat has already surged by more than 40 percent since the beginning of the conflict. Prices of other staples like rice and corn are facing similar upward pressures, in part because of disruptions in production, in part because they close substitutes for wheat.

1. Prepared by Michele Ruta (Lead Economist, ETIRI), Nadia Rocha (Senior Economist, ETIRI) and Alvaro Espitia (Consultant, ETIRI).

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TABLE 2.1: Most important export products of Ukraine (2018-2020)

Code	Product Label	Avg Exported Value 2018-2020 (US Dollar Thousand)	Share of Ukraine Exports	Share of World Market
'TOTAL	All products	48,858,607		
'1512	Sunflower-seed, safflower or cotton-seed oil and fractions thereof, whether or not refined, ...	4,568,730	9.4%	38.0%
'1005	Maize or corn	4,536,010	9.3%	10.6%
'2601	Iron ores and concentrates, incl. roasted iron pyrites	3,502,041	7.2%	2.4%
'1001	**Wheat and meslin**	**3,419,411**	**7.0%**	**7.2%**
'7207	Semi-finished products of iron or non-alloy steel	2,871,087	5.9%	10.0%
'8544	Flat-rolled products of iron or non-alloy steel, of a width >= 600 mm, hot-rolled, not clad, ...	1,912,003	3.9%	3.6%
'1205	Insulated "incl. enamelled or anodised" wire, cable "incl. coaxial cable" and other insulated ...	1,430,844	2.9%	1.1%
'2306	Oilcake and other solid residues, whether or not ground or in the form of pellets, resulting ...	1,037,522	2.1%	13.4%
'7201	Pig iron and spiegeleisen, in pigs, blocks or other primary forms	925,538	1.9%	16.8%

Source: Trademap, International Trade Centre, https://www.trademap.org/Index.aspx
Note: The table presents the simple average top-10 exported products during the period 2018-2020 for Ukraine.

> > >

TABLE 2.2: Countries most dependent on imports of wheat from Ukraine (2018-2020)

Importer	Avg Exported Value of wheat 2018-2020 (US $ Thousand)	Share of Ukraine Exports of wheat	Ukraine Share of total Imports of wheat
Gambia	1,582	0.0%	84%
Lebanon	89,744	0.1%	67%
Moldova, Republic of	478	2.9%	57%
Djibouti	21,239	0.0%	57%
Libya, State of	120,151	0.7%	45%
Tunisia	193,216	3.8%	41%
Pakistan	86,009	6.2%	39%

Importer	Avg Exported Value of wheat 2018-2020 (US $ Thousand)	Share of Ukraine Exports of wheat	Ukraine Share of total Imports of wheat
Somalia	3,128	2.7%	31%
Bangladesh	293,620	0.1%	24%
Mauritania	36,174	9.3%	22%
Israel	78,024	1.2%	21%
Eritrea	498	2.5%	20%
Indonesia	522,453	0.0%	20%
Morocco	210,351	16.6%	19%
Yemen	120,167	6.7%	18%
Egypt	512,138	3.8%	18%
Thailand	122,572	16.3%	16%
Jordan	34,335	3.9%	15%
Tanzania, United Republic of	8,600	1.1%	14%
Malaysia	47,149	0.3%	12%
Philippines	200,553	1.5%	12%
Qatar	5,213	6.4%	11%
Korea, Republic of	100,888	0.2%	10%

Source: Trademap, International Trade Centre, https://www.trademap.org/Index.aspx
Note: The table presents the list of countries that imported (on average) 10 percent or more of their wheat from Ukraine.

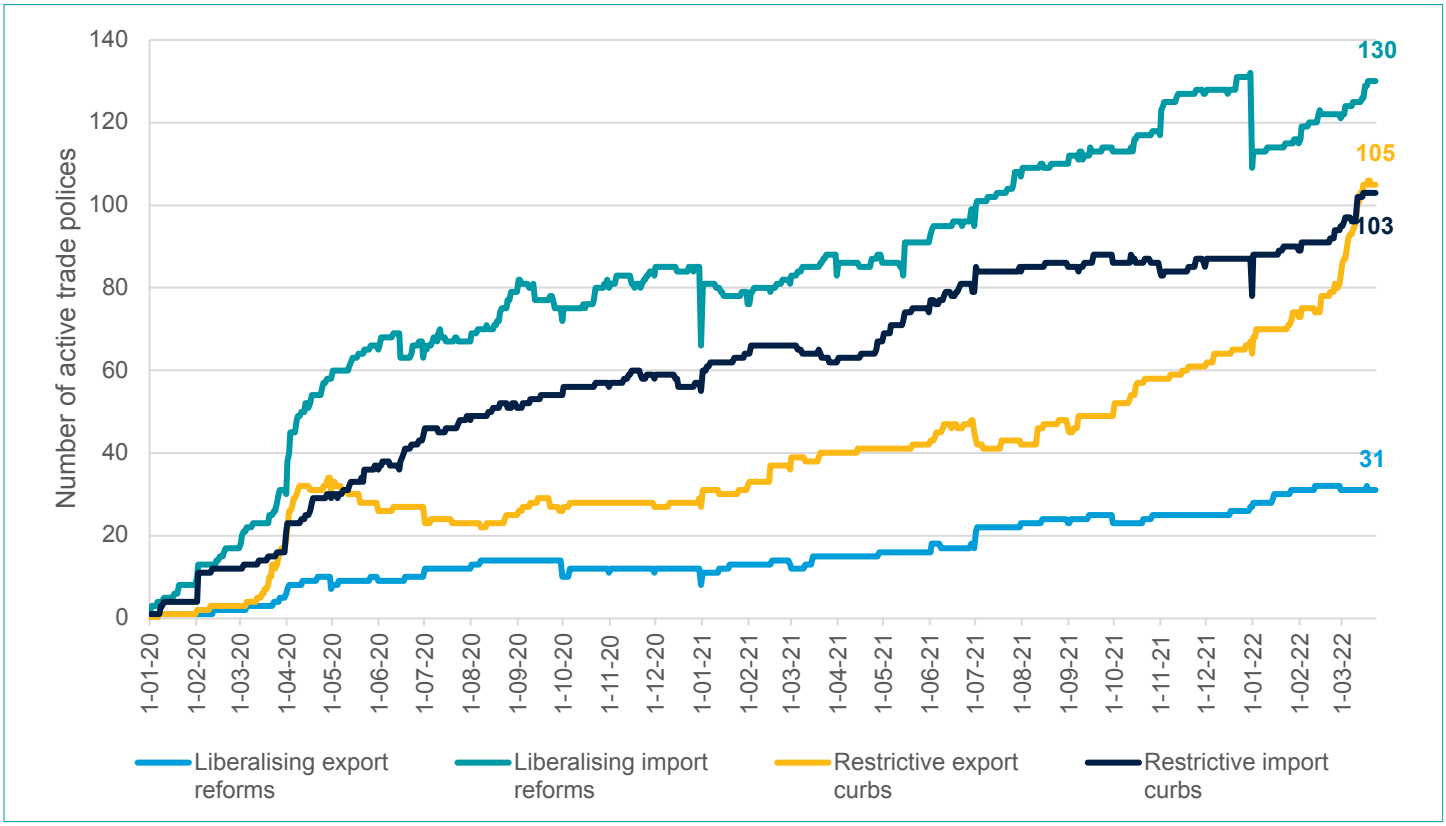
Trade policies could trigger a food crisis

Rising trade-policy interventions risk further disrupting global food markets.

- Monitoring by the World Bank – Global Trade Alert released at the end of March Trade shows that countries actively used trade policy to respond to domestic needs in the presence of potential shortages in food supply at the beginning of the COVID-19 pandemic. This policy activism resurfaced since the beginning of 2022 and particularly since the war in Ukraine began. As of March 23, governments had imposed a cumulative 161 trade liberalizing measures and 208 trade restrictive measures (Figure 2.1).

> > >

FIGURE 2.1: Number of active trade policies on food and fertilizers in force between January 1st 2020 and March 23, 2022



Source: Authors using World Bank and Global Trade Alert trade policy monitoring in essential goods.

- A total of 53 new trade policies (67 including subsidies) were imposed or announced between the beginning of the conflict on February 23 and March 23, 2022 (109 since the beginning of the year).[2] This surge has been dominated new export bans and export-licensing requirements (31 measures), followed by import bans and import quotas (13 measures), and liberalizing import reforms such as tariff cuts (9 measures).[3]

- Sixteen nations are responsible for the increase in export controls since the beginning of the war, especially in the ECA region (Figure 2.2). Examples include export bans of vegetable oils, maize and wheat imposed by Serbia on March 10 and export licenses for grains by Hungary on March 4. Export controls were also imposed by food-importing nations such as Algeria, which on March 13 introduced a ban on consumer products such as sugar, pasta, oil, and semolina; and Egypt, which on March 18 imposed a ban exports of cooking oil, corn, and all kinds of cracked green wheat for a period of three months.

2. See appendix Table A 1.1 for a detailed list of trade policy measures imposed between the beginning of the conflict on February 23rd and March 23rd, 2022. Note this list includes both measures that have been implemented and policy announcements gathered from official sources and news reports.
3. See appendix Table A 1.2 for a granular description of the measures.

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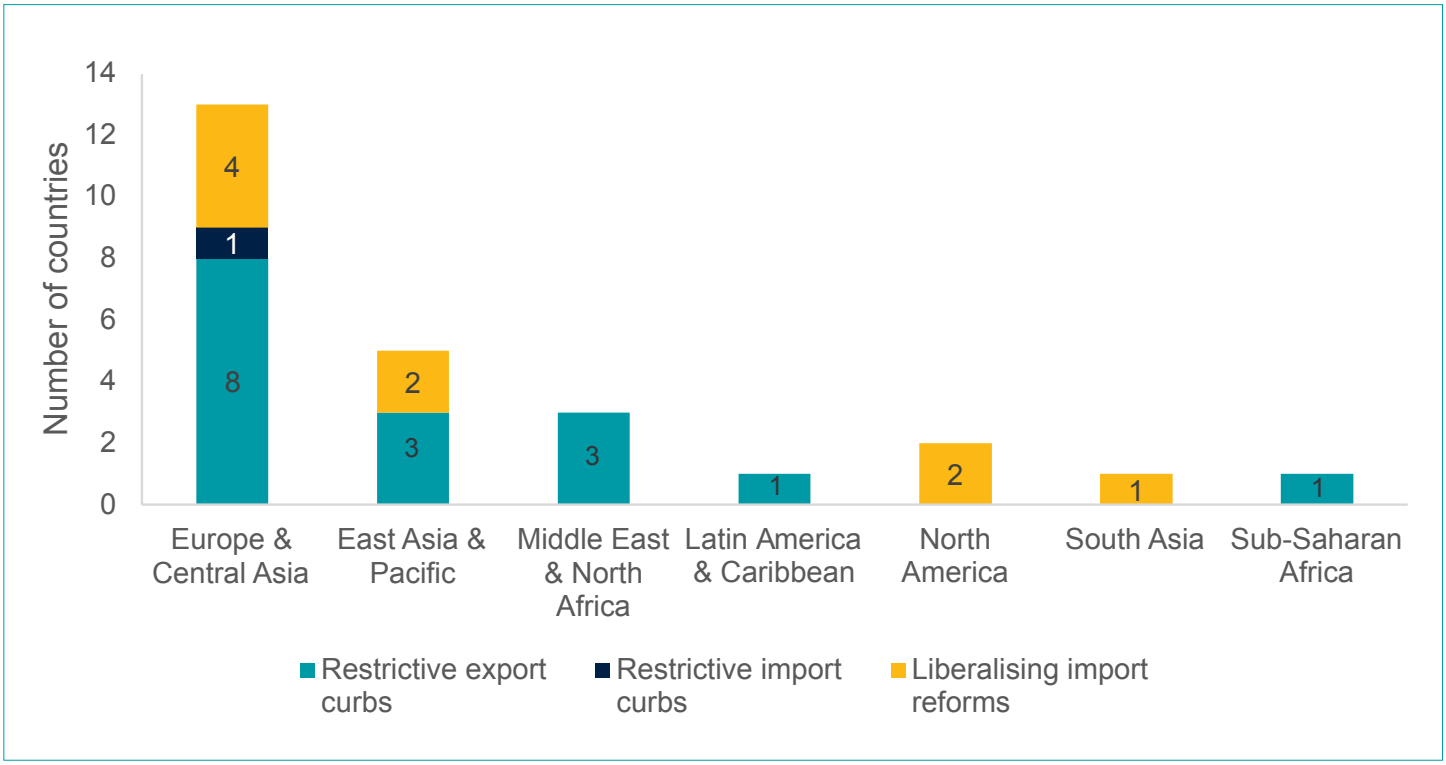
FIGURE 2.2: Regional breakdown of new trade policies on food and fertilizers imposed between February 23rd and March 23rd, 2022



Source: Authors using World Bank and Global Trade Alert trade policy monitoring in essential goods.

- Since Russia's invasion of Ukraine, 13 new import restrictions have been imposed by countries, mainly targeting Russian exports. For instance, the United States on March 11 prohibited imports of fish, seafood, and preparations thereof; as well as alcoholic beverages from Russia. Similarly, on March 11, the G7 countries revoked Russia's Most-Favored-Nation status at the WTO, which may result in further tariff increases on specific products.

- Governments have taken measures to alleviate pressures in national food markets. Since the beginning of the war, 12 governments from every continent except North America have increased subsidies for farmers and fertilizer producers or have subsidized food purchases by citizens. Azerbaijan, for instance, announced the allocation of up to US$44.1 million in subsidies to cover the difference in domestic and international prices of wheat and flour products.

- In addition, nine measures have been taken since the beginning of the war to reduce or remove import barriers on food and fertilizers. For instance, on March 3, Colombia decreased to zero import duties on corn, seeds, and resinoid oils, among other food products. The Philippines has announced cuts to taxes on food imports to curb broad price pressures.

Increasing export restrictions on staples such as wheat are magnifying the surge in food prices (Figure 2.3). Rising global food prices have typically induced differential policy responses, as governments try to shield domestic markets from price surges. Some governments lower import restrictions, and some food producing countries curb exports. As research shows (Giordani et al. 2016), trade interventions contributed to an increase in world food prices of 13 percent during the 2008-11 global food crisis—and by 30 percent for wheat.

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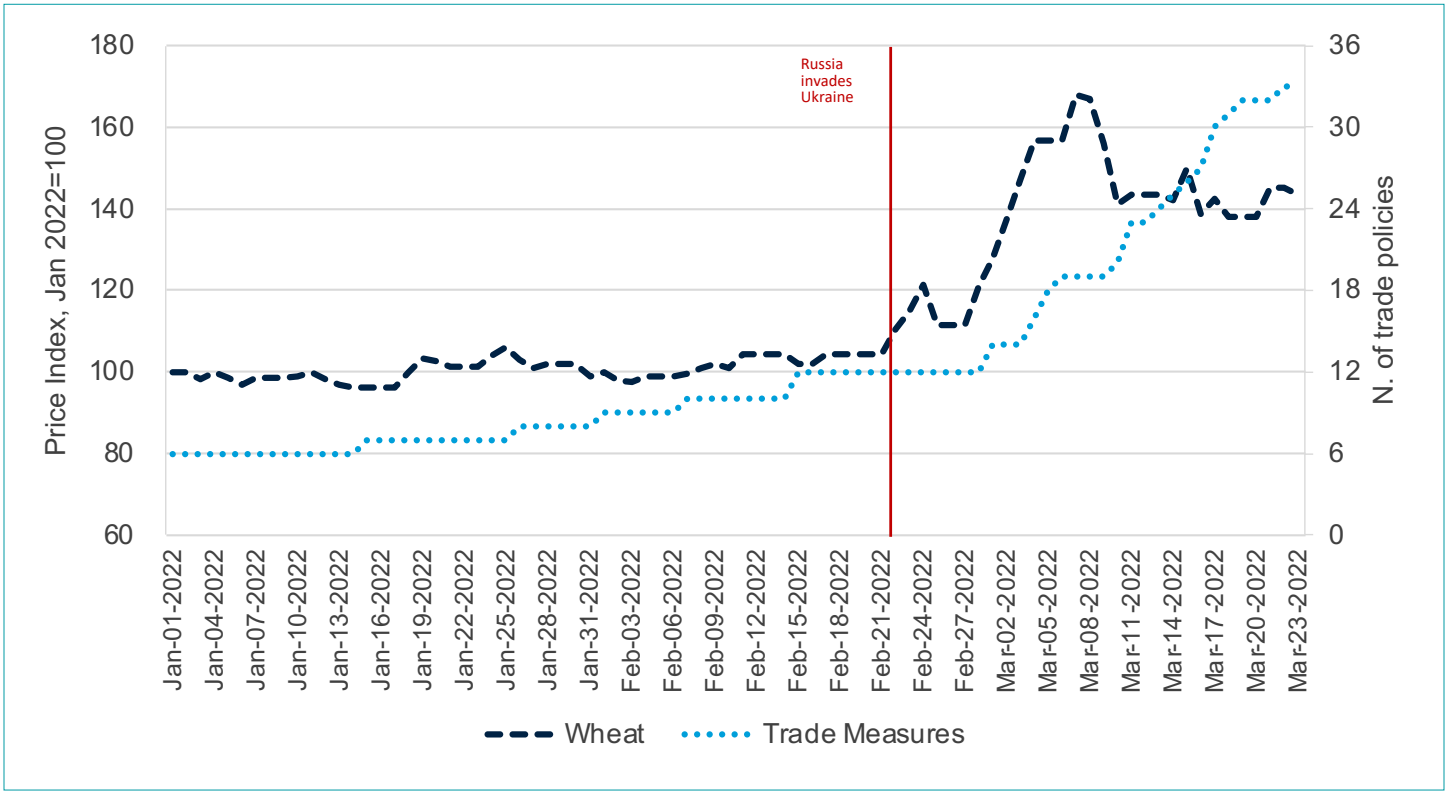
FIGURE 2.3: International wheat prices and trade policy measures



Source: Authors' calculations on Capital IQ commodity price statistics and on World Bank and Global Trade Alert trade policy monitoring of essential goods.

Trade measures are already driving up world prices of wheat. Bans on wheat exports imposed by Russia to countries outside the Eurasian Economic Union, by smaller exporters like Serbia or North Macedonia, and by food-importing countries like Egypt cover 16 percent of world trade and are responsible for a 7-percentage point increase in world wheat prices (i.e. roughly one-sixth of the observed price surge).

Further escalation in trade intervention in wheat signals more disruptions ahead. If any of the top five exporters of wheat were to ban exports, the cumulative effect of these measures would be to increase the world price by at least 13 percent, and much more if others react. Rising prices are more damaging for net food-importing countries that are predominantly low-income economies (Figure 2.4). As the consumption basket of poorer people is dominated by food, food-price surges hurt the poor everywhere and threaten to push millions into poverty.

While the consequences of the war on food markets will be difficult to manage, a more catastrophic scenario can be avoided. Large exporters of food products like the United States, Canada, the European Union, Australia, Argentina, Brazil — which together represent more than 50 percent of global exports of key staples like wheat, barley and corn — could make a clear joint statement that they will not restrict their exports of staples (Malpass, 2022). Security of these flows would allow markets for critical products to continue working, helping to preserve the stability of global food markets— and well beyond these markets.

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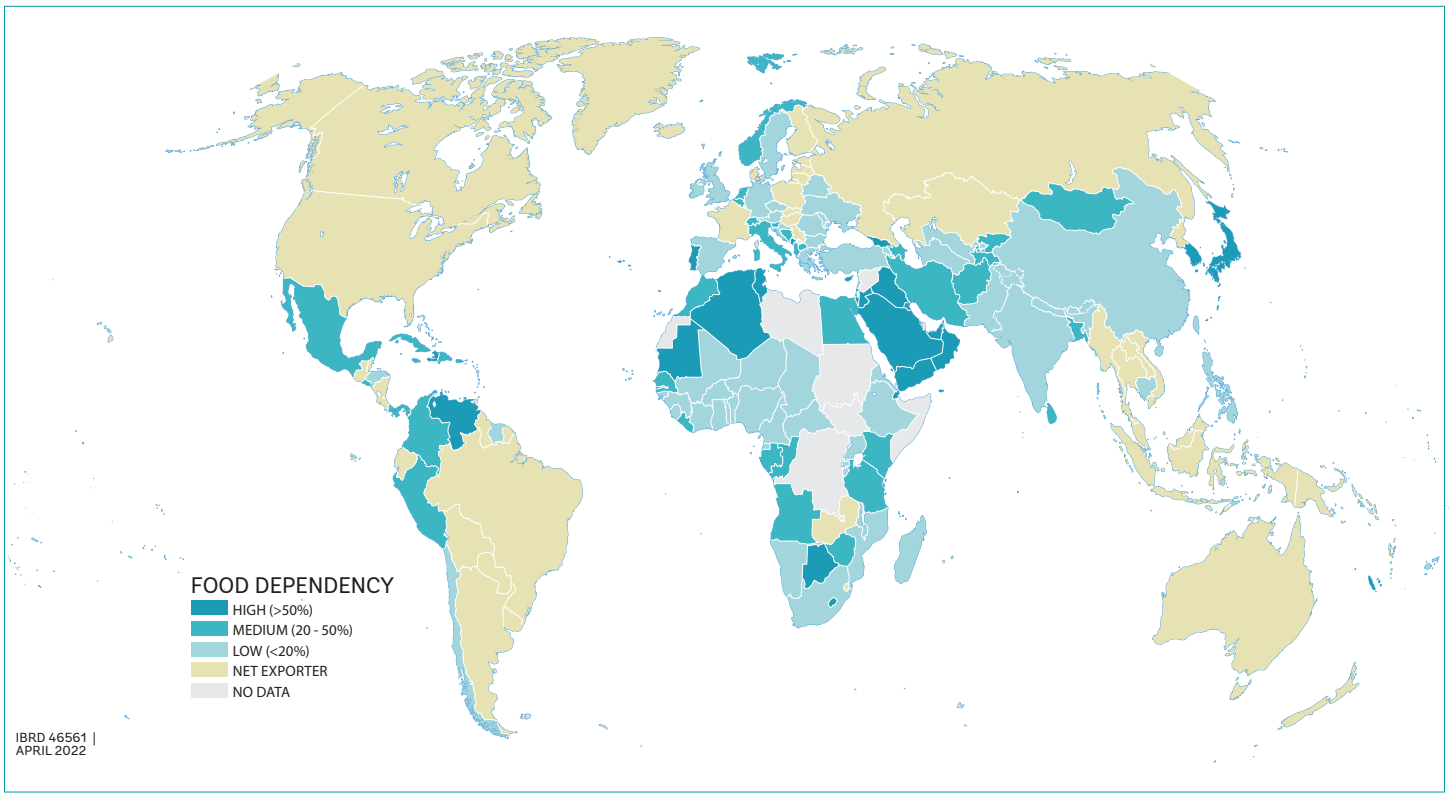
FIGURE 2.4: Percentage of net food imports in domestic food supply (total calories)



Source: UN's Food & Agriculture Organization Global Perspectives Studies (2018)
Note: Net imports are defined as difference between domestic production and domestic absorption, that is the sum of demand for food and "other uses" (feed, seed, food losses, non-food processing).

References

Giordani, P.E., N. Rocha, M. Ruta (2016). Food prices and the multiplier effect of trade policy. Vol. 101, 102-122, Journal of International Economics.

Malpass, D. (2022). A New Global Food Crisis Is Building. Barron's. April 9, 2022.

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Annex

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Table A 2.1. New trade policies imposed between February 23rd and March 23rd, 2022

Jurisdiction	Type	Initial assessment	Announcement
Ireland	Subsidies		3/22/2022
Kenya	Subsidies		3/20/2022
Argentina	Exports	restrictive	3/19/2022
EAEU (Eurasian Economic Union)	Imports	liberalizing	3/18/2022
Indonesia	Exports	restrictive	3/17/2022
Azerbaijan	Subsidies		3/17/2022
Egypt	Subsidies		3/17/2022
Pakistan	Subsidies		3/17/2022
Rwanda	Subsidies		3/17/2022
Pakistan	Subsidies		3/16/2022
Mongolia	Subsidies		3/16/2022
India	Export Subsidies		3/16/2022
Bangladesh	Imports	liberalizing	3/16/2022
Ukraine	Imports	liberalizing	3/16/2022
Philippines	Imports	liberalizing	3/16/2022
United Kingdom	Imports	restrictive	3/15/2022
Russia	Exports	restrictive	3/14/2022
Russia	Exports	restrictive	3/14/2022
Russia	Exports	restrictive	3/14/2022
India	Subsidies		3/14/2022
State of Palestine	Imports	liberalizing	3/14/2022
Argentina	Exports	restrictive	3/13/2022
Algeria	Exports	restrictive	3/13/2022
Egypt	Exports	restrictive	3/12/2022
Ukraine	Exports	restrictive	3/12/2022

Jurisdiction	Type	Initial assessment	Announcement
Lebanon	Exports	restrictive	3/11/2022
United States of America	Imports	restrictive	3/11/2022
United Kingdom	Imports	restrictive	3/11/2022
Japan	Imports	restrictive	3/11/2022
European Union	Imports	restrictive	3/11/2022
United States of America	Imports	restrictive	3/11/2022
Turkey	Exports	restrictive	3/11/2022
North Macedonia	Exports	restrictive	3/10/2022
Egypt	Exports	restrictive	3/10/2022
Serbia	Exports	restrictive	3/10/2022
Japan	Subsidies	restrictive	3/9/2022
Sri Lanka	Imports	restrictive	3/9/2022
Turkey	Exports	restrictive	3/9/2022
Japan	Exports	restrictive	3/8/2022
European Union	Imports	liberalizing	3/8/2022
Philippines	Subsidies		3/7/2022
Iran, Islamic Rep	Subsidies		3/6/2022
Ukraine	Exports	restrictive	3/5/2022
Bulgaria	Subsidies		3/5/2022
Ukraine	Exports	restrictive	3/5/2022
Hungary	Exports	restrictive	3/4/2022
Russia	Exports	restrictive	3/4/2022
Turkey	Exports	restrictive	3/4/2022
Turkey	Exports	restrictive	3/4/2022
Colombia	Imports	liberalizing	3/3/2022
Canada	Imports	restrictive	3/3/2022
Turkey	Imports	liberalizing	3/3/2022
Ukraine	Exports	restrictive	3/2/2022
Ukraine	Imports	restrictive	3/2/2022
Japan	Exports	restrictive	3/1/2022

Jurisdiction	Type	Initial assessment	Announcement
Pakistan	Imports	liberalizing	3/1/2022
Moldova	Exports	restrictive	2/28/2022
Burkina Faso	Exports	restrictive	2/28/2022
Switzerland	Exports	restrictive	2/28/2022
Switzerland	Imports	restrictive	2/28/2022
Turkey	Exports	restrictive	2/27/2022
Australia	Imports	restrictive	2/24/2022
Japan	Exports	restrictive	2/24/2022
Japan	Imports	restrictive	2/24/2022
New Zealand	Exports	restrictive	2/24/2022
European Union	Imports	restrictive	2/23/2022
Russia	Exports	restrictive	2/1/2022

Source: Authors using World Bank and Global Trade Alert trade policy monitoring in food products and medical goods.

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Table A 2.2: New export restrictions on food products (measures announced between February 23, 2022, and March 23, 2022)

Jurisdiction	Export Ban	Products	Announcement Date
Argentina		Soybeans, oil and flour	3/19/2022
Indonesia		Palm oil	3/17/2022
Russia	YES	Wheat, meslin, rye, barley, and corn	3/14/2022
Russia	YES	White sugar and cane sugar	3/14/2022
Russia		Sunflower oil	3/14/2022
Argentina		Flour and soy oil	3/13/2022
Algeria	YES	Sugar, pasta, oil, semolina and all wheat derivatives	3/13/2022
Egypt	YES	Cooking oil, corn, and all kinds of cracked green wheat	3/12/2022
Ukraine	YES	Nitrogenous mineral or chemical fertilizers, phosphatic mineral or chemical fertilizers, potassic mineral or chemical fertilizers	3/12/2022
Lebanon	YES	Meat products, fish, potatoes, fruits and vegetables, oils, animal fat, ice cream, cacao, mineral water, and milk	3/11/2022
Turkey		Lentils, chickpeas, wheat, dried beans, barley, sunflower seeds, and sunflower seed oil	3/11/2022
Serbia	YES	Durum wheat, maize, wheat flour, corn flour, and sun-flower-seed oil	3/10/2022
North Macedonia	YES	Wheat, barley, corn, wheat flour, sunflower seeds, and sunflower seed oils	3/10/2022
Egypt	YES	Wheat, fava beans, lentils, pasta, and all kinds of flour	3/10/2022
Turkey	YES	Soyabean oil, sunflower seed oil, vegetable fats and oils, margarine	3/9/2022
Japan	YES	Food products (not specified)	3/8/2022
Ukraine		Wheat and meslin, corn, poultry, eggs, sunflower oil	3/5/2022
Ukraine	YES	Rye, oat, buckwheat, millet, sugar, salt, bovine meat and by-products and live cattle	3/5/2022
Russia		Fertilizers	3/4/2022
Hungary		Wheat, rye, barely, oats. Maize, soybean, sunflowers	3/4/2022
Turkey	YES	Beans, lentils, olive oil	3/4/2022
Turkey		Rice, wheat flour, corn, vegetable oil, and meat of bovine animals	3/4/2022

Jurisdiction	Export Ban	Products	Announcement Date
Australia	YES	Goods (food) from Australia to all Russian military end-users	3/3/2022
Ukraine	YES	All food products to Russia	3/2/2022
Japan	YES	Single blanket export ban on goods to Russia	3/1/2022
Moldova	YES	Wheat, maize and sugar	2/28/2022
Burkina Faso		Millet, maize and sorghum flours	2/28/2022
Switzerland	YES	Food products (not specified)	2/28/2022
Turkey	YES	Beans, lentils, and olive oil	2/27/2022
Japan	YES	Food products (not specified)	2/24/2022
New Zealand	YES	Food products (not specified)	2/24/2022

Source: Authors using World Bank and Global Trade Alert trade policy monitoring in food products and medical goods.

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Effects on Global Logistics and Connectivity[1]

Impact on shipping connectivity of the Russian Federation

Sanctions have severely limited container shipping connectivity of the Russian Federation. Complying with sanctions, major western logistics companies, ocean carriers and express freight providers have ended operations with and in the Russian Federation, with the possible exception of food and pharmaceuticals. Sanctions imposed on the Russian Federation not only require shipping companies to check if a shipment is legally permissible, but also to make sure that every party to the transaction is compliant, including banks, insurers, and shippers. Payments to European ports by vessels flagged, owned, or operated by entities based in Russia are becoming increasingly difficult. This resulted in cutting connections between Russian Baltic container ports (e.g., in St. Petersburg, Ust-Luga) and Northern European gateways (e.g., Antwerp, Rotterdam, Hamburg).

Container traffic from and to Russia goes through Baltic ports (40 percent of total volume) as well as Black Sea and Far East ports (30 percent each). While traffic to the Northwest (Baltic) is directly affected by European sanctions, Russia may still connect from the Black Sea or Far East to countries or with operators (e.g., Chinese shipping lines) not joining sanctions. Russia's own shipping lines may be able to operate with ports not among the more than 35 countries that have issued sanctions.

The global impact is small, but uncertainty may add to stress in global shipping. Russia is a comparatively small destination for container shipping as its ports handle only about 4.9 million TEUs (for comparison: Canada and Greece handled 6.2 million TEUs and 5.8 million and respectively, in 2021). The freed-up capacity in container shipments from and to Russia (due to idling vessels), however, is not expected to alleviate global container-shipping stress; it may instead create increased uncertainty and disruptions at a time when the world economy is on the path of post-pandemic recovery.

1. Prepared by Jean-François Arvis, Cordula Rastogi and Daniel Saslavsky.

Sanctions will not affect bulk shipping of commodities from Russia as severely as container shipping. Russian commodity exports depend on bulk shipping, a massive 800 million tons, with a similar geographical distribution between the three coasts as for container shipping (Table 3.1). Bans of Russian-flagged, owned, and operated ships as well as cargo handling in western ports affects bulk shipping from the Baltic Sea, much less so the other regions. Furthermore, in bulk shipping, vessels do not operate on regular lines but are chartered on demand. Services are available from operators in many countries, including those applying no sanctions or less serious ones than the EU, the UK or the United States.

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TABLE 3.1: Russian Federation - Cargo Throughput in Maritime Ports, Aggregated by Region, 2021 (Million tons)

	Total Cargo Volume	Dry Bulk	Wet Bulk
Russian Federation (total)	**835.2**	**412.9**	**422.4**
North-West	316.1	143.8	172.3
Black Sea	259.4	116.4	143.0
Far East	225.8	150.1	75.6
Others	33.9	2.5	31.5

Russia has a strong domestic logistics industry serving Russian and Central Asian customers, and its functioning will be affected in the short to medium term. Domestic logistics operations and movement of goods is relatively less affected by the exit of Western European operators at least in the immediate term. In the short to medium term, the use of western transport and cargo handling equipment as well as information technology systems by Russian operators will be affected by sanctions. The maintenance of the Russian civil aviation sector may be compromised as a matter of weeks (less than three), as Airbus and Boeing are stopping operations, including spare parts deliveries. Limiting the sphere of insurance, another significant restriction included in the EU sanctions package will mean that planes will not be able to take off. This will affect three quarters of Russia's current commercial air fleet, with planes built in the EU, the US and Canada.

Impact on shipping connectivity in Ukraine

Ukrainian ports are unable to operate commercial shipping. Vessel traffic to Ukraine is no longer insured, and most ports are cut off or controlled by the Russian military. Like the Russian Federation, Ukraine exports large volumes of commodities, including about 50 million tons of grain (2018-19). The export supply chain relies on long-distance rail to one of the ports on the Black Sea (Figure 3.1 and Figure 3.2). The main Ukrainian sea ports are in the Odessa area: Yuzhny (> 60 million tons throughput in 2020), Odessa (> 20 million tons), Chornomorsk (> 20 million tons), serving Western and Central Ukraine. The specialized river port at Mikolaiv (in 2020, total traffic 30 million tons, of which 13 million tons of grain) serves Eastern and Central Ukraine, and is close to Russian-occupied Kherson. Mariupol farther east is under siege.

If the war in Ukraine continues, logistics solutions for grain exports are few and constraints many (notwithstanding losses in production, such as destruction, unattended fields, etc.). There is limited flexibility to move exports to non-Ukrainian ports given the dependence on the railway system, rail gauge interruption with EU countries, and the impracticability and cost of moving such volumes on trucks over long distances to EU countries, even from Western Ukraine.

- The status of exports from regions in the hinterland of ports, possibly Russian controlled, is uncertain. This applies to Eastern Ukraine (about half of Ukrainian production).
- Even if normal traffic resumes, a war-risk premium will be likely applied by marine insurers, raising the costs of imports from both the Russian Federation and Ukraine.
- Countries increasing exports to compensate for the decline from Ukraine (e.g., Australia, Canada), may face temporary export logistics capacity constraints to cope with the surge, delaying shipments.

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FIGURE 3.1: Average Throughput, 2006-2020 (Million Tons)

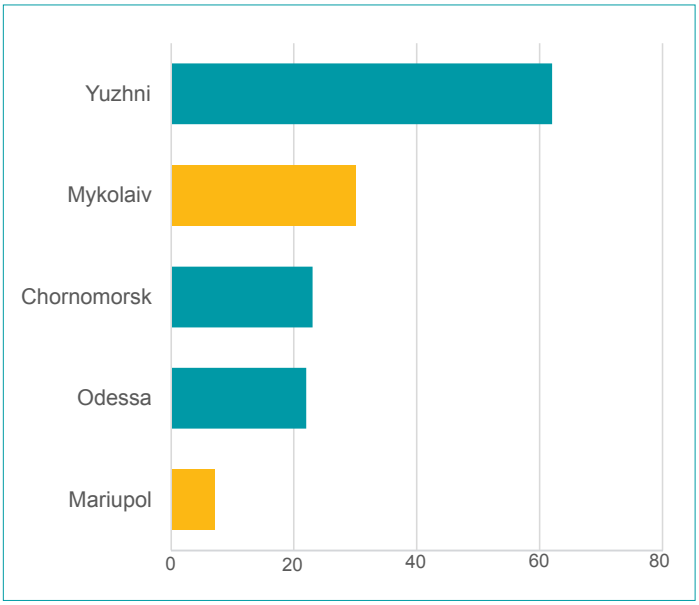

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FIGURE 3.2: Localization of Ukrainian Port

Global and Regional Spillovers of Logistics Disruptions

A possible interruption of the China-Europe rail connection would primarily affect EU countries and China. The Eurasian land bridge consists of two main overland rail routes, the Trans-Siberian Rail Link and Trans-Kazakhstan Rail Link. Overland rail routes connecting Europe and Asia through these two routes play a growing role in trade between Asia (mainly China) and Europe. This rail link carries about 3 percent of total China-Europe container trade. Volume was about 1.46 million TEU in 2021, corresponding to over 10,000 rail journeys. The lines connect to countries of the European Union at Brest in Belarus, with transloading of containers from one rail gauge to the other.

> > >

TABLE 3.2: Trade between the EU and China in 2021, by Mode (Billion Euro)

	Sea	Air	Rail
EU to CN	127	84	12
CN to EU	343	112	20

Source: Eurostat.

The rail connection occupies an important niche market (including industrial products such as mechanical, electronics, automotive) which has seen recent growth. It has a shorter lead time than maritime transportation (two weeks versus six weeks) and is cheaper than aviation. Over the past 18 months in response to supply chain disruptions, shipments by rail via the Eurasian land bridge have grown substantially. Rising container shipping costs contributed to a doubling of the traffic on the route between 2019 and 2021. High-value goods and critical components are shipped along this route, which is important for the German automotive industry and the electronics industry (HP and Samsung). In 2020 alone, some 10 million notebook computers were shipped through this network from the southwestern Chinese city of Chongqing. German railways (Deutsche Bahn, Schenker) have been promoting the route in alliance with Russian, Kazakh, and Chinese railways.

Rail connections continue to function, but additional procedures to check sanctions compliance when entering the EU may affect lead times. While businesses can cooperate with Russian Railways, international payments may become increasingly difficult to make; the impact of which remains fluid. How sanctions may be applied to the Russian Federation as a transit country is yet to be known (e.g., freight charges could be paid in China). Under the sanctions regime, multinational logistics and industrial operators may opt out, or Russia may extend a “no-transit zone” for railways, as it did for aviation. The disruption to Europe (and China) would be significant, especially for Germany, Poland, and Austria and could not be absorbed by switching to ocean services, which are already at capacity. The air freight market also could not take up the demand, which would add almost 20,000 TEUs a week. Other land-based multi-modal routes via the Caspian Sea (Middle Corridor) are unlikely to fully substitute for the existing rail route, given performance and capacity bottlenecks. Finally, an interruption of the land bridge would mean revenue losses for the transit countries. Transit brought approximately 35 percent of the revenue of the Kazakhstan railways in 2020.

Airfreight with the Russian Federation is severed. The EU, Canada, and US closure of airspace to Russian aircraft and the reciprocal closure of Russian airspace to aircraft from those countries dramatically reduces international passenger and cargo flights with Russia. Aeroflot, the Russian national carrier, discontinued most international traffic, starting on March 8, 2022. Before the sanctions, it served 146 cities in 52 countries. Aeroflot is believed to have feared that its planes could have been impounded on arrival abroad. The fate of planes leased by Aeroflot from foreign firms now at Russian airports is unclear. Moscow-based AirBridgeCargo (ABC, a Volga-Dnepr company) is in dire straits after having been one of the fastest growing all-cargo airlines in the world for several years, adding to strain on the market.

The closedown of airspace means longer routes and rising rates between Europe and East Asia. The re-routed alternatives easily add five to 10 hours to a one-way leg and may require an intermediate stop en route. United-States-Asia routes are affected, but to a lesser extent. The impact on freight capacity may be limited, considering the small market share of Russian operators (e.g., Volga-Dnepr). However, longer routes and rising fuel prices are likely to push freight rates higher. According to experts, air cargo rates between Europe and East Asia could have risen by around 30 percent to 50 percent by the end of March from February. About US$50 billion of trade between Europe and Asia is directly affected. Unlike their competitors, Chinese airlines continue operating direct routes to EU or the United States, overflying Russia.

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FIGURE 3.3: Drop in International Flights, 12/2021-3/2022

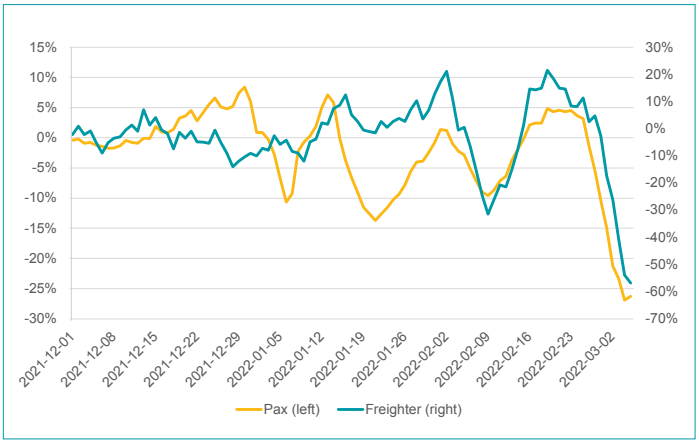

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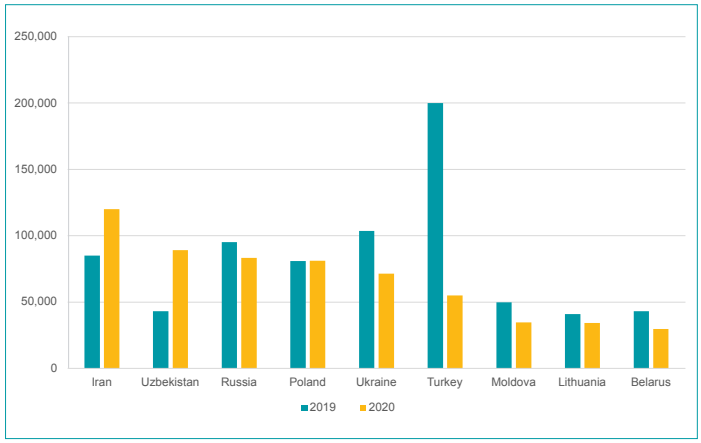
FIGURE 3.4: TIR - Russian Federation and Ukraine, Number of Carnets issued, 2019-2020



Long-distance trucking logistics between the EU and Russia-Central Asia is likely to be affected. The war in Ukraine has direct and indirect effects on long-distance trucking logistics in Europe, including under customs transit systems such as "Transports Internationaux Routiers" (TIR). Sanctions will affect the movement of drivers, insurance, transit guarantees, and payments. TIR supports trade in high-value goods between Europe, Russia, and Central Asia (Table 3.3). Russia and Ukraine are among its main users (Figure 3.4). Ukraine has developed a geographic comparative advantage directly and indirectly to serve these markets; Polish trucking companies employ 100,000 Ukrainian drivers. Some traffic to and from Central Asia may be rerouted through the Middle Corridor and the Southern route (Caucasus or Turkey), which are much less practical than direct routes through Belarus and Russia. In the EU, Germany and Poland are the two countries most affected by the loss of long-distance trucking connectivity.

> > >

TABLE 3.3: Trade Between the EU and Central Asia, 2021 by mode (Billion Euros)

	Air	Road	Multimodal	Others
EU to CA	2.1	5.8	0.8	0.5
CA to EU	0.0	0.8	14.0	0.2

Source: Eurostat.

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Effects on Ukraine's key (non-food) exports and specific GVC[1]

Ukraine's integration in global value chains is concentrated in a limited number of sectors

Ukraine's participation in global value chains is at the lower end in ECA and has slightly declined between 2009-2018 (Figure 4.1). Ukraine lags behind the ECA average and participates in a limited number of GVCs. The magnitude of the war's impact on other countries involved in those value chains will depend on the role Ukraine plays in them, either as an important supplier or user of inputs.

Ukraine's exports are important in three manufacturing sectors. Ukraine is not a large supplier on a world scale. However, it is a large supplier of some specific products in these sectors. Table A1 in the Annex lists Ukraine's top exports and Ukraine's share of world markets, while Table A2 lists the products for which Ukraine has the largest shares of world supply. Ukraine's exports of iron ore and iron products, some metals, semi-finished metal products and transport equipment appear as the most relevant for the supply chains of Ukraine's trading partners.

Ukraine's balance of payments data show the growing importance of the computer services sector for its exports. These computer services provide inputs to numerous firms abroad: ICT services are therefore also included in this analysis of the key GVCs affected by the war. Information on GVC participation for Ukraine does not allow precise identification of other service sectors in which Ukraine might be an important actor.

1. This note was produced by J.C. Maur.

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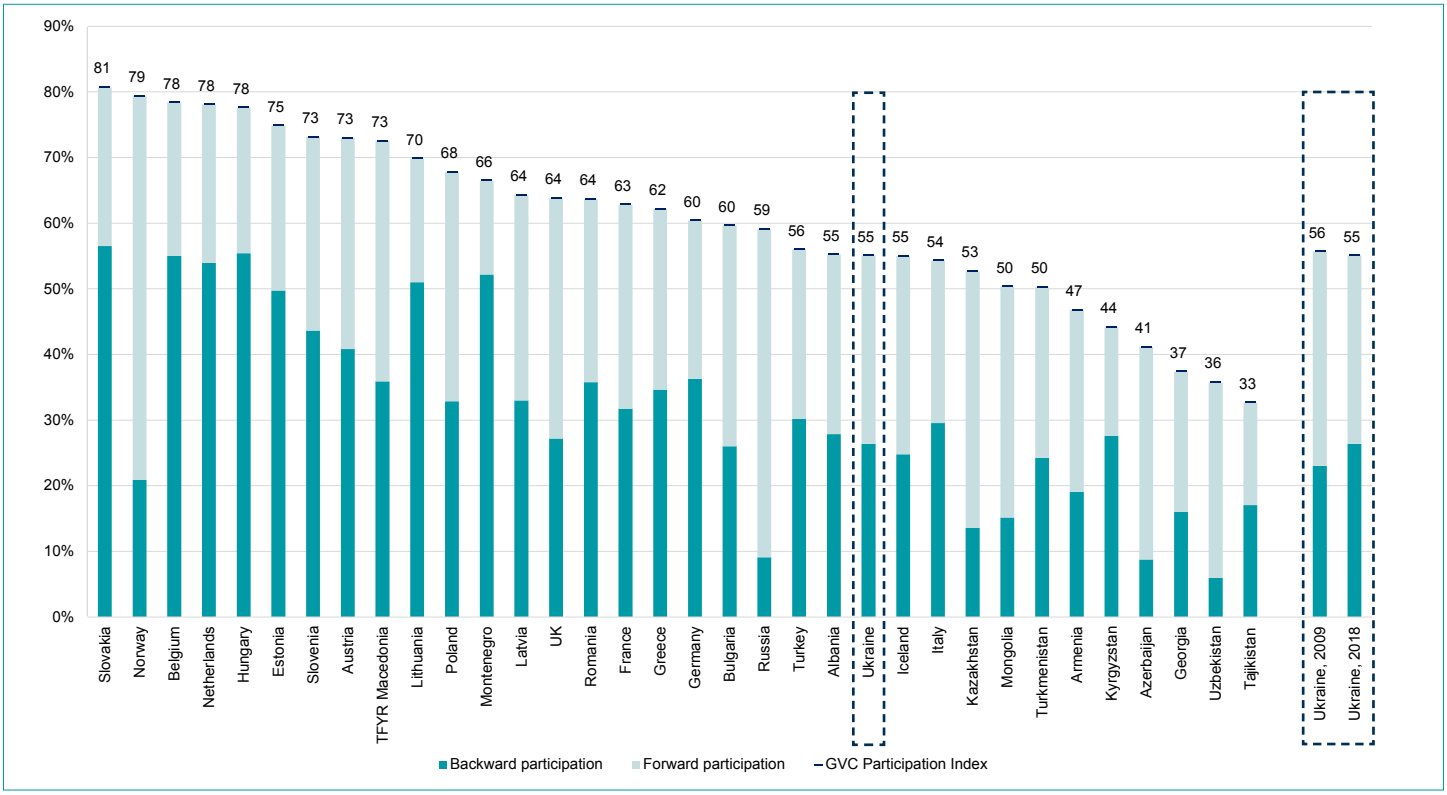
FIGURE 4.1: GVC Participation Index[2]: Ukraine and ECA, 2018 (percent of gross exports)



Source: Calculations based on UNCTAD-Eora GVC database.

Markets that are most dependent on Ukraine for imports or as an export destination

Countries that are most dependent on Ukraine for imports are primarily in Central and Eastern Europe. Moldova is the most dependent, relying on Ukraine for more than a quarter of its agricultural imports, while Georgia sources nearly one-fifth of its agricultural purchases from Ukraine. Only Moldova relies heavily on Ukraine for industrial products and capital goods. Ukraine's exports of intermediate goods represent more than 5 percent of external supply for five countries—Moldova, Senegal, Georgia, Belarus, and Russia (Table 4.1). Outside of Europe, Tunisia imports relies heavily on Ukraine for its agricultural imports, while some African and Arab countries rely on it for imports in specific GVCs.

2. Expressed as the sum of *Backward GVC participation (upstream)*, i.e., the use of foreign inputs embodied in gross exports and *Forward GVC participation (downstream)*, i.e., the domestic value-added in intermediate exports to the third country exports.

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TABLE 4.1: Top ten countries relying the most on Ukraine for their imports (2018-2020, share of merchandise imports)

Agricultural products				Industrial products				Intermediate goods				Capital goods			
Importer	UKR %	$US mln	UKR rank	Importer	UKR %	$US mln	UKR rank	Importer	UKR %	$US mln	UKR rank	Importer	UKR %	$US mln	UKR rank
Moldova	26%	196	1	Moldova	7%	327	7	Moldova	14%	165	1	Moldova	4%	39	5
Georgia	19%	238	2	Belarus	3%	886	5	Senegal	9%	127	4	Belarus	3%	216	6
Tunisia	15%	361	1	Georgia	3%	201	9	Georgia	8%	111	4	Georgia	2%	31	13
Belarus	15%	600	2	Russia	2%	4552	11	Belarus	7%	519	3	Armenia	1%	14	14
Azerbaijan	15%	266	2	Senegal	2%	127	15	Russia	7%	2714	3	Russia	1%	926	22
Armenia	11%	89	2	Azerbaijan	2%	185	14	Bulgaria	5%	450	7	Kyrgyzstan	1%	8	14
Egypt	10%	1437	4	Bulgaria	2%	522	18	Lebanon	5%	157	8	Uzbekistan	1%	76	14
India	8%	1901	5	Hungary	2%	1585	16	Ethiopia	4%	145	7	Azerbaijan	1%	24	21
Turkey	7%	1156	4	N.Macedonia	1%	116	22	Cameroon	4%	54	7	Kazakhstan	1%	106	17
Lebanon	7%	188	2	Serbia	1%	287	19	Egypt	3%	683	9	Tajikistan	1%	4	19

Source: Calculations based on data from UN COMTRADE. Notes: agricultural and industrial products are defined according to the WTO product grouping classification; intermediate and capital goods are defined according to UNCTAD's SoP definition.

Ukraine is not a major export destination. Countries that rely on Ukraine as an export destination are also mainly in Eastern Europe, Central Asia, and the Caucasus. Ukraine is the second-largest destination for Georgia's agricultural exports, at 12 percent, while other countries have a less than 3 percent share. Belarus exports 14 percent of its industrial products to Ukraine, followed by Benin and Lithuania at 6 percent and 4 percent, respectively. In terms of intermediate goods, Belarus exports 10 percent of its goods to Ukraine, Benin stands at 7 percent (due to cotton), and Georgia at 4 percent. Ukraine's largest market share for capital goods exports was for Moldova at 10 percent, Azerbaijan at 9 percent, and Belarus at 8 percent (Table 4.2).

> > >

TABLE 4.1: Top ten countries relying on Ukraine as an export destination (2018-2020, share of merchandise exports)

Agricultural products				Industrial products				Intermediate goods				Capital goods			
Importer	UKR %	$US mln	UKR rank	Importer	UKR %	$US mln	UKR rank	Importer	UKR %	$US mln	UKR rank	Importer	UKR %	$US mln	UKR rank
Georgia	12%	86	2	Belarus	14%	3633	2	Belarus	10%	945	2	Moldova	10%	6	4
Russia	3%	662	7	Benin	6%	7	7	Benin	7%	7	4	Azerbaijan	9%	8	4
Belarus	3%	151	4	Lithuania	4%	1046	9	Georgia	4%	28	6	Belarus	8%	371	2
Armenia	3%	19	6	Moldova	3%	24	7	Lithuania	3%	226	9	Kyrgyzstan	8%	8	7
Benin	3%	18	9	Georgia	2%	37	11	Poland	3%	1191	10	Russia	4%	794	5
Malawi	2%	19	14	Poland	2%	4622	15	Hungary	3%	436	13	Georgia	3%	2	9
Moldova	2%	26	12	Russia	2%	6820	14	Slovakia	2%	290	9	Armenia	3%	2	7
Latvia	2%	60	10	Guyana	2%	30	10	Russia	2%	1938	15	Lithuania	2%	138	11
Poland	2%	679	13	Hungary	2%	2162	14	Moldova	2%	6	10	Uzbekistan	2%	3	11
Azerbaijan	2%	17	8	Azerbaijan	2%	334	14	Azerbaijan	2%	14	8	Poland	2%	1292	15

Source: Calculations based on data from UN COMTRADE. Notes: agricultural and industrial products are defined according to the WTO product grouping classification; intermediate and capital goods are defined according to UNCTAD's SoP definition.

Key (non-food) exports that could affect GVCs

In terms of individual value chains, the war in Ukraine could cause disruption for the products that are Ukraine's largest exports. These products belong to the following GVCs: steel (due to Ukraine's exports of iron ores, ferro silico manganese, pig iron), heavy manufacturing (flat and rolled steel products), semiconductors (neon gas), cars (ignition cables), industries using titanium, and the IT industry.

Trade flows for iron and steel products in the runup to the war show unusual patterns. These could suggest that some industries took preemptive measures to mitigate the risk of looming conflict. Monthly trade imports from EU27 countries show a strong increase, with near doubling of monthly import volumes compared with periods during July-September 2021 for steel products (Figure A4.2), and a large increase for iron ore (Figure A4.3). These increases could have been caused by other factors such as price increases, but prices of iron ore were stable during this period and below historical levels. Industry specific factors or decisions should not be discounted. Other exports (cereals or vehicle equipment) do not exhibit similar patterns.

Markets are pricing in a significant impact on the steel and iron value chains. The price of rebar and hot rolled coil has more than tripled since mid-January.[3] Iron ore prices surged by more than 40 percent and the Dow Jones steel index by 57 percent since early January.[4] Arguably the economic sanctions on Russia have a compounding effect on these prices, as do have rising energy prices and earlier supply chain disruptions.

Inputs into the steel industry

Europe relies on Ukraine for inputs into the steel industry, such as iron ores, ferro-silico manganese, and pig iron. Europe relies on imports from Ukraine for agglomerated and non-agglomerated **iron ores** at 16 percent and 15 percent, respectively, with Poland and the Czech Republic being two big importers. While this suggests the potential for supply chain disruption, as iron and steel products are used in many manufactured goods, Ukraine is not a large supplier on a global scale for non-agglomerated iron ore (1.78 percent of world exports) and a second-tier exporter of agglomerated iron ore (7.9 percent of world exports in 2019) with several countries, including Vietnam, sourcing a major part of their imports from Ukraine. However, Russia is also a large exporter of agglomerated iron ore with 8.4 percent of world exports, and thus there is potential for more disruptions for this product if there are capacity constraints for sintering (the agglomeration of fine iron dusts) or limited substitution options. In terms of the impact on prices, the iron ore price has been generally on the rise since the beginning of the year while remaining below the last year's levels. There was a spike between February 28 and March 15, when the price rose by 11.7 percent and returned to the same level, remaining significantly below the higher prices in the summer of 2020 and indicating the limited impact of the increase.[5]

Ukraine is the second-largest exporter of ferro-silico manganese with 18.2 percent of world's exports in 2019. Turkey, Germany, Poland, and Egypt are Ukraine's main importers, and overall, Europe imports 49 percent of its ferro-silico-manganese from Ukraine. Ferro-silico-manganese is used as an alloying element in the production of steel and can be used as a substitute for ferro-manganese or silico-manganese in the production of different types of steel.

Pig iron, the first transformation of iron ore, is an input for wrought iron and steel making. Ukraine is among the largest suppliers of pig iron and, combined with Russia, accounts for more than half the world's exports. Ukraine's main destination is the United States, followed by Europe (Italy and Spain being the top two markets). For non-alloy pig iron, the most important pig iron product exported by Ukraine, the United States imports 41 percent of its needs from Ukraine. Turkey and Saudi Arabia are also large destinations, with Turkey importing nearly a quarter of its non-alloy pig iron from Ukraine.

3. Bloomberg data quoted by the Washington Post https://www.washingtonpost.com/business/energy/steel-is-the-other-big-commodity-shock-from-the-war-in-ukraine/2022/03/22/b2cf3508-a9b2-11ec-8a8e-9c6e9fc7a0de_story.html
4. See e.g. https://markets.ft.com/data/commodities/tearsheet/charts?c=Iron+ore
5. https://markets.ft.com/data/commodities/tearsheet/summary?c=Iron+ore

Inputs into other metal industries: aluminum and titanium

Titanium ore is an input in the aerospace, aviation, automotive, and medical industries. Ukraine was the fifth largest world exporter of titanium in 2019. It is the main supplier of the mineral to several countries (Table A1), with Russia and the Czech Republic being by far the largest importers. Several European countries are large importers of titanium, but their sourcing is diversified (South Africa, Sierra Leone, Australia, and the United States). In addition, Norway is a producer of the metal, which could suggest the availability of substitute sourcing.

Ukraine's supplies of aluminum oxide account for only 6 percent of world exports. It is almost exclusively exported to Russia, for whom Ukraine is the main supplier. Ukraine accounts for 37 percent of Russia's imports of aluminum oxide (Table A3). The importance of Ukraine for other countries is trivial at less than 3 percent of imports. Aluminum oxide[6] is the main input in the manufacture of aluminum metal, as well as the production of fillers, glass, catalysts, gas purification, abrasive substances, paint, body armor, and electrical insulation. The application is wide across microelectronics, chemicals, aerospace, and other high-technology fields.[7]

Inputs into heavy manufacturing

Rolled iron products have many uses in industry and construction. Europe's imports from Ukraine are important for two products (HS codes 720711[8] and 720712,[9] see Table A1). Ukraine is a major supplier of these two products in several other markets (Table A1). Because of their variety of uses, it is unclear how important they may be for specific supply chains. Among markets outside of Europe, Turkey, and Nigeria source heavily from Ukraine for one category of the product (Table A1). Ukraine is among the top world exporters for these two products.

Inputs into semiconductor production

Ukraine exports 70 percent of the world's neon gas, a byproduct of the steel industry and an important input in the production of computer chips. A factory in Odessa produces 65 percent of the world's neon. Trade statistics do not distinguish between uses of neon, but according to industry sources,[10] dependence on Ukraine for highly purified neon used in chip production is large, as Ukraine is the source of 40 percent to 50 percent of the world supply of this critical input. Contingency stockpiles are helping mitigate the shock for the moment.[11] According to the combined trade statistics for rare gases other than argon (neon, krypton, xenon), Moldova and Slovenia depend on Ukraine for 36 percent and 12 percent of imports per product, respectively, although import flows amount to less than US$0.2 million. The United States relies on Ukraine for 11 percent of imports per product (US$8.5 million), Austria for 7 percent (US$1.2 million), and Hungary for 5 percent (US$1 million). Notably, imports of wiring sets from Ukraine are important for Romania (22 percent of imported product), Germany (12 percent), and the Czech Republic (11 percent).

Inputs into transport vehicles

Ukraine is not a major world supplier of ignition wiring sets for transport vehicles, with only 4 percent of world's exports, it is however an important supplier for some European markets (Table A3). Notably, imports of wiring sets from Ukraine are important for Romania (22 percent of imported product), Germany (12 percent), and the Czech Republic (11 percent).

Axles and wheels are inputs for the production of railway vehicles; Ukraine is not a major world exporter but is the most important supplier to a few countries in the region. Ukraine's exports of axles and wheels[12] account for 8 percent of world's exports (Table A2). Ukraine is the most important supplier for Bulgaria (61 percent, US$28 million), Russia (49 percent, US$154 million), Belarus (48 percent,

6. 81820 Aluminium oxide (excl. artificial corundum).
7. https://www.sciencedirect.com/topics/materials-science/aluminum-oxide
8. 720711 Semi-finished products of iron/non-alloy steel, containing by weight <0.25% of carbon, of rectangular (incl. square) cross-section, the width measuring < twice the thickness.
9. 720712 Semi-finished products of iron/non-alloy steel, containing by weight <0.25% of carbon, of rectangular (other than square) cross-section.
10. https://www.semiconductors.org/sia-statement-on-sanctions-on-russia/
11. https://www.wsj.com/articles/russian-attack-on-ukraine-could-dent-chip-maker-supply-lines-11645837830
12. 860719 Axles & wheels; parts of bogies, bissel-bogies, axles & wheels.

US$48 million), and Latvia (46 percent, US$3 million). Ukraine is also the largest supplier for Moldova (71 percent), Sri Lanka (42 percent), and Saudi Arabia (34 percent), but the trade values are significantly smaller, under US$5 million (Table A3). These exports may be tied to specific types of railway equipment and brand manufacturers, which may mean that finding alternative sources of supply might be more challenging than conveyed by trade figures alone.

ICT services

Ukraine exported US$6.8 billion of telecommunications, IT, and computer services in 2021, according to the IT Ukraine association,[13-14] a 35 percent increase from 2020. This makes it the third-largest sector of exports for the country, accounting for one-third of total services exports in 2020. The sector has been growing rapidly since 2014. It is possible that the actual volume of exports is larger as the activity of many freelancers selling IT services may not be well captured in balance of payment statistics.

Ukraine IT services mainly serve North America and Western Europe; 81 percent of Ukrainian IT companies export to the United States. The second-largest buyer of Ukraine's IT exports is the UK (64 percent of companies), followed by Germany (60 percent). In value, exports to the United States account for 40 percent of the total. E-commerce, banking, and fintech are the main client industries and software development and operations (DevOps), software quality assurance (QA), and user interface and experience design (UI/UX) the most prominent services provided by Ukraine (N-iX, 2021).

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13. https://bank.gov.ua/ua/statistic/sector-external/data-sector-external#1
14. https://itukraine.org.ua/en/ukrainian-it-exports-exceed-$5-billion-in-a-year-for-the-first-time.html

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Annex

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Table A 1. Top 30 products exported by Ukraine and share of world exports, 2018-2020

Product Code	Product Description	UKR Exports, avg1820 ($US min)	Share in world exports per product, avg1820
100590	Maize (corn), other than seed	4526	14%
151211	Sunflower seed/safflower oil, crude	4077	52%
100190	Wheat other than durum wheat; meslin	3413	9%
260111	Iron ores & concentrates (excl. roasted iron pyrites), non-agglomerated	1858	2%
260112	Iron ores & concentrates (excl. roasted iron pyrites), agglomerated	1644	9%
854430	Ignition wiring sets & other wiring sets of a kind used in vehicles/aircraft/ships	1320	4%
720712	Semi-finished products of iron/non-alloy steel, containing by weight <0.25% of carbon, of rectangular (other than square) cross-section	1262	12%
120510	Low erucic acid rape/colza seeds, whether/not broken	1085	12%
720711	Semi-finished products of iron/non-alloy steel, containing by weight <0.25% of carbon, of rectangular (incl. square) cross-section, the width measuring < twice the thickness	1009	14%
230630	Oil-cake & other solid residues, whether/not ground/in pellets, from extraction of sunflower seeds	1001	48%
720110	Non-alloy pig iron containing by weight 0.5%/less of phosphorus, in pigs/blocks/other primary forms	926	22%
120100	Soya beans, whether/not broken	896	2%
100300	Barley	757	10%
720851	Flat-rolled products of iron/non-alloy steel, of a width of 600mm/more, hot-rolled, not clad/plated/coated, not in coils, not further worked than hot-rolled, of a thickness >10mm	703	8%
720720	Semi-finished products of iron/non-alloy steel, containing by weight 0.25%/more of carbon	586	15%
721420	Bars & rods of iron/non-alloy steel (excl. of 72,13), containing indentations/ribs/ grooves/other deformations produced during the rolling process/twisted after rolling	562	5%
720230	Ferro-silico-manganese, in granular/powder form	545	18%
720839	Flat-rolled products of iron/non-alloy steel, of a width of 600mm/more, hot-rolled, not clad/plated/coated, in coils, not further worked than hot-rolled (excl. pickled), of a thickness of <3mm	521	4%
281820	Aluminium oxide (excl. artificial corundum)	511	6%
151219	Sunflower seed/safflower oil, other than crude, & fractions thereof , whether/not refined but not chemically modified	492	13%
721391	Bars & rods, hot-rolled, in irregularly wound coils, of iron/non-alloy steel (excl. of 7213.10 & 7210.20), of circular cross-section measuring <14mm in diameter	342	5%
440710	Wood sawn/chipped length wise, sliced/peeled, whether/not planed, sanded/end-jointed, of a thickness >6mm, coniferous	335	1%

Product Code	Product Description	UKR Exports, avg1820 ($US min)	Share in world exports per product, avg1820
271600	Electrical energy (optional heading)	330	1%
240220	Cigarettes containing tobacco	328	2%
720852	Flat-rolled products of iron/non-alloy steel, of a width of 600mm/more, hot-rolled, not clad/plated/coated, not in coils, not further worked than hot-rolled, of a thickness of 4.75mm/more but not >10mm	306	10%
999999	Commodities not specified according to kind	280	0%
20714	Cuts & edible offal of species Gallus domesticus, frozen	268	2%
860719	Axles & wheels; parts of bogies, bissel-bogies, axles & wheels	262	8%
230400	Oil-cake & other solid residues, whether/not ground/in pellets, from extraction of soyabean oil	231	1%
720838	Flat-rolled products of iron/non-alloy steel, of a width of 600mm/more, hot-rolled, not clad/plated/coated, in coils, not further worked than hot-rolled (excl. pickled),of a thicknessof 3mm/more but <4.75mm	224	4%

Source: Calculations based on data from UN COMTRADE.

> > >

Table A2. Ukraine as a share of world exports: Top 30 products

	Product Code	Product Description	UKR Exports, avg1820 ($US min)	Share in world exports per product, avg1820
1	151211	Sunflower seed/safflower oil, crude	4077	52%
2	230630	Oil-cake & other solid residues, whether/not ground/in pellets, from extraction of sunflower seeds	1001	48%
3	250830	Fire-clay	215	45%
4	690890	Glazed ceramic flags & paving/hearth/wall tiles (excl. of 6908.10); glazed ceramic mosaic cubes & the like, whether/not on a backing	76	25%
5	720110	Non-alloy pig iron containing by weight 0.5%/less of phosphorus, in pigs/blocks/other primary forms	926	22%
6	720230	Ferro-silico-manganese, in granular/powder form	545	18%
7	841111	Turbo-jets, of a thrust not >25kN	132	17%
8	300210	Antisera & other blood fractions & modified immunological products, whether/not obt. by means of biotechnological processes	21	15%
9	720720	Semi-finished products of iron/non-alloy steel, containing by weight 0.25%/more of carbon	586	15%
10	100590	Maize (corn), other than seed	4526	14%

	Product Code	Product Description	UKR Exports, avg1820 ($US min)	Share in world exports per product, avg1820
11	720711	Semi-finished products of iron/non-alloy steel, containing by weight <0.25% of carbon, of rectangular (incl. square) cross-section, the width measuring < twice the thickness	1009	14%
12	151219	Sunflower seed/safflower oil, other than crude, & fractions thereof, whether/not refined but not chemically modified	492	13%
13	120510	Low erucic acid rape/colza seeds, whether/not broken	1085	12%
14	720712	Semi-finished products of iron/non-alloy steel, containing by weight <0.25% of carbon, of rectangular (other than square) cross-section	1262	12%
15	720927	Flat-rolled products of iron/non-alloy steel, of a width of 600mm/more, not in coils, not further worked than cold-rolled (cold-reduced), not clad/plated/coated, of a thickness of 0.5mm/more but not >1mm	39	11%
16	100820	Millet	18	11%
17	100300	Barley	757	10%
18	721631	Angles, shapes & sections of iron/non-alloy steel, U sections, not further worked than hot-rolled/hot-drawn/extruded, of a height of 80mm/more	139	10%
19	720852	Flat-rolled products of iron/non-alloy steel, of a width of 600mm/more, hot-rolled, not clad/plated/coated, not in coils, not further worked than hot-rolled, of a thickness of 4.75mm/more but not >10mm	306	10%
20	721020	Flat-rolled products of iron/non-alloy steel, of a width of 600mm/more, plated/coated with lead, incl. terne-plate	1	9%
21	380130	Carbonaceous pastes for electrodes & similar pastes for furnace linings	26	9%
22	261400	Titanium ores & concentrates	140	9%
23	260112	Iron ores & concentrates (excl. roasted iron pyrites), agglomerated	1644	9%
24	860630	Self-discharging vans & wagons, railway/tramway (excl. of 8606.10/8606.20), not self-propelled	69	9%
25	440839	Sheets for veneering (including those obtained by slicing laminated wood), for plywood/for similar laminated wood & other wood, sawn lengthwise, sliced/peeled, whether/not planed, sanded, spliced/end-jointed, of a thickness not> 6 mm, of tropical wood s	29	9%
26	100190	Wheat other than durum wheat; meslin	3413	9%
27	720291	Ferro-titanium & ferro-silico-titanium, in granular/powder form	17	8%
28	860719	Axles & wheels; parts of bogies, bissel-bogies, axles & wheels	262	8%
29	590490	Floor coverings consisting of a coating/covering applied on a textile backing, whether/not cut to shape (excl. linoleum)	5	8%
30	720851	Flat-rolled products of iron/non-alloy steel, of a width of 600mm/more, hot-rolled, not clad/plated/coated, not in coils, not further worked than hot-rolled, of a thickness >10mm	703	8%

Source: Calculations based on data from UN COMTRADE.

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FIGURE A4.2: Ukraine monthly exports of iron and steel products to top 10 European trade partners

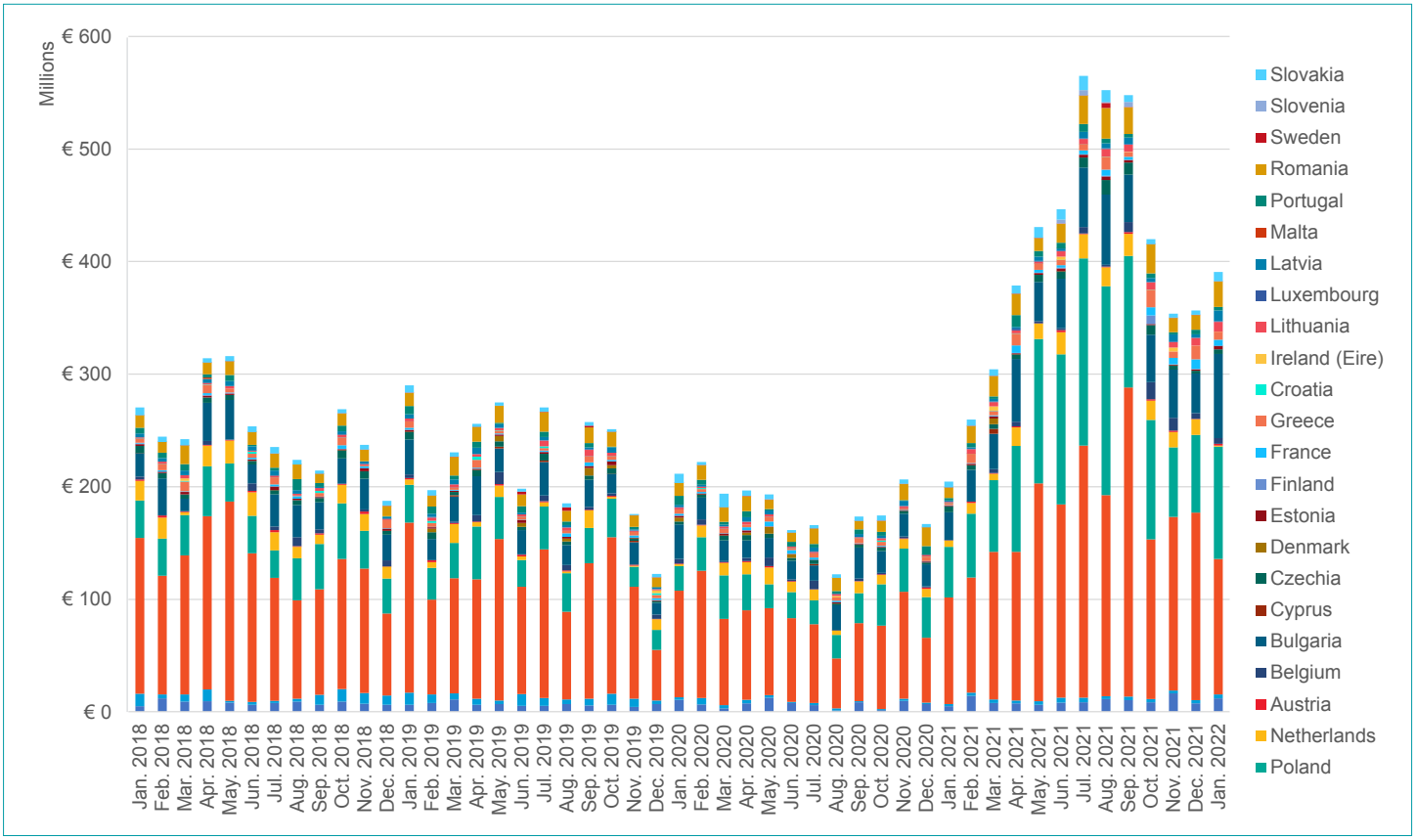

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FIGURE A4.3: Ukraine monthly exports of iron ore products from top 10 European trade partners

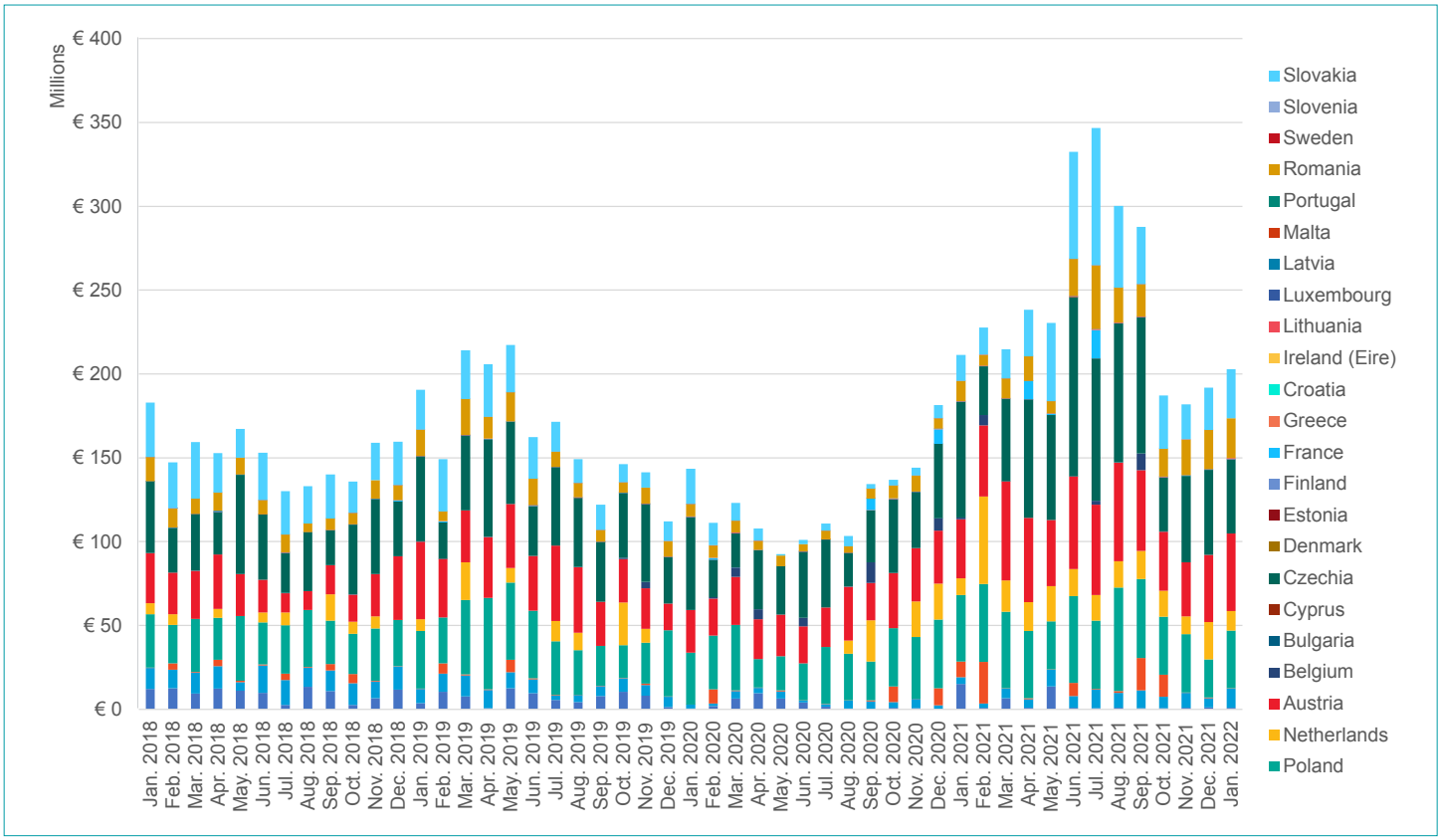

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Table A 3. Ukraine exports of (non-food) products: Top ranked importers for each product, and share of supply from Ukraine average 2018-2020

	Product	Importer from UKR	$US mln	UKR share in the market's imports per product (%)	UKR rank among suppliers
Inputs into aerospace, aviation, automotive, and medical industries	261400 Titanium ores & concentrates	Czech Republic	32	100%	1
		Egypt, Arab Rep.	2	93%	1
		Belarus	2	82%	1
		Russian Federation	81	75%	1
		Romania	2	65%	1
		Hungary	1	46%	1
		Vietnam	1	40%	1
		Turkey	6	39%	2
		Kazakhstan	8	22%	2
		Mexico	11	18%	2
Inputs in the manufacture of aluminium metal	281820 Aluminium oxide (excl. artificial corundum)	Russian Federation	686	37%	1
		Uzbekistan	0.1	3%	5
		United States	0.2	0.03%	22
Inputs into the steel industry	260111 Iron ores & concentrates (excl. roasted iron pyrites), non-agglomerated	Belarus	4	100%	1
		Czech Republic	387	78%	1
		Poland	332	75%	1
		Slovak Republic	143	60%	1
		Serbia	45	56%	1
		Hungary	34	40%	1
		Romania	73	32%	1
		Belgium	20	4%	4
		Vietnam	39	4%	4
		United States	7	2%	7
	260112 Iron ores & concentrates (excl. roasted iron pyrites), agglomerated	Czech Republic	89	82%	1
		Romania	49	78%	1
		Poland	91	66%	1
		Serbia	126	66%	1
		Hungary	71	63%	1
		Slovak Republic	97	35%	2
		Vietnam	21	27%	2
		China	645	16%	2
		Korea, Rep.	69	16%	2
		Turkey	79	12%	4

	Product	Importer from UKR	$US mln	UKR share in the market's imports per product (%)	UKR rank among suppliers
Inputs into heavy manufacturing	720110 Non-alloy pig iron containing by weight 0.5%/ less of phosphorus, in pigs/ blocks/other primary forms	Russia	54	99%	1
		Egypt	18	81%	1
		Canada	7	78%	1
		Bulgaria	4	66%	1
		UAE	36	61%	1
		USA	641	32%	2
		Spain	31	32%	1
		Romania	4	30%	2
		Finland	4	25%	2
		Turkey	99	22%	2
	720711 Semi-finished products of iron/non-alloy steel, containing by weight <0.25% of carbon, of rectangular (incl. square) cross-section, the width measuring < twice the thickness	Russia	82	100%	1
		Bulgaria	191	88%	1
		Costa Rica	6	48%	1
		Ethiopia (excl. Eritrea)	13	46%	1
		Bosnia and Herzegovina	16	43%	1
		Cameroon	22	41%	1
		Qatar	48	39%	1
		Nigeria	21	22%	3
		Turkey	175	22%	2
		Colombia	4	21%	3
	720712 Semi-finished products of iron/non-alloy steel, containing by weight <0.25% of carbon, of rectangular (other than square) cross-section	Slovak Republic	5	89%	1
		Italy	1009	69%	1
		North Macedonia	26	59%	1
		Hungary	47	53%	1
		United Kingdom	130	45%	1
		Turkey	346	36%	2
		Malaysia	15	18%	3
		Sudan	1	8%	3
		Thailand	51	7%	4
		China	84	6%	5

	Product	Importer from UKR	$US mln	UKR share in the market's imports per product (%)	UKR rank among suppliers
Inputs into automotive value chains	854430 Ignition wiring sets & other wiring sets of a kind used in vehicles/ aircraft/ships	Romania	161	20%	2
		Poland	64	14%	2
		Hungary	81	12%	3
		Germany	553	11%	3
		Czech Republic	141	10%	3
		Slovak Republic	92	6%	5
		Austria	29	6%	8
		Russian Federation	11	5%	8
		China	6	1%	18
		Turkey	3	1%	16
	860719 Axles & wheels; parts of bogies, bissel-bogies, axles & wheels	Moldova	0.2	71%	1
		Bulgaria	28	61%	1
		Russian Federation	154	49%	1
		Belarus	46	48%	1
		Latvia	3	46%	1
		Sri Lanka	1	42%	1
		Saudi Arabia	5	34%	1
		Pakistan	1	30%	2
		Georgia	1	29%	2
		Lithuania	2	24%	2

Source: Calculations are based on UN Comtrade.
Note: Highlighted countries are those who are not high income.

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The Effects of Russia's global value-chain participation[1]

Context and outlook

A large share of Russia's exports are raw materials (inputs used upstream in GVCs), while its imports are dominated by semi-final or final consumer and capital goods. By international comparison, Russia's high forward GVC participation (Figure 5.1, left panel) stands out, indicating that it is especially important as an exporter of primary and intermediate goods and services used in other countries' exports at an early stage of production. The commodities that drive this upstream link into GVCs are energy (coke and petroleum), metals, chemicals, as well as transport and certain business services (right panel) (see also appendix Figure A 5.1). By contrast, Russia is far less important as a "buyer" in GVCs, relying less on imported inputs to produce its exports (backward GVC participation), but it is more relevant as an importer of semi-final and final goods further downstream for domestic consumption.

A wide range of financial, trade, and private-sector sanctions and restrictions have disrupted Russian trade and have led to logistics disruptions, input shortages, and commodity price hikes that reverberate through GVCs. Specific bans on exports to Russia are disrupting Russia's production capabilities, notably in electronics, automobiles, iron and steel, and aviation. Logistics disruptions affect almost all trade flows between Russia and Europe, resulting in delays and inflating already high global freight prices and delays between East Asia and Europe.[2] The revocation of most-favored nation (MFN) tariff treatment on Russian exports by G7 and EU countries means that these countries are now free to raise import tariffs sharply on Russian goods, implying higher prices for such goods. Globally, supply constraints and price hikes are being felt, notably for wheat, corn, and vegetable oils (which has led several countries to restrict their own exports of such goods), fertilizers, metals, and energy commodities.

1. Prepared by Deborah Winkler (Senior Consultant, ETIRI), Lucie Wuester (Consultant, ETIRI) and David Knight (Lead Economist, EECM1), drawing on findings in Winkler, Wuester, and Knight (2022). The authors thank Ana Fernandes, Sandeep Mahajan, Antonio Nucifora, Michele Ruta and Daria Taglioni for valuable comments and suggestions.
2. A more detailed assessment of the logistics and connectivity disruptions is provided in chapter 3 by Arvis, Rastogi and Saslavsky (2022).

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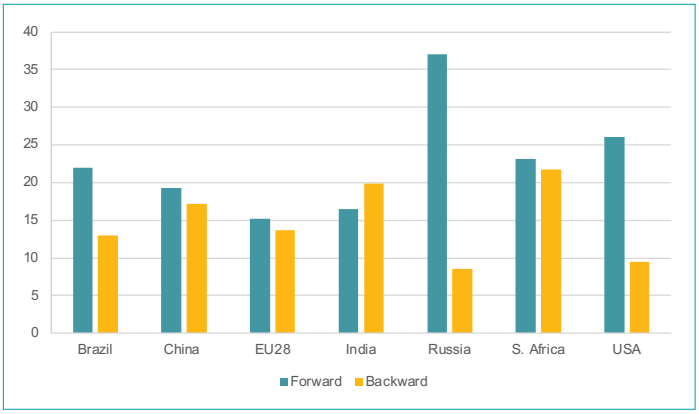
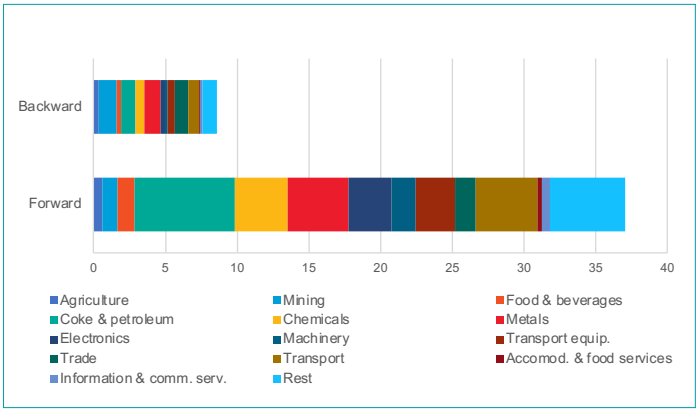
FIGURE 5.1: Russia's forward and backward GVC participation, total and sectoral decomposition, 2018

a. GVC participation in Russia and comparators, 2018



b. GVC participation 2018, sectoral decomposition



Source: Own computations. Data: OECD-WTO TiVA 2021 release. Note: Forward GVC participation = Domestic value added embodied in third country exports (% of exports). Backward GVC participation = imported inputs in exports (% of exports).

The disruption of Russia's exports will feed into GVCs via major global production hubs for trade and will especially affect regional economies that are highly dependent on these exports. While virtually all GVCs are affected by rising energy prices, GVCs that are especially reliant on other (notably metals and fertilizer) commodity inputs from Russia for their export production include transport equipment, machinery, electronics, agribusiness, transport, and business services (Figure 5.2). The GVC production hubs of China (and to a lesser extent Japan and South Korea), Germany (and other Western European countries), and the United States are among Russia's largest trade partners, both as importers of Russian commodity inputs and as exporters of GVC goods. Examples of high regional dependence include imports of cereals and fertilizer from Russia, metals (nickel and iron and steel), wood products, and mechanical goods (e. g. Kazakhstan imports over 90 percent of hydraulic turbines/water wheels from Russia) and vehicles (especially in the Eurasian Economic Union (EAEU[3])). These countries also export high shares of products to Russia across many sectors including apparel, food products, transport equipment, machinery, and electronics.[4]

3. The EAEU is a customs union which consists of Armenia, Belarus, Kazakhstan, Kyrgyzstan, and Russia.
4. CIS countries are also highly exposed to Russia in terms of their inward foreign direct investment stock (see chapter 6 by Liu 2022).

> > >

FIGURE 5.2: Russia as a seller, key sectors and products, and implications for supply chain partners

Sector	Key Products	Key Global / Regional Value Chains	Largest direct partners	Most dependent partners
Fuels	Crude oil	Many	CHN, DEU, NDL, POL, BLR	MNG, BLR, SVK, EST, KAZ
	Petroleum products	Many	USA, TUR, DEU, GBR, KOR	MNG, KAZ, KGZ, BLR, TJK
	Natural Gas	Many	ITA, JPN, BLR, SVK, CZE	BLR, SVK, EST, LVA, SRB
Metals	Palladium	Transp. equipment (catalytic converters)	USA, JPN, DEU, CHN, ITA	CAN, JPN, USA, ITA, KOR
	Iron and steel	Transport equipment, machinery	TUR, USA, BLR, ITA, BEL	KAZ, BLR, KGZ, AZE, UZB
	Copper, aluminum	Electronics, trans. equip, machinery	CHN, DEU, TUR, JPN, USA	BLR, KAZ, ARM, UZB, AZE
	Nickel	Metal (alloying), auto (batteries), electronic	CHN, FIN, DEU, NLD, USA	FIN, BLR, UKR, LVA, MDA
Chemicals	Fertilizers	Agribusiness	BRA, USA, CHN, IND, MEX	MNG, BLR, AZE, KAZ, MDA
Electronics	Cell phones, receivers, etc.	Electronics	BLR, KAZ, AZE, CHN, GEO	BLR, ARM, GEO, TJK, KAZ
Transport Equipment	Metal, auto parts	Transport equipment, machinery	CHN, FIN, DEU, NLD, USA	FIN, BLR, UKR, LVA, MDA
Services	Transport, business serv.	Business services, agribus., transport	DEU, NLD, JPN, AUT, USA, FIN	LIT, LVA, EST, SLV, FIN

Source: Own compilation. Note: Based on analysis in Winkler, Wuester, and Knight (2022).

Countries reliant on Russia as an export market will also be affected, as Russian imports of goods and services are disrupted directly through trade and logistics and indirectly through macroeconomic channels and diminished consumer demand. Export sanctions and logistics bottlenecks will make it more difficult for Russia to import goods, while ruble depreciation and declining domestic demand in Russia will reduce import demand even if goods are available. This will have an effect on exporters of these goods to Russia, as well as transport and business services providers who depend on these activities (Figure 5.3). Countries dependent on Russia as an export market include EAEU and CIS countries[5] (apparel, food and beverage goods) as well as the Faroe Islands (fish) and Paraguay (oil seeds and meat).

5. The countries in the CIS are Azerbaijan, Armenia, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Uzbekistan, and Ukraine.

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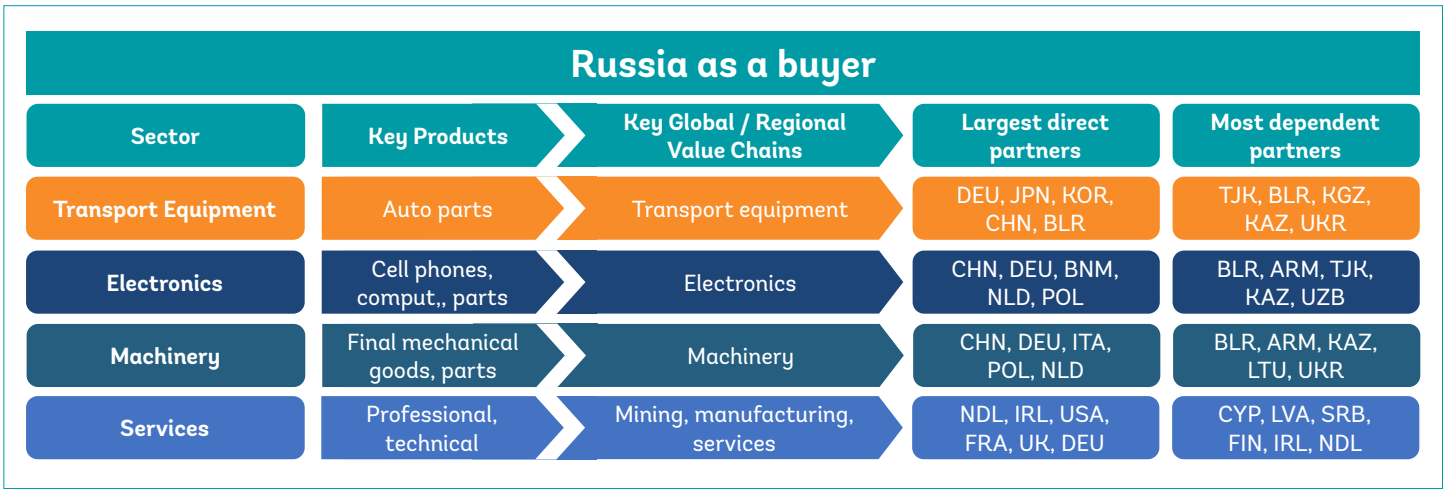
FIGURE 5.3: Russia as a buyer, key sectors and products, and implications for GVCs and trade



Source: Own compilation. Note: Based on analysis in Winkler, Wuester, and Knight (2022).

While a country's GVC risk depends largely on its direct trade links with Russia, the availability of alternative inputs plays an important role. The substitutability of inputs from Russia depends on whether products are differentiated or homogeneous. Several of Russia's key export products (e.g. rare metals) are difficult to replace in the short run, suggesting a severe impact on GVCs. Power relations also matter, with certain GVCs consisting of many competing suppliers globally (e.g., apparel), while in others global suppliers have large market power (e.g., semiconductors). For example, pig iron exports are dominated by three countries (Russia, Brazil, and Ukraine) together accounting for over three-quarters of global exports; hence, replacing imports from Russia will be more difficult than for products in which the global market is less concentrated. In an effort to secure access to critical inputs, countries could put in place restrictive trade measures (e.g. price or export controls) or begin stockpiling, which would further add to the ongoing supply chain distress. While this chapter emphasizes GVC risk, it is crucial to also highlight one key benefit of GVC participation in the context of shocks: Countries and firms relying on a more diversified global supplier base have shown to be more resilient to idiosyncratic shocks, including during the COVID-19 pandemic.[6] The high dependence of some countries on imports from Russia highlighted in this analysis reveals their lack of substitutes and suggests stronger negative effects.

Importantly, even countries that do not directly trade with Russia experience ripple effects along GVCs as well as increasing commodity and logistics prices. Trade disruptions can have ripple effects for countries further downstream or upstream in GVCs, even though they are not directly trading a specific product with Russia. Rising logistics costs in the region are exacerbating the impact. The shock may also be transmitted globally via effects on the pricing of internationally traded commodities and price hikes of inputs (e.g., energy), triggered by protectionist measures in other countries. Higher prices especially affect the profitability of energy-intensive activities. Metal producers in ¬Germany, for instance, have stopped production due to inflating energy prices, rendering production unprofitable.

The rest of this chapter illustrates Russia's participation in GVCs as a seller of metals, chemicals, and transport and business services, and as a buyer of electronics, transport equipment, and business services. It identifies key GVCs that could be affected, as well as Russia's largest direct trade partners and most dependent countries. For Russia's largest and most dependent export markets overall and their sectoral import shares from Russia, see appendix Figure A 5.2 and Figure A 5.3. The following analysis does not include fuel and food exports. While fuel is Russia's main export, it is used virtually in all manufacturing sectors downstream and goes beyond the analysis of specific GVC effects.[7] Food exports have a smaller weight in Russia's export basket, although it is an important global wheat exporter.[8]

6. Brenton, Ferrantino, and Maliszewska (2022).
7. Detailed analysis for fuel, wood and GVC-intensive sectors is provided in Winkler, Wuester and Knight (2022).
8. Implications of disruptions of Russia's food (wheat) exports are covered in chapter 2 by Ruta, Rocha and Espitia (2022).

Russia's participation as a seller of metals, chemicals, and business services

Russian metal exports are dominated by aluminum, copper, iron, steel, and nickel. These are mainly used in the construction, transport, machinery, electronics, and metals sectors abroad. Over half of Russia's metal exports over the period 2018-20 were iron and steel, representing over 5 percent of world exports (over 30 percent of global exports of specific semi-finished products), while related products made up another 10 percent. Copper and aluminum exports represented another 15 percent and 14 percent, respectively, of Russia's metal exports, with world export-market shares of 3.3 percent and 3.6 percent. While nickel constitutes only 7 percent of its metal exports, Russia's world market share is 12 percent. Russia's metals are used in a variety of final-demand sectors abroad, most notably construction (20 percent of final demand), but also motor vehicles, other transport and machinery absorbing another 20 percent, while electronics and metals consumed almost 10 percent, respectively (Figure A 5.4).

Russia's largest markets for metals are Turkey, China, Germany, and the United States, while the most dependent countries are mainly non-EU ECA economies, including Turkey, and also EU members Finland and Latvia. Russia's top export partners for metals over the period 2018-20 include Turkey, China, Germany, and the United States, importing metals worth between US$3 and 5 billion, respectively (Figure 5.4, left panel). Turkey is the most dependent of these four, with an import share of over 17 percent, while import shares only range from 2 percent to 4 percent in the other top four markets. Among the ten most dependent countries, we find mainly non-EU ECA countries, including all EAEU members and Uzbekistan where Russian import shares exceed 40 percent, as well as Turkey, but also two EU members (Latvia and Finland), which strongly depend on metals from Russia (right panel). Finland relies on nickel imports, related to a Finland-based Norilsk Nickel's plant, which largely delivers inputs for EV batteries (German BASF SE battery company has a long-term agreement with the company).

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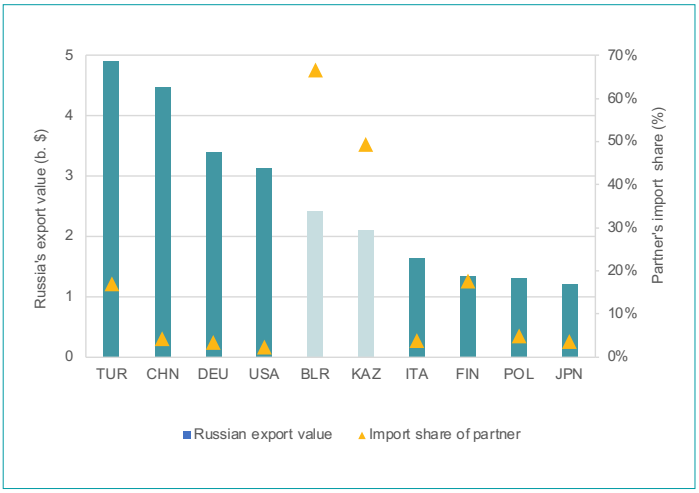
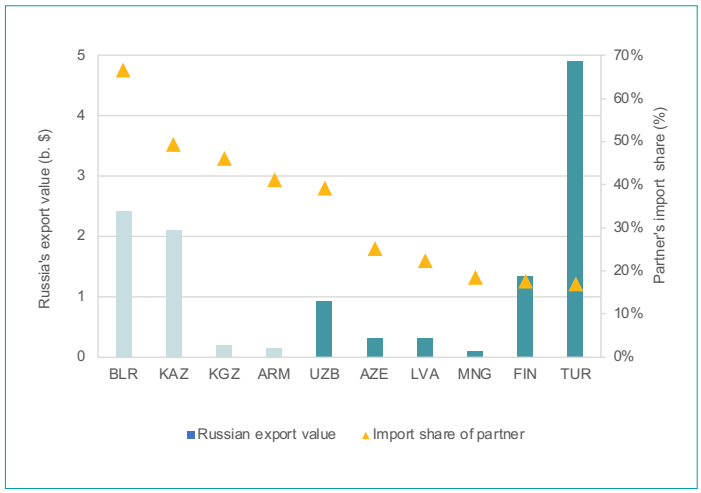
FIGURE 5.4: Russia's metal exports, top export markets and most dependent countries, 2018-20 avg.

a. Russia's top 10 export markets, metals



b. 10 most dep. markets on imports from Russia, metals



Source: Own computations. Data: UN Comtrade. Note: Mirror data for exports used. Bright blue bars = EAEU countries.

ECA countries are most dependent on Russia's largest exported metal products. Semi-finished iron and non-alloy steel exports (now under EU sanctions) from Russia are especially important for Denmark (sourcing 99 percent from Russia), Belgium (82 percent), and Brazil (79 percent) (appendix Table A 5.1). For the former two this is likely linked to the mining and steel company NLMK's plate mills in Denmark and joint venture in Belgium, producing steel for construction, shipbuilding, pressure vessels, as well as steel plates for wind energy equipment. Exports of unwrought aluminum largely reach CIS countries with shares above 90 percent, as well as Norway (84 percent). Belarus imports 99 percent of unwrought copper from Russia, the Netherlands 53 percent on average. Both products are used in a range of manufacturing activities, including power, construction, consumer electronics, and transportation. Except iron and steel products, these exports are not currently sanctioned for trade with Russia, but the sectors will be affected by price hikes and logistics bottlenecks.

Russia has a large global market share in precious metals such as palladium and platinum. Russia exported palladium worth US$4.5 billion over the period 2018-20, representing a global export market share of 24 percent. The largest use for palladium is in the production of catalytic converters. Canada, Japan, the United States, Italy, and South Korea import between 34 percent and 48 percent of their palladium from Russia. Russia's platinum exports were worth US$650 million (8.7 percent of global market share), with import shares largest for Italy (29 percent), the Czech Republic (16 percent), and China (14 percent). Platinum is used in jewelry making and dentistry and also serves as an input for electrical contacts, fine resistance wires, and medical and laboratory instruments.

Russia's exports of fertilizers are globally important, and many neighboring and low-income countries are highly dependent on them. The largest buyers of Russia's chemical exports include Brazil, the United States, Kazakhstan, Belarus, and China, while India is another important non-European buyer. The most dependent countries are mainly non-EU ECA countries, with the exception of Estonia and Finland (Figure A 5.5). Forty-three percent of Russia's chemical exports consist of fertilizers, representing over 13 percent of world exports. Belarus, Mongolia, and Moldova import between 81 percent and 98 percent of fertilizers from Russia; Honduras and the Central African Republic between 57 percent and 60 percent. Except Tajikistan and Uzbekistan, all CIS countries import at least 30 percent of fertilizer from Russia, and the former two largely depend on fertilizer imports from Kazakhstan and Turkmenistan.

In transport and other business services, Russia is more strongly integrated with EU countries. The bulk of Russia's transport services is exported to European countries, most importantly Germany, Austria, Finland, Lithuania, and Switzerland, as well as Canada. Unlike Russia's goods exports, the top 10 most dependent countries in transport services include many Eastern European EU countries, with the highest dependence in Lithuania, Latvia, and Finland (Figure A 5.6). Similarly, Russia's buyers of business services are mainly Western EU countries but also include Japan and the United States, while its most dependent export partners are Eastern EU countries.

Russia's role as a buyer of electronics, transport equipment, and business services

Russia's top three import partners are the GVC hubs of China, Germany and the United States (Figure A 5.7), with select other countries important in certain GVCs.[9] The United States, Germany, and Japan had a similar weight in Russia's imports of transport equipment over the period 2018-20, with import values ranging from US$3.5 to US$4 billion for each (Figure A 5.8). However, Russia makes up only a small share in these countries' transport exports: 2.4 percent in the United States and Japan and 1.4 percent in Germany. In machinery and electronics, Russia's dominant source of imports is China, exporting goods worth over US$25 billion. Other relevant import partners include Italy, the United States, and Japan, followed by Vietnam and South Korea.

Russia's major imports along GVCs are final electronics, intermediate and final vehicles, and apparel, coming largely from East Asia and the EU (Figure 5.5). The goods in these GVCs together account for 35 percent of Russia's imports, and final electronics account for 10.8 percent, a much more substantial share than exports. Just over half of final electronics imports come from China, in large part consisting of cellphones and computers. From the EU, final electronics imports include computers and related equipment and machines and mechanical appliances used for manufacturing.

9. This section focuses on the implications of economic sanctions imposed on Russia for its direct trade partners, drawing on gross import data in Russia. While analysis based on import data does not allow to identify the origin of value added nor their final use – i.e. if imports are used for export production or domestic consumption in Russia – our first-order concern is to identify the top and most dependent partner countries exporting to Russia.

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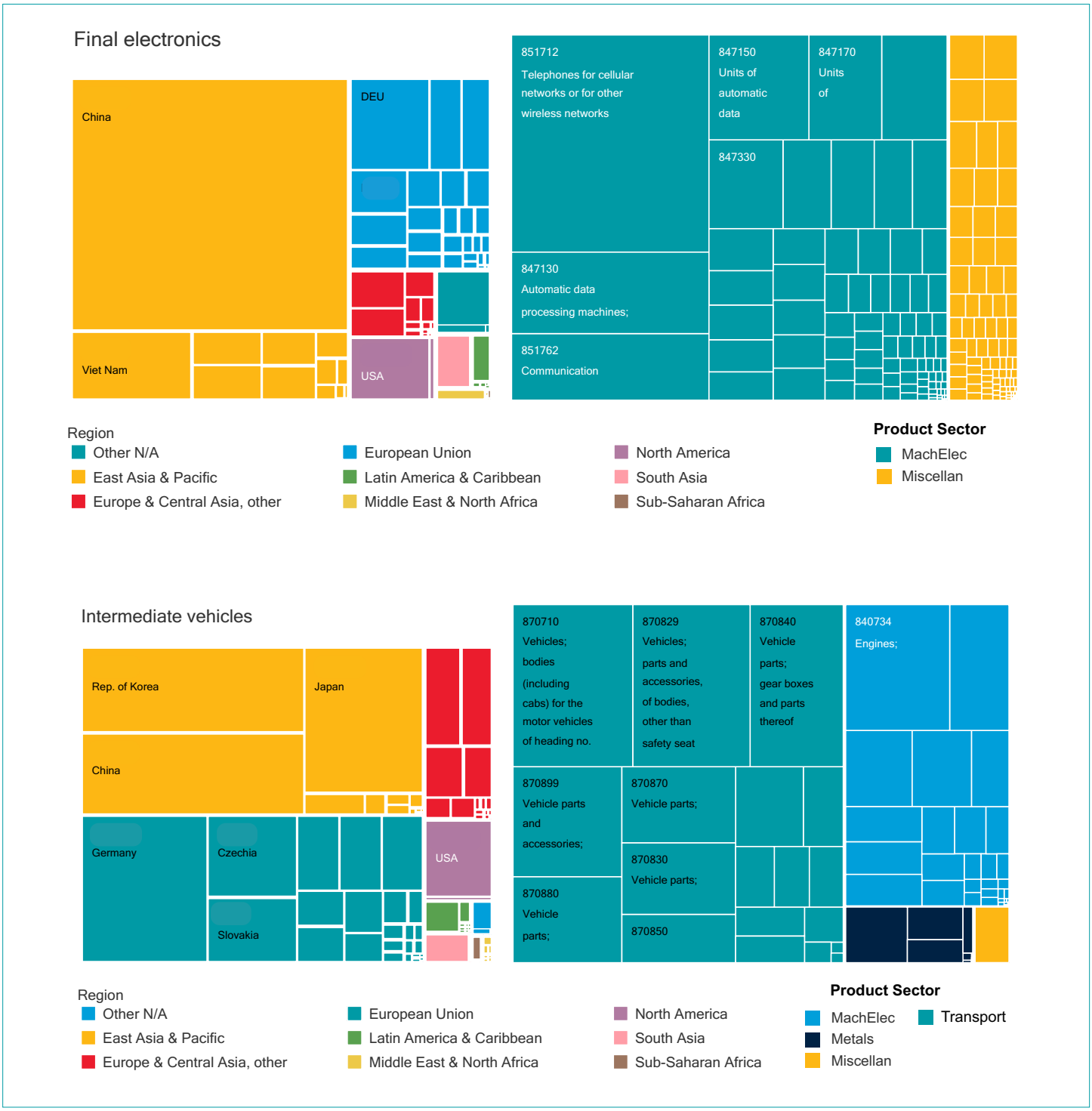
FIGURE 5.5: Russia's imports of intermediate vehicle parts and final electronics, 2018-20 avg.



Source: Own computations. Data: World Bank MC-GVC database.

The top 10 exporting countries most dependent on Russia include all EAEU countries, Georgia, Moldova, Uzbekistan, and Tajikistan, as well as the Faroe Islands and Paraguay. Dependence of these countries on exports to Russia, however, is relatively low, in particular in electronics and transport equipment. Their largest export shares to Russia are in apparel, food and beverage goods (Figure A 5.9), that are all likely to fall in line with lower consumer demand in Russia, affecting in particular neighboring and EAEU countries' exports. Paraguay depends heavily on Russia for its meat and oil seeds exports, whereas Faeroe Islands export over a fifth of their fish to Russia.

Russia's imports of services exceed its exports, with trade deficits largest in travel and other business services; the largest imports are other business services (especially architectural, engineering, scientific and other technical services) and transport services sourced from Europe and the United States. Of 'other business services', around 21 percent were used in manufacturing and professional/scientific/technical activities, respectively, 17 percent in mining and quarrying, and 14 percent in transportation and storage in 2020. Other business services are predominantly sourced from the United States and EU countries, most importantly Netherlands, Ireland, France, the UK and Germany. Almost a third of other business services imported by Russia consist of architectural, engineering, scientific, and other technical services which are predominantly sourced from the UK, Italy, Germany, the United States, and Finland (Figure A 5.10). Transport services imports are dominated by freight and air transport services. Russia's top transport services import partners include mostly smaller European countries, especially Switzerland, Lithuania, Denmark, and Cyprus, but also Germany. Eastern EU countries, especially Cyprus, are the most dependent on Russia in both other business services and transport services, while Switzerland has some dependence in transport services exports (9 percent).

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Annex

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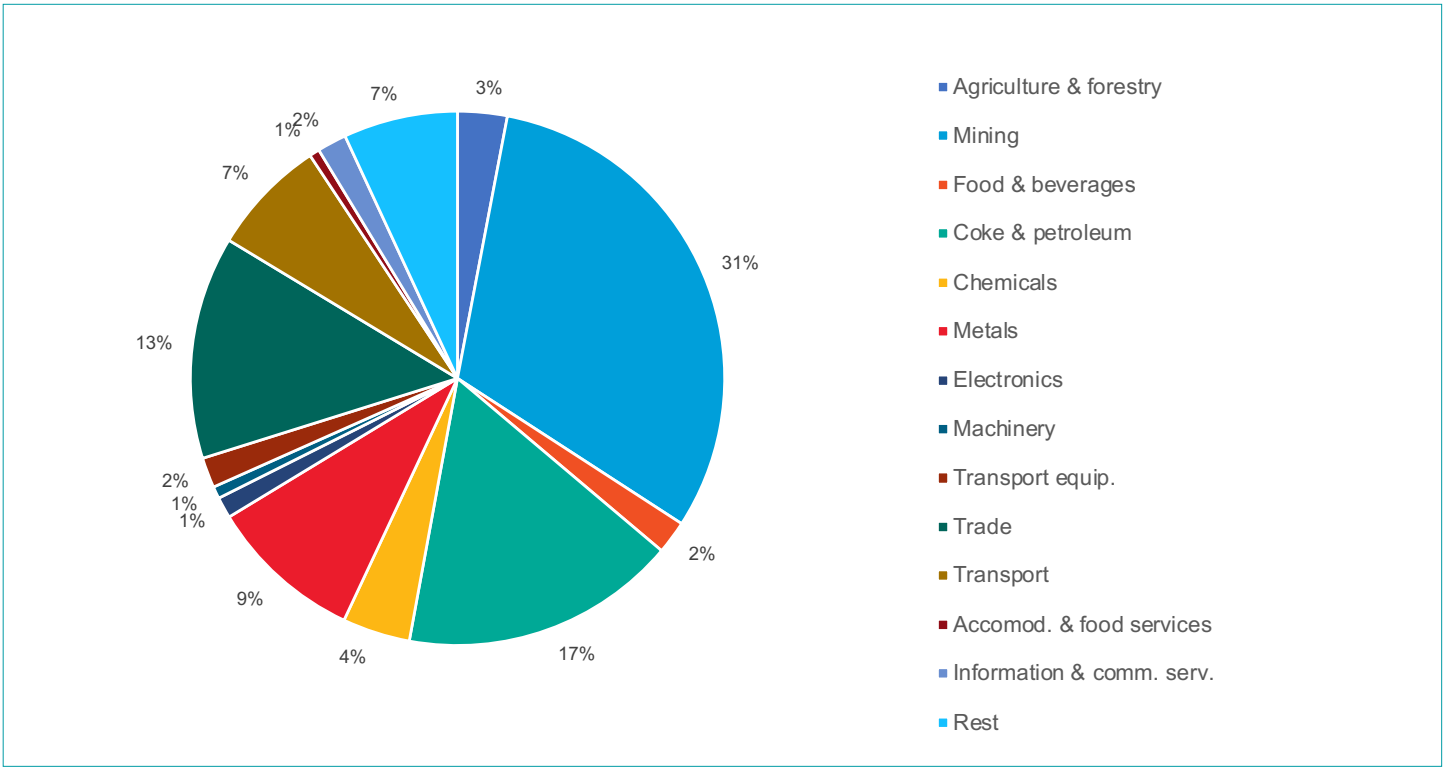
FIGURE A5.1: Sectoral decomposition of Russia's gross exports, 2018



Source: Own computations. Data: OECD-WTO TiVA 2018 release. Note: Agriculture & forestry also includes hunting and fishing.

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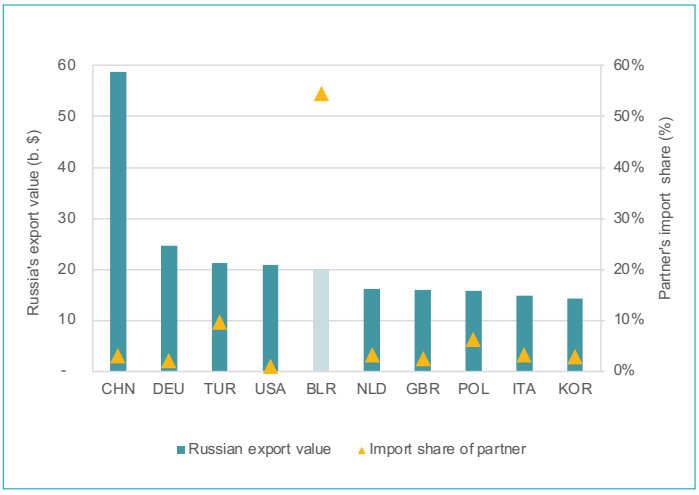
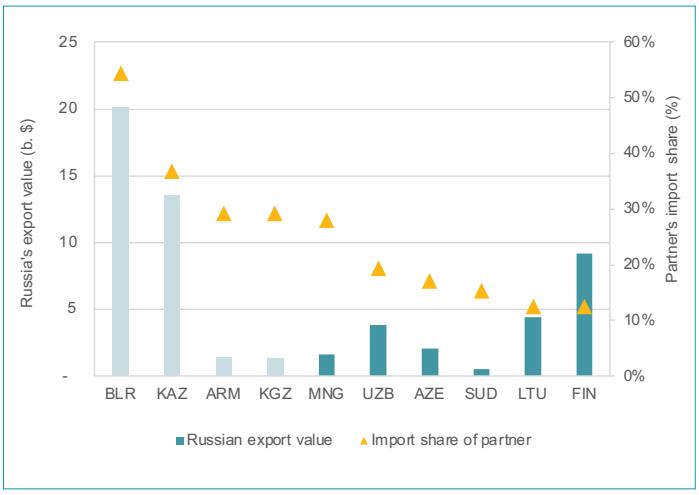
FIGURE A5.2: Russia's goods exports, top export markets and most dependent countries, 2018-20 avg.

a. Russia's top 10 export markets, totals

b. 10 most dep. markets on imports from Russia, totals





Source: Own computations. Data: UN Comtrade. Note: Mirror data for exports used. Bright blue bars = EAEU countries.

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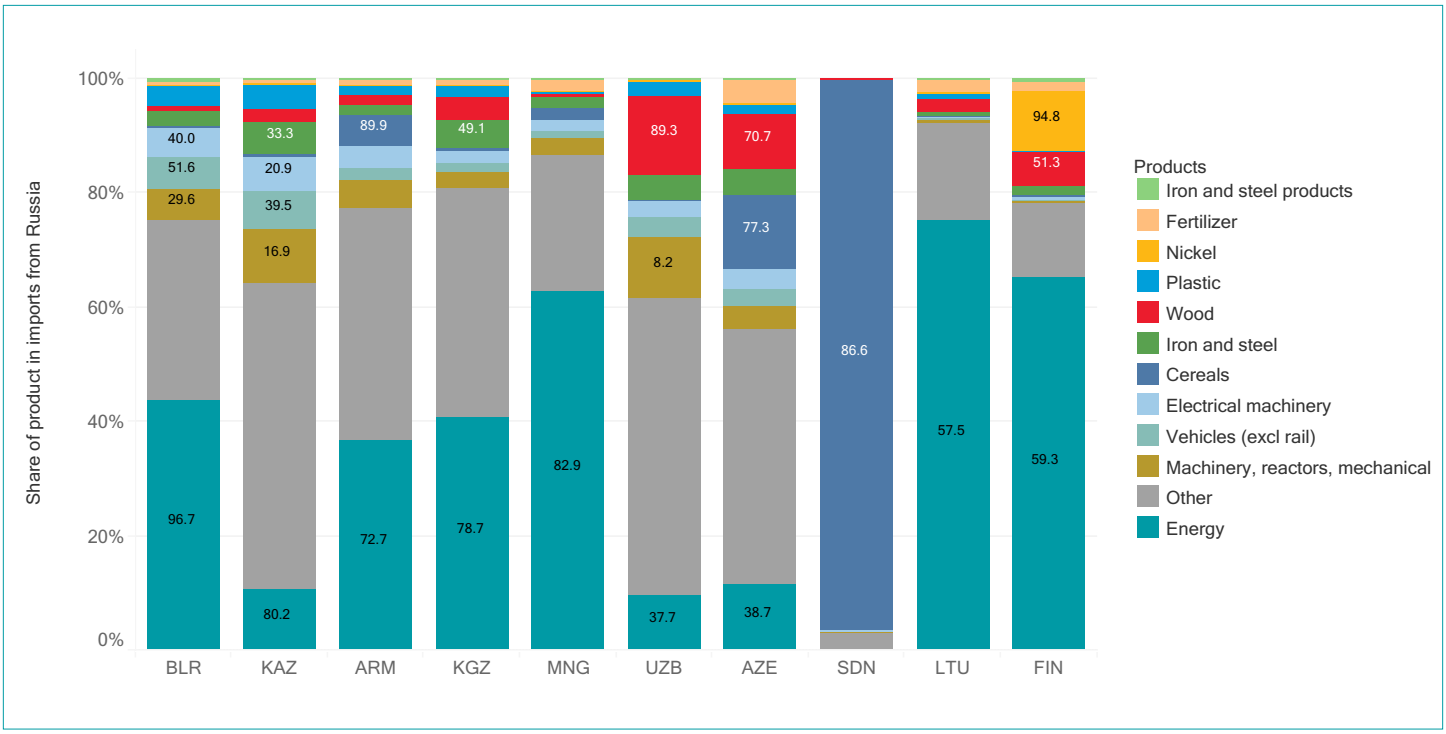
FIGURE A5.3: Ten most dependent markets on imports from Russia, import share of key products, 2018-20 avg.



Note:Label shows share of Russia in reporters total imports of the product
Source: Own computations. Data: UN Comtrade.

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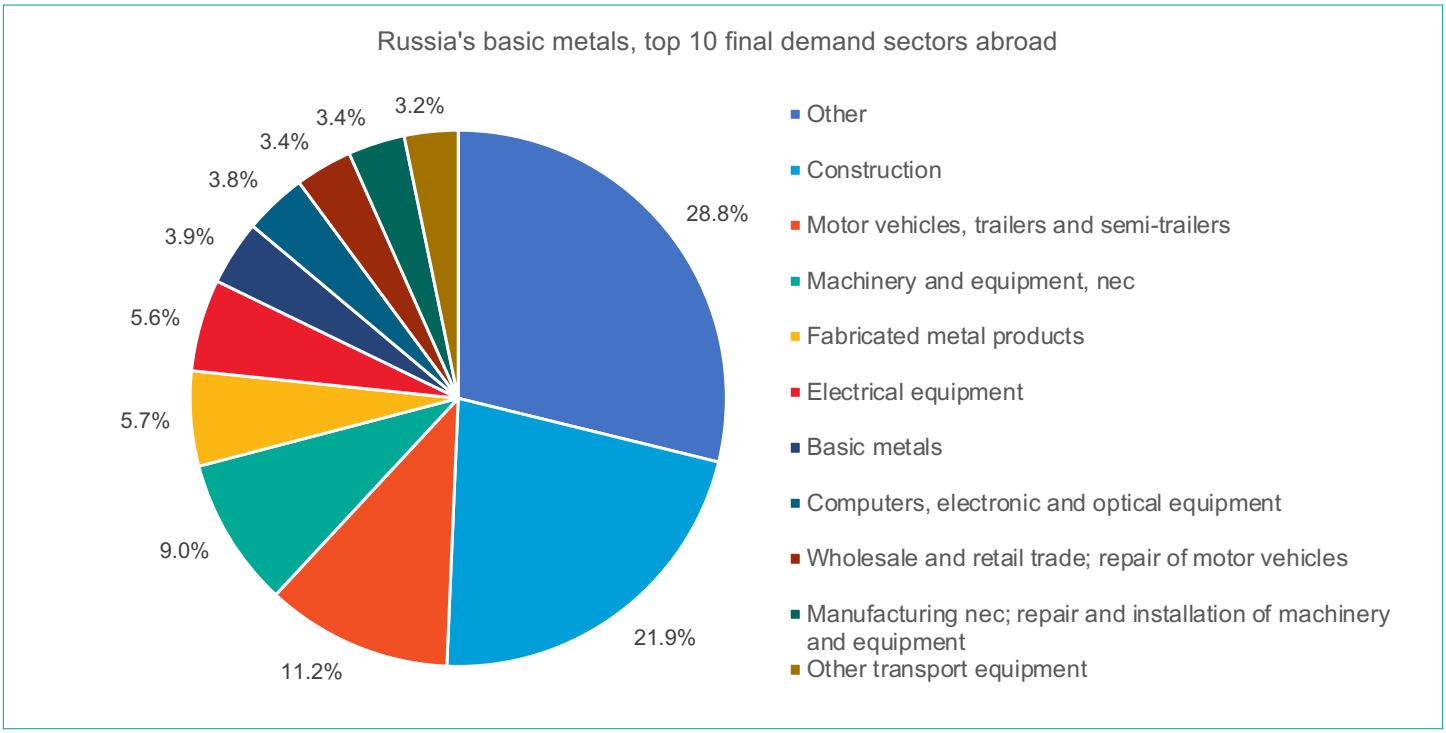
FIGURE A5.4: Top ten final demand sectors of Russian basic metals value added in other countries, 2018



Source: Own computations. Data: OECD-WTO TiVA 2018 release.

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Table A 5.1. Russia's largest metal export products and most dependent markets, 2018-20 (avg.)

HS code	Product	Rus share in world imports	Russia export, ml. US$	# of partners with share >90%	# of partners with share 50-89%	Top markets in terms of share of imports from Russia
760110	Aluminium; unwrought, (not alloyed)	19.0	4886.5	4	5	Armenia, Kazakhstan, Ukraine, Belarus, Norway
740311	Copper; refined, unwrought, cathode	7.0	4002.3	1	1	Belarus, Netherlands
720712	Iron or non-alloy steel; semi-finis	30.5	3581.2	1	6	Denmark, Belarus, Brazil, Czech Rep, Poland
750210	Nickel; unwrought, not alloyed	21.6	2110.9	0	2	Belarus, Ukraine
720110	Iron; non-alloy pig iron containing	42.1	2092.8	2	8	Azerbaijan, Belarus, Saudi Arabia, Korea, Italy
760120	Aluminium; unwrought, alloys	7.4	1971.5	2	1	Armenia, Belarus, Greece
720711	Iron or non-alloy steel; semi-finis	23.9	1644.5	2	5	Ukraine, Kazakhstan, Poland, Turkey, Georgia
720839	Iron or non-alloy steel; in coils,	10.6	1457.3	3	6	Latvia, Kazakhstan, Azerbaijan, Ukraine, Belarus
720449	Ferrous waste and scrap; n.e.c. in	6.0	1332.5	1	2	Kazakhstan, Belarus, Ukraine
750110	Nickel; nickel mattes	25.6	1070.0	1	2	Finland, Belarus, Ukraine
720310	Ferrous products; obtained by direc	35.8	945.0	4	4	Belarus, Uzbekistan, Sweden, Belgium, Italy

Source: Own computations. Data: UN Comtrade. Note: Includes trade flows larger than 1 million US$.

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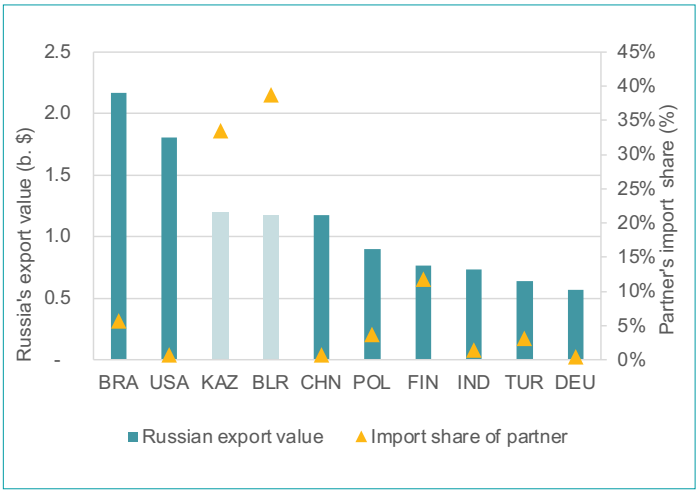
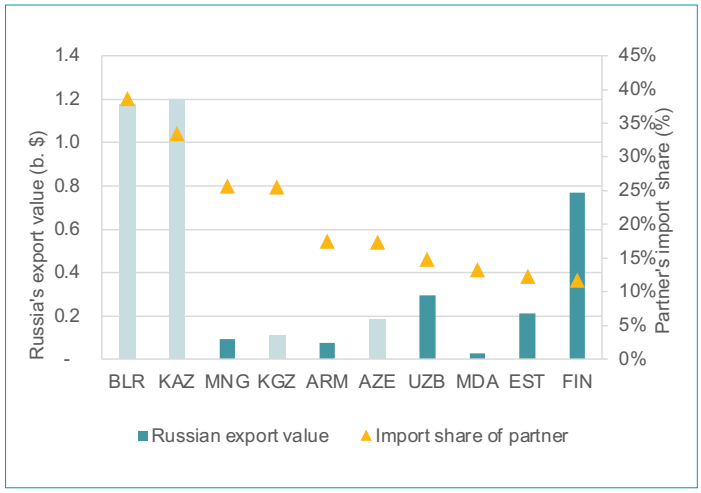
FIGURE A5.5: Russia's chemicals exports, top export markets and most dependent countries, 2018-20 avg.

a. Russia's top 10 export markets, chemicals



b. 10 most dep. markets on imports from Russia, chemicals



Source: Own computations. Data: UN Comtrade. Note: Mirror data for exports used. Bright blue bars = EAEU countries.

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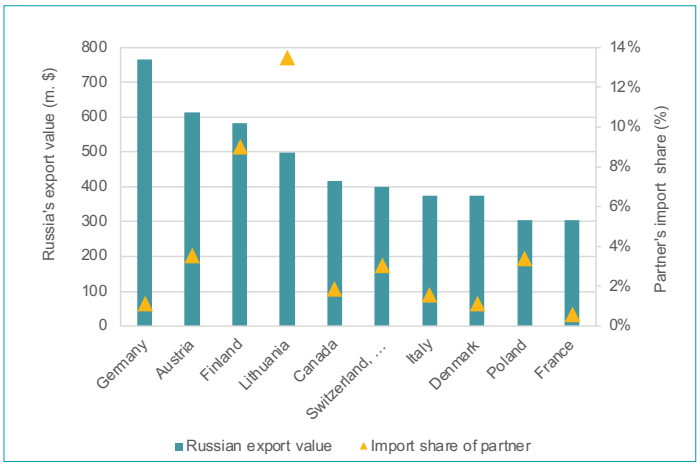
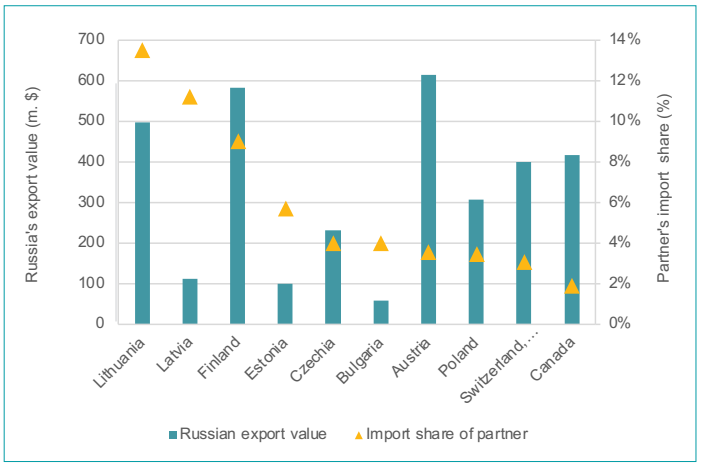
FIGURE A5.6: Russia's transport services exports, top export markets and most dependent countries, 2018-20 avg.

a. Russia's top 10 export markets



b. 10 most dep. countries on imports from Russia



Source: Own computations. Data: UNCTAD. Note: Mirror data for exports used.

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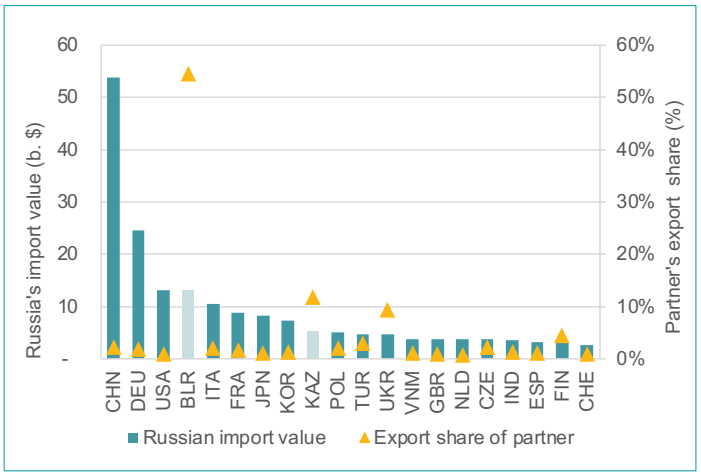
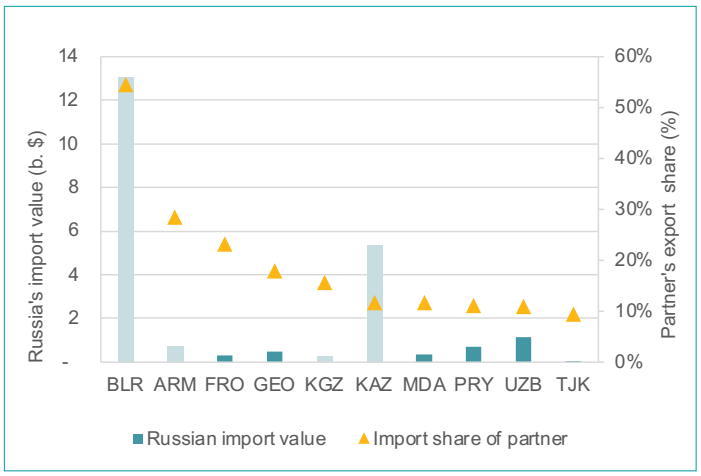
FIGURE A5.7: Russia's goods imports, top import partners and most dependent countries, 2018-20 avg.

a. Russia's top 20 import markets, total



b. 10 most dependent countries on exports to Russia, total



Source: Own computations. Data: UN Comtrade. Bright blue bars = EAEU countries.

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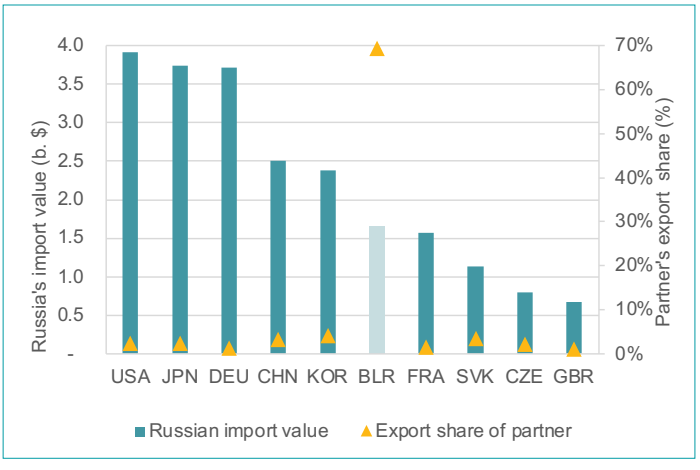
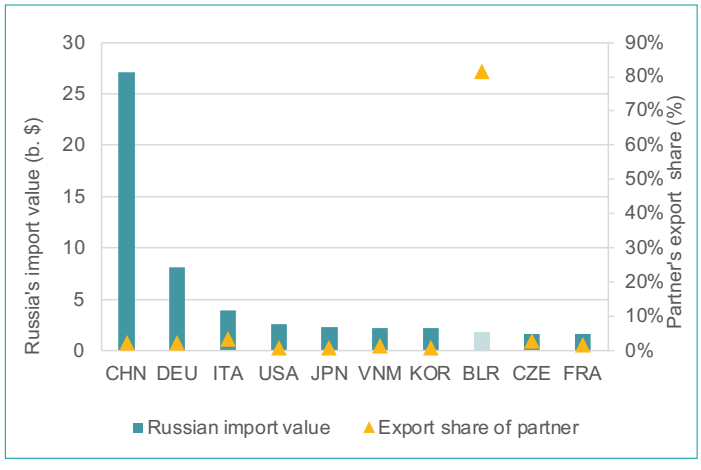
FIGURE A5.8: Russia's goods imports, top import partners and most dependent countries, 2018-20 avg.

a. Russia's top 10 import partners, transport equipment



b. Russia's top 10 import partners, machinery/electronics,



Source: Own computations. Data: UN Comtrade. Bright blue bars = EAEU countries.

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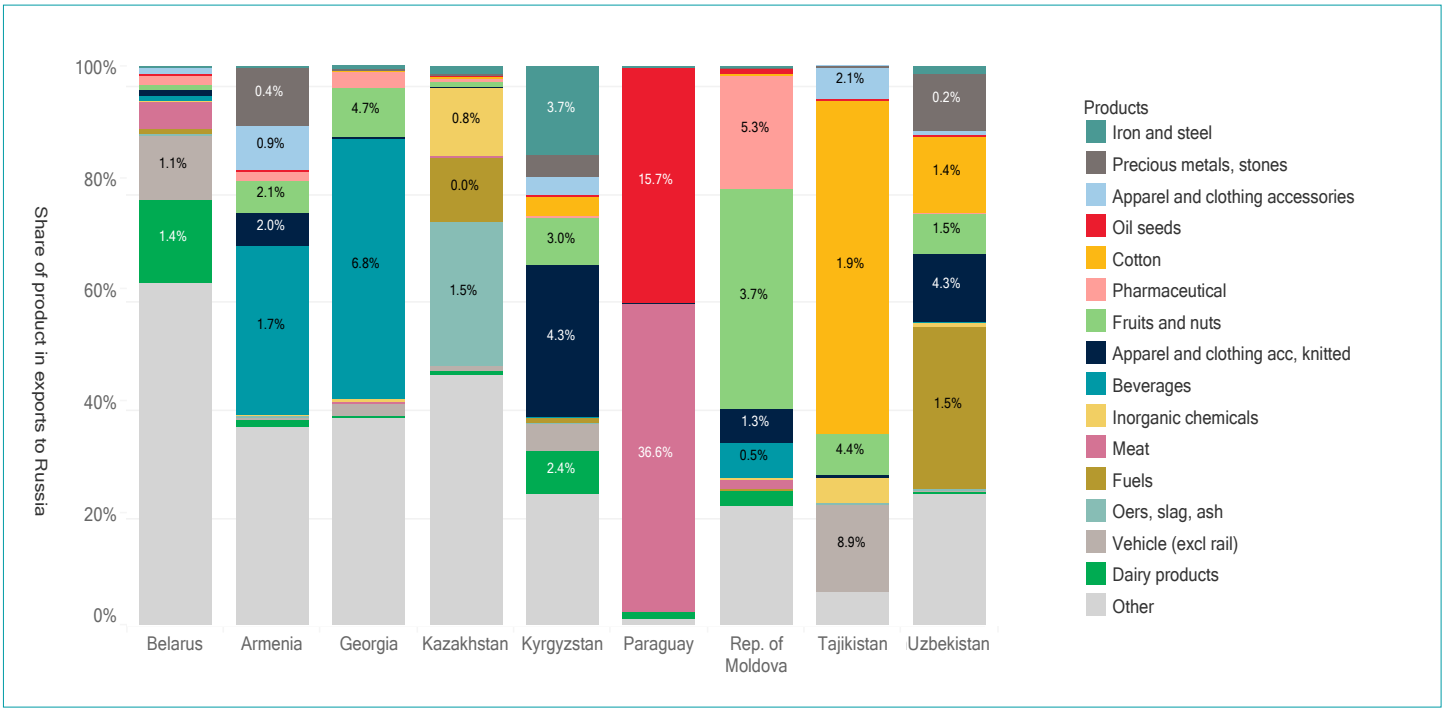
FIGURE A5.9: Ten most dependent markets on exports to Russia, export share of key products, 2018-20 avg.



Source: Own computations. Data: UN Comtrade.

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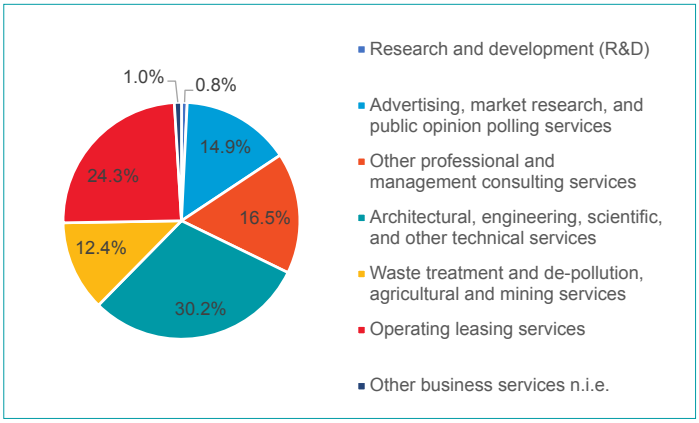
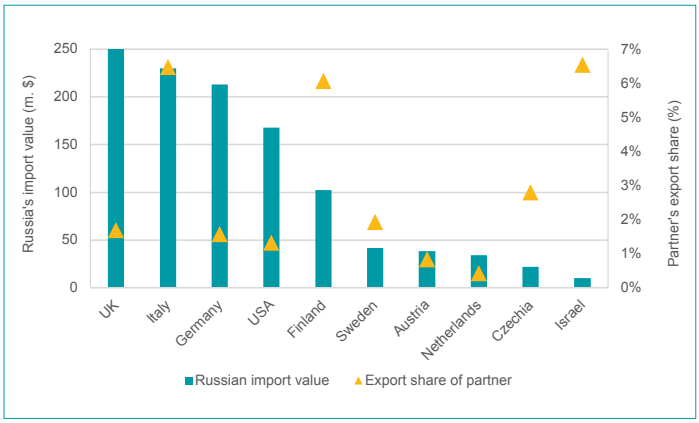
FIGURE A5.10: Russia's other business services imports, top and most dependent import partners, 2018-20 avg.

a. Russia's other business services imports by category, 2018-20 avg.



b. Russia's top 10 import partners, architectural, engineering, scientific and technical services, 2018-20 avg.



Source: Own computations. Data: UNCTAD. Note: Russian imports based on its partner's export data.

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Effects on Global FDI[1]

Russia and Ukraine in Global FDI Networks

Russia and Ukraine are not major players in global FDI networks. Russia was the 22nd largest FDI destination in 2020 among 202 countries, and the 22nd largest outward investor among 172 countries. Its inward and outward FDI stock represented 1 percent of the global stock. A network analysis of global FDI stock shows that Russia is a second-tier node in the global and regional FDI network, clearly below par given the size of its population (Figure 6.1). Cyprus appears to be the largest FDI source and destination for Russia due to "round-tripping" funds from Russia. Ukraine accounted for 0.1 percent of global inward FDI stock in 2020, and its outward FDI stock is negligible.

Eastern European and Central Asian economies are the most dependent on Russia for bilateral investments. Russia's top FDI source and destination countries include several advanced European countries, though FDI into and from Russia makes up a tiny share of total FDI from and in these countries. About one-third of total inward FDI stock in Armenia and Belarus come from Russia. Moldova, and the Kyrgyz Republic also received nearly a fifth of their total inward FDI stock from Russia in 2020. Austria, Tajikistan, Montenegro, Burkina Faso, Seychelles, and Latvia are also highly dependent on Russian inward FDI, which accounted for about 10 percent of their total inward FDI stock (Figure 6.2 and Figure 6.3). Russia hosted 77 percent of Belarus' total outward FDI stock. Kazakhstan and North Macedonia had around 10 percent of their outward FDI stock in Russia, followed by Slovenia, Latvia, Azerbaijan, Estonia, and Poland, though these countries' outward FDI stock in Russia was generally less than US$1 billion.

1. This note has been prepared by Yan Liu (Economist, ETIIC).

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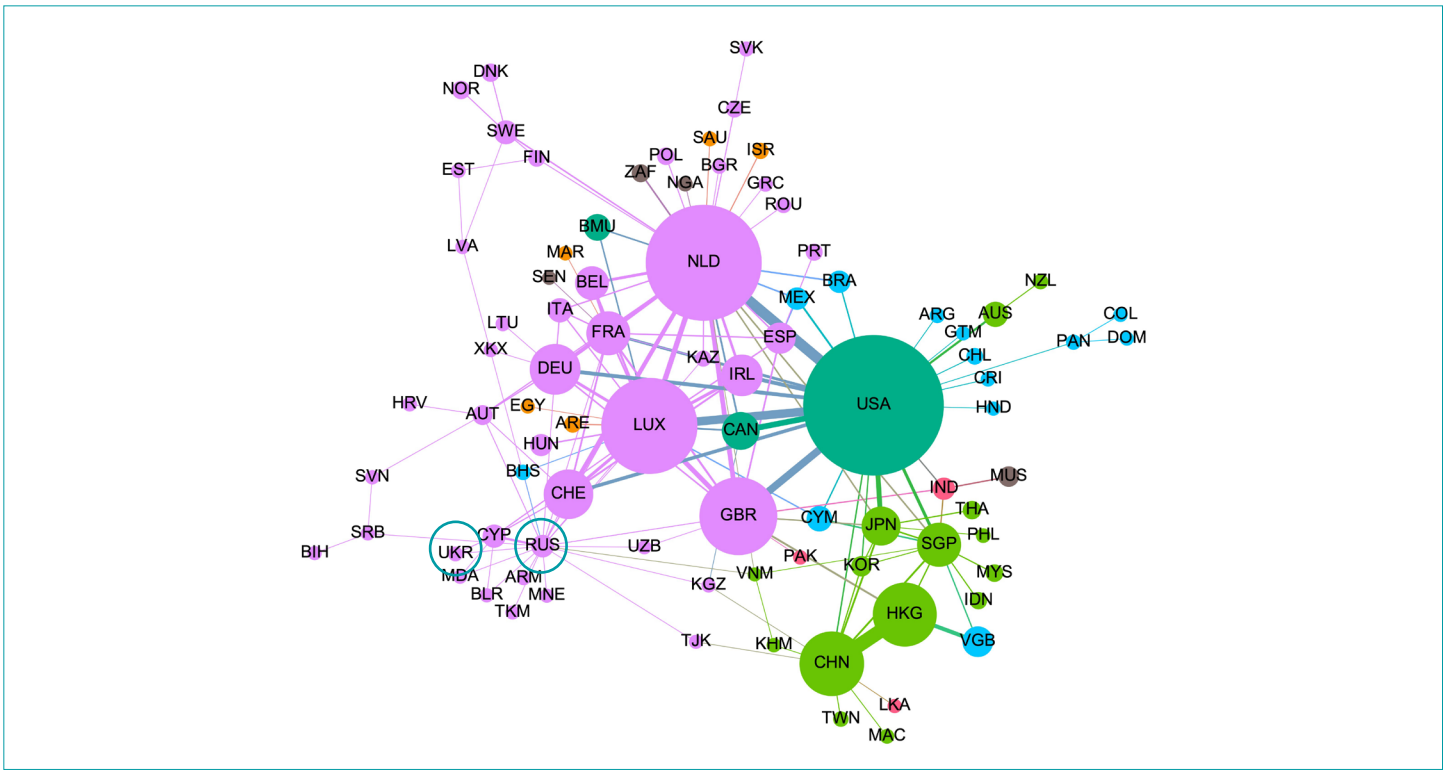
FIGURE 6.1: Russia and Ukraine are marginal players in global FDI networks



Source: Author's calculation based on IMF CDIS database. Node size represents the sum of a country's total inward and outward FDI stock in 2020. Node color by World Bank region. Thickness of connecting lines represent bilateral FDI value (absolute value of inward stock plus absolute value of outward stock). Countries with stronger FDI ties are positioned closer.

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FIGURE 6.2: Share of each country's total inward FDI stock from Russia

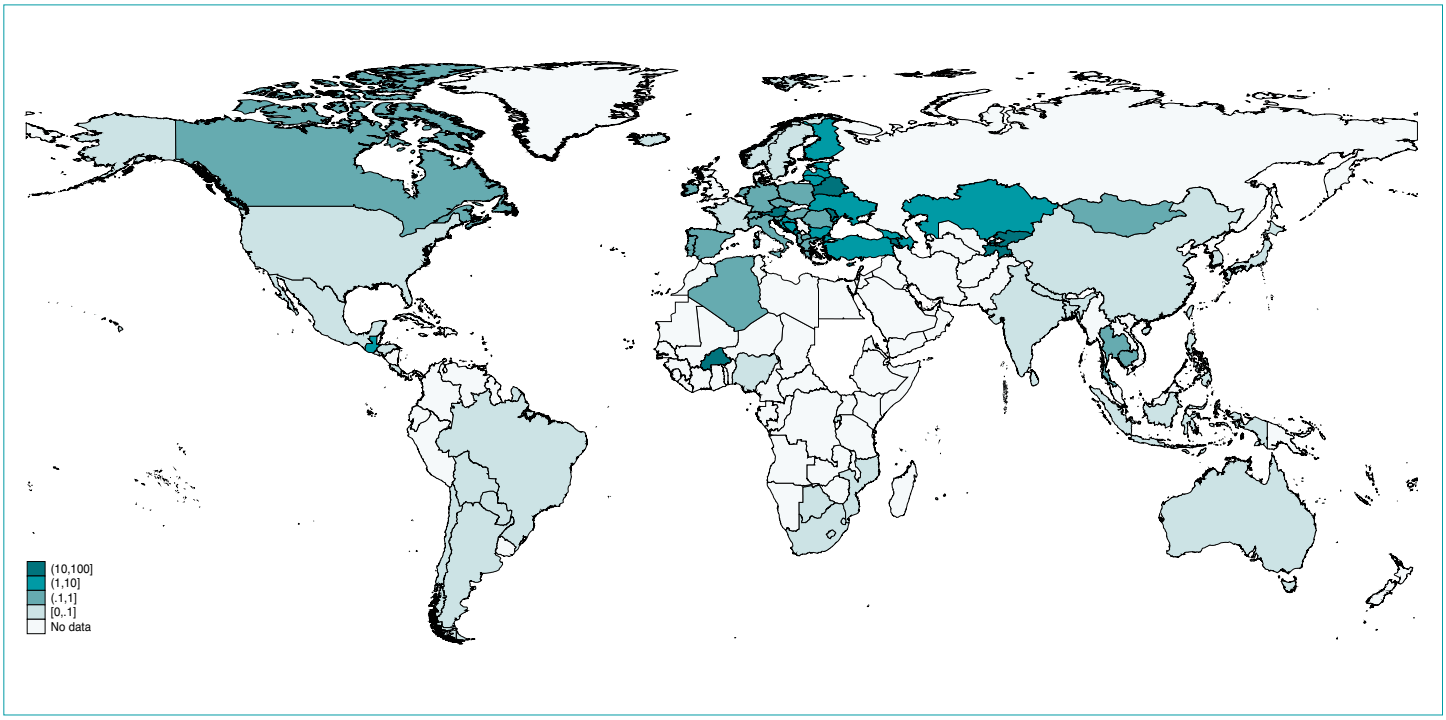

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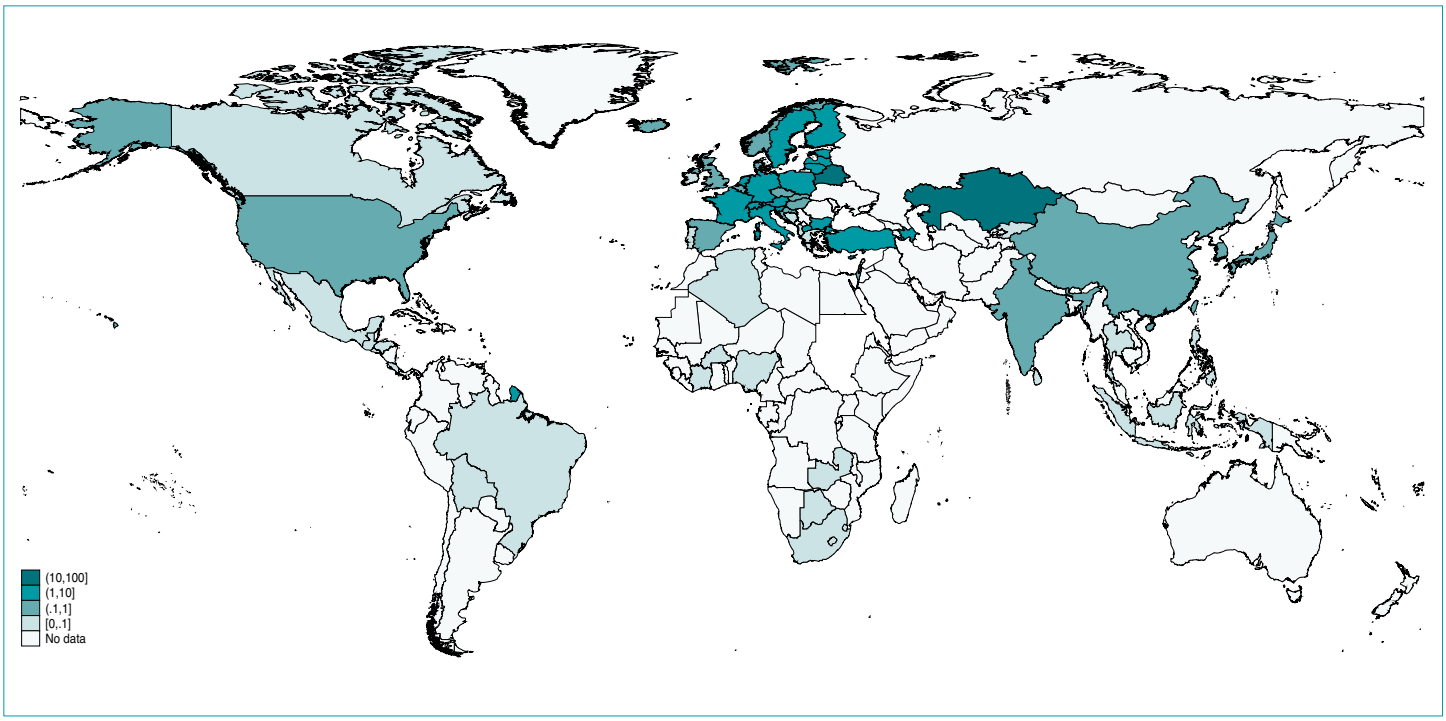
FIGURE 6.3: Share of each country's total outward FDI stock in Russia



Note: Darker green means higher share of FDI from/in Russia.
Source: Author's calculation based on IMF CDIS database 2020.

MNCs are important players in Russia's economy, especially in knowledge-intensive manufacturing industries, where MNCs contribute as much as 40 percent of output. Foreign MNCs accounted for 9 percent of total fixed-asset investment and 7 percent of employment in Russia's modern sectors in 2012-2018. Foreign MNCs contributed 40 percent of output in the automotive industry and nearly 30 percent in chemicals in 2016 (Figure 6.4). Coal, oil and gas is the largest greenfield FDI receiving sector in Russia, followed by real estate, food and beverages, automotive OEM, and transportation (Figure 6.5). China, the United States, Germany, France, and Finland are main investors in Russia's energy sector.

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FIGURE 6.4: Total output breakdown by firm ownership

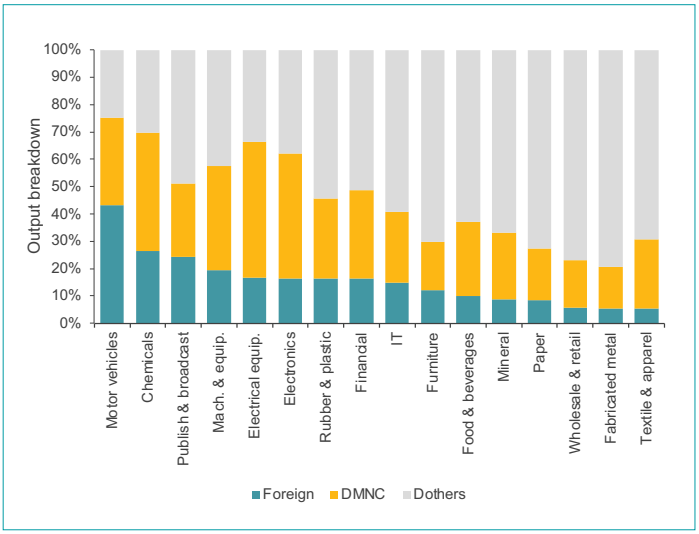

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FIGURE 6.5: Greenfield FDI in Russia by sector

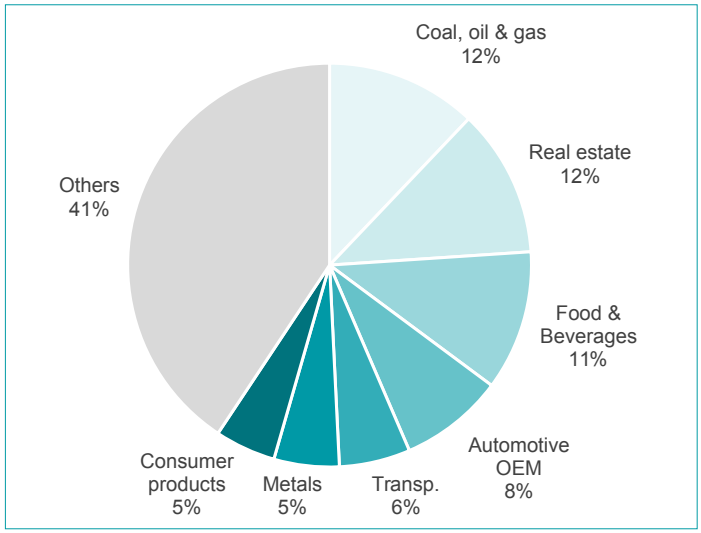

Figure 6.4 source: OECD AMNE database. DMNC = domestically owned MNCs in Russia. Dothers = other domestic firms.
Figure 6.5 source: fDi Markets database. 2003-2021. The figure shows cumulative amount of greenfield FDI Russia received during 2003-2021 by sector.

Many European and Central Asian countries rely heavily on bilateral investment with Russia in the energy sector. More than half of Russia's outward greenfield FDI amount is in coal, oil, and gas; the cumulative amount during 2003-2021 exceeded US$120 billion and accounted for 5 percent of global greenfield FDI in the sector. Top destinations for Russia's outward greenfield FDI in coal, oil, and gas include Egypt, Uzbekistan, Iraq, Jordan, Vietnam, Syrian Arab Republic, Germany, Venezuela, Bulgaria, and Indonesia. Jordan, Uzbekistan, Egypt, and Iraq rely on Russia for 30-60 percent of inward energy greenfield FDI. Some European countries also depend on Russia for inward and outward energy investment, including Bosnia and Herzegovina, Ukraine, Serbia, Bulgaria, Germany, Finland, and Norway (Figure 6.6 and Figure 6.7).

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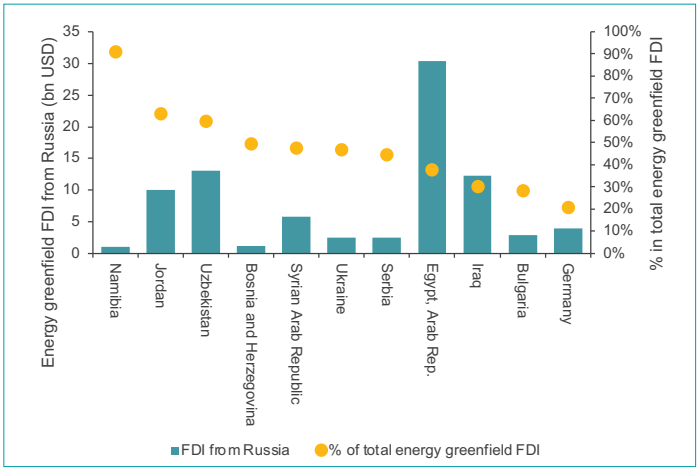
FIGURE 6.6: Countries with highest share of energy greenfield FDI from Russia



Note: % indicates Russia's share in reporting countries' total energy greenfield FDI amount during 2003-2021.
Source: Author's calculation based on fDi Markets database.

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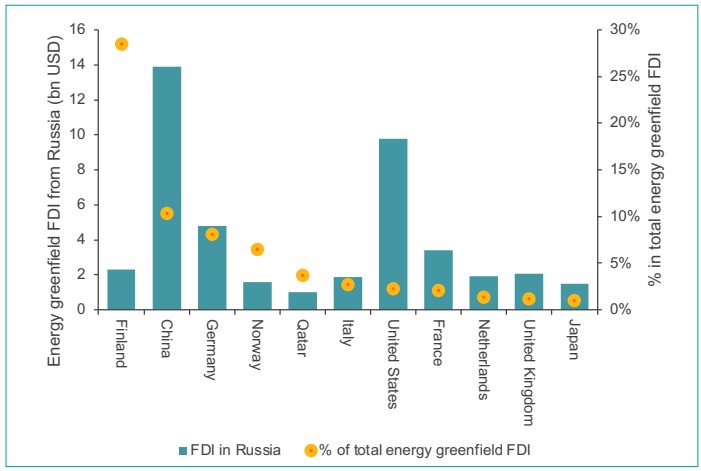
FIGURE 6.7: Countries with the highest share of energy greenfield FDI in Russia



Note: % indicates reporting countries' share of energy greenfield FDI amount in Russia during 2003-2021.
Source: Author's calculation based on fDi Markets database.

Impact of the conflict through FDI

The United States, UK, EU, and other allies have imposed unprecedented and expansive sanctions on Russia in response to its invasion of Ukraine. These sanctions include freezing the assets of Russian politicians, officials, and oligarchs; removing seven Russian banks from the Swift payments system; banning transactions between most Russian financial entities and US counterparts; freezing the assets of the Russian central bank; restricting exports of products used in electronic, automotive, aviation and oil refining value chains, among others, to Russia; and other financial and economic sanctions. The United States, UK and EU have either banned imports of Russian oil and gas or plan to scale down purchases. The list is growing as countries announce new sanctions. As firms' operations are severely disrupted by the sanctions, many foreign MNCs are leaving, further depressing economic activity in Russia.

Eastern European and Central Asian economies, including Armenia, Belarus, Moldova, the Kyrgyz Republic, Tajikistan, and Montenegro, will be affected through multiple channels: (1) The conflict and Western sanctions will take a toll on existing Russian MNCs in these economies by complicating cross-border transactions, weakening their parent companies, and disrupting logistics. Eventually Russia may whittle down its existing investment in these countries. (2) A shrinking Russia economy and depreciating ruble will reduce FDI inflows and remittances in these countries, depress domestic demand and weigh on economic growth. (3) Currencies in some of these economies have depreciated against the US dollar, resulting in a contraction in their FDI stock and probably triggering capital outflows. (4) Countries like Belarus and Kazakhstan with large shares of total outward FDI stock in Russia will likely suffer losses on their investments in Russia due to ruble depreciation, difficulty of transferring funds, and Russia's deteriorating economy. The direct losses will have a limited impact on the economies of Belarus and Kazakhstan as their outward FDI stocks in Russia are below US$2 billion.

European countries dependent on bilateral energy investment with Russia may face elevated risks, potential investment losses, disruptions in energy supplies, and higher energy prices. BP is among several foreign energy firms exiting Russia; the estimated cost of disinvestment can be up to $25 billion. Engie (France), Eni (Italy), Equinor (Norway), Neste (Finland), OMV (Austria), Shell (UK and Netherlands), TotalEnergies (France), and Uniper (Germany) either have major stakes in Russian oil fields or are financially tied to Nord Stream 2. Russia supplied 27 percent, 47 percent, and 41 percent of crude oil, solid fuel, and natural gas EU imported in 2019 respectively (Eurostat 2022). Many EU countries with large shares of energy greenfield FDI in Russia —including Finland, Germany, and Norway —could experience disruptions in energy supplies and higher energy prices.

While the war's direct FDI effects are limited to more exposed countries, the indirect effects on FDI and MNCs could prove much more profound and far-reaching. The negative effects on MNCs more exposed to Russia will also ripple through value chains. Sanctions may affect bank liquidity and solvency and tighten global financial conditions, possibly leading to increased EMDE borrowing costs and financial strain. Soaring commodity prices and rising inflation could prompt more rate hikes in advanced economies, slowing down global growth and suppressing private investment. Elevated uncertainty and geopolitical risks will damp investor confidence, deter new investment, and force some MNCs to limit their operational footprints. Developing countries are still reeling from the COVID-19 pandemic; both output and investment in EMDEs are projected to remain significantly below pre-pandemic levels for years while advanced economies will achieve full recovery by 2023 (World Bank 2022). High risks and uncertainty, exchange-rate volatility, slower growth, and tightening global liquidity will accelerate capital flight from developing countries as investors flock to safer assets in advanced economies. This will add to the vulnerabilities caused by COVID-19 and further discourage FDI in EMDEs. In the longer term, Russia and other countries might set up their own banking networks or reduce their reliance on the dollar to conduct international transactions. The sanctions on Russia may also prompt some countries to seek tech self-reliance. Eventually, the long-term fallout of the war and sanctions could be a further debilitation and fragmentation of the global financial system and global value chains.

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Effects on Global Tourism[1]

Outbound Tourism

The war in the Ukraine has severely affected outbound travel from Russia and Ukraine, which makes up a sizeable proportion of global tourism. Russians took an estimated 45 million trips abroad in 2019 (4th most in the world), generating US$36 billion in tourism receipts at an average of US$798 per trip (UNWTO, 2022). Ukrainians took 29 million trips in 2019 (7th most in the world), generating US$8.9 billion in receipts and spending an average of US$295 per trip. Russia and Ukraine's outbound tourism and expenditure have been increasing in the past decade in absolute and relative terms. The conflict is expected to lead to a decrease in both volumes and expenditures (absolute and per trip).

1. This chapter was produced by Alex Pio, Andrew Beath and Ryan Chia Kuo from the TIC Global Tourism Team.

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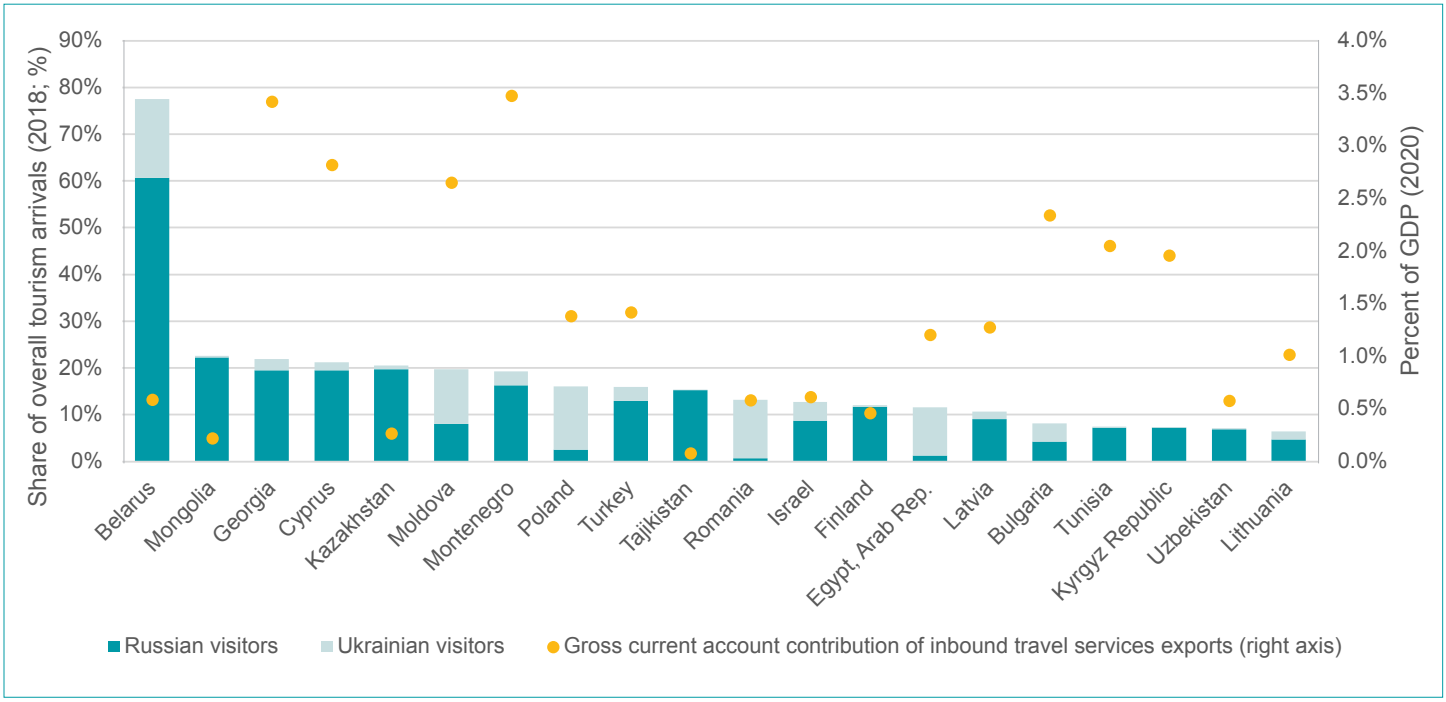
FIGURE 7.1: Russian and Ukrainian Shares of Tourist Arrivals (2018) and Contribution of Tourism Gross Exports to Current Account Balance (2020)



Note: Chart shows top 20 countries in terms of combined share of Russian and Ukrainian visitors of total tourist arrivals in 2018. Source: World Bank staff analysis based on data from UNWTO and IMF.

Effects within ECA

The war is likely to have the most severe effects on Eastern European and Central Asian countries, both due to a loss in tourism from Russian and Ukrainian markets as well as a drop in global visits to the region. The magnitude of these effects will depend on the scope and scale of the war. Comparisons are difficult; however, data from previous conflicts points to a potential reduction in tourism firm revenues of 16 percent to 23 percent due to reduced global visitation, as was the case for Croatia during the 1999 Kosovo conflict (Tkalec, and Žilić, 2017).

Tourism flows to Eastern European and Central Asian destinations were dominated by Russian and Ukrainian visitors both before and during the pandemic. In 2019 and 2021, for instance, more than half of commercial air passengers visiting Armenia (58 percent in 2021), Kyrgyz Republic (71 percent), Tajikistan (78 percent), and Uzbekistan (54 percent) originated in Russia or Ukraine. As of 2021, Russian and Ukrainian travelers made up a substantial proportion of commercial air passengers to Azerbaijan (33 percent in 2021), Belarus (49 percent), Georgia (28 percent), Moldova (25 percent), Montenegro (23 percent), Kazakhstan (15 percent), Turkey (15 percent), and Turkmenistan (15 percent).

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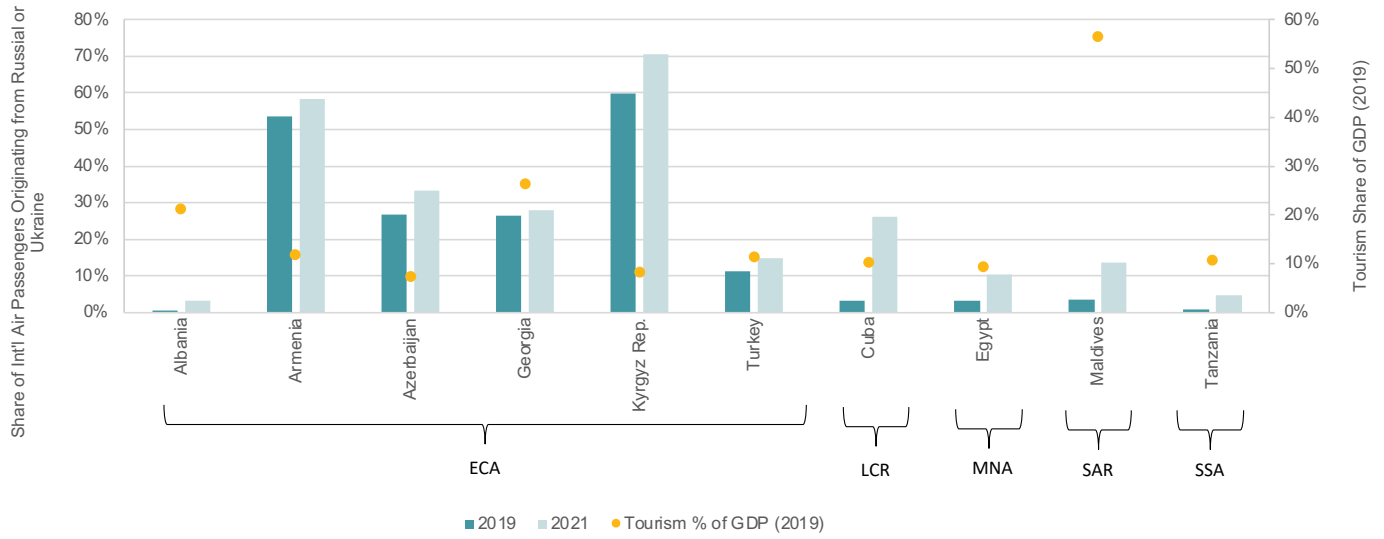
FIGURE 7.2: Top 10 Countries with the Greatest Change in Air Travelers Originating from Russia and Ukraine (2019 and 2021)



Note: Graph displays low- and middle-income countries (excluding Russia and Ukraine)
Source: World Bank staff analysis based on data from OAG and WTTC.

Effects in regions beyond ECA

Outbound tourism from Russia and Ukraine will be substantially affected, barring a quick end to the war. Outbound flows and expenditures from the two countries were growing in prominence pre-pandemic, a structural trend that had been accelerated during COVID and was likely to persist.

Numerous highly tourism-dependent destinations turned to Russian and Ukrainian visitors to offset pandemic-related declines from other markets (Figure 7.2). In 2021, travelers from Russia and Ukraine made up 26 percent of commercial air passengers visiting Cuba, 10 percent to Egypt, 14 percent to the Maldives, and 17 percent to the Seychelles.

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BOX 7.1: The Dominican Republic's Pivot to Russian and Ukrainian Markets

In the Dominican Republic, where tourism makes up 16 percent of its GDP (2019), the importance of the Russian and Ukrainian markets increased significantly during the pandemic and particularly so since July 2021 (Figure 7.3). During 2021, Russia and Ukraine were the 2nd and 9th largest inbound markets respectively, collectively representing 5 percent of non-resident arrivals. This shift contributed to the country recovering faster than its peers and achieving its highest visitation ever recorded in December 2021 (Central Bank of Dominican Republic, 2022).

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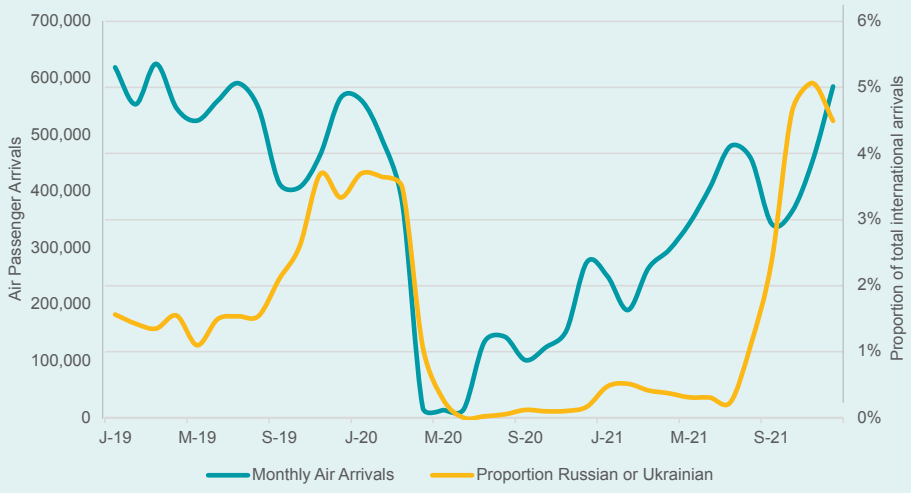
FIGURE 7.3: Air Passengers Arriving in the Dominican Republic



Global Impacts

Analysis of previous wars, such as the Gulf War and the Balkan conflict of the 1990s, suggests that the war in Ukraine will have only a short-term impact on global tourism. However, if the war is long-lasting, or spills across borders, global tourism may see a sharper drop and longer recovery, more akin to the post-9/11 period. At least in the short-term, the war will contribute to the sector's uneven recovery from the pandemic and the Omicron variant. Key channels through which the war may affect global tourism include airspace restrictions and security concerns, drops on consumer confidence, and higher fuel prices:

- Airspace restrictions and security concerns have disrupted routes over Russian, Ukrainian, Moldovan and Belarusian airspace. On February 28, Russia closed its airspace to airlines from 36 countries, including all of the EU. Security concerns are also causing airlines to avoid overflying Ukraine and neighboring countries. Some flights will be re-routed, resulting in higher fuel costs and crew block hours, while others may be cancelled altogether. Rerouting flights around Ukrainian and Russian airspace generally entails increased travel times and fuel costs, rendering some routes unfeasible or otherwise economically unviable. As a result, capacity on routes between Europe and East Asia —which often fly over Russian or Ukrainian airspace— will be affected, as airlines have cut flights scheduled between March and June 2022 (Figure 7.4). Further cancellations may occur as the war evolves.

- Consumer confidence has dropped. The online booking tool, Kayak, reported that global searches for international flights fell 8 percentage points overnight on February 25, the day of the Russian invasion of Ukraine. Travelers may reconsider whether to visit Europe this summer and decide to stay closer to home.

- Higher prices, particularly fuel prices, may affect the financial viability of airlines and price-sensitive segments and destinations. Although most airlines are well hedged with forward contracts for fuel at fixed prices, airlines may come under financial distress and global airfares may rise if oil prices remain elevated for extended periods. In this case, connectivity may decline as a result of airlines cutting unprofitable routes or going out of business altogether. Global jet fuel prices have risen to 14-year highs as of March 8, 2022. This will likely affect more price-sensitive markets and destinations, particularly long-haul ones, with visitors limiting travel to shorter distances.

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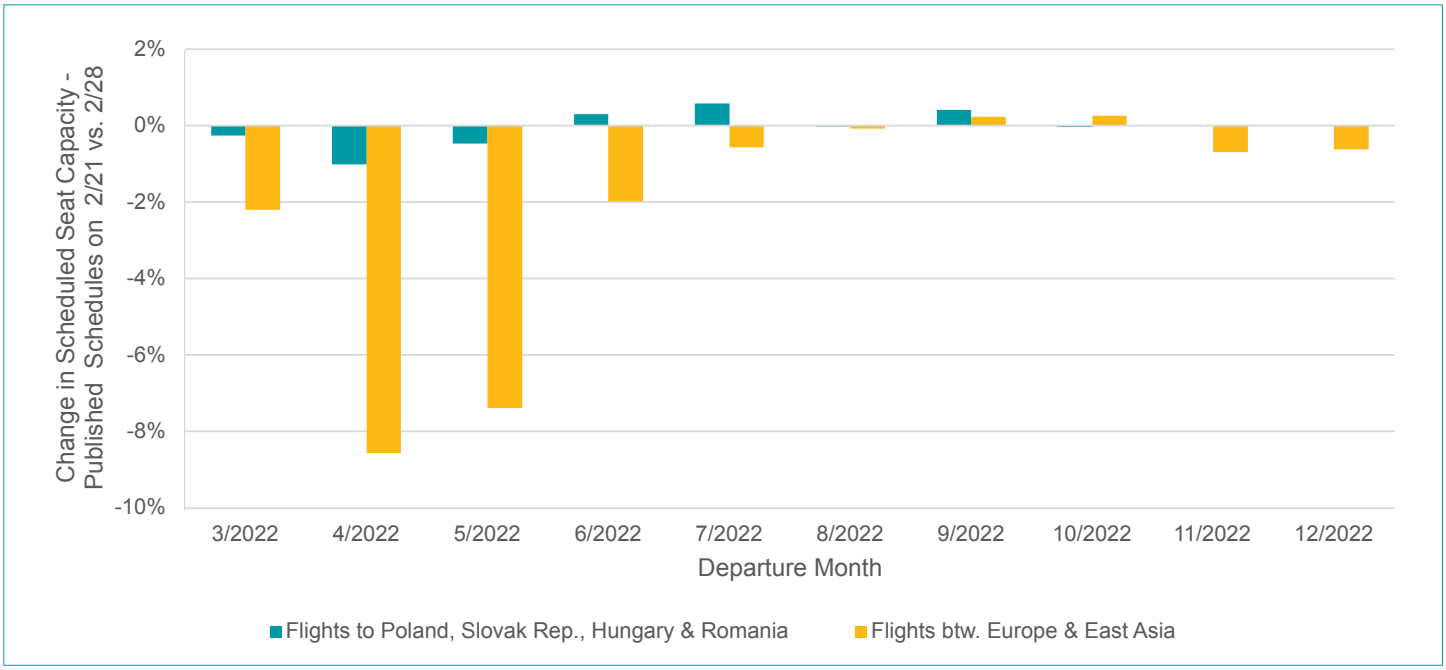
FIGURE 7.4: Schedule Adjustments for Overflights and Flights to Neighboring Countries



Note: Flights originating from Russia, Ukraine, Moldova, and Belarus excluded from analysis to isolate indirect effects from direct effects from airspace closures. Data periodicity is monthly.
Source: World Bank staff analysis based on data from OAG.

Inbound Tourism

Inbound tourism to Russia and Ukraine has been severely affected and is likely to remain so until the conflict is fully resolved and beyond, in Ukraine's case. In 2019, tourism made up 6.3 percent of Ukraine's economy and 6.9 percent of its total employment, with international visitor expenditures making up 3.7 percent of total exports (WTTC, 2022). For Russia, tourism contributed 4.9 percent of GDP and 5.6 percent of total jobs in 2019, with international visitor expenditures making up 3.4 percent of Russia's total exports (WTTC, 2022). As observed with other post-conflict states, Ukraine's tourism sector is likely to take years to recover after the conflict's resolution. Russia's tourism sector is being affected by sanctions, airspace restrictions, traveler confidence, and traveler solidarity. Its sector is likely to pivot to domestic and politically friendly source markets for the near future.

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Long term effects of the war in Ukraine on global value chains

The long term effects of the war in Ukraine on globalization will depend on how government policies and firms' trade and investment decisions adjust in a world of higher geopolitical risks. As discussed in previous chapters, the war has direct effects on the firms operating in Russia and Ukraine and on firms relying on suppliers from those markets. But the shock caused by the war goes well beyond these two countries, as geopolitical risks have increased globally. The global Geopolitical Risk Index (Caldara and Iacoviello, 2022) more than doubled since the beginning of the year, reaching levels not seen since the outset of the war in Iraq in March 2003 (Figure 8.1). The data also show substantial changes in geopolitical risks in several economies that are more integrated than Russia and Ukraine in world trade and global value chains including China, Finland, Sweden, Taiwan China, among others, pointing to changing perceptions on the risks of future conflicts and sanctions. How governments' policies and firms' trade and investment decisions will adjust to these broader geopolitical risks will ultimately determine the longer-term impact of the war on globalization.

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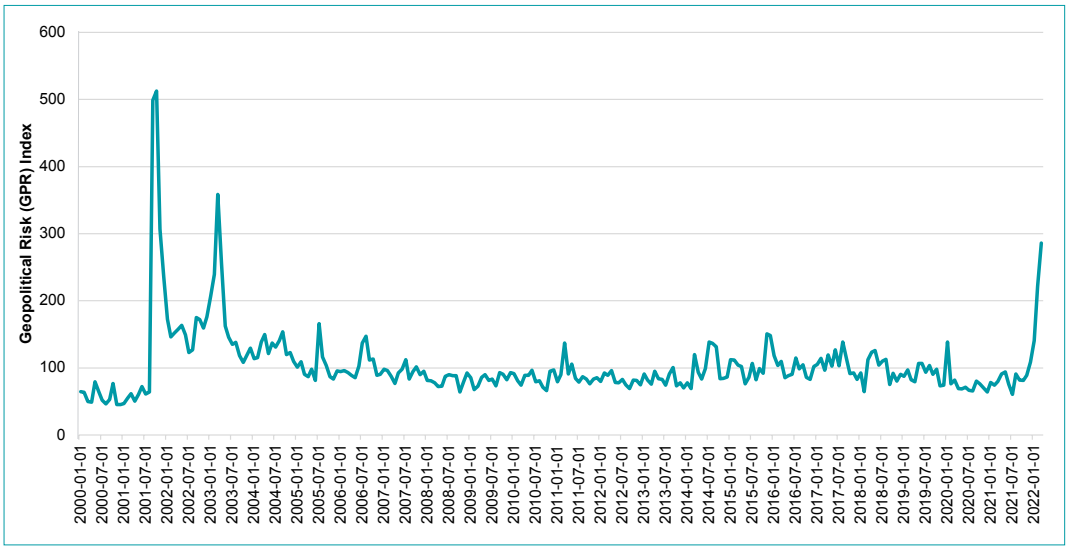
FIGURE 8.1: Geopolitical Risk Index (GPR), January 2000 – March 2022



Source: Geopolitical Risk Index (Caldara and Iacoviello, 2022)

The war in Ukraine, just like the COVID-19 pandemic in 2020 and the Japan earthquake in 2011, exposes the risks associated with the interconnected nature of global trade. The reliance on foreign input producers can lead to the disruption of production when source countries experience a negative shock, be it a natural disaster, a pandemic, or a war that leads to economic sanctions. Many observers argue that firms will respond to these shocks by reconsidering the balance between efficiency and resilience in production, leading to long term changes in the structure of GVCs in the form of reshoring, nearshoring and diversification or even the end of globalization (e.g. Javorcik, 2020 and Lund et al., 2020 on COVID-19; Posen, 2022 on the war in Ukraine).

At the same time, the technological and economic factors that have underpinned the international fragmentation of production in the recent decades make a retrenchment of GVCs unlikely, unless policies radically change. The structure of GVCs is determined by fundamentals—technology, endowments, distance, etc.—and by policies that affect the cost of trade (World Bank, 2020). Factors such as technological innovations that reduce the costs of communication and wage differentials across countries are still present even after a negative shock. Firms will adjust their trade and investment decisions in the new environment, but these factors will continue to stimulate the international fragmentation of production as firms seek to improve efficiency and maintain competitiveness. A retrenchment of GVCs therefore seems unlikely, unless there is a change in the policy environment that radically affects trade costs (Antràs, 2021).

The war in Ukraine may reshape GVCs, particularly for firms that rely heavily on countries where geopolitical risks have surged, but this does not imply the end of globalization. A simple model based on Freund et al. (2021) can help explain the main forces at play (see Box 1). A higher geopolitical risk raises the insurance premium that firms need to pay to cover the risk of future production disruptions in a foreign country that could be caused by economic sanctions or the breakout of a conflict. For a firm, the risk of disruption rises alongside its reliance on imports from the country at risk, so more exposed firms are more likely to leave to avoid paying higher insurance costs. But several factors create inertia, suggesting that a reshaping of some GVCs does not imply sudden deglobalization. First, cost differentials between countries are not affected by geopolitical risk. This makes reshoring to high-cost countries unlikely. Second, relocating production is expensive, due to the sunk cost of building new infrastructure and the search cost of establishing new relationships in a different country.

Sectors with higher fixed costs, such as capital-intensive sectors, and sophisticated intermediate products, where specific relationships are more important, are less likely to relocate in response to higher geopolitical risks—unless policy intervenes. The model also illustrates that the reshaping of GVCs may affect different sectors and products differently. Firms in an industry like autos, which requires high upfront investment in infrastructure, and firms that rely on sophisticated intermediate products, which rely on relationship specific investment, face higher costs of relocating production and are thus less likely to leave a country in presence of higher geopolitical risk. Even if the nature of the shock differs, this intuition is confirmed by evidence on the reconfiguration of GVCs in the aftermath of the 2011 Japan earthquake (Freund et al. 2021). Firms in those sectors and products may not reorganize production based only on market incentives, but rather if they expect a change in the policy stance that affects trade costs.

The world economy would be hurt by the reshaping of GVCs induced by higher geopolitical risks and a fragmentation of the trade system, but some countries would gain and others lose. In response to higher geopolitical risks, firms adjust their production and trade structure in the pursuit of economic efficiency. In this process, they may seek new suppliers in developing countries that have a latent comparative advantage and lower geopolitical risks. While the high-risk economies, and the global economy as a whole, are worse off in a more uncertain and fragmented world, the new suppliers would benefit from the increased investment and trade opportunities. Indeed, the evidence from the 2011 Japan earthquake shows that firms did not re-shore or nearshore production, but rather replaced suppliers from earthquake-stricken Japan with new suppliers from developing countries. In this context, rather than aiming at reshoring or nearshoring, government policies should focus on defusing tensions and strengthening global value chains against future disruptions.

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BOX 8.1: A simple model of geopolitical risk and GVCs

To guide our thinking of the long-term effect of the war in Ukraine on global value chains, we rely on a simple framework based on Freund et al. (2021). To fix ideas, we focus on the choice from the perspective of a multinational firm, but a similar logic applies to arm's length trade. Assume that the multinational imports key inputs from a subsidiary in a foreign country and that a geopolitical shock creates security concerns in that country (say, the risk that the country will be involved in a conflict or be subject to economic sanctions in the future). Under what conditions does the surge in geopolitical risks leads the multinational firm to move its subsidiary to a new location (either at home or to a different foreign country)?

Define the cost of relocation, C, as the sum of the cost of building a new factory, F, and the cost of establishing new relationships in the new production location, S. The benefit of relocation, $B = (c + i)\, q$, depends on the scale of production, q (assumed for simplicity to be the same in the two locations), the per-unit cost difference, c, which captures factors like the wage differential between the different locations, and the per-unit insurance premium difference, i, which captures the insurance cost that a firm must pay to cover the risk of production disruptions due to geopolitical or other shocks. In this environment, a firm would relocate production if the benefit is larger than the cost of moving: $(c + i)\, q > F + S$. Figure 8.2 shows that before the geopolitical shock, when the security concern is low, any multinational firm that imports from the foreign economy q^*(low risk) or less has no incentive to leave.

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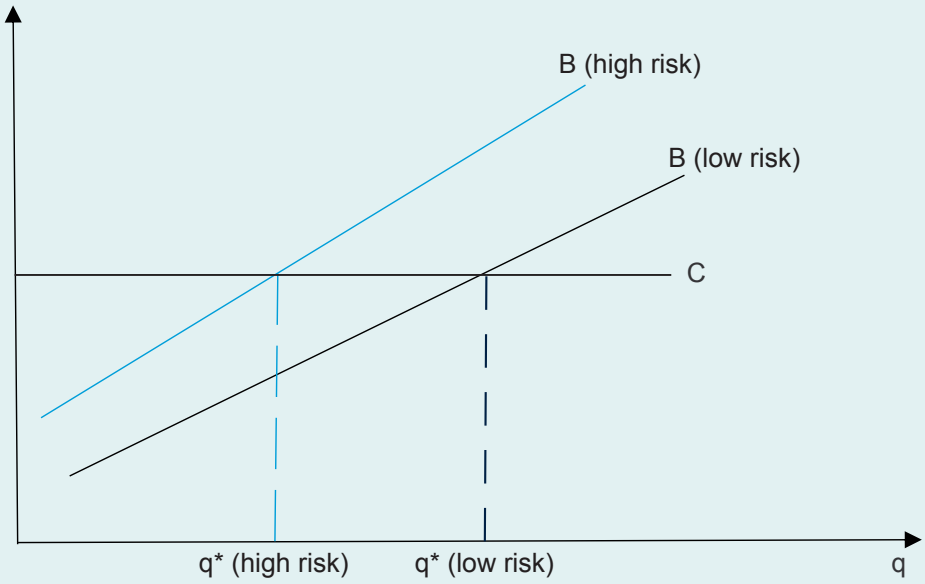
FIGURE 8.2: Benefits and costs of switching import sources induced by changes in geopolitical risks



How does a geopolitical shock that raises security concerns changes this equilibrium? The shock raises the per unit insurance premium difference i. As the old location is suddenly riskier, relocating to a new low-risk location becomes more attractive. In Figure 8.2, the benefit schedule shifts from B(low risk) to B(high risk) where the latter depicts the upward shift in benefits due to the upward revision in perceived riskiness, and hence the insurance premium differential, after a shock. For any given level of dependence, an increase in the perceived riskiness of the source increases the benefit from switching away from it. The other factors, cost differences (c) and the relocation costs (C), are not changed by the shock. In the new equilibrium, when the security concern is high, any multinational firm that imports from the foreign economy more than q^*(high risk) has an incentive to leave. Those that import less than q^*(high risk) have no incentive to leave even after the geopolitical shock.

This simple framework has several insights on the forces that affect GVCs in response to a geopolitical shock:

- First, the geopolitical shock leads to partial exit from the country at higher risk. This is captured by the lower threshold at which firms would choose to switch suppliers from q*(low risk) to q*(high risk) in Figure 8.2.
- Second, only firms that are more dependent on the source country switch to a different supplier (i.e., a firm leaves if imports are higher than q*(high risk); firms with imports lower than q*(high risk) have no incentive to replace the source).
- Third, capital intensive sectors, where the fixed costs of building a factory (F) are higher, and intermediate goods, where the costs of investing in new relationships (S) are higher, would display more inertia. In Figure 8.2, higher F and/or S increase the cost of relocation C, moving to the right the threshold q*(high risk).

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