

The impact of the Ukraine crisis on international trade*

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Abstract

This paper studies the economic implications of Russia's invasion of Ukraine, by scrutinising global trade volumes and commodity prices, trade balances, and bilateral trade flows between major economic powers and Russia. We find that the war hit the volume of global trade in goods and services by 3.4%, increased energy prices by over 100%, and the prices of non-energy commodities by 8%. While important input costs of industrial production were not impacted by the war, soaring energy prices deteriorated the trade balance of countries importing energy.

Only half of the increase in Russia's trade surplus was related to soaring energy prices, the other half resulted from the collapse of Russian imports, which will likely undermine the Russian economy's productive capacity over time. Falling Russian exports of goods other than mineral fuels suggest Russia's productive capacity has already weakened. Russia's trade was reoriented from advanced economies to China, India and Turkey.

We find that sanctions had an impact on trade. There is no evidence of European and US companies circumventing sanctions by re-routing sanctioned goods to Russia via China and Turkey. The UK and the US have already stopped importing fossil fuels from Russia, and such imports by the EU have declined. With the EU's Russian petroleum import ban coming to effect in December 2022 and February 2023, Russian revenues from fossil fuel exports to the EU are set to shrink significantly, with limited options for redirecting that to other countries.

1. Introduction

On 24 February 2022, Russia launched its invasion of Ukrainian territory. This aggression has been condemned by the international community. The 2 March 2022 UN resolution demanding that Russia immediately end its military operations in Ukraine has been adopted by 141 countries, with 37 abstentions and 5 against, while the 12 October 2022 UN resolution demanding the reversal of Russia's attempted illegal annexation of Ukrainian territories has been adopted by 143 countries, with 35 abstentions and 5 against¹.

The international condemnation was quickly followed by the imposition of wide-ranging economic sanctions on Russia, and military support to Ukraine, by most OECD and other European Union countries. Trade-related sanctions have included prohibitions of exports to Russia of strategic goods,

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¹ The five countries that voted against the UN resolution in March 2022 were Belarus, North Korea, Eritrea, Russia and Syria, while in October 2022 Eritrea abstained and Nicaragua joined the other four countries voting against it. Most of those countries abstaining were African nations, alongside China and India. See at <https://news.un.org/en/story/2022/03/1113152> and at <https://news.un.org/story/2022/10/1129492>.

including high-tech goods and components for use in electronics, telecommunications, aerospace and oil refining, among other sectors. Sanctions imposed by the United States apply not only to goods exported by US companies, but also to goods produced elsewhere using US technologies. The extra-territorial nature of US sanctions has likely impacted exports to Russia even from countries that have not applied sanctions. The EU, UK and US have also announced plans to phase out imports of Russian energy.

The war hit the global economy by creating new geopolitical and economic uncertainties, soaring energy prices, and disruptions to global value chains in which Russian and Ukrainian companies were involved. Economic sanctions exerted adverse effects not only on the targeted countries, but also on countries that imposed them and, more generally, on other economies due to higher energy and commodity prices.

Isolating the impact of Russia's war on the global economy and trade is difficult because global inflation pressures were building up already before the war, along with the recovery from the COVID-19 pandemic. The pandemic resulted in shortages of various materials and machinery, and increased transportation costs and times. The fiscal stimulus implemented by most countries around the world in 2020-2021 supported household incomes, but the uncertainty and lockdown restrictions boosted household savings in several countries, creating pent-up demand. Sandbu (2022) argues that one of the reasons for the global surge in inflation, which came earlier than the energy price shock, was the strong rebound in US consumer goods demand, leading to a global scarcity of goods, with spill-over effects on the rest of the world. As restrictions were eased and largely eliminated from 2021 or early 2022, demand for contact-intensive services has also resumed². These developments would have exerted upward pressure on various prices even without any war. In fact, global commodity prices started to increase significantly already in 2021.

The war added extra price pressures, which induced the Federal Reserve, the European Central Bank (ECB), and the Bank of England to tighten monetary policy more aggressively than previously expected. This had spill-over effects on the rest of the world via trade and financial links.

In this paper, we analyse the implications of Russia's war on trade. We start by scrutinising global trade volumes and commodity prices, by comparing pre-war projections with current outcomes. Next, we examine monthly Russian trade statistics. Since Russia's central bank stopped publishing detailed foreign trade data after Russia invaded Ukraine³, we collected such bilateral data from European Union countries, China, the United States, South Korea, Japan, India, the United Kingdom and Turkey to analyse exports to and imports from Russia. These 34 countries accounted for around 75% of Russia's exports and imports in 2019. We then zoom in on the trade of some sanctioned product categories, also examining if there has been an attempt to circumvent sanctions. A concluding section closes the study.

2. Global trade volumes and commodity prices

A possible way to approximate the impacts of the war is by comparing commodity price and trade volume projections made in October 2021 (when the perceived likelihood of a war was probably zero by perhaps everyone⁴ except the Russian leadership), April 2022 (shortly after the war started), and

² See Darvas and Martins (2022) for a comparative analysis of demand conditions in the euro area, Japan, the United Kingdom and the United States during the recovery from the pandemic recession.

³ <https://www.reuters.com/article/ukraine-crisis-russia-imports-idUSKCN2MD1T7>

⁴ The October 2021 IMF WEO did not mention any risk related to Russia and Ukraine.

October 2022. Several other interrelated developments make this approximation imperfect. Let us mention three such possible factors.

First, expectations for monetary policy tightening by major central banks are higher now than in 2021, which might drag global economic activity, and hence global trade and commodity prices. Yet, one of the reasons for more tightening is the higher inflationary pressure resulting from higher energy prices due to the war.

Second, another factor could be that the likelihood of new pandemic waves potentially necessitating further lockdown measures, as well as the pace of withdrawal of existing pandemic restriction measures, might have been predicted imprecisely in 2021. The October 2021 IMF World Economic Outlook (WEO) put pandemic-related risk as the first among a series of downside risk factors⁵, while a year later, the October 2022 WEO noted that *“Although the pandemic’s impact has moderated in most countries, its lingering waves continue to disrupt economic activity, especially in China”*, suggesting that in most countries, pandemic-related restrictions could be less of a constraint on economic growth than in the previous two years. If the 2022 pandemic waves became milder than expected, resulting in less stringent restrictions, then on their own, less stringent restrictions boosted growth, global trade, and commodity prices.

Third, the Chinese economy started to slow down, which would have likely happened without the war. For 2024-2026, a period which will hopefully fall beyond the war, IMF expects about half percent per year slower GDP growth in China in its October 2022 forecast than its October 2021 forecast.

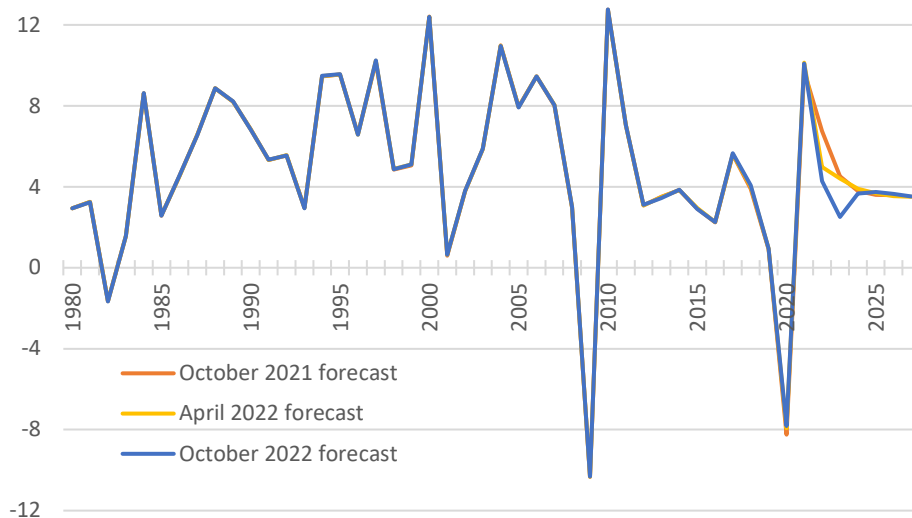
Thus, even though the revisions in trade and commodity price forecasts do not reflect solely the impact of the war, the war has likely played an important role in the revisions.

Figure 1 shows that the pandemic resulted in a major drop in global trade in 2020, followed by a strong rebound in 2021, bringing total trade volume to 1.5% higher in 2021 than in 2019. Naturally, the rebound-driven pace of global trade growth in 2021 was set to decelerate from 2022. The October 2021 forecast for 2022 growth of global trade volume was 6.7%, which was reduced to 5.0% in the April 2022 forecast and 4.3% in the October 2022 forecast. Overall, the level of global trade volume in 2023 was forecasted to be 3.4% lower in October 2022 than the October 2021 forecast, which gap is forecasted to stabilise in 2024-2026. Whether 3.4% is small or large is subject to judgement. On the one hand, this is a large value in dollar terms, about USD 1 trillion annually, given global trade is around USD 30 trillion a year⁶. On the other hand, Figure 1 shows that the annual fluctuations in the growth rate of global trade are rather large. There were 12 years over 1980-2018 (excluding 2009-2011, three years after the global financial crisis) when the change in the growth rate in one year was larger than 3.4 percentage points in absolute terms. Thus, annual changes exceeding this magnitude are rather common.

⁵ The October 2021 IMF WEO’s first downside risk factor was: *“Emergence of more transmissible and deadlier SARS-CoV-2 variants could further re-energize the pandemic’s spread and intensity, prolonging the pandemic and precipitating pullbacks of economic activity. Trade disruptions and supply-demand mismatches could increase with port closures due to renewed lockdowns.”*

⁶ <https://unctad.org/news/global-trade-hits-record-77-trillion-first-quarter-2022>

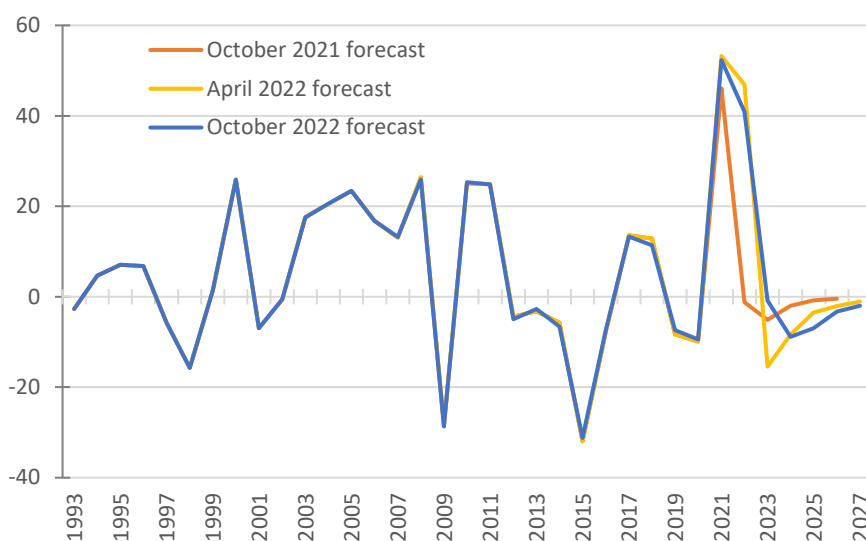
Figure 1: The global trade volume of goods and services, 1980-2027 (% annual change)



Source: IMF World Economic Outlook October 2021, April 2022, and October 2022.

In 2021, the year before Russia’s war, commodity prices increased by 52%, faster than in any year since data is available from 1992 (Figure 2). In October 2021, the IMF forecasted some commodity price falls in 2022 (-1.2%) and some subsequent falls in later years. The forecast for 2022 was significantly revised upwards to a 47% increase in the April 2022 forecast, and then marginally reduced to a 41% increase in the October 2022 forecast. Thus, while these upward revisions in the 2022 commodity price increases are very substantial and were likely driven by the impacts of Russia’s war, commodity prices in 2021 increased faster than what the latest forecasts suggest for 2022.

Figure 2: Commodity prices, 1993-2027 (% annual change)



Source: IMF World Economic Outlook October 2021, April 2022, and October 2022.
 Note: the figure shows overall commodity prices including both fuel and non-fuel prices.

The composition of the commodity price increase offers insights into which segments of the market were hit the hardest by the war. We compare the October 2022 IMF forecasts to the forecast made a year earlier.

Table 1 suggests that the impact of the war is mostly confined to energy prices, whereas non-energy commodity price forecasts changed little. Within energy, gas prices were revised upwards by about 244%. This upward revision came on top of the 254% increase in gas prices in 2021. So, compared to 2020, gas prices in 2022 are forecast to be 9-times higher than in 2020⁷. The revision in coal prices was also significant, 181%, while the revision in petroleum prices was also rather large but smaller in magnitude, 51%.

Non-energy commodity prices were revised much more modestly, with an overall 8% upward revision. Food price forecasts went up by 11%, beverages by 14%, while agricultural raw material price and metal price forecasts hardly changed on average. The latter suggests that important input costs of industrial production were not much impacted by the war, though metal prices increased by almost one-half in 2021.

It should again be highlighted that non-energy commodity prices, including food prices, already increased by 26% on average in 2021, so the additional increase due to the war tops up these earlier price hikes.

There is some variation within each main component. For example, while food price forecasts went up by 11% on average, the revision in wheat prices was 25%, possibly because Ukraine was a main exporter of wheat (Table 2). The largest upward revision within food prices was 41% for chicken, while the largest downward revision was for rice at -9%.

Among metals, the close to zero average revision hides large differences (Table 3): Uranium prices were revised upward by 40%, nickel by 32%, zinc by 23%, and aluminium by 8%, while price forecasts were revised downward for iron ore (-10%), tin (-5%), copper (-3%) and lead (-3%).

Table 1: Revision in commodity price forecasts, October 2022 vs October 2021

	2021 % change	2022 % change		Revision in 2022 price level forecast
		October 2021 forecast	October 2022 forecast	
Total	52%	-1%	41%	49%
Energy	100%	-2%	80%	102%
Petroleum	66%	-2%	41%	51%
Gas	254%	-4%	155%	244%
Coal	111%	-2%	158%	181%
Non-energy	26%	-1%	7%	8%
Food	26%	2%	14%	11%
Beverages	22%	6%	16%	14%
Agricultural raw materials	15%	0%	3%	1%
Metals	47%	-7%	-5%	-1%

Source: Authors' calculation using the October 2021 and October 2022 editions of the IMF World Economic Outlook.

Note: the 2021 values are from the October 2022 WEO, which marginally differ from the forecast made in October 2021 for 2021. The last column of the table includes the effect of revisions for both 2021 and 2022.

⁷ The gas price index expressed as 2016=100 was 71.7 in 2020, 253.7 in 2021 and forecast to be 646.0 in 2022.

Table 2: Revision in commodity food price forecasts, October 2022 vs October 2021

	2021 % change	2022 % change		Revision in 2022 price level forecast
		October 2021 forecast	October 2022 forecast	
Food	26%	2%	14%	11%
Cereals	41%	4%	23%	18%
Wheat	43%	9%	31%	25%
Maize (corn)	57%	-1%	20%	17%
Rice	-8%	-1%	-4%	-9%
Barley	70%	7%	39%	38%
Vegetable Oil	48%	-5%	11%	17%
Soybeans	44%	-6%	12%	16%
Rapeseed oil	42%	5%	-3%	-7%
Palm oil	61%	-11%	13%	33%
Sunflower Oil	63%	-6%	18%	30%
Olive Oil	59%	4%	-1%	-6%
Fishmeal	12%	2%	0%	-3%
Groundnuts (peanuts)	8%	2%	14%	14%
Meat	33%	5%	18%	11%
Beef	18%	16%	16%	-1%
Lamb	26%	4%	0%	-2%
Swine (pork)	56%	-7%	11%	13%
Poultry (chicken)	38%	6%	47%	41%
Seafood	10%	2%	17%	16%
Fish (salmon)	13%	4%	25%	19%
Shrimp	5%	0%	0%	7%
Sugar	37%	6%	4%	-3%
Bananas	-1%	0%	19%	16%
Oranges	8%	14%	34%	16%

Source: Authors' calculation using the October 2021 and October 2022 editions of the IMF World Economic Outlook.

Note: the 2021 values are from the October 2022 WEO, which marginally differ from the forecast made in October 2021 for 2021. The last column of the table includes the effect of revisions for both 2021 and 2022.

Table 3: Revision in commodity metal price forecasts, October 2022 vs October 2021

	2021 % change	2022 % change		Revision in 2022 price level forecast
		October 2021 forecast	October 2022 forecast	
Metals	47%	-7%	-5%	-1%
Copper	51%	-1%	-5%	-3%
Aluminum	45%	6%	11%	8%
Iron Ore	46%	-21%	-23%	-10%
Tin	89%	8%	0%	-5%
Nickel	34%	4%	35%	32%
Zinc	32%	2%	22%	23%
Lead	21%	2%	-1%	-3%
Uranium	12%	3%	34%	40%

Source: Authors' calculation using the October 2021 and October 2022 editions of the IMF World Economic Outlook.

Note: the 2021 values are from the October 2022 WEO, which marginally differ from the forecast made in October 2021 for 2021. The last column of the table includes the effect of revisions for both 2021 and 2022.

3. Changes in trade balances

Trade balances were impacted by commodity price changes. Countries exporting commodities, such as Russia's exports of mineral fuels, benefitted from rising prices, while countries importing commodities, such as the European Union, had to pay a higher price.

The European Union's monthly trade balance averaged a surplus of about USD 21 billion from 2011-2019 (Figure 3). There were some variations in the trade balance during the most acute phase of the pandemic, but then, from early 2021 onwards, the EU's trade balance steadily deteriorated. The trade balance turned into a deficit in November 2021 and had a deficit of around USD 31 billion in December 2021, before the war started. The deterioration continued after the war began, with the EU's trade deficit increasing above USD 55 billion in August 2022. The sharp deterioration was mainly driven by higher energy prices.

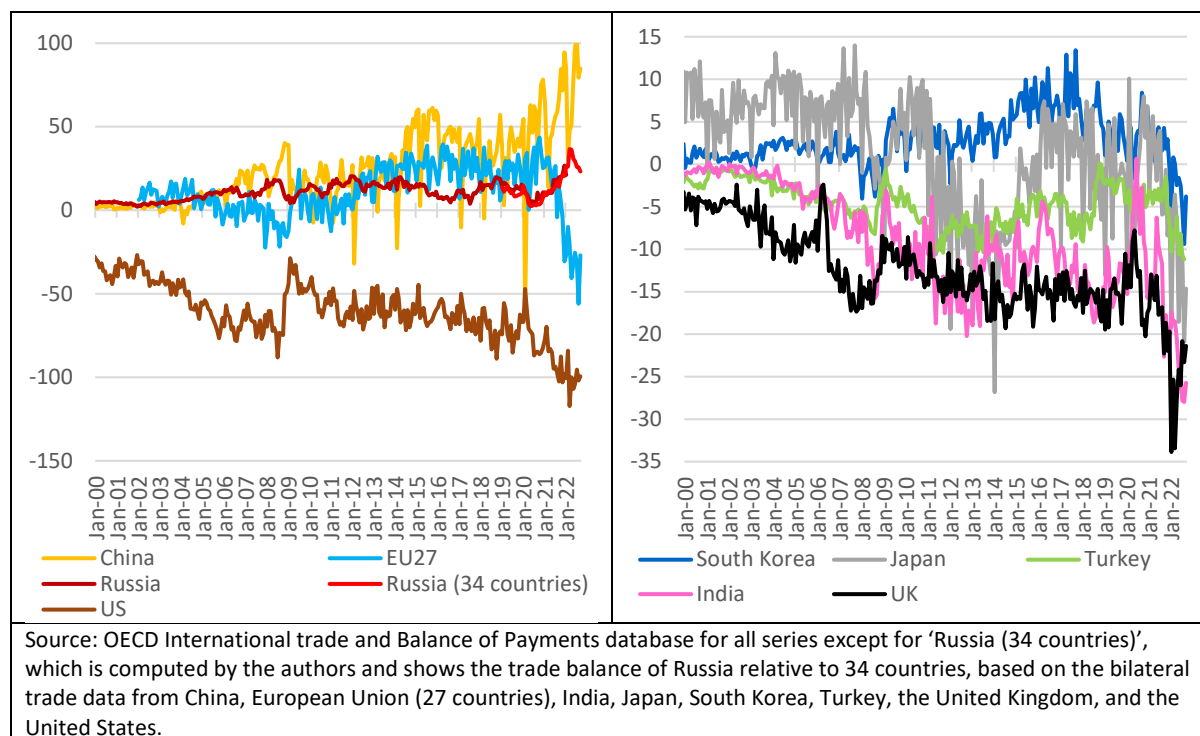
Russia, which was the EU's largest supplier of energy before the war, has benefitted from higher energy prices, but to a lesser extent than the deterioration of the EU's trade surplus. Russia's trade surplus increased from about USD 7 billion in late 2020 to USD 21 billion in January 2022, after which the Russian central bank stopped publishing detailed trade data.

To track Russian trade, we collected bilateral data from European Union countries, China, the United States, South Korea, Japan, India, the United Kingdom, and Turkey. These 34 countries accounted for around 75% of Russia's exports and imports in 2019, and for about 90% of the Russian trade surplus in the half-year period before the war. Russia's trade balance relative to these countries increased in the first few months of the war, but then fell back to the January 2022 level by September 2022. In the next section, we scrutinise the components of Russian trade, emphasising the period since the start of the war.

Since 1999, China recorded its highest trade surpluses in July 2022, while the United States recorded its largest trade deficit in March 2022. In both countries, the trend for the trade balance (increase for China, decline for the US) started well before the war erupted. In the case of the US, the deficit has been accentuated due to a faster increase in imports. For China, export growth has been higher than its imports, sustaining an increase in the trade balance.

Being net energy importers, the trade balances of India, Japan, South Korea, Turkey, and the United Kingdom deteriorated. For these countries, an accentuated decline after the start of the war is visible.

Figure 3: Overall trade balance of goods, January 2000 - September 2022 (USD billions)



4. Changes in Russian trade

Due to the suspension of the publication of detailed trade statistics by the Russian authorities, in this section, we reconstruct data on Russia's foreign trade based on the bilateral statistics published by the statistical offices or trade ministries of 34 countries: 27 European Union countries, China, India, Japan, South Korea, Turkey, the United Kingdom and the United States⁸. Official import statistics provide the best source of trade data as methodologies of consignee countries differ, and final destinations of goods reported at export customs authorities sometimes misreport the actual final destination due to uncertainty at the time of export and entrepôt trade. Given the lack of official trade statistics from the Russian authorities, mirror statistics of Russia's trading partners provide the best source available.

Figure 4 shows that Russia's monthly trade surplus with the 34 countries we study fluctuated between USD 8 billion and USD 15 billion in 2019 (the most recent year without a major global shock). The surplus for mineral fuels and related products was USD 15 billion to USD 20 billion per month, while for other goods, Russia recorded a deficit of about USD 5 billion per month. The COVID-19 pandemic depressed mineral fuel revenues, as demand and prices declined. From early 2021, however, mineral

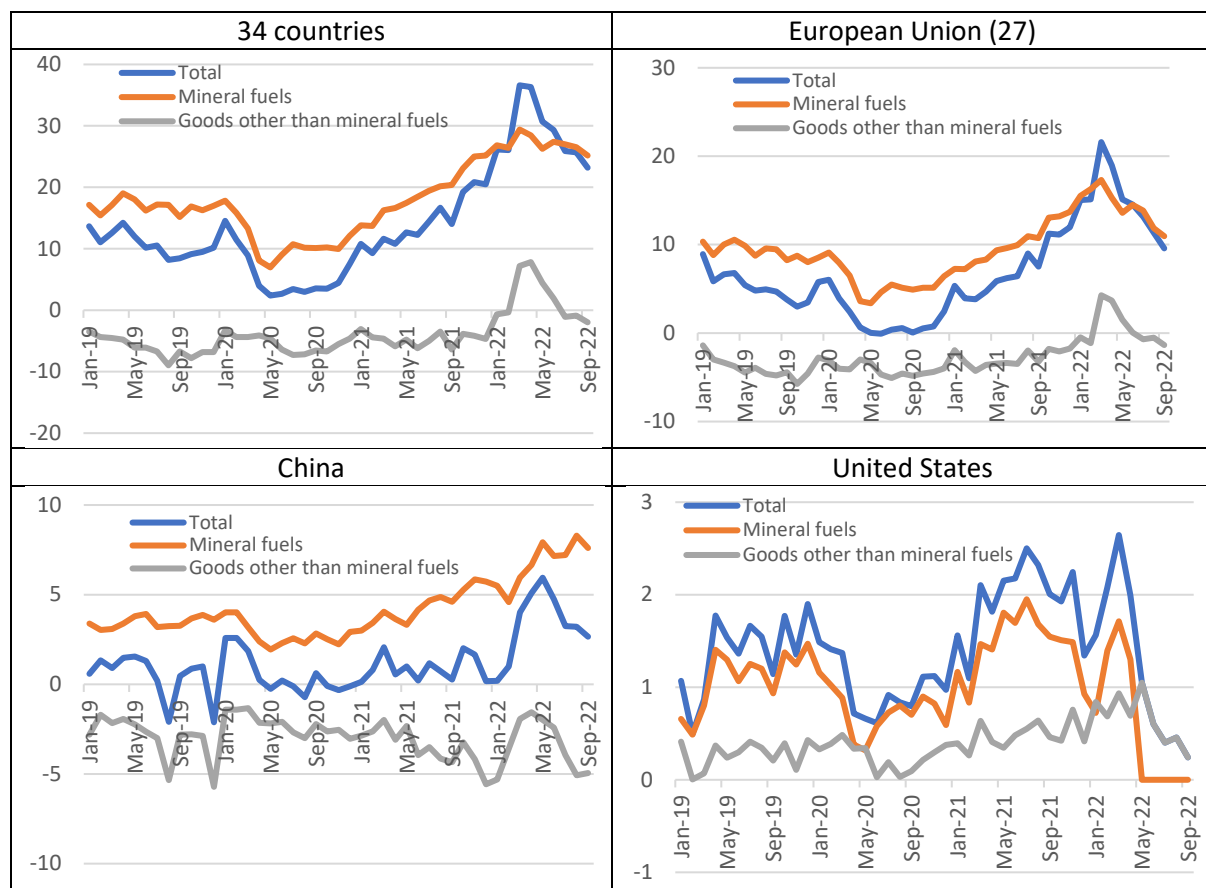
⁸ The EU, Japan, Turkey, the United Kingdom and the United States report trade statistics according to the Standard International Trade Classification (STIC). China, India and South Korea report trade statistics according to the Harmonized System (HS). There is a perfect correspondence between HS and STIC for 4-digit product categories, but unfortunately, some of these countries report data for only 2-digit categories. In the Annex, we describe how we matched the 2-digit HS categories with the 2-digit STIC categories.

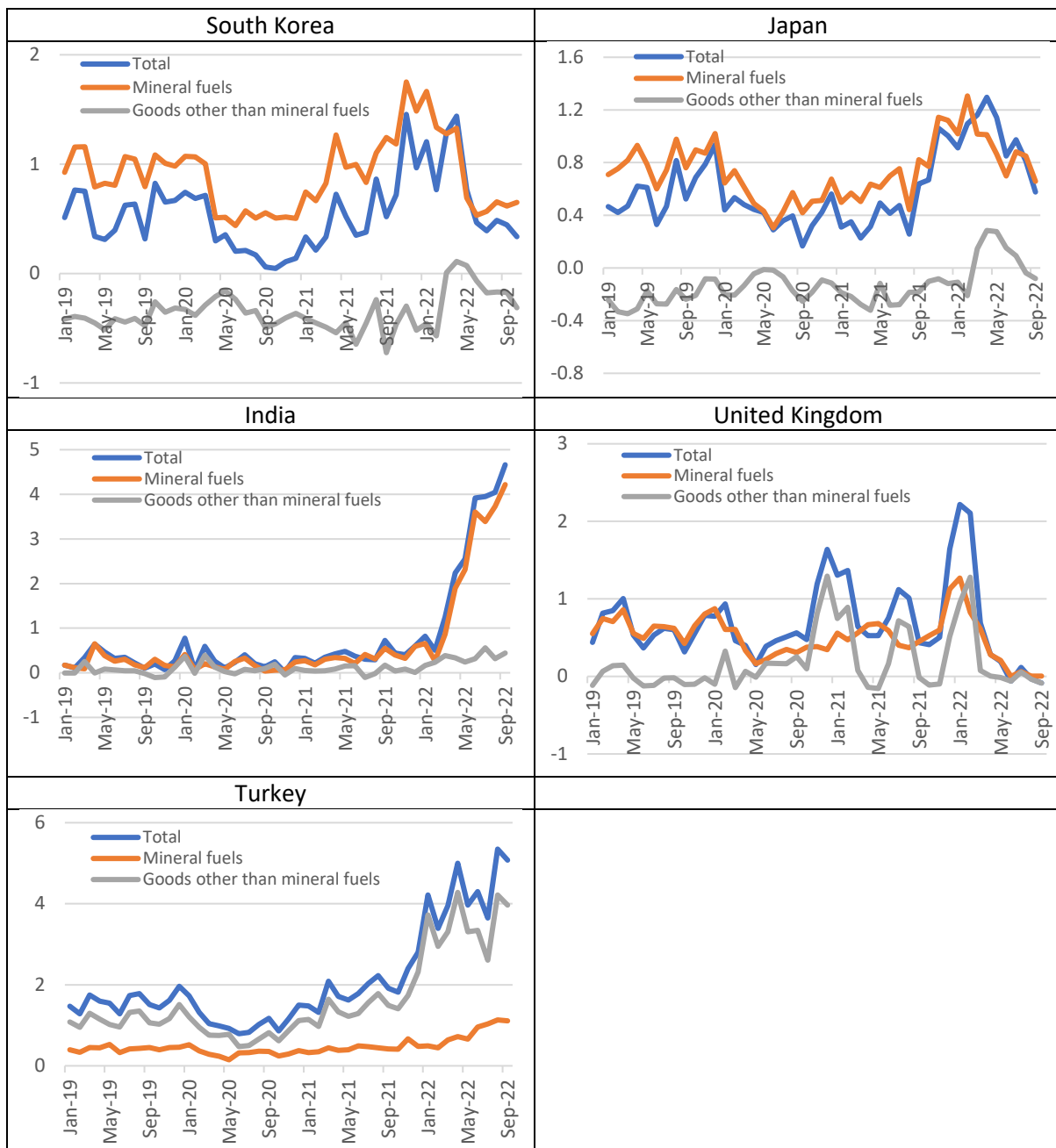
fuel demand and prices started to increase and thus so did revenues. There was a sudden jump in Russian trade revenues with the start of the war.

The war also brought about a jump in Russia’s trade balance on goods other than mineral fuels: in March and April 2022, monthly surpluses ran at approximately USD 5 billion – an increase of about USD 10 billion per month from the pre-war period. This had declined to a balanced position by July 2022 and remained at the same level by September 2022, the last observation available at the time of writing.

The March-August 2022 trade surplus with the 34 countries was USD 106 billion larger than the March-August 2021 trade surplus. From this overall USD 106 billion increase in Russia’s trade surplus, mineral fuels accounted for USD 57 billion, while goods other than mineral fuels accounted for 49 billion. Slightly more than half of the latter resulted from the drop in sales by the 34 countries of machinery and transport equipment to Russia, which will likely undermine Russia’s ability to produce advanced technological products, including military equipment.

Figure 4: Russia’s trade balance with selected countries, January 2019 - September 2022 (USD billion)





Source: Authors based on Eurostat, General Administration of Customs - People's Republic of China, United States Census Bureau, Korea Customs Service, Ministry of Finance - Trade Statistics of Japan, Ministry of Commerce and Industry - Government of India, Office of National Statistics (UK), Turkish Statistical Institute.

Figure 4 reveals important differences across partner countries. The most striking picture emerges for India, which typically had a small, less than USD 0.5 billion a month, trade deficit relative to Russia up to January 2022. But India's trade deficit with Russia (or Russia's trade surplus with India) increased to about USD 4 billion in June 2022 and stayed at this level in the subsequent two months, further increasing in September 2022. This increase is almost entirely driven by mineral fuels, suggesting the reallocation of Russian mineral fuel exports as western nations purchased less. See the figures in Annex 1 and Annex 2 for Russia's exports to and imports from the partner countries we study.

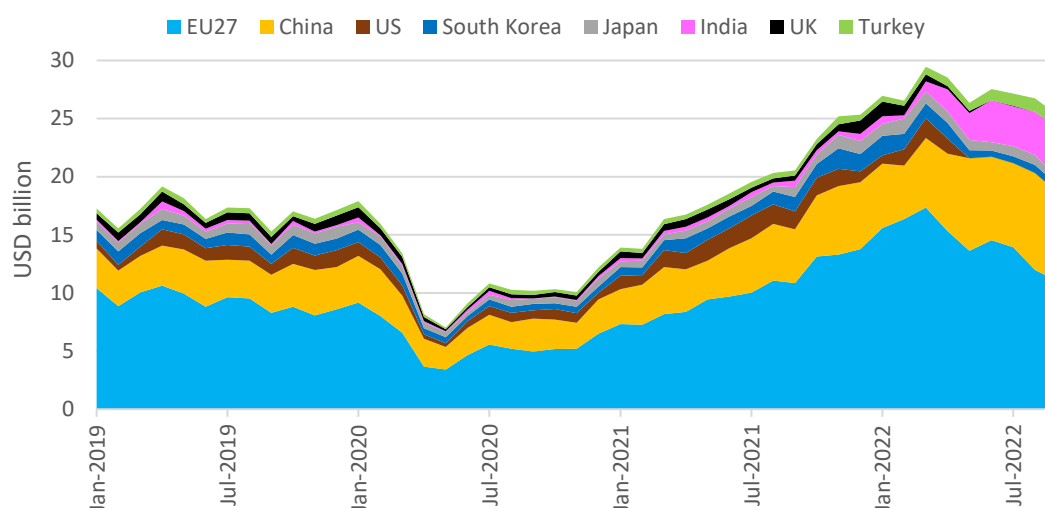
Turkey's trade balance with Russia has also substantially deteriorated. While Russia's pre-war trade balance with Turkey showed a surplus between USD 1-2 billion per month, it exceeded USD 5 billion

by August 2022. Most of this increase resulted from Russia’s exports of goods other than mineral fuels to Turkey (Figure 6).

On the contrary, Russia’s trade surplus with the US and UK fell to very low values given the complete (in the case of the US) and almost complete (in the case of the UK) elimination of mineral fuel imports from Russia by these countries.

By zooming on the components of the trade balance, Russian mineral fuel exports to the 34 countries have steadily increased from low values observed in early 2020, at the time of the global outbreak of the COVID-19 pandemic, until a peak in March 2022 (Figure 5). Since March 2022, Russia’s mineral fuel exports to the EU have declined both in value (from USD 17.4 billion in March 2022 to USD 11.0 billion in September 2022) and as a share of total Russian mineral fuels exports (from 59% in March 2022 to 44% in September 2022), but the EU remained dominant so far. Meanwhile, there has been a significant increase in both the quantity and the share of these exports going to China and, especially, to India. The US and the UK have phased out Russian-sourced fossil fuels, and South Korea and Japan have been declining since the war started.

Figure 5: Russia’s mineral fuel exports to 34 countries, January 2019 - September 2022 (USD billion)



Source: Authors based on Eurostat, General Administration of Customs - People's Republic of China, United States Census Bureau, Korea Customs Service, Ministry of Finance - Trade Statistics of Japan, Ministry of Commerce and Industry - Government of India, Office of National Statistics (UK), Turkish Statistical Institute.

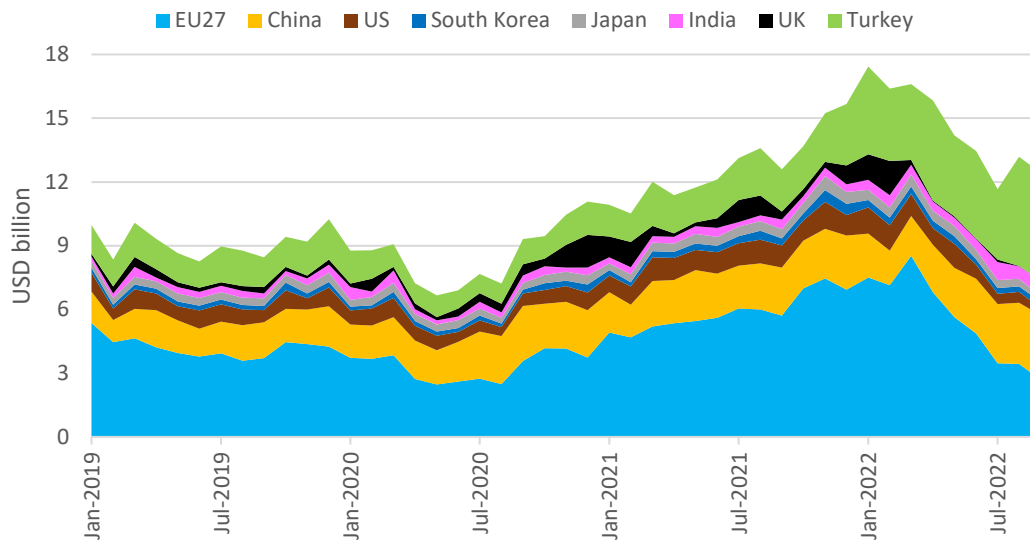
The fall in Russian exports of goods other than mineral fuels from January 2022 is spectacular. The notable increase in Russia exports to Turkey in August 2022 marked a reversal of the downward trend, but in September 2022 there was a slight decrease, while such Russian exports to the other 33 countries we analyse continued to go down till September 2022 (Figure 6). Among the different categories of goods⁹, the largest drop, 34%, was observed for material manufactures, followed by chemicals and ‘machinery and transport equipment’, both at a 22% decline¹⁰. These declines might

⁹ Here considered at the 1-digit level Standard International Trade Classification (SITC) categories.

¹⁰ The Russian export of beverages and tobacco declined by 31% from January-August 2022, but this group category had a minor share in Russian exports.

suggest that the war and the various sanctions imposed (see the next section) have already started to damage the productive capacity of the Russian economy. The drop in food and live animals exports was modest at 9%, while the drop in crude materials (not including mineral fuels) was just 3%.

Figure 6: Russia’s exports of goods other than mineral fuels to 34 countries, January 2019 - September 2022 (USD billion)

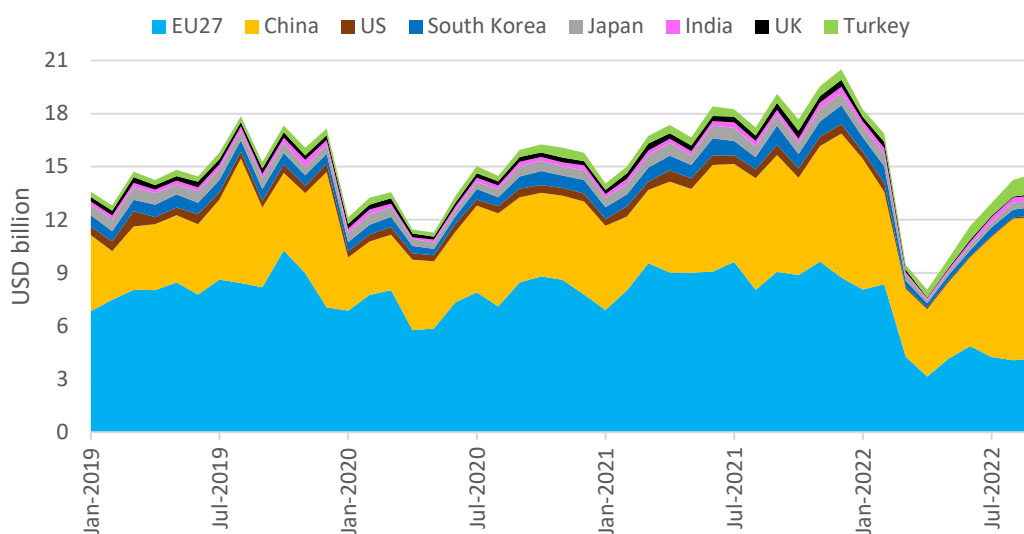


Source: Authors based on Eurostat, General Administration of Customs - People's Republic of China, United States Census Bureau, Korea Customs Service, Ministry of Finance - Trade Statistics of Japan, Ministry of Commerce and Industry - Government of India, Office of National Statistics (UK), Turkish Statistical Institute.

As for changes in the destination of Russian goods other than mineral fuels, there has been a clear increase in Turkey’s overall weight (from 21% in February 2022 to around 41% in September), while Russia’s exports to the UK have stopped almost completely (Figure 6). The shares of Russian exports going to the US, EU and Japan have also decreased since March 2022.

The drop in Russian imports has been dramatic: the initial drop shortly after the war started was slightly more than 50%, followed by some recovery. Still, the average value in March-August 2022 was 41% lower than in the preceding six months (Figure 7). This affected all major product categories, with one of the biggest drops recorded for machinery and transport equipment with a 55% reduction. Russia’s imports from every country, including China, dropped substantially shortly after the war started, though imports from China recovered to close to their pre-war peak by August 2022. The strongest recovery was seen in Turkey’s exports to Russia, which in the summer of 2022 exceeded pre-war levels, though the total magnitude of Turkey’s exports to Russia is rather small.

Figure 7: Russia's imports from selected countries, January 2019 - September 2022 (USD billion)



Source: Authors based on Eurostat, General Administration of Customs - People's Republic of China, United States Census Bureau, Korea Customs Service, Ministry of Finance - Trade Statistics of Japan, Ministry of Commerce and Industry - Government of India, Office of National Statistics (UK), Turkish Statistical Institute.

The much bigger drop in Russia's non-fossil fuel imports than in its exports of these goods reflects the impact of sanctions (though most sanctions did not take immediate effect; see the next section). It could also reflect the difficulties Russian companies have in paying for imports, partly because several Russian banks have been sanctioned, making it more difficult for their clients to make payments abroad, and partly because, since the war started, Russian companies must convert 80% (recently reduced to 50%) of hard currency revenues to roubles with the Bank of Russia (Reuters, 2022). Reduced activities of foreign companies in Russia seem to have also contributed to falling Russian imports (Demertzis et al, 2022), as has the initial substantial depreciation of the Russian rouble.

The rebound of Russia's imports from May 2022 might have been helped by the rouble's recovery and relative stability, and the fact that some companies initially went further than sanctions in halting business with Russia (Chorzempa, 2022). With a better understanding of sanctions, some activities have been resumed.

5. Are sanctions circumvented via China and Turkey?

Sanctions have included prohibitions by several countries of exports to Russia of strategic goods, including high-tech goods and components for use in electronics, telecommunications, aerospace and oil refining, among other sectors. US sanctions apply not only to goods exported by US companies, but also to goods produced elsewhere using US technologies (Box 1). The extra-territorial nature of US sanctions could help explain the generalised drop in Russia's imports since March 2022, even from countries that have not announced sanctions.

Box 1: The sanctions imposed on Russia

Since the 2014 annexation of Crimea, Russia has been subject to sanctions, some of them trade related. With the recognition of the independence of the regions of Donetsk and Luhansk, and the subsequent invasion of the Ukrainian territory on 24 February 2022, Russia was condemned by various countries around the world, several of which imposed sanctions. These sanctions, which have been announced continuously since end-February 2022, ranging from the financial sector to travel and trade, covering also penalties for individuals. In this box, we focus on trade-related sanctions imposed on Russia since February 2022 by the United States, the European Union, the United Kingdom, Japan and South Korea.

China, India and Turkey have not joined other countries in imposing sanctions on Russia as a response to the invasion of Ukraine. In the case of China, there was even a decision favouring coal imports, with a tariff cut to zero.

Export bans to Russia

The US acted promptly by announcing on the [24 of February](#), [stringent export controls](#) that aimed to severely restrict Russia's access to technologies and other items needed to sustain its military capabilities, primarily targeting Russia's defence, aerospace, and maritime sectors. The export controls work in a way that they not only restrict the trade of US-produced items, but also foreign items produced using U.S. technology (for instance, equipment, software, and blueprints). Some of the items under export controls are semiconductors, computers, telecommunications, information security equipment, lasers, and sensors. In the following days, [the EU](#), [the UK](#), [Japan](#) and [South Korea](#) also announced export bans on various strategic goods for Russia, which included high-tech goods and components for use in sectors including electronics, telecommunications, aerospace and oil refining.

In the aftermath of the [G7 meeting on the 11 of March](#), the G7 countries announced export bans of luxury goods, and after the [27 June G7 meeting](#), importing gold from Russia was also prohibited. Additionally, other products added to the list of sanctioned goods of various countries include wood, machinery, cutting-edge goods such as quantum computers, iron and steel, and spirit drinks.

Import bans from Russia – a focus on fossil fuels

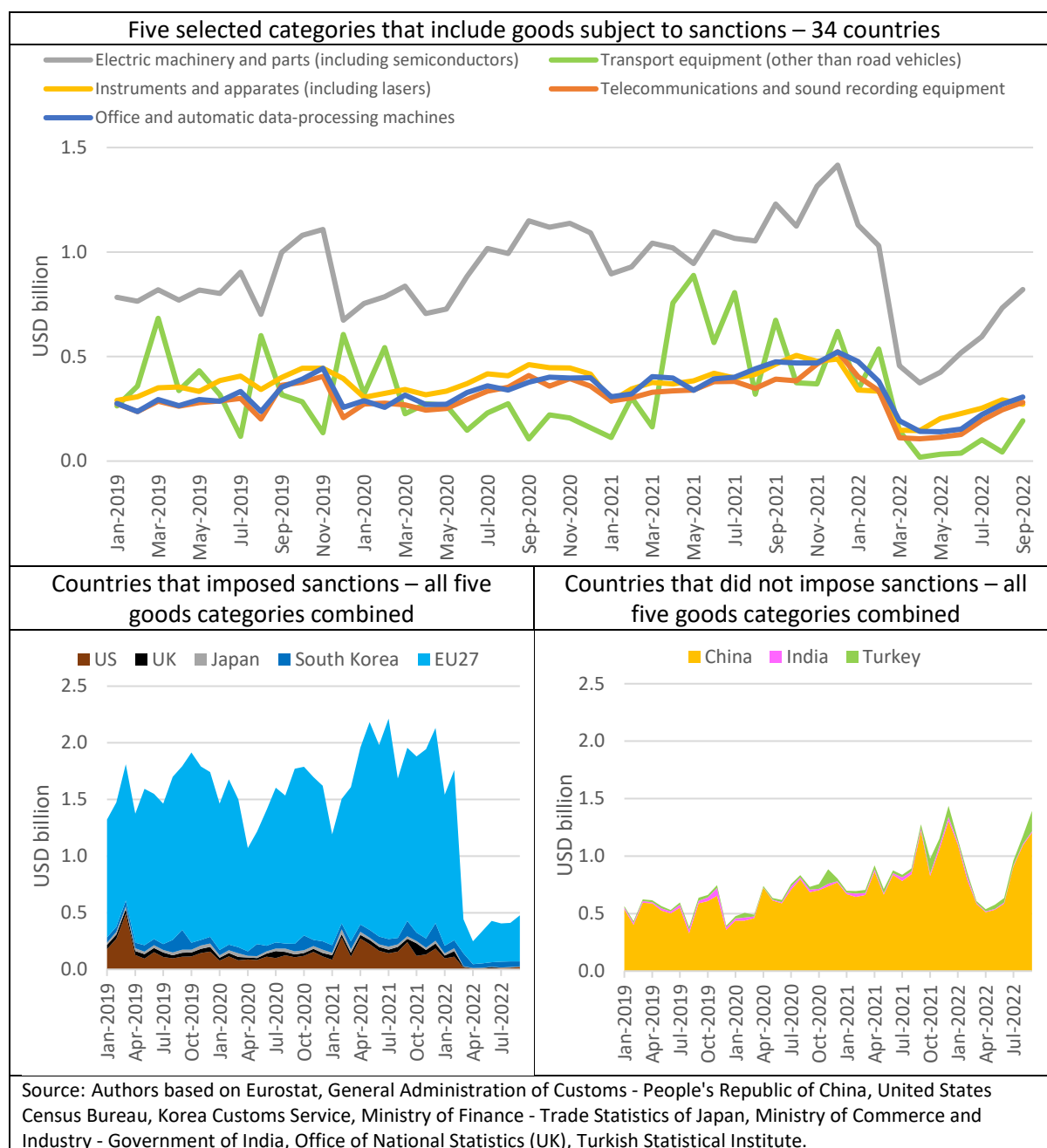
The US, EU and the UK all announced plans to phase out Russian sources of energy. On [the 8 of March](#), the US announced a ban on imports of Russian fuels, including oil, liquefied natural gas (LNG), and coal. For contracts agreed before this date, the 22nd April was the date when the ban would become effective. By May, US imports of Russian mineral fuels have declined to zero.

The UK first announced plans to [phase out Russian oil](#) by the end of 2022, then [reinforcing the stance by declaring](#) that they would also end all imports of Russian coal by end of 2022, and of gas as soon as possible. Trade data shows that in June the UK had already completely phased out all types of mineral fuel imports from Russia, though there was a minor increase in July.

The EU started by [announcing on the 8 of April](#) a prohibition of coal imports starting from August 2022, and [two months later added](#) that it would also prohibit imports of crude oil and certain petroleum products, effective from December 2022 and February 2023, respectively (with exceptions for crude oil by pipeline and also for Bulgaria and Croatia).

Categories in the 2-digit level classification for the Standard International Trade Classification (SITC) we use do not correspond precisely to sanctioned products. Categories that surely include sanctioned items also include non-sanctioned items. Nevertheless, for Figure 8, we selected some categories which could be dominated by sanctioned items.

Figure 8: Russia’s imports of selected categories that include goods subject to export bans from advanced economies, January 2019 - September 2022 (USD billion)



The decline in Russia’s imports from the 34 countries from February to September 2022 was 13% for all goods, but 28% for the selected five (2-digit level SITC) product categories that include sanctioned products. Thus, Russia’s imports of sanctioned products have declined much more than imports of other products, suggesting that sanctions have influenced trade flows.

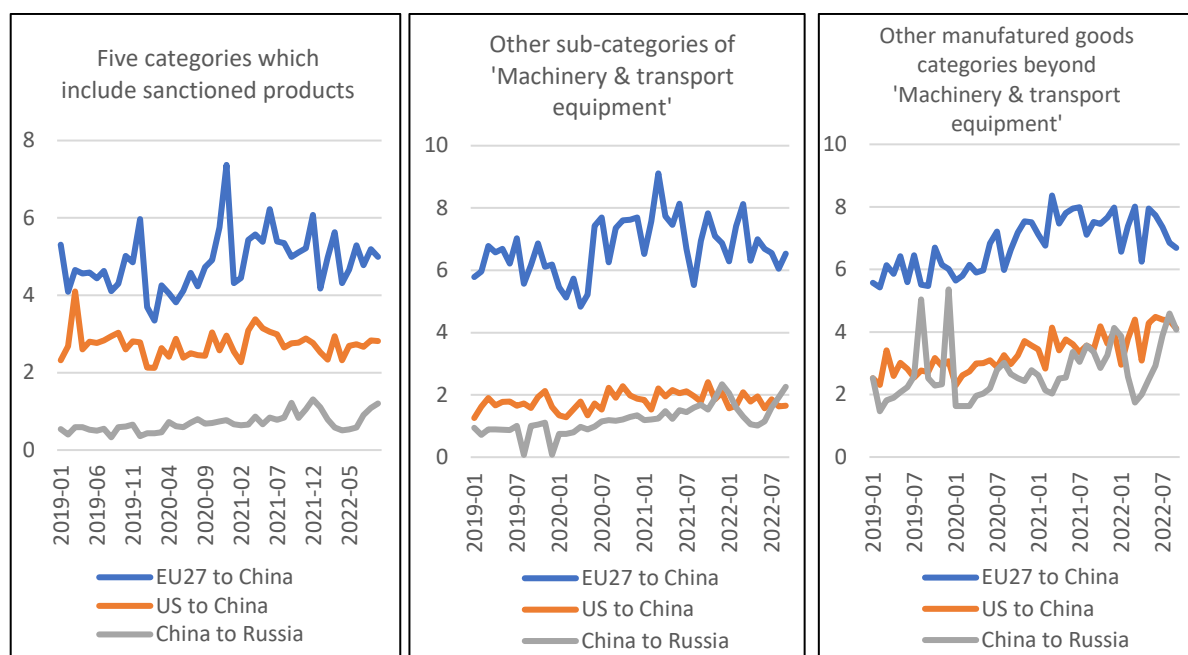
Strikingly, Russia’s imports of the five product categories from the EU, US, UK, Japan and South Korea, which imposed sanctions, declined massively after February 2022, and the recovery by summer 2022 was only modest (second panel of Figure 8). For China, which did not impose sanctions, the initial decline was big at about one-half, but comparatively smaller than imports from countries that imposed sanctions, and there was a subsequent recovery, which was still ongoing in September 2022

(third panel of Figure 8). While China’s overall weight on the export of these goods to Russia had been increasing before the war, it was still relatively smaller when compared to the exports from the countries that imposed sanctions. Now, however, China has become quite significant as an exporter of these goods to Russia. India and Turkey did not impose sanctions either, but Russia imports small amounts from these countries, as the third panel of Figure 8 shows.

An important question is whether companies established in countries that imposed sanctions have tried to circumvent those sanctions by re-routing the forbidden direct export to Russia to an export to China and Turkey, which could be then re-exported from China and Turkey to Russia. We check if this was the case for the EU and the US, the largest western exporters to Russia.

Chinese exports to Russia in the five product categories that include sanctioned goods have indeed increased after May 2022, but EU and US exports of goods in the same categories to China have hardly changed (left panel of Figure 9). The middle and right panels of Figure 9 show similar tendencies for product categories which likely do not include sanctioned products: an increase in Chinese exports to Russia and little change in EU and US exports to China.

Figure 9: EU and US exports to China and Chinese exports to Russia, January 2019 - September 2022 (USD billion)



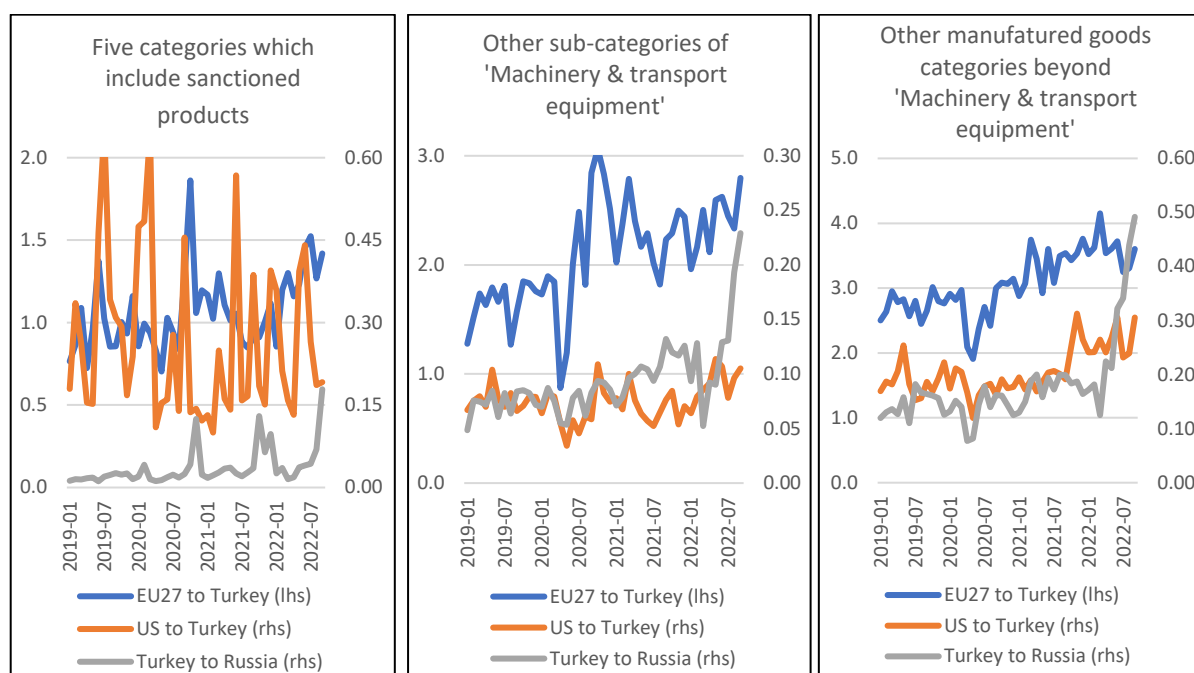
Source: Authors based on Eurostat, General Administration of Customs - People's Republic of China, United States Census Bureau. Note: the five categories of goods that include sanctioned items are specified in Figure 8. Since 'Machinery & transport equipment' includes sub-categories with sanctioned products, in the second panel we show the remaining sub-categories. Other manufactured goods categories include Chemicals and related products, Manufactured goods classified chiefly by material, and Miscellaneous manufactured articles.

In the case of Turkey, an increase in EU exports of the five product categories that include sanctioned goods started well before the war, in September 2021 (left panel of Figure 10). While Turkey has increased its exports of these product categories to Russia from April 2022, there is no clear sign that this coincides with a change in trend in EU exports to Turkey of these categories. Moreover, the USD

value of the increase in Turkish exports from March to September 2022 (which is plotted on the right scale of Figure 10), is negligible compared to the level of EU exports to Turkey (left scale of Figure 10).

Furthermore, the increase in Turkish exports to Russia in goods categories that do not include sanctioned products (the middle and right panels of Figure 10) was much steeper than the increase in goods categories that include sanctioned products (left panel of Figure 10), suggesting again that circumvention of sanctions via China and Turkey did not really happen. Instead, we see a general trade diversion, whereby Russia trades more with China, Turkey and India in all product categories and trades less with western nations that imposed sanctions.

Figure 10: EU and US exports to Turkey and Turkish exports to Russia, January 2019 - September 2022 (USD billion)



Source: Authors based on Eurostat, General Administration of Customs - People's Republic of China, United States Census Bureau. Note: the five categories of goods that include sanctioned items are specified in Figure 8. Since 'Machinery & transport equipment' includes sub-categories with sanctioned products, in the second panel we show the remaining sub-categories. Other manufactured goods categories include Chemicals and related products, Manufactured goods classified chiefly by material, and Miscellaneous manufactured articles.

6. Russia's mineral fuel exports

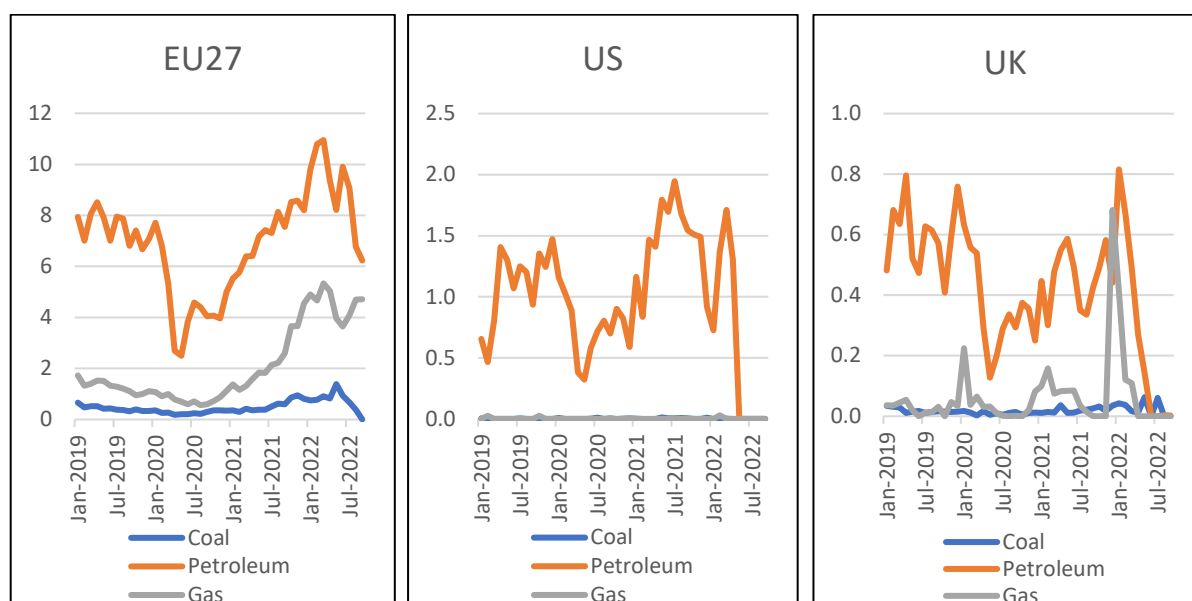
The US, EU and UK announced plans to phase out Russian sources of energy. Mineral fuel exports from Russia to the US and UK fell to zero by May and June respectively, though in the UK a small amount of coal imports resumed in July and of oil in August (Figure 11).

Russian gas exports to the EU have reduced in quantity, but due to high and volatile gas prices, the USD value of gas exports was also volatile. The EU has not introduced limits on Russian gas, but supply

cuts resulted in a reduction. Since gas prices peaked in August 2022, so did the USD value of Russian gas exports to the EU, even though the quantity was smaller in this month than in preceding months¹¹.

The USD value of Russian oil and coal exports to the EU increased shortly after the war began, which hint at attempts to compensate for shortfalls in other energy sources ahead of deadlines to phase out coal completely (August 2022) and oil and oil products (December 2022 and February 2023, with exceptions for crude oil by pipeline and for Bulgaria and Croatia; see Box 1). But, since June, both coal and petroleum exports of Russia to the EU started to decline and, despite higher prices, the USD values were smaller than exports one or two years earlier, suggesting a reduction in quantity.

Figure 11: Russia’s mineral fuel exports to the EU, US and UK, January 2019 - September 2022 (USD billion)



Source: Authors based on Eurostat, United States Census Bureau, Office of National Statistics (UK).

The values reported so far are in US dollars and reflect both quantity changes and price changes. Unfortunately, distinguishing quantity and price is not possible based on trade statistics that we use. However, Eurostat publishes trade data in both current prices and kilogrammes. The latter can be an indirect and imperfect proxy for quantity: a kilo of paper weighs the same as a kilo of gold, but their values differ greatly, so for total trade, which adds up the weights of various product, the weight can be a bad proxy for quantity. The weight of a product can be a good proxy for quantities if a particular product is homogeneous. For a product category including multiple products, the weight can be a good proxy for quantity if the shares of different products in the product category do not change and there are no quality changes. For gas, probably there is no major violation of these conditions, but there are different types of petroleum and coal products, so these conditions might be violated to a greater degree.

Nevertheless, it is instructive to plot the value and weight of Russian petroleum, gas and coal exports to the EU (Figure 12). For gas and petroleum, the weight fluctuated in a more or less horizontal range

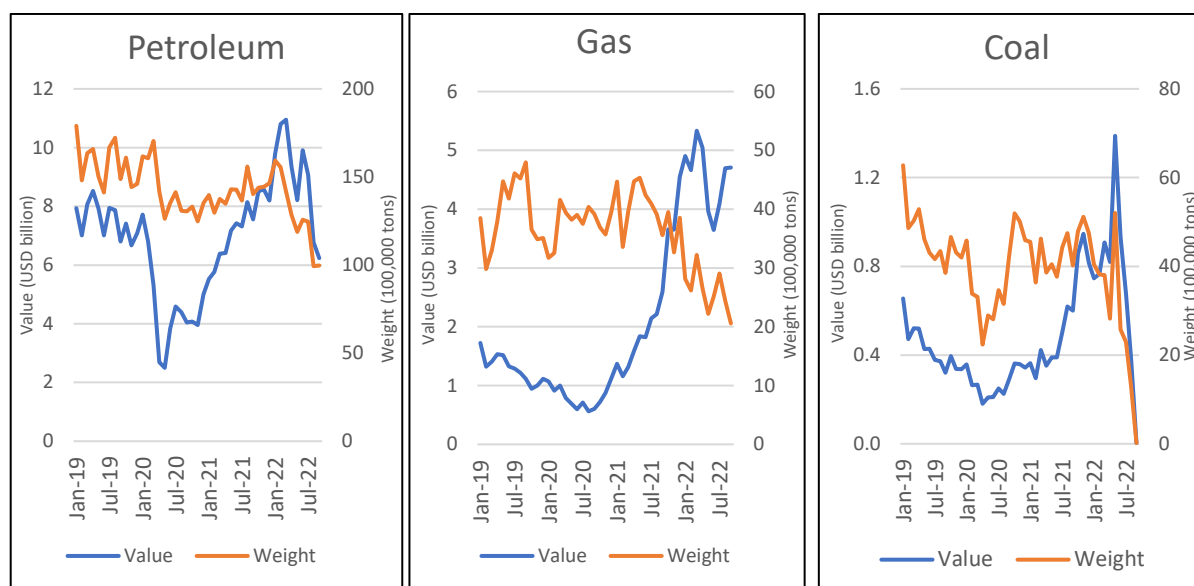
¹¹ See the quantity of EU gas import by source countries at: <https://www.bruegel.org/dataset/european-natural-gas-imports>

from 2019 until the start of the war in February 2022. As for USD values, there were big swings in the period from 2019 to February 2022, reflecting changes in prices. Since the war erupted, the weight of Russian exports of gas and petroleum started to fall, even though no gas sanction has been introduced, while petroleum sanctions will become effective between December 2022 and February 2023.

Even though there are some exceptions (see Box 1), most of Russia’s petroleum exports to the EU are bound to end. The volume of current Russian petroleum exports to the EU is large, but most likely a significant share of current petroleum exports to the EU cannot be sold by Russia to other countries due to the limitations in transport capacity and access to insurance (McWilliams, Tagliapietra and Zachmann, 2022).

For coal, there were larger fluctuations in weight in the pre-war period, including a notable decline in spring 2020, when the COVID-19 pandemic hit Europe. After the war started, a spike in May 2022 is visible in both weight and value, suggesting that EU importers purchased some extra amounts of coal before the ban took effect. The latest data for September 2022 shows that EU’s coal imports have drastically reduced to values close to zero, indicating that the ban was respected.

Figure 12: Value and weight of Russia’s mineral fuel exports to the EU, January 2019 - September 2022 (USD billion, 100 thousand tons)



Source: Authors based on Eurostat.

7. Conclusions

Beyond its devastating humanitarian consequences and global security implications, Russia’s invasion of Ukraine is having major repercussions for the global economy, in the form of new uncertainties, higher prices, and global value chains disruptions. In this paper, we focus on the implications of Russia’s war on trade, first on an international scale and then zooming on trade with Russia.

The war hit the global economy at a time when its recovery from the COVID-19 pandemic was underway, and strong inflationary pressures had already emerged. In 2021, the year before the war erupted, commodity prices increased by 52%, a record growth rate in at least three decades. Within

commodities, energy prices doubled in 2021, while non-energy commodities increased by a quarter on average.

We approximated the impact of the war on global trade and commodity prices by calculating the revision in commodity price and trade volume projections made before and after the war started. We found that the volume of global trade in goods and services was revised downward by 3.4% from October 2021 to October 2022, implying a shortfall in global trade of about USD 1 trillion annually. Nevertheless, there were many years in the past three decades when global trade changed by larger magnitudes. The fall in global trade primarily resulted from the decline in global economic and trade activity.

The war primarily impacted energy prices with an upward revision of over 100%, while non-energy commodity prices were revised upward by only 8% on average. Within energy, gas prices soared the most, followed by coal prices. Soaring energy prices deteriorated the trade balance of countries importing energy. Within non-energy commodities, food price forecasts went up by 11% compared to the forecast made a year earlier, while agricultural raw material price and metal price forecasts remained practically unchanged. The latter suggests that important input costs of industrial production were not impacted by the war, though we should recall that metal prices increased by almost one-half in 2021. The gap between the Chinese trade surplus and the US trade deficit has widened considerably, which does not seem to be related to the war.

Since Russian authorities suspended the publication of detailed trade statistics, we collected bilateral trade data from 34 countries (27 European Union countries, China, India, Japan, South Korea, Turkey, the United Kingdom and the United States) to reconstruct and analyse Russia's foreign trade since the war erupted. While Russia registered record trade surpluses in the first months of the war, only about half of its increase was related to soaring energy prices, the other half was due to the collapse of imports, which will likely undermine the Russian economy's productive capacity.

Russian exports of goods other than mineral fuels suffered from a gradual decline since the war started, with the largest falls in the categories of 'material manufactures', 'chemicals', and 'machinery and transport equipment'. These declines suggest that the war and the various sanctions imposed have already started to damage the productive capacity of the Russian economy.

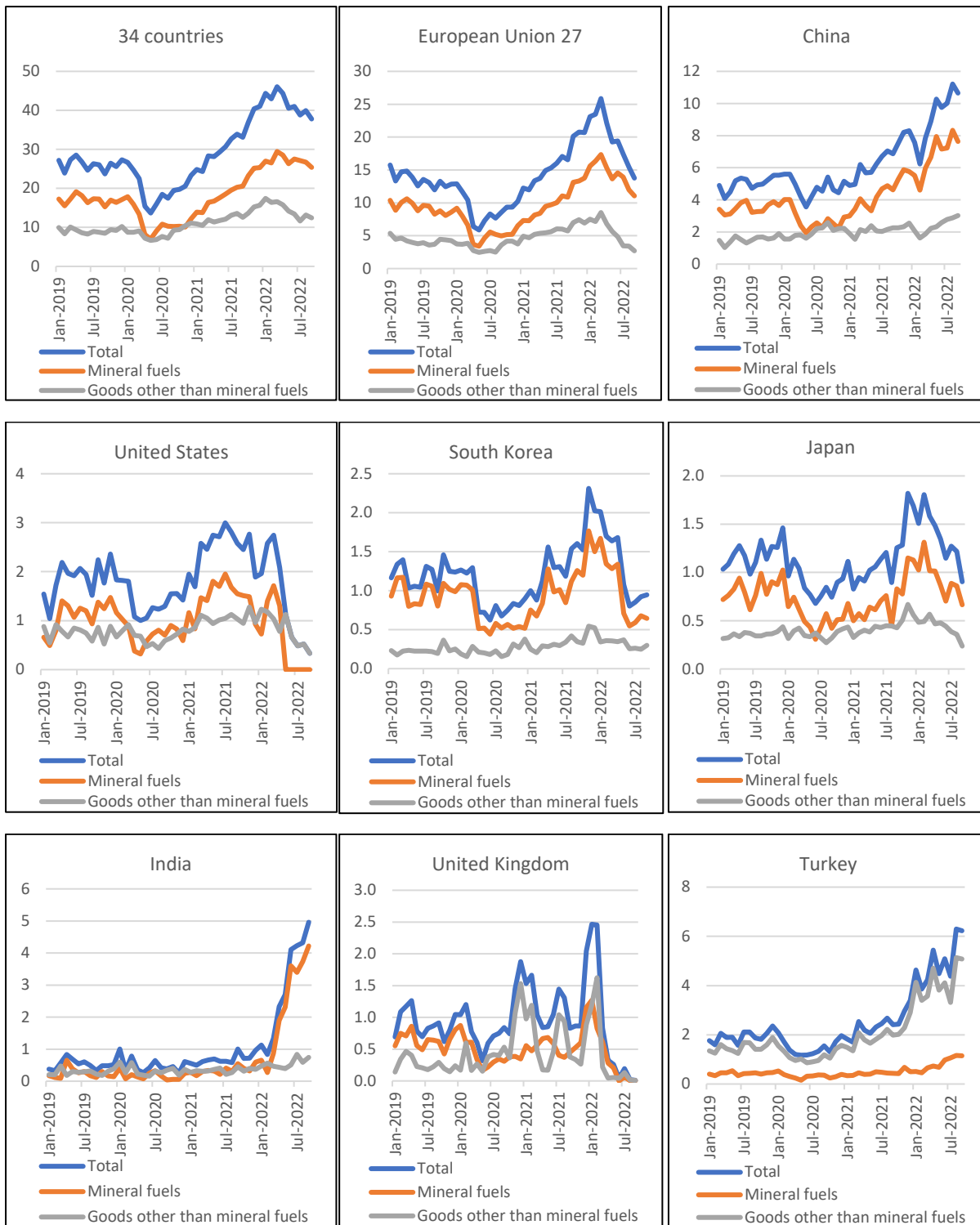
Russia's trade was reoriented from advanced countries imposing sanctions to China, India and Turkey, three countries that did not impose sanctions. Nevertheless, Russian imports of product categories that include sanctioned products suffered a hit, even from those countries that did not impose sanctions, which suggests that sanctions had an impact on trade. This runs counter to the idea that Russia's large trade surplus reflects the inefficiency of western sanctions. We analysed whether European and US companies tried to circumvent sanctions by re-routing sanctioned goods to Russia via China and Turkey, but we did not find evidence for this hypothesis.

On the energy front, the EU, UK and US announced plans to phase out Russian sources of energy. Mineral fuel exports from Russia to the US and UK fell to zero a few months after the war erupted. Russian mineral fuel exports to the EU have declined, but still, the EU remains Russia's largest energy customer at the time of writing. This is, however, bound to change. The EU's petroleum sanctions will become effective between December 2022 and February 2023 and limitations in transport capacity and access to insurance will prohibit the redirection of a significant share of current Russian petroleum and gas exports to other countries. This implies that most of the current Russian revenues from petroleum and gas (around USD 10 billion per month) from Europe will be gone. This will have a significant impact on Russia's trade surplus, which is doomed to deteriorate.

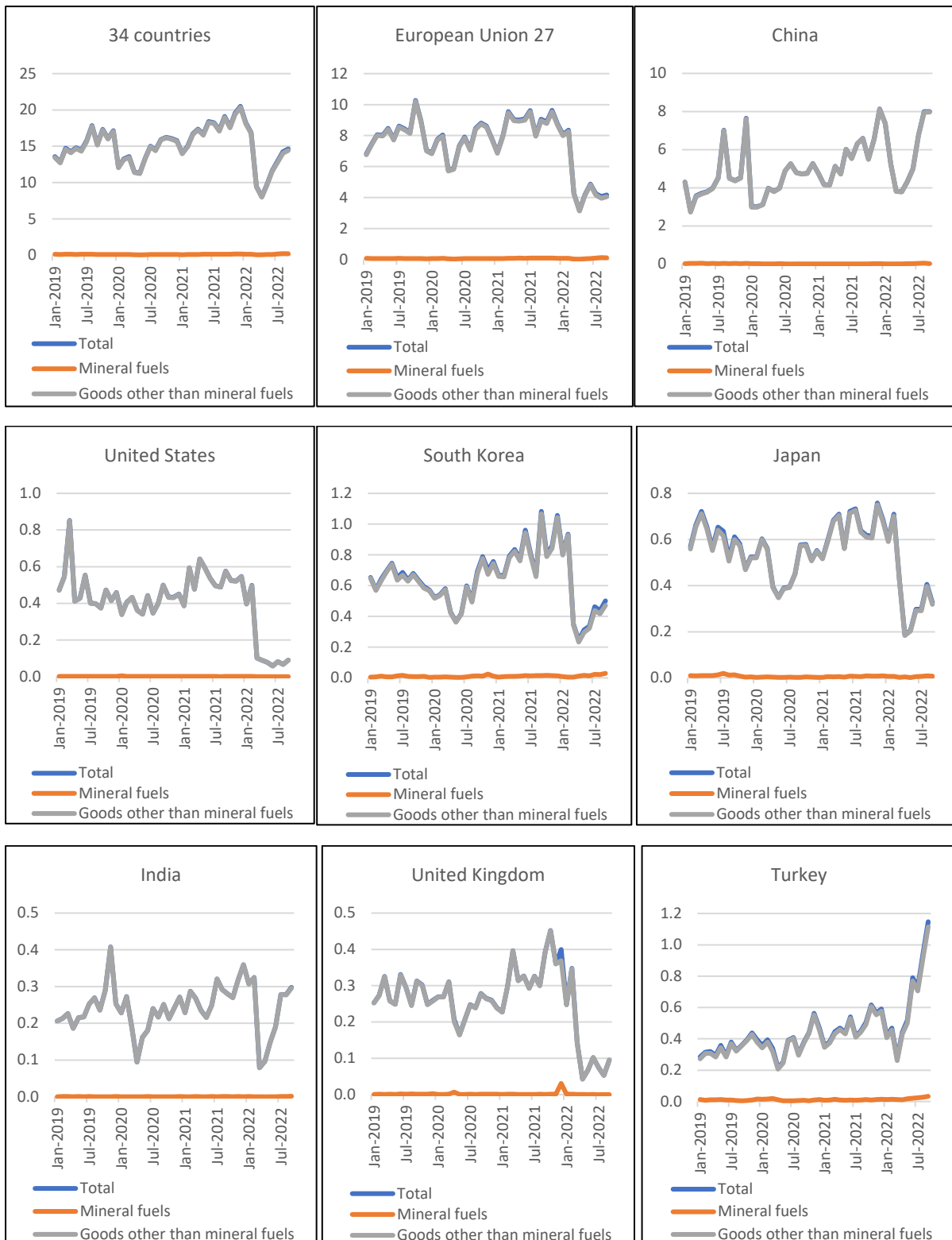
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Annex 1: Russia's exports to selected countries, January 2019 – September 2022 (USD billions)



Annex 2: Russia's imports from selected countries, January 2019 – September 2022 (USD billions)



Annex 3: Methodology to match HS and SITC codes at 2-digit level

Different countries use different reporting standards for trade statistics. The EU, Turkey, the United Kingdom, and the United States report trade statistics according to the Standard International Trade Classification (STIC). China, India, and South Korea report trade statistics according to the Harmonized System (HS). In the case of Japan, data is reported using Principal Commodity Code, which closely resembles SITC codes.

There is a perfect correspondence between HS and STIC for SITC 4-digit product categories and higher levels of granularity. But existing correspondence tables do not offer a match at the 2-digit level. For some countries, data reported would have a maximum detail of 2-digits, hence we tried to match the 2-digit HS categories with the 2-digit STIC categories using correspondence tables from the UN Statistics division¹².

We started by truncating the codes in the correspondence tables at 2 digits. Then, we analyzed how frequently each 2-digit category of HS would match with each SITC 2-digit category. For about 41% of the HS categories, there was a perfect match with the corresponding SITC category. For another 12%, the matching was not exactly precise, but HS codes would fall within the same 1-digit category of SITC. The analysis would be mostly focused on 1-digit SITC categories, so this did not constitute a major issue. For the remaining 46% of the HS 2-digit categories, we did the matching by distributing the HS category by various SITC categories. To do so, we first, carefully analyzed the description of HS and SITC 2-digit categories. In the cases in which the match of one HS category with various SITC categories would seem reasonable and proportionate, we distributed the HS 2-digit category by various SITC 2-digit categories using equal proportions. For the remaining cases, we used discretion to distribute more weight among the categories that seemed like a stronger match. By the end of this process, we had created a matching table between HS and SITC 2-digit categories, which we then used to ensure all the data used in our analysis was using SITC codes.

¹² <https://unstats.un.org/unsd/classifications/Econ>