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To cite this article: Hussam Hussein & Matyas Knol (2023) The Ukraine War, Food Trade and the Network of Global Crises, The International Spectator, 58:3, 74-95, DOI: [10.1080/03932729.2023.2211894](https://doi.org/10.1080/03932729.2023.2211894)

To link to this article: <https://doi.org/10.1080/03932729.2023.2211894>



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RESEARCH ARTICLE



The Ukraine War, Food Trade and the Network of Global Crises

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ABSTRACT

Although the Russia–Ukraine war has had only a limited impact on the agricultural production in the two belligerent states, it has triggered a number of interlocking ripple effects, which have exacerbated pre-existing strains in the supply chain. The war is best seen not as an isolated shock, whose effects can be traced along a single linear axis, but as a factor in a network of interlocking global crises. The initial small drop in food supply has translated into market panic, spiking inflation and food insecurity in import-dependent areas, subsequently enhancing geopolitical dislocation. Quantitative data on food prices and trade and production volumes will be combined with a qualitative study of the war's socio-political ripples in at-risk regions to examine the effects of the war on the global food trade and put these in a theoretical framework, outlining the links between geopolitics, socio-economic strains, disruptions to global commodity markets and food insecurity.

KEYWORDS

Ukraine war; food security;
food trade; global crises

Russia's invasion of Ukraine on 24 February 2022 followed a period of low-intensity conflict, which had been simmering in the Donbas region since 2014. The move to full-scale conventional warfare has had a significant impact on the global food supply, with implications extending far beyond the Black Sea region. The crisis has been analysed from a food security perspective, looking at the risk of shortages in areas reliant on Russian/Ukrainian agricultural imports (FAO 2022; WFP 2022). Research has also focused on the geopolitics of food, mainly in relation to the diplomatic alignment of import-dependent states (*Insecurity Insight* 2022, 7-8). Other scholars have examined the implications of food shortages for political stability in vulnerable regions and highlighted the war's knock-on effects in terms of increased migration. Some have pointed to Russia's efforts to restrict the global food supply and thus increase migrant flows to destabilise Ukraine's allies in Europe (Braw 2022). Finally, there are studies of Russia's position in the oil and gas trade, the war-induced shocks to energy prices and the ways in which the Kremlin wields its fossil fuel wealth as a foreign policy tool (Chatham House 2022).

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Scholars and analysts commonly highlight the multicausal nature of the global food crisis. Many have noted how the COVID-19 pandemic contributed to the fragility of global supply chains, making them more vulnerable to war-related disruptions. Attention has also been given to the role of adverse weather events in driving down agricultural production in other geographic areas, thus contributing to global supply shortfalls (Hassen and El Bilali 2022, 5). Research on the financial dimension of the crisis has demonstrated that sanctions against Russia have had large spillover effects, impacting non-aligned countries that rely on Russian imports (Ozili 2022, 31). Efforts have been made to situate the complex networks of causality underpinning the global supply crisis within a conceptual framework. The interrelatedness of food and energy markets has been described as a network of feedback loops (Shams Esfandabadi *et al.* 2022, 1642). The ‘cascading failure’ model has often been applied including to the breakdown of food and energy security, showing how market integration facilitated the transmission of the initial shock (Zhou *et al.* 2023, 1-2). We aim to advance this strand of the literature by examining the disruptions to global food markets in the aftermath of Russia’s invasion, placing them at the intersection of agricultural production, trade and geopolitics.

In this paper, the Ukraine war will be situated in a nexus of interlocking crises. The question guiding this study is as follows: How has the shock to food supply induced by Russia’s invasion of Ukraine in February 2022 exposed the gravity of the overlapping crises affecting the current world order? We will assess the role of geopolitics in the decline of Russian and Ukrainian agricultural production and the instability of the global food trade. We will then trace the geopolitical knock-on effects of supply shortages, linking geopolitics to other threats to supply chain integrity, such as the fallout of the COVID-19 pandemic or the fiscal constraints imposed by the internal economic structures of individual states. We will put forward a framework to describe the network of interlinked supply shocks. To this end, we draw on Adam Tooze’s concept of “polycrisis”, which highlights how the synchronicity of macroscopic disruptions amplifies pressures on the global order (Tooze 2022). Although the main part of the research was concluded in August 2022, some references are made to secondary literature that has been published since then.

The paper is divided into three sections, dedicated to three dimensions: ‘internal’, focusing on the impacts of the war in Ukraine on regional agricultural production; ‘external’, examining the consequences for global food trade; and ‘geopolitical’, outlining the relationship between food shortages and political structures in import-dependent countries and the world diplomatic system. These three layers are also split chronologically. In examining the ‘internal’ aspects of Russian and Ukrainian agriculture and the risks stemming from the two countries’ role in the global food supply, the focus is primarily on the pre-war context. The section on the ‘external’ dimensions of food production in the Black Sea focuses on the period after the invasion, mapping out the impacts of the crisis roughly between the beginning of the war in February 2022 and the conclusion of this research in August 2022. In the section on the third dimension, the attention is partially shifted to long-term projections.

The paper is based mainly on open-source secondary data, both quantitative and qualitative. Quantitative data – primarily production, trade and price data – are used to trace the macro-level implications of the crisis and identify regions that face the greatest risk of shortages. This helps isolate the importance of Ukraine and Russia both

globally – across market segments – and in specific geographic areas. The quantitative approach is complemented by a qualitative analysis of the political and economic ties between Russia and Ukraine, on the one hand, and importing states, on the other. Furthermore, we will focus on the role of import substitutability, the strength of the national agricultural base and the impact of rising energy prices on transport costs and input availability. Through this analysis, the range of at-risk regions is narrowed down to the Middle East and North Africa (MENA) region, with less attention devoted to Sub-Saharan Africa, Latin America and Central, South and South-east Asia. Russia and Ukraine are important exporters of a range of agricultural products, including barley and sunflower seed. However, the scope of this research is limited to the markets for corn and wheat, given their large share of total consumption in importing states, their correlation with the share of other imports and their significance for Russian and Ukrainian trade.

The guiding conceptual framework of this paper, based on Tooze’s “Krisenbilder” method, is presented in [Figure 1](#) (Tooze 2022). As a methodological starting point, it uses the subjects of the initial shock to global food markets: Russian and Ukrainian agricultural trade and production (in green/underlined). The framework outlines two categories of disruptions. First-order shocks (in **red/bold**) are conceptualised as being largely causally independent in the context of the particular network of crises. The category primarily includes Russia’s invasion of Ukraine, but also the COVID-19 pandemic, the impact of the climate crisis and economic and political instability in vulnerable states. Second-order shocks (in *blue/italics*) arise from the interlocking nexus of crises set off and amplified by the first-order shocks. Given the polydirectional, mutually reinforcing nature of global crisis dynamics, the distinction between the two categories is not firmly delineated. At times, the knock-on effects of initial shocks amplify these first-order disruptions, contributing to a self-perpetuating cycle. The visual framework is developed throughout the paper, with individual factors being described in each of the three sections that discuss the three aforementioned dimensions (‘internal’, ‘external’ and ‘geopolitical’).

General background: Russia and Ukraine – the granaries of the world

The importance of Russia and Ukraine for global agricultural markets dates back to the mid-1800s. At the start of the First World War, Tsarist Russia was the world’s leading wheat exporter (Goodwin and Grennes 1998, 408). In the 1970s and 1980s, the grain consumption of the Union of Soviet Socialist Republics (USSR) rose steeply owing to governmental efforts to increase meat consumption, which in turn translated into a rising demand for animal feed. As a result, the USSR became a net importer of grain. As of 1992, Russia and Ukraine accounted for ten per cent of global grain imports. However, the contraction of the previously heavily subsidised livestock sector in both countries during the 1990s and 2000s allowed them to regain their position as major exporters (Liefert *et al.* 2013).

Today, Russia and Ukraine account for a significant share of the global agricultural output. In 2020-1,¹ Russia and Ukraine produced about six per cent of the world’s corn, 12 per cent of wheat, 13 per cent of barley and over 25 per cent of sunflower seed (see [Figure 2](#)). Agricultural production in Russia and Ukraine significantly exceeds domestic

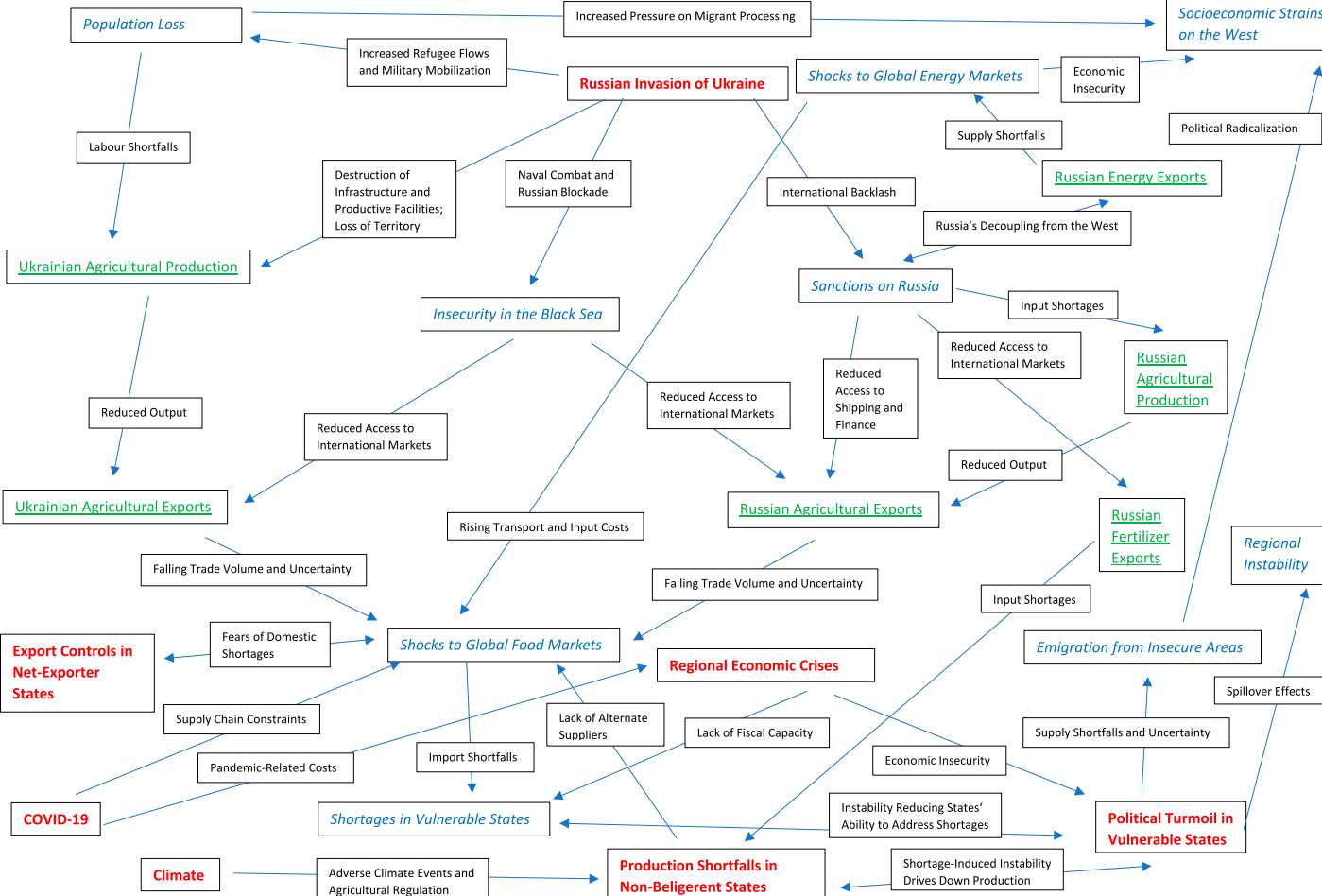


Figure 1. The Ukraine War and the nexus of global crises.

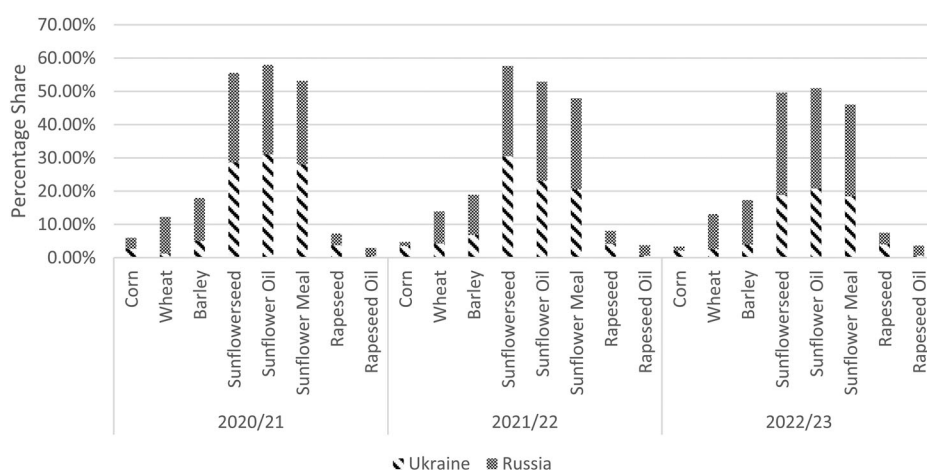


Figure 2. Global share of Russian and Ukrainian agricultural production.

Source: authors based on USDA (2022).

consumption and is translated into a disproportionately large share of the global market. As of 2020-1, exports from the two states comprised over seventy per cent of global trade in sunflower oil and sunflower meal. The figures were about thirty per cent for barley and 17 per cent for rape seed. Perhaps most significantly, Russia and Ukraine accounted for 27 per cent of global wheat exports. Furthermore, Ukraine exported 13 per cent of the world's corn, with Russia adding two per cent (see Figure 3) (USDA 2022).

As of 2020, over thirty net importers of wheat relied on Russia or Ukraine for more than thirty per cent of their total imports (see Online Appendix). Dependent countries were concentrated along the borders of both countries and in the Middle East and Africa (see Figure 4). Post-Soviet states and the Kremlin's close allies depended almost exclusively on Russia for their wheat supply. Russia provided 100 per cent of imports in Armenia, 98.5 per cent in Azerbaijan and 98 per cent in Georgia. In Africa and the Middle East, trade tended to be more evenly split between Russia and Ukraine, with the balance usually tipping in favour of the former. For instance, within the observed period, Somalia sourced 53 per cent of wheat imports from Russia and about thirty-seven per cent from Ukraine. Russia accounted for approximately sixty-two per cent of Egypt's wheat imports, whereas 23.5 per cent came from Ukraine (see Online Appendix).

The relatively small scale of Russia's corn production means that its exports were mostly limited to countries in its past or current sphere of influence, including several European countries (Figure 5). The destinations of Ukrainian exports are more diverse. A large share of Ukrainian corn is shipped to the MENA region, accounting for just over 62 per cent of the total in Libya and about 25 per cent in Lebanon, Egypt and Israel. Large parts of Western Europe also rely on Ukrainian imports, which comprised 48 per cent of the total in the Netherlands, 30-40 per cent in Spain, Ireland and

¹The data refer to commodity marketing years rather than calendar years. These run from 1 June to 31 May for wheat and barley, 1 September to 31 August for corn, 1 October to 30 September for sunflower seed and 1 July to 30 June for rapeseed.

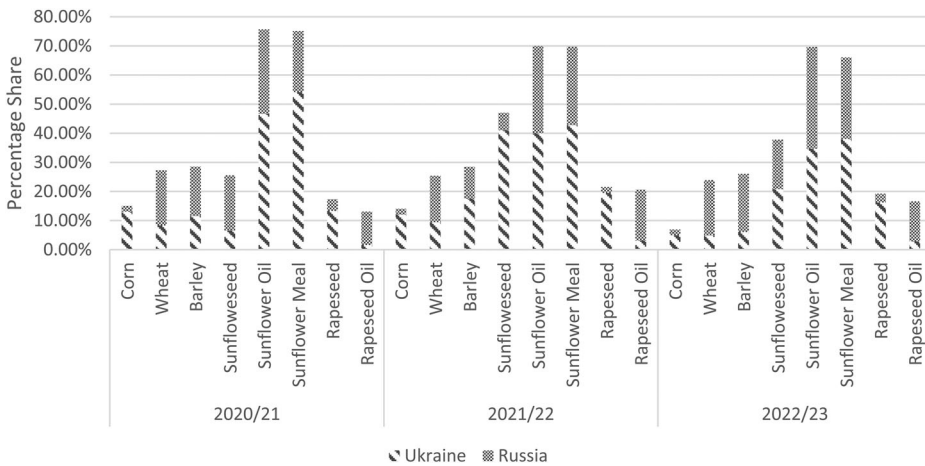


Figure 3. Global share of Russian and Ukrainian agricultural exports.

Source: authors based on USDA (2022).

Portugal and around twenty-six per cent in the United Kingdom (see Figure 4 and Online Appendix).

The risk of shortages is greatest in areas where dependence on Russian or Ukrainian imports coincides with other risk factors. Eckart Woertz conceptualises the vulnerability of importing states as the result of water scarcity. Imports constitute ‘virtual water’, embedded in agricultural products and thus transferred between humid and dry regions. Trade allows water-scarce states to sustain population sizes beyond their domestic resource capacity. Import shortfalls are therefore bound to exacerbate pressure on water resources and, by extension, amplify the risk of food insecurity (Woertz 2022, 3-4). Furthermore, many major importers of grain from the Black Sea region are low-income states that are ill-equipped to shoulder the costs of inflation (FAO 2022, 7) and where

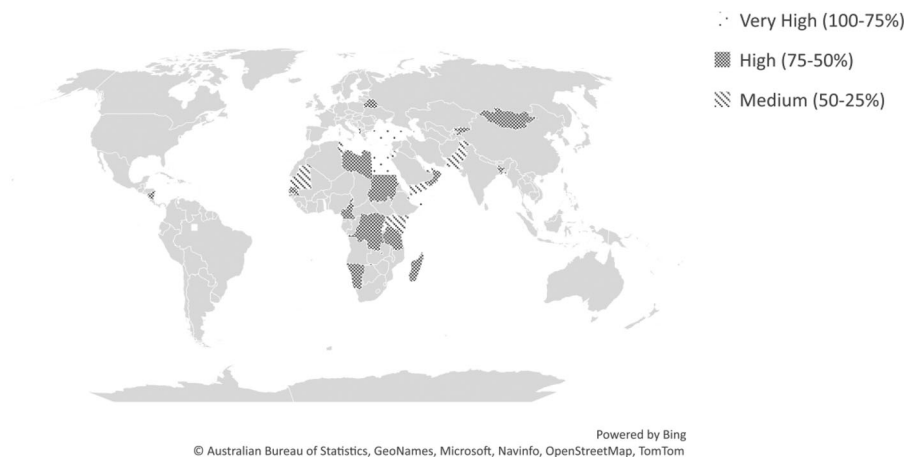


Figure 4. Share of Ukrainian and Russian wheat imports in at-risk countries (2020).

Source: authors based on FAOSTAT (2022), OEC (2022).



Figure 5. Share of Ukrainian and Russian Corn Imports in at-risk countries (2020).

Source: authors based on OEC (2022), UN Comtrade (2022).

cereals account for a larger share of consumption. Therefore, disruptions in grain markets have a substantial impact on food supply. The price of cereal products tends to be kept down by subsidies; rising prices thus translate into higher fiscal burdens. In other words, inflation endangers both food availability and budgetary stability (van Meijl *et al.* 2022, 28-31).

Aside from exporting agricultural commodities directly, Russia, Ukraine and Belarus are also major providers of secondary inputs. As of 2020, Russia exported about 7.5 per cent of the world's diammonium phosphate. Russia and Belarus combined accounted for up to 29 per cent of the trade in muriate of potash, exporting 16 per cent and 13 per cent respectively. Russia, Ukraine and Belarus accounted for 14 per cent of the world's trade in urea (see Online Appendix). Low- and middle-income states across the entire developing world – predominantly in Latin America and Africa – depend on Russia and Belarus for fertilisers. Additionally, up to 27 per cent of the EU's fertiliser imports came from Russia in 2020, with a further nine per cent coming from Ukraine and two per cent from Belarus (see Online Appendix). The EU's vulnerability is exacerbated by its reliance on calcium ammonium nitrate (CAN), given that Russia and Ukraine account for 50 per cent of global CAN exports (Kennes *et al.* 2022).

The internal dimension: impact of the war on food production

The war's impact on regional agriculture can be divided into two categories: first-order effects, which take the shape of immediate combat-related destruction; and second-order effects, that is, indirect constraints on productive facilities resulting from the spillover of the conflict or from the diplomatic and economic response of the international community. The second-order effects extended beyond the battlefields but did not go further than the two belligerent states. Only by interacting with the world trade system – a dynamic discussed in the following sections – did the initial shock take on a global dimension.

The immediate effects of the war on Ukrainian agriculture have been significant, but not catastrophic. The war came amidst a major year-on-year hike in production; although the upward trend was somewhat flattened by the conflict, in the short term, Ukraine's total wheat output was still set to increase from about twenty-five and a half million metric tons to 33 million between 2020-1 and 2021-2. Corn production was predicted to rise from about thirty million metric tons to over forty-two million (see Online Appendix). The sowing season for corn and wheat fell outside the period of the most intense hostilities, in the first few weeks of the war, meaning that Ukrainian farmers faced less severe disruptions to production (see Online Appendix). After Russia's initial multi-front offensive, the fighting shifted to the east and south, allowing production to resume in Ukraine's heartlands (FAO 2022, 20-1).

Although the worst effects of the Russian invasion were avoided thanks to a combination of seasonal factors and combat successes, the medium- to long-run future of Ukrainian agriculture remains grim. In 2022-3, Ukraine is expected to produce only 19.5 million metric tons of wheat, a 40 per cent decline compared with the previous marketing year. Its corn production is estimated to fall by a similar share, to about twenty-five million metric tons. Furthermore, given the prospect of continued warfare on Ukrainian territory, the decrease in output is set to last at least several years and possibly worsen as productive capacities continue to degrade.

Agricultural production in Ukraine was also affected by collateral damage to infrastructure. Before the beginning of its missile and drone strike campaign in October 2022, Russia denied having deliberately targeted Ukrainian infrastructure. However, from the very start of the war, the damage wrought upon civilian facilities indicates either deliberate intent or a total disregard for collateral damage on the part of the invading forces. Indiscriminate destruction was exacerbated by a shortage of precision-guided munitions (Seyler 2022) and the fact that grain storage sites tend to be located close to key infrastructure junctions, often targeted by the invaders in an attempt to cripple military logistics (FAO 2022). The Russian forces have left deep marks on the landscape, and the reconquest of occupied territories did not automatically enable a return to full-scale production. On reclaimed lands, Ukrainian farmers face mined fields and the loss of equipment, either stolen or destroyed by the invaders (MacDonald and Grove 2022).

It should be noted that Ukraine has suffered the greatest territorial losses in highly productive areas. Although a prominent strand of the secondary literature – drawing on realist and neo-realist theory – frames the Russian invasion as a result of security concerns (Qaisrani *et al.* 2023, 15), Derek Hall notes that the war's economic dimensions point to its character as a neo-imperialist land grab, aimed at seizing and exploiting natural resources (Hall 2023, 39). Indeed, examining the changes in land ownership is integral to understanding the impact of the war on agriculture. Russian-occupied territories account for 28 per cent of Ukraine's peacetime agricultural output and roughly fifteen per cent of its storage capacity (FAO 2022, 20-1). The loss of land to Russia has had an adverse impact on Ukraine itself, but the international implications are less clear. At first glance, given the difficulties involved in getting Ukrainian grain to global markets, the Russian occupation could be somewhat beneficial in terms of fixing shortages in importing states. However, the Kremlin has shown itself to be more concerned with consolidating its rule than with restarting production. In areas that it controls, Russia has pursued sweeping 'nationalisation' schemes, expropriating the legal

owners and transferring land to Kremlin-aligned oligarchs (MacDonald and Grove 2022). This process is bound to lead to a loss of efficiency as production adjusts.

In addition to the loss of land and facilities, Ukraine's agriculture has also suffered from the second-order effects of war, namely in the form of a shock to its productive labour force. The Ukrainian government has taken steps to mitigate this, for instance by carving out exemptions from conscription for essential workers (FAO 2022, 20). However, the demographic fallout caused by the war has not been fully contained. Indeed, the outflow of more than ten per cent of Ukraine's pre-war population is still bound to affect productivity. Additionally, should the fighting spread and escalate, it would likely sap the labour force even more by intensifying mobilisation pressures and/or stalling the repatriation of migrants.

Russia's agricultural sector is not directly threatened by the first-order effects of the war. Indeed, compared to 2021-2, in 2022-3, Russian wheat production is set to rise by about 8.5 per cent, to 81.5 million metric tons, with corn falling by 5 per cent, to 14.5 million metric tons (see Online Appendix). However, over the long term, Russia will struggle to maintain its output as sanctions imposed primarily by the EU, the US and their allies will be felt. The effects of the sanctions have been more delayed than those of direct war-related destruction but could also prove more far-reaching. As of 2020, around thirty-two per cent of Russian sowing seeds were exported to the Netherlands, 13 per cent to France and 11 per cent to Germany. Other EU members (including Poland and Denmark) were also key suppliers. Russia furthermore relied on the EU for pesticides; France and Germany alone accounted for about twenty-nine and fourteen per cent of pesticide imports respectively (see Online Appendix). In the past decade, Russian pesticide imports have exceeded domestic consumption, suggesting a tendency to stock-pile (FAO 2022, 23). Russia has the reserves to bridge temporary shortfalls in foreign supplies, but in the long run, shortages could turn out to be highly damaging. Whereas the shock to Ukraine's agriculture is limited to combat areas, Russia could see a nationwide decline in production.

The effects of the war depend on its duration, scope and intensity, and on the geographic location of combat operations. Ukraine's corn production is concentrated in the centre and north of the country (see Online Appendix), which were recaptured following Russia's withdrawal in the early months of the war. In contrast, a large portion of Ukraine's wheat is grown in the south and east, including in the Kharkiv, Kherson and Dnipropetrovsk oblasts (see Online Appendix). These areas have seen the fiercest fighting ever since Russia refocused its offensive on the Donbas region. Ukrainian wheat is therefore at particular risk because of its proximity to the battle-lines. In addition to the direct destruction of machinery and crops, combat operations also threaten transport, especially given Russia's tendency to target civilian infrastructure. Ukrainian counter-offensives could exacerbate insecurity through an expansion of the fighting to the Donetsk and Luhansk regions, which are also important wheat producers (see Online Appendix). Finally, escalation on the battlefields could trigger a tightening of sanctions, exacerbating Russia's input shortages.

The external dimension: the war and the global food trade

Trade networks played a key role in globalising the initial shock of the invasion, setting off and amplifying a set of interrelated crises. The effects of the war in this context can be

split into two categories. On one hand, there is the restriction of Ukraine's trade as a component of Russia's strategy. On the other, there is the collateral damage associated with waging a war of conquest in an area crucial for food production. Both categories of disruptions highlight the impact of the war in terms of the fragilities of and bottlenecks in the global food trade system.

Russia has sought to cripple Ukraine's economy by severing its access to global markets. In the opening days of the war, Russia imposed a blockade on Ukrainian ports in the Black Sea, reducing the country's sea-borne exports to a trickle (Stevis-Gridneff 2022). Naval transport has also been threatened by the spillover effects of the conflict. Both sides have deployed anti-ship mines on a wide scale and representatives of Black Sea littoral states have warned about the danger of mines drifting off their coasts (*Insecurity Insight* 2022, 5). On several occasions, commercial vessels from non-belligerent states have been attacked by Russian forces (Åslund 2022). Such incidents are almost certainly accidental, but they still increase the risks for sea-borne travel and disrupt trade flows. War-related risks also raise insurance premiums, adding to transportation costs (Woertz 2022, 3). This demonstrates that the financial system serves to transmit and amplify geopolitical pressures.

Ukraine relies on sea-borne transport for approximately ninety per cent of its exports (FAO 2022, 18). According to Ukrainian officials, land-based alternatives can only carry about fifteen per cent of the country's total pre-war trade volume (Wax 2022). Furthermore, while transport to the Black Sea accounts for about ten per cent of the average market price of Ukrainian grain, moving goods to alternative European ports in Gdańsk or Klaipėda entails at least a threefold cost increase (Åslund 2022). Russia is not facing similar constraints, but its trade has suffered from the sanctions. For Russian exporters, direct war-related risks to transport are combined with reduced access to finance and shipping (Jones and Nti 2022). Russia's trade outlook remains relatively strong, with the country poised to benefit from Ukraine's decline. Russia's share in the global market for wheat is set to grow by three per cent between 2021-2 and 2022-3, rising from 16 per cent to 19 per cent (see Figure 3). However, Russia's long-term future looks less positive. As its stockpiles of pesticides and seeds run low and imported agricultural machinery breaks down, Russia will be forced to re-evaluate its quasi-autarkic strategy. The first indications of the shift were observable in the Russia-Ukraine grain deal signed in July 2022, which signalled the Kremlin's desire to re-enter global trade (Stevis-Gridneff 2022).

The combined direct and indirect effects of the war fostered market uncertainty. Nicolas Legrand (2022) traces the surge in prices to the structure of global food markets. Low storage stocks meant that market demand was equal to consumer demand, and therefore highly inelastic, leading to a sudden contraction of supply that caused major inflation (Legrand 2022, 6). Furthermore, in high-price environments, net food producers tend to restrict exports to raise revenue and tame inflation at home, leading to a self-sustaining cycle of trade collapse. Tarek Ben Hassen and Hamid El Bilali draw comparisons with the food crisis of 2007-8, during which the initial supply shock was amplified by panic buying, stockpiling and the imposition of export controls. Russia's invasion of Ukraine raised the risk of a repeat of this scenario on a wider scale (Hassen and El Bilali 2022, 5). For the two belligerent states, fears of shortages in national markets were exacerbated by the threat of war-related destruction

(in Ukraine's case) or sanctions (in Russia's case) (FAO 2022, 26). In the first months of the war, both Russia and Ukraine temporarily banned agricultural exports to bolster domestic food security. The measures were later lifted, but the threat of market segmentation still exacerbated inflationary pressures (Kumenov 2022).

From 24 February 2022 onwards, wheat and corn prices were about 9 and 7 USD/bushel respectively. In the following months, wheat prices peaked at over 13 USD/bushel, an increase of 28 per cent as opposed to pre-war levels, while corn prices reached 8 USD/bushel, rising by over 18 per cent (see Figure 6 and Figure 7). Fertiliser prices also spiked, driven by a mix of direct (the decline in exports from Russia, Belarus and Ukraine) and indirect (rising energy prices) factors. Between February and April, fertiliser prices surged by about twenty-five and a half per cent for diammonium phosphate, 24 per cent for urea and 30 per cent for potassium chloride (see Online Appendix).

Other than being a major food exporter, Russia also produces an important share of the world's fossil fuels. War-related dislocations in food and energy markets are inextricably linked, in terms of both impact and origins. Since 2020, Russia has exported 12 per cent of all crude oil, 11 per cent of refined oil products, nine per cent of liquefied petroleum gas and 17 per cent of natural gas (see Online Appendix). Western sanctions against Russia exacerbated the pre-war supply crunch, driving a surge in inflation. Increased energy prices translated into higher costs for transport and agricultural inputs, disrupting the distribution and production of food (ECOWAS *et al.* 2022, 6). The link between energy and food shortages demonstrates how geopolitical dislocations ripple through individual dimensions of the global economy in a mutually reinforcing cycle. The initial shock of the invasion produced a second-order effect, namely the reduction of Russian energy exports, which then led to a further decline in trade and production among non-aligned states.

The impact of the war on energy markets varies from commodity to commodity. Russia's oil output dropped in the first few months after the invasion, but by the



Figure 6. Global wheat price.

Source: authors based on MacroTrends (2022).



Figure 7. Global corn price.

Source: authors based on MacroTrends (2022).

summer, it had largely recovered; between July 2021 and July 2022, it had even increased by about three per cent (see Online Appendix). Oil exports were redirected to alternative markets and trade returned to pre-war heights (see Online Appendix). As the markets adapted, oil prices also started to decline (see Online Appendix). While oil markets are globally integrated, natural gas markets are more segmented and inflexible. Given that Russia cannot swiftly redirect exports from sanctioning countries, it has seen a decline in trade and output. As of August 2022, the International Energy Agency (IEA) estimated that Russia's gas output would fall by 480 billion cubic metres before 2025 (IEA 2022). The grim prospects of Russian gas exports translated into steadily rising inflation. In July, the IMF's EU Natural Gas Index and Asia LNG Index hit 72 per cent and 48 per cent of pre-war levels respectively (see Online Appendix). Thus, despite deflation in some segments of the market, the Global Energy Price Index remained at 169 in July 2022, which was about one hundred and twenty-eight per cent of its February value (see Online Appendix).

The summer brought about a partial recovery in the food markets. Towards the end of July 2022, Kyiv and Moscow signed a deal – brokered by Turkey and the UN – to unblock food trade in the Black Sea region (Steviss-Gridneff 2022). The negotiations indicated that Russia had partially abandoned its plans to destabilise the global food supply. Parallel to the Russia-Ukraine negotiations, talks have been held between Moscow, Brussels and Washington that resulted in the easing of sanctions on Russian shipping and fertiliser exports, further relieving the stress on food markets (Prokopenko 2022). Following these diplomatic advancements, grain and fertiliser prices tumbled back to pre-war levels, confirming that inflation was predominantly a result of panic rather than supply-side pressures.

It should be noted that the wartime price hikes started from a baseline significantly elevated by previous supply chain issues, caused primarily by the COVID-19 pandemic. Grain prices have been on the rise since 2020. Between January 2020 and February 2022,

the price of corn and wheat increased by 77 per cent and 40 per cent respectively (see [Figure 6](#) and [Figure 7](#)). A short-term stabilisation of global trade did not eliminate the threat of food insecurity, especially given the enduring threat of escalation. The perceived instability of the world food system is perhaps more important than the reality, as panic caused by geopolitical shocks becomes self-reinforcing.

The geopolitical dimension: the implications of food shortages in the context of interlocking crises

The geopolitical implications of the shocks to global trade are amplified by pre-existing pressures on food security, which have both a local (adverse climate events and inter-/intra-state conflicts) and a global (supply chain constraints, rising energy prices and economic instability) nature (WFP 2022, 6). The world food market has a diversified, elastic structure and is relatively resistant to geopolitical shocks. However, the synchronicity of crises has constrained its flexibility and exacerbated the resulting dislocations. Market destabilisation is concentrated in areas that are most dependent on imports from the Black Sea region, namely Africa and the Middle East. Droughts in the Horn of Africa and floods in the Sahel are taking a toll on domestic production (WFP 2022, 4). For instance, Niger's agricultural output in 2022 was 39 per cent lower than the rolling average of the previous five years (ECOWAS *et al.* 2022, 9). Conflicts, such as the wars in Ethiopia or Libya (Resnick 2022) or the anti-jihadist campaigns in West Africa (Toulemonde 2022), further affect production efficiency and supply chain integrity.

Import dependence tends to be correlated with economic insecurity. In the aftermath of the COVID-19 pandemic, up to 60 per cent of the world's low-income countries were confronted with the risk of a debt crisis (WFP 2022, 4). The appreciation of the US dollar raised the costs of interest and imports, undermining fiscal stability in vulnerable states (van Meijl *et al.* 2022, 32). Rising energy prices, combined with worsening liquidity shortages, limit the availability of foreign inputs. A combination of these developments has led to a drop in production (ECOWAS *et al.* 2022, 7). Hassen and El Bilali have noted that the war not only compounded COVID-19-related disruptions but also directly affected the post-pandemic economic recovery, limiting states' ability to contend with the surge in food prices (Hassen and El Bilali 2022, 5). Low-income importing states are most at risk, as they face the effects of inflation without having a domestic production base to lean on. However, the interconnectedness of global markets means that even states that do not depend on Black Sea grain, or are net exporters, suffer from price transmission (Glauben *et al.* 2022, 158). In sum, economic development constitutes a more reliable indicator of food security than the scale of domestic production.

In high-price environments, exporters are incentivised to compensate for the shortfalls in supplies from Russia and Ukraine. However, harvest failures in other countries, including major wheat exporters like Canada and the US, have weakened the responsiveness of global food markets (Lin *et al.* 2023, 6). The EU, which is a major supplier to the areas that are most affected by the decline in exports from the Black Sea region, has seen remarkably low yields, mainly owing to increased temperatures (Donley 2022). The intersection of inflation in world markets and localised supply shortfalls has encouraged export controls, with India restricting the outflow of wheat to a few select countries in its

proximity (Chakraborty 2022). Moreover, inflation in energy markets not only drives up the costs of transport and inputs but also incentivises the shift of agricultural production to biofuels, further undercutting the global food supply (Shams Esfandabadi *et al.* 2022, 1642). Economic stress and concerns about shortages have reduced commitments to international aid. The World Food Programme has seen a major drop in endowments (WFP 2022, 6). Even as prices fell and trade in the Black Sea region was partially revived, the risk of market fragmentation and shortages prevailed, casting doubt on the prospects for global food supply.

High-income food importers are insulated from the most severe effects of price inflation. For the Gulf States, the dual nature of the global food and energy crisis was a blessing in disguise; rising grain prices were matched and outpaced by the surge in oil and gas export revenues (Woertz 2022, 5). Still, wealthy states remain vulnerable to the international fallout of supply chain disruptions. Conversely, as Eoin McGuirk and Marshall Burke note, rising food prices in low-income states push net consumers to embrace armed insurgency as a method of sustenance (McGuirk and Burke 2022, 134). This diminishes the ability of states to respond, engendering a self-propelling cycle of instability and food scarcity. The riots in Sri Lanka or the protests in Pakistan, Peru and Tunisia were in large part spurred by rising food prices (Harter 2022). These instances of unrest raised the spectre of more widespread and severe turmoil with regional or even global spillover effects.

Looming food shortages in the Global South have revived the EU's fears of mass migration. Compared to 2021, the number of people seeking asylum in the EU in the first half of 2022 doubled. The frequency of illegal border crossings increased by 23 per cent, with most migrants coming from Bangladesh, Egypt and Tunisia – areas that are at particular risk of food insecurity. Refugees have arrived along new paths, for instance via Cyprus, putting pressure on the EU's migrant policy, which was largely formulated in the mid-2010s and left unchanged (Braw 2022). The EU's migrant-processing capabilities, already burdened by the arrival of some three and a half million Ukrainian refugees, are at serious risk of collapse should the pressure on the southern border escalate (Euractiv 2022). A wave of mass migration could, therefore, have sweeping implications for the EU's internal cohesion, which is already strained by other effects of the war.

The geopolitical consequences of the Russian invasion are often two or more degrees of separation away from the initial shock and determined by independent factors. It is tempting to de-emphasise the Kremlin's role in the resulting confluence of crises. However, in this regard, the global food trade must be viewed through the prism of Russia's broader politico-military ambitions in the developing world. From the early 2010s onward, Russia has sought to extend its influence beyond its 'near abroad'. Numerous African and Middle Eastern leaders have forged close ties with Moscow. States like Syria, Mali or the Central African Republic have become dependent on Russian support and both official (arms deliveries, economic cooperation, diplomatic solidarity) and covert business ties to Kremlin-aligned oligarchs and the deployment of paramilitary forces (Resnick 2022). The war in Ukraine has initially diverted Russia's attention away from its overseas allies. Still, the Kremlin's efforts to gain a foothold on NATO's southern flank continue. In April 2022, Cameroon signed a military aid deal with Russia, which is one of the latest examples of the Kremlin's global advance (Dougueli and Olivier 2022).

The global supply crisis elevated grain to a key instrument in Russia's geopolitical toolkit. On these grounds, Hall argues that the global food crisis should not be conceptualised purely as a result of the unintended fallout of the conflict, but as a product of Russia's geostrategy, which is concerned with the reconstruction of its imperial influence (Hall 2023, 37-8). Russia was swift to exploit market instability, using its exports as a bargaining chip and rewarding those who offered support. Ukrainian officials have reported that Russia has diverted stolen grain from conquered lands to its allies (*Insecurity Insight* 2022, 7-8). This fits into a broader pattern of Russian policy, characterised by the quasi-colonialist exploitation of occupied territories and intended to strengthen the Kremlin's diplomatic and commercial influence. Since 2014, Kremlin-backed intermediaries have thus been exporting coal from separatist republics in the Donbas, causing multiple international trade disputes (Åslund 2022). Russia's importance for the global food markets insulates it from the diplomatic consequences it might otherwise face for contributing to strains in the global supply chain. Since the destinations of Russian and Ukrainian exports often overlap, the states pressuring the Kremlin to cease its aggression risk losing not just one, but two major suppliers.

Some have accused Russia of pursuing a targeted plan to starve import-dependent states in an attempt to generate instability and increase pressure on Kyiv's allies (Bernatskyi 2022). Ultimately, it is hard to say whether the global food crisis is a result of deliberate Russian policy or a downstream effect of its efforts to weaken the Ukrainian economy. However, given that market instability and the resulting turmoil in low-income states benefits Russian interests, induced supply shortages may complement its wider efforts to divide the US-aligned diplomatic bloc. Unrest, conflict and immigration are likely to put a strain on support for Ukraine. The migrant crisis of 2014-5 drove a surge in right-wing extremism (Ratković 2017, 48; Futák-Campbell 2020, 30-1). Renewed pressure on the EU's southern frontier could produce similar effects, exacerbated by Ukrainian migration from the east and fatigue with the war's economic fallout. The reignition of a cycle of ethnic anxiety and political radicalisation could then fracture the EU's internal unity. The initial geopolitical shock of the invasion – mediated and amplified both by Russia's own actions and by its exploitation of the vulnerabilities in the global trade system – rebounds in the form of a more severe crisis.

The Kremlin treads a delicate line between putting pressure on the West and alienating allied and neutral states. Imposing controls on agricultural exports and attempting to spur global instability tarnishes Russia's economic and diplomatic credibility and favours its rivals (Glauben *et al.* 2022, 162). The interconnectedness of global food markets means that in the medium to long run, alternative suppliers – mainly the EU and the US – are likely to replace Russian exports. The July 2022 grain deal revealed the Kremlin's pliability to diplomatic pressure from importing states and its eagerness to rejoin global trade and offset its revenue shortfalls. Russia has repeatedly threatened withdrawal from the grain deal in attempts to force the West into further relaxing its sanctions (*Reuters* 2023). However, its refusal to make good on these threats suggests that, for the Kremlin, the usefulness of the deal as an instrument of exerting diplomatic pressure outweighs the potential benefits of a renewed blockade of Black Sea trade. At the same time, the signing of the deal does not imply that Russia has fully abandoned its attempts to disrupt the global food supply; the prospective benefits in terms of undermining the integrity of the West and crippling Ukraine are too high. However, Russia will likely

strive to do so under the cover of plausible deniability, while signalling its willingness to negotiate (Rupert 2022). These diplomatic constraints also limit the scope of disruption that Russia can bring about.

Conclusion: surveying the crisis and proposing solutions

As Tooze stresses, the term “polycrisis” denotes not just a confluence of several crises, or a linear causal pattern of one crisis leading to the next, but rather a network of interactions within which individual crises are mutually reinforcing (Tooze 2022). To examine the shock to food markets caused by Russia’s invasion of Ukraine, it is necessary to outline a multipolar, multidirectional model, in which disruptions produce a ‘billiard-ball effect’. This framework is presented in Figure 1. The initial shock, represented by the invasion, has compounded underlying socio-economic, political and environmental strains; this means that a relatively modest decline in the actual volume of agricultural output, mediated through diplomacy, trade and finance and layered upon existing supply chain issues, raised a major threat to food insecurity and political turmoil across import-dependent states and beyond.

The first-order effects of the Russian invasion have been most evident in the decline in Ukrainian agricultural output. The war led to the destruction of production, storage and processing facilities and the loss of productive regions as a result of the occupation or active combat. By successfully restricting the invasion to the east and south-east of the country and mitigating labour shortages, Ukraine managed to prevent a complete halt in agricultural production. The blockade of Ukrainian ports imposed at the beginning of the war almost severed the flow of Ukrainian grain to global markets, but since then, Russia has yielded to the pressure from importing states and made a deal to guarantee the free passage of Ukrainian grain exports. Nevertheless, Ukraine’s reliance on Black Sea shipping lanes remains a significant liability.

Although the direct effects of the war were somewhat contained, its ripples still had a sweeping impact. The invasion induced a diplomatic response, transmitting the initial shock of the war to Russia. The shortages of foreign inputs due to sanctions have had a limited and short-term effect, but in the long term they could lead to a major drop in production. Combat operations in the Black Sea region have raised the threat of trade disruptions across the wider region. Although Russia faces few direct trade barriers, sanctions have restricted its access to commercial shipping and finance. Overall, the impact on the food supply has been limited. However, the threat of import shortages, combined with pre-existing pressures on global trade, has led to panic and inflation. In other words, global economic and diplomatic structures have amplified the initial geopolitical shock.

The Ukraine war is one of several interlocking threats to food security in vulnerable states. Supply chain issues related to the COVID-19 pandemic have led to significant inflation in key commodities, later accelerated by Russia’s invasion. The pandemic has strained the budgets of low-income states, impairing their ability to tackle rising food prices. States across Africa and the Middle East are facing wars, insurgencies and riots that further strain supply chain integrity. Simultaneously, the impact of the war has stretched beyond the grain market. The trade in fertilisers, oil and gas has also been impacted. In addition to food import shortages, vulnerable states grapple with increased transport costs and a lack of inputs, which hamper agricultural production.

The initial shock of the Russian invasion has been mediated through economic structures and translated into further geopolitical dislocation. Dissatisfaction with rising prices in vulnerable states causes socio-political tumult, undermining governments' efforts to address market shocks. The result is a self-perpetuating cycle of political and economic crisis, which leads to increased emigration from at-risk areas, the Middle East and Africa towards the EU. The West's initial response of backing Ukraine and cracking down on Russian trade and finance has, in a roundabout way, come back in the form of increased pressure on the EU's southern frontier. When linked with the surge in energy prices and the burdens of processing Ukrainian refugees, this situation could strengthen the European far right and weaken support for Kyiv.

The destabilising political fallout of the global food supply crunch implies deliberate intent on Russia's part. In the first months of the war, Russia did not engage in a large-scale, targeted destruction of Ukraine's civilian infrastructure. However, from the outset, the war was associated with economic and infrastructural sabotage. The blockade of Ukraine's ports also suggests an effort to undermine global food security. The grain from occupied areas is being shipped to Russian-aligned states. Thus, the Kremlin is disrupting world markets while advancing its diplomatic influence. Simultaneously, Russian policy cannot simply be described as an all-out effort to reduce the world's food supply. Russia has not significantly cut its own exports and it has shown responsiveness to diplomatic pressure from non-aligned states, as well as a willingness to negotiate with the pro-Ukrainian coalition on issues relating to the food trade. Russia is wary of international blowback and has been forced to strike a balance between deepening its diplomatic isolation and putting pressure on the world community to withdraw its support for Ukraine.

The multifaceted nature of the global supply crisis points to the necessity of addressing food security through complementary solutions, situated in a multilateral framework. Hall observes that analyses of the impact of the Russian invasion on global food supply often tend to treat the war as a purely exogenous market shock, which in turn means that the geopolitical aspects of the crisis are neglected (Hall 2023, 27). In light of this, it is necessary to note that the solutions to the crisis must be formulated on two basic levels: neutralising the initial geopolitical disruption and containing its ripples. Kyiv's battlefield successes have enabled it to push back Russia's forces and challenge its hegemony in the Black Sea (Axe 2022). A further strengthening of Ukraine's anti-ship capabilities would allow it to secure its coast in the short term and limit Russia's ability to disrupt Black Sea trade over the long term (Frydenborg 2022). Military support for Ukraine also bolsters Kyiv's strategic autonomy, enabling it to negotiate with Russia on its own terms and reduce its reliance on the international community. However, there are limitations to this direct approach. It requires a substantial commitment of resources and political capital and, therefore, a large degree of diplomatic unity. Many non-belligerent states – especially in Africa and the Middle East – are tied to Russia economically or by more direct political bonds (Mills 2022). Consequently, addressing the root cause of global food insecurity on a broad, multilateral basis becomes a complicated matter. The Ukraine war has shown that the geopolitical power of disruptive actors is inversely correlated with the willingness and ability of the international community to act against them.

Focusing on the second-order effects of the initial shock offers greater opportunities for transnational cooperation. In a certain sense, the diversity in attitudes towards Russia can even act as a boon. Turkey's role in mediating the Russia–Ukraine grain deal under UN supervision provides a template for the role of non-Western countries in mitigating market dislocation. By not fully committing to a hard-line anti-Russian stance, countries such as the United Arab Emirates, Saudi Arabia or Turkey can exert greater diplomatic pressure on the Kremlin. The Russia–Ukraine grain deal could be an initial step in a broader push to liberalise global trade, dismantle restrictions in exporting states and counter market panic and fragmentation. The pro-Ukrainian coalition also plays a role in such efforts. Although Russia has been projecting an image of relative macroeconomic stability, in reality, the country has had to face a sharp decline in trade revenues, coupled with a shortage of high-tech imports as a result of Western sanctions. These pressures have led to an almost total halt in production in several key sectors, coupled with a major fall in living standards (Milov 2022). The signing of the Russia–Ukraine grain deal and the consequent loosening of Western trade restrictions has proven that Russia is open to limited cooperation to restore pre-war commercial relations. The global food security crisis has provided a model for a two-track diplomatic approach, based on a combination of soft power – that is, diplomatic pressure exercised by non-aligned states – and more direct economic coercion.

The multifaceted implications of geopolitical disruptions provide a basis for mutual interest to foster new bonds of interdependence. Although the EU has avoided major food shortages, it is heavily threatened by war-related shocks to energy markets. In past years, EU states have grown intensely dependent on Russian oil and gas (see Online Appendix). In the wake of the invasion, the EU experienced a major withdrawal of energy imports, which has translated into severe inflation (see Online Appendix). On the other hand, Middle Eastern and North African states are at the highest risk of food shortages, but they are net exporters of energy. Indeed, the EU was already drawing a significant share of its fossil fuels from these areas prior to February 2022 (see Online Appendix). Incentives for transactional cooperation to address the supply crisis have led to an increase in mutual food and energy trade, which has significantly mitigated the spike in prices. For instance, Algeria's gas exports to Italy have risen considerably in the wake of the invasion of Ukraine, with the North African state compensating for the shortfall in Russian imports (Butt 2023).

The gas deal between Italy and Algeria highlights the limitations of short-term, bilateral commercial integration. The rise in mutual trade was not associated with an increase in the overall level of Algerian exports to the EU at large (Ibid). In fact, demand reduction, rather than the increase in imports from alternative sources, was likely the most significant factor ensuring the EU's ability to withstand the energy crisis (Zeniwski *et al.* 2023). Despite convergence in mutual interests, structural constraints inhibit the expansion of production in exporting states, thus limiting the viability of trade as a solution to shortages. Cooperation between the EU and the countries located along its southern periphery requires extensive investment in capacity-building and is therefore hampered by a significant time lag. Robin Mills notes that the EU's commitment to climate goals and the distrust associated with its past policy towards the MENA area has made regional governments reluctant to accept the risks of economic interdependence (Mills 2022). Thus, to reduce its reliance on Russia, the EU as well as its prospective

partners would have to commit not only to narrow transactional cooperation but also to a broad and long-term, multilateral framework of supply chain integration and diplomatic convergence. The barriers described by Mills cannot be overcome at once, but in the meantime, limited steps to boost production and liberalise trade can serve to build diplomatic goodwill and establish a basis for a more ambitious plan.

To conclude, Hall correctly notes that even when examining the impacts of the Russia–Ukraine war from a food security perspective, emphasis should be placed on Russia’s role in instigating the conflict (Hall 2023, 42), thus drawing attention to the fact that Russia’s imperialist aims represent a long-term threat to the world order. Import-dependent states on both sides of the Mediterranean will benefit from a limitation of Russia’s ability to destabilise global markets. Moreover, a similar framework of cooperation can serve as a model for improving resilience to the multidimensional effects of geopolitical shocks. The onshoring of agricultural supply chains has been proposed as a way to address trade disruptions (Galanakis 2023, 10). However, this approach entails major opportunity costs and fails to exploit the comparative advantage of highly productive countries while forcing states that are net importers to abandon other, more profitable forms of economic activity in the name of food security. The answer is therefore not autarky but a broader, more diffused supply chain structure, situated in a multi-lateral network of economic and diplomatic ties.

Acknowledgements

This paper is a result of collaboration within a research internship programme supported by Somerville College, Oxford. The authors are grateful to Dr Claire Cockcroft, Director of the Development Programme at Somerville, for her kind support in setting up the internship.

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