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Global commodity market disruption and the fallout

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Abstract

The war in the breadbasket of Europe, which spawned at the heels of the once-in-a-lifetime pandemic, sent major cereal prices spiralling upward. The unprecedented sequence of events leading to and including the war has tested the resilience of global commodity markets and the craftsmanship of policymakers. While the circumstances may differ, the disruption of global commodity markets is not exactly uncharted territory, with many examples and experiences from near and distant history. By showcasing anecdotal and empirical evidence from the past, this study puts the current crisis and its consequences in perspective and offers an outlook with a specific focus on low- and middle-income countries.

K E Y W O R D S
cereal prices, commodity markets, food crisis, market disruption, trade restrictions

J E L C L A S S I F I C A T I O N
Q02, Q11, Q17

1 | INTRODUCTION

On 24 February 2022, Russian armed forces invaded Ukraine. This was a culmination of a several-month build-up of Russian troops at Ukrainian borders, and the beginning of what turned out to be a war the scope and magnitude of which Europe has not seen in decades. One cannot overstate the direct detrimental impact this war has had on the Ukrainian economy and the livelihoods and, indeed, lives of Ukrainians. Here, we abstract away from analysing these direct impacts. Rather, we focus on the war-induced global shock to commodity markets

and its repercussions on countries and people around the world, with emphasis on low- and middle-income countries (LMICs).

Specifically, we address the following questions: what has caused the global commodity market disruption? What are the likely consequences of this disruption? And how it compares with similar events that took place in the recent history?

The literature on global commodity price fluctuation, its causes and consequences has considerable breadth and depth. Indeed, the observed sharp increase in the prices of wheat (and other cereals) is hardly unprecedented. Focussing on the 20-year period from the start of this century to the onset of the COVID-19 pandemic, the grain markets saw booms in 2007–2008, and then in 2010–2011. Since the beginning of the pandemic, prices of wheat and maize have been on the rise even before the war rattled the markets (Figure 1).

Focussing on wheat—a commodity that has been at the centre of discussion for its importance as a source of calories in many LMICs—this is not the first time a large exporting
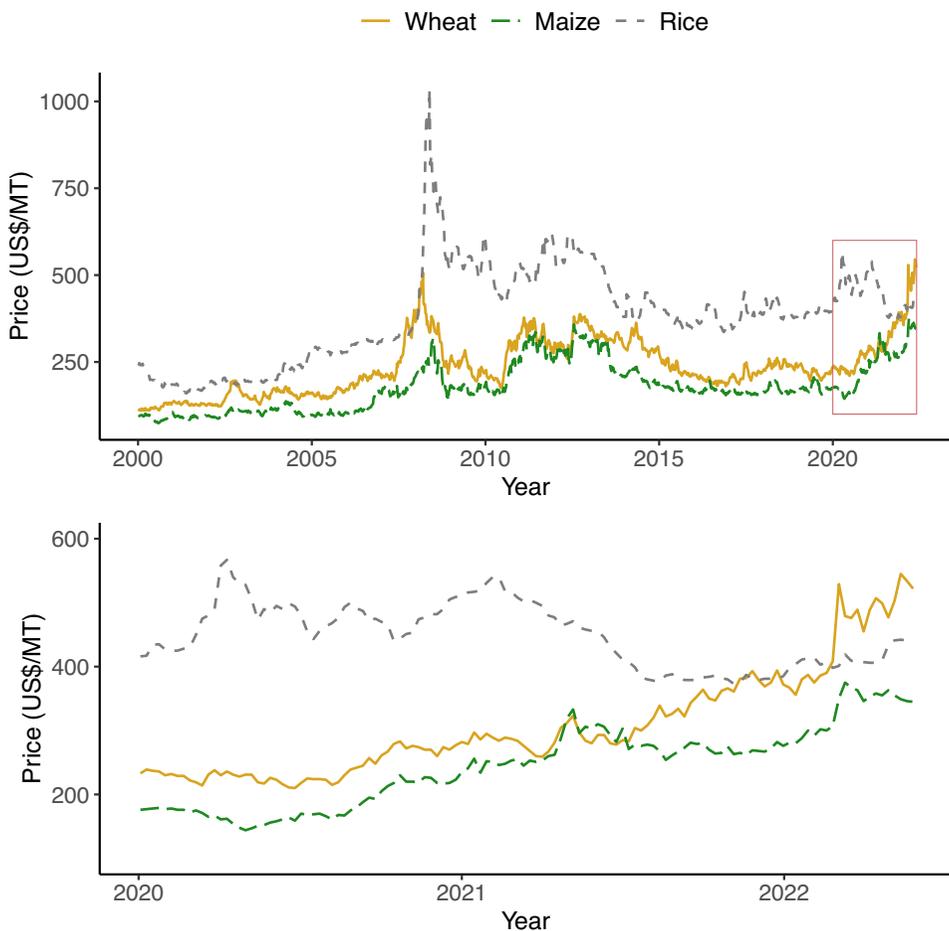
FIGURE 1 Time series of the selected cereal grains prices.
Note: The weekly nominal price series are denominated in US$/MT (fob), and are for U.S. Hard Red Winter Wheat (Gulf), U.S. No. 3 Yellow Maize (Gulf) and Thailand 5% Broken Rice. The top panel features the series from January 2000 to May 2022, and the bottom panel zooms in on January 2020–May 2022 period, which captures the time frame of the pandemic and of the Ukrainian War. The data are obtained from *International Grains Council*.

country, Russia in particular, has stopped its export. In 2010, in the wake of the drought-induced poor harvest, Russia banned wheat exports for the reminder of the year and then extended this ban for the first half of 2011. The wheat futures market reaction related to this ban appears to be comparable with that induced by the recent war in Ukraine (Figure 2).

Such market reaction to shocks originating from Russia and, most recently, Ukraine is not surprising, considering the role these two countries play in the world wheat production. Referred to as the Black Sea region, Russia and Ukraine accounted for more than a quarter of world exports in 2021 (see Figure 3). Exports from the Black Sea region compare with combined exports from European Union and the United States—the other two major wheat-exporting
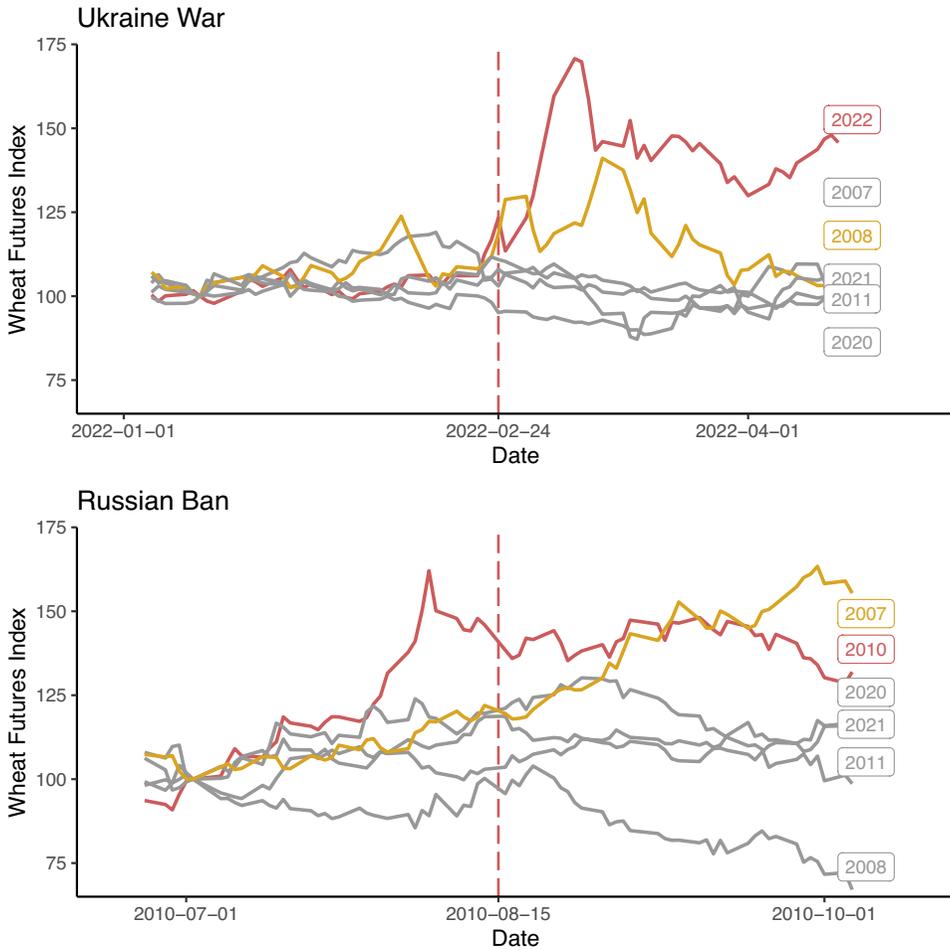
FIGURE 2   Wheat futures prices around the known day of a shock.
Note: The graphs capture wheat futures price dynamics during the 2010 Russia's export ban (top) and the 2022 Ukraine War (bottom), compared with a selected set of other years. The series is centred on the event date. Prices are relative to each considered year's base period set at 100. The base period is set to 30 trading days before the event. The trading days do not necessarily match across years, so the indices are constructed to ensure the same number of observations for each year, and the series is shifted forward or backward by a day if and as needed, to account for the across-year discrepancy of the weekdays (e.g. if the day and month of an event in a given year fall on the weekend of another considered year, the series is centred on the nearest trading day). The indices are based on nearby (open-interest-switch) futures prices from CBOT, obtained from Stevens Analytics via Nasdaq Data Link.
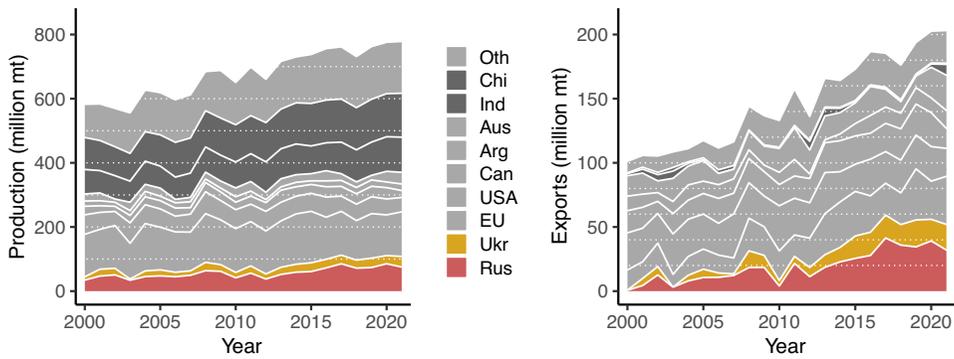
FIGURE 3 Wheat production and exports from key regions.
Note: The left panel presents global wheat production, and the right panel presents the global wheat exports by the selected list of key producers and exporters, including Russia and Ukraine, in years 2000–2021. The data are from USDA/FAS PSD Online.

regions, which used to account for more than two-fifths of the world wheat exports in the beginning of this century.

The 2010 export ban is a curious case as it represents a policy shock—a trade restriction—that had been caused by adverse weather and the related poor harvest. To the extent that weather and agriculture are intrinsically linked, such chain of events is not surprising, nor it is a stand-alone historical instance in the political economy of commodity markets. In the wake of 2007–2008 commodity price boom, India—one of the major suppliers of rice on the world market—banned exports of non-Basmati rice. This policy shock turned out to be a key contributor to what became to be known as the 2008 rice crisis.

The foregoing anecdotal evidence underscores the complexity of factors contributing to short-term trends in global commodity markets. Usually, multiple factors are at play, which often exacerbate the issue. The current global commodity market disruption is not an exception. Indeed, in many ways, this disruption is unprecedentedly multifaceted and potentially far-reaching. We address some of its key features here.

The rest of the article is organised as follows. In Section 2, we examine the causes of global commodity market disruption in recent history with some examples from more distant past. We conclude the section by outlining the key factors of the 2022 crisis. In Section 3, we discuss some of the key consequences of this disruption, with specific focus on poverty and under-nutrition as well as conflict and social unrest. In Section 4, we summarise some of the key aspects, including the opportunity costs of the current disruption in agricultural commodity markets, and present implications this may have to LMICs.

2 | GLOBAL COMMODITY MARKET DISRUPTION

Export bans in response to drought or trade sanctions after military invasions highlight the general pattern of events that lead to global commodity market disruption, which is a combination of exogenous shocks followed by policy responses. In the spirit of Tadesse et al. (2014), one can build a taxonomy of the causes of food and agricultural commodity price trends and volatility. The root cause of commodity price spikes is exogenous shocks, such as weather shocks that affect the production of commodities, energy shocks that affect both production (through input costs) and distribution (through transportation costs), and geopolitical shocks (e.g. armed conflict) that deter commodity production and distribution. Government

intervention such as export bans or market responses such as speculation, both potentially endogenous to market disruption, can further amplify the effect of the shock.

In what follows, we analyse the main messages of the economic literature on the relative importance of these various causes of market disruption. We focus on the role of discrete events for explaining grain price spikes, but more gradual and long-term shifts in demand and supply are often key underlying causes for short periods of high prices. The increase in the use of cereals for biofuel production and animal feed is the most prominent example of a demand shift for cereals (Carter et al., 2017; Headey & Fan, 2008; Wright, 2011). Carter et al. (2011) argue that strong global demand, especially in LMICs, was an important factor in the commodity booms of 1973–1974 and 2007–2008.

Shifts in supply in the long term are driven by the rate of growth in agricultural productivity. Fuglie (2018) finds that agricultural productivity has not slowed down at a global level, but Andersen et al. (2018) find that U.S. agricultural productivity growth has slowed in recent decades. Ortiz-Bobea et al. (2021) provide evidence suggesting that anthropogenic climate change has reduced agricultural productivity growth by 21 per cent since 1961.

A sustained increase in demand or a decrease in supply can reduce the stocks-to-use ratio to such an extent that prices become highly responsive to exogenous shocks. The literature on grain storage and price volatility (Gouel, 2012; Wright, 2011, 2012), for example, points to the increased responsiveness of the prices of a storable commodity in a low-inventory regime. Carter et al. (2011) find that the 1973–1974 and 2007–2008 periods exhibited extreme price spikes only for those commodities with low stocks.

2.1 | Weather shocks

Since 2000, there have been several drought episodes that led to significantly reduced world grain production and higher prices. Droughts in Russia in 2010 and in the United States in 2012 contributed to a rise in grain prices, although as evident from Figure 1, these price rises were relatively smaller than in 2007–2008 and 2022. The price increase in 2010 was larger than in 2012, most likely due to the more widespread use of export restrictions in 2010 than in 2012. Interestingly, a decline in grain production caused by reduced acreage in Russia and a drought in Argentina in 2018 did not lead to a price surge, despite the fact that the world production drop was similar in magnitude to 2012 (which, in turn, manifested in a comparable drop in exports, as observed in Figure 3). An important difference between weather shocks of 2018 and those of other years is the state of crude oil prices. From the beginning of 2015 to the end of 2020, the West Texas Intermediate (WTI) crude oil prices were hovering in the US$40–$60/ Bbl range, whereas from 2011 to 2014, the WTI crude oil prices were, on average, at US$100/ Bbl mark. As discussed in the next subsection, low oil prices limit the demand for biofuels and reduce the transport costs to move commodities, both of which matter to realised prices of cereal grains.

The relationship between weather shocks and commodity prices is mediated through the well-established channel that links weather to crop yields, and in turn, crop production to prices. To that end, two aspects of this relationship are of relevance. First, because cereal grains are grown and harvested annually, the effect of the weather shocks on production is also manifested at that frequency. However, the expectations about the yields are formed at higher frequency and updated regularly through various information shocks (which we discuss below), such as monthly World Agricultural Supply and Demand Estimates (WASDE) reports of the United States Department of Agriculture (USDA), or monthly seasonal climate forecasts released by the International Research Institute (IRI) at Columbia University.

Second, on a global scale, the weather shocks and harvest seasons are not synchronised, owing to their geographical disparities and seasonal differences between northern and

southern hemispheres. Thus, two similar weather shocks in a country (e.g. United States) or a geographic region (e.g. EU) can have very different price effects depending on what has happened in other regions (concurrently or in the recent past) due to the potential for intra-annual arbitrage. Lybbert et al. (2014) provide evidence suggesting that interhemispheric trade and supply responses can moderate the effects of weather shocks on global food supply.

Weather affects prices when information is revealed to the markets. Indeed, empirical evidence suggests that much of the price adjustments to weather shocks happen before the yield is actually realised (Letta et al., 2022). Such adjustments are typically small in magnitude. A lack of complete information followed by a sudden update can bring about a price shock, however. The classic example of such an event is the so-called 'Great Grain Robbery' of 1972 when the Soviet Union purchased over one billion bushels of U.S. wheat at an average price of US$1.65/bushel (Nordhaus & Shoven, 1974). The U.S. government at the time was not aware that the USSR had a crop failure in 1972, and world grain prices soared when this information was later revealed.

Information has become much more freely available in recent decades, making sensational events such as the 'Great grain robbery' of 1972 a thing of the past. However, information continues to be lacking at times, particularly with respect to the level of Chinese grain stocks. As recently as 2018, the USDA revised its estimate of China's grain stocks upwards by 149 million tonnes, although the impact on world prices was negligible.[1]

2.2 | Energy shocks

Energy and food prices tend to comove. The apparent linkage between the two markets has intensified due to the use of agricultural commodities in biofuel production, and the associated mandates. de Gorter et al. (2013) argue that the 2007–2008 price rise was entirely driven by the biofuel policies, while Carter et al. (2017) estimate the effect of 30 per cent higher prices of maize, on average, during the 2008–2014 period due to the U.S. ethanol mandate. Headey and Fan (2008) and Wright (2011) clarify that the increased demand for maize due to U.S. biofuel mandates was a major contributing factor to the decline in the stocks-to-use ratio, which set off the 2007–2008 price spike.

The notable cereal price spikes of the 21st century were all paralleled by rising energy prices (Figure 4). From January 2007, during the next year and a half, crude oil prices more than doubled, exceeding US$133/Bbl in June–July 2008. After a sharp drop following the great financial crisis, crude oil prices increased again, reaching US$110/Bbl in April 2011. Reminiscent of these previous two instances, crude oil prices have been increasing after an abrupt episode of recession in early 2020, reaching US$110/Bbl by May 2022.

The premise that energy prices impact agricultural markets is hardly unequivocal. Headey and Fan (2008) argue that the oil price spike contributed to the food price spike of 2007–2008. Dillon and Barrett (2016) find that global oil prices affect maize prices in east Africa, but mainly through their impact on transportation costs. This finding may only be generalizable to a subset of countries similar to those in east Africa, where the uses of fuels and fertilisers as inputs in agricultural production, and diversion into biofuels, are limited, thus making transport the main channel. However, Baumeister and Kilian (2014) provide suggestive evidence that energy prices and food prices are jointly determined by underlying aggregate demand. To the extent that costs of input and transportation are a factor, for the 2022 crisis, this effect has been in the making through the most part of the pandemic, and especially since the second half of 2021 when prices of fertilisers increased dramatically and contributed to rising food prices (Vos et al., 2022).

Energy prices and international shipping costs tend to be pro-cyclical. Kilian (2009), for example, argues that bulk shipping rates are driven primarily by aggregate demand in the

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[1] See https://www.usda.gov/oce/commodity-markets/wasde/historical-revisions.
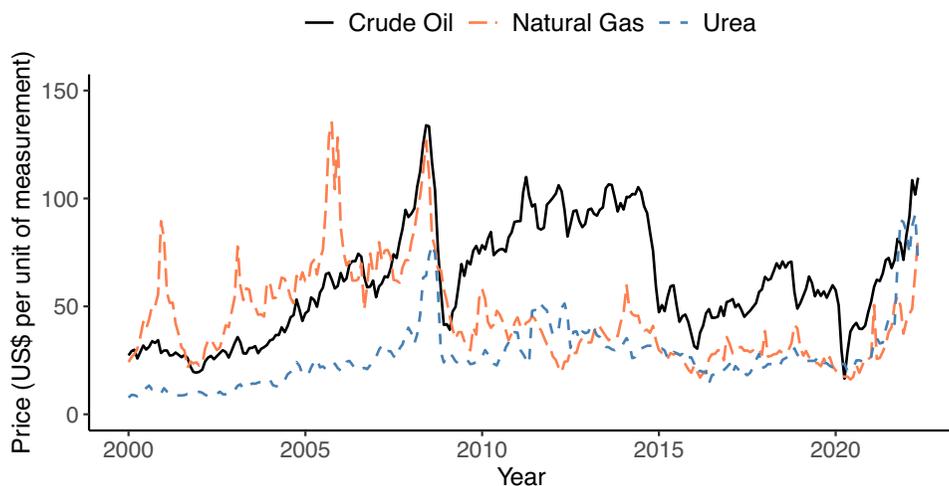
FIGURE 4   Time series of the food, energy and fertiliser indices.
Note: Prices of crude oil (West Texas Intermediate), natural gas (spot price at Henry Hub, Louisiana) and urea (fob Black Sea, from March 2022 fob Middle East) are denominated in nominal US\$. The units of measure are barrels for crude oil, metric million British Thermal Units for natural gas and metric tonnes for urea. The prices of natural gas are scaled by 10, and the prices of urea are scaled by 0.1 to facilitate visual comparison of the series. The covered period from January 2000 to May 2022 captures the 2007–2008 crisis, the 2010–2011 crisis and the beginning of the 2022 crisis. The data are from The World Bank Commodity. Markets Portal is commonly referred to as the 'Pink Sheet'.

world economy. Upward spikes in international shipping costs have tended to go hand in hand with food price spikes. The Baltic Exchange Dry Index—a benchmark for the price of moving the major raw materials by sea, which considers 23 different shipping routes carrying a range of commodities such as coal, iron ore and grains—reached an all-time high of 11,793 in May 2008, before falling back to prespike levels in the aftermath of the Global Financial Crisis in the fall of 2008. The Baltic Dry Index recently rose again to new highs in October 2021, mainly driven by the economic recovery from the COVID-19 pandemic. Vos et al. (2022) argue that international freight prices were an additional factor that led to increased food prices in 2021.

2.3 | Policy shocks

Government intervention has featured prominently during food price spikes. In the wake of the 2007–2008 commodity price boom, nearly three-quarters of emerging market and developing economies took policy actions in an attempt to moderate the impact (World Bank Group, 2009). In response to higher global food prices, net food-importing countries typically intervene by lowering import tariffs and taxes, while net food-exporting countries impose export restrictions (Anderson, 2022; World Bank Group, 2019). Martin and Anderson (2012) find that changes in border protection rates during 2005–2008 can explain 30 per cent of the observed change in the international wheat price, and 45% of the observed change in the price of rice—a key contributing factor of the global rice crisis of 2008.

Trade wars can also have a significant effect on commodity prices. The trade war between the United States and China beginning in 2018 led to China levying a 25% retaliatory import tariff on U.S. soybean exports. The tariff severely disrupted U.S. soybean exports to China, resulting in a sudden drop in the U.S. soybean price and an increase in soybean prices in the rest of the world. Adjemian et al. (2021) find that the tariff resulted in the price of soybeans

at Gulf export locations dropping by US$0.74/bushel on average between July and December 2018. The authors also find that the price of soybean exports from Brazil increased by US$0.97/bushel during the same five-month period.

Since the food price spikes of 2007–2008 and 2010–2011, economists have devoted extensive study to evaluating not only the policy responses by governments but also the role of pre-emptive policies. Much of the focus has been on the provision of market information, which is key to the proper functioning of markets. The USDA's WASDE reports have historically been the main source of market information about commodity supply and demand fundamentals. Research has shown that WASDE announcements are associated with a reduction in price volatility (Adjemian, 2012; Adjemian et al., 2018; Isengildina-Massa et al., 2008a, 2008b).

Another policy focus during the last decade has been international coordination in order to avoid the use of export restrictions in times of crisis. This is a difficult task, owing to skewness in the commodity price distribution—in times of relatively rare but large positive price deviations food-exporting countries have an economic incentive to deviate from cooperative trade policy (Gouel, 2016). Launched in 2011 by the G20 agriculture ministers, the agricultural market information system (AMIS) serves as a platform for coordinating policy action in times of market uncertainty. Using the soybean market as the case study, Gouel (2020) finds that advanced information facilitates redistribution of intrayear price volatility but has a limited effect on interannual price volatility.

Storage is another pre-emptive policy option, but policy recommendations on this have been mixed. In their summary of the competitive storage literature, Carter et al. (2011) highlight that occasional price spikes are a feature of storable commodity markets, due to rare occurrences of large negative supply shocks. Gouel and Jean (2015) find that price stabilisation pursued solely through storage subsidies does not improve consumers' welfare, but a combination of storage subsides and trade policies (export taxes or import subsidies) can be cost-effective from a domestic perspective. Larson et al. (2014) find that strategic wheat stockpiles can be effective in reducing domestic price volatility in the Middle East and North Africa, but a more efficient policy is targeted transfers to poor households.

2.4 | Other shocks

Other shocks, not related to weather or economics, can also affect food commodity prices. This category includes everything from geopolitical events to pandemics. The war in Ukraine clearly provides an example of a geopolitical event that significantly affected food commodity prices, in particular cereals and vegetable oils. While the vast majority of such events tend to be localised and thus have little-to-no effect on global markets, there is suggestive evidence of conflict-related disruptions in local markets (e.g. Hastings et al., 2022).

The COVID-19 pandemic, arguably one of the key reasons for the 2022 food crisis, had a surprisingly limited *initial* impact on global cereal markets. Prices, for the most part, were stable during the pandemic, although prices for wheat and maize started trending upward from the second half of 2020. Rice prices, which increased in the beginning of 2020 as a result of precautionary export restrictions by several key rice-producing countries, decreased and then plateaued in 2021 after the restrictions were relaxed.

Part of the reason for the subdued initial impact of the pandemic on food prices is that global food supply chains proved to be more resilient than anticipated. Arita et al. (2022) find that international trade flows were not significantly affected for most food and bulk agricultural commodities. However, Vos et al. (2022) argue that the increase in food prices in the second half of 2021 was largely associated with the recovery in food demand and temporary disruptions in logistics. One notable exception to the resilience of food supply chains during the pandemic was the disruption in meat processing plants, which led to a

spike in meat prices in the beginning of the COVID-19 pandemic. Lusk et al. (2021) find that the reduction in slaughtered hogs and cattle in the spring of 2020 caused wholesale beef prices in the United States to quadruple and wholesale pork prices to double during a short period.

Another important factor affecting global commodity markets is sanctions. Trade sanctions imposed in response to military conflicts have also affected commodity prices. The Russian invasion of Crimea in 2014 triggered EU sanctions, to which Russia responded by banning the imports of several EU food products.[2]

The EU and Russian sanctions in 2014 arguably did not affect world grain prices to any great extent, but the price of certain EU food exports was severely affected. Boulanger et al. (2016) evaluate the market impacts of the Russian import ban on food imports using a computable general equilibrium (CGE) model and find that fruit and vegetable prices were most affected. In an analysis of Swedish firms, Gullstrand (2020) finds that export prices for food products banned by Russia dropped significantly after 2014.

2.5 | Key factors of the current market disruption and food crisis

The global agricultural commodity market disruption of 2022, while not unprecedented, is unique in a number of ways. Most notably, The Ukraine War, arguably one of the key triggers of soaring cereal prices, erupted almost exactly at a two-year mark of one of a kind pandemic, which has been depleting financial resources, both public and private, and testing the resilience of supply chains in high- and low-income countries alike. On the contrary, factors such as strong demand and high or rising energy prices were also on display during the previous notable events of 2007–2008 and 2010–2011. Table 1 summarises the key factors of market disruption in the current and previous crises.

3 | THE FALLOUT

Global commodity price shocks can have direct and indirect impact on economies and the sociopolitical scene in low- and middle-income countries. The direct effect is associated with price transmission from global commodity markets to local food markets. The indirect effect is channelled through the reduced aid and assistance from high-income countries. Both these effects are important and relevant in analysing the fallout of the global price shocks, as the spike in local food prices is what will impact the affordability of food items by households, especially those in or on the verge of poverty.

Evidence suggests that sanctions and embargoes, or any policy interventions that lead to market disruptions, threaten food security of the most vulnerable households (Anderson, 2022), primarily through higher prices for goods that were previously imported. Hinz and Monastyrenko (2022) find that the price of embargoed goods in Russia rose by between 8 and 15 per cent in the short run. In the case of the Gaza trade embargo of 2007–2010, Etkes and Zimring (2015) find that the consumer price index (of which food imports constitute nearly half of household expenditures) increased by over 10% compared with the West Bank counterfactual economy. In the absence of adequate support, higher food and agricultural commodity prices in a country not only threaten food security but also push some to involve in destructive or unlawful activities such as protests and riots, or possibly more violent and intense forms of civil conflict.

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[2]See https://www.government.nl/binaries/government/documents/letters/2014/08/13/decree-of-thepresident-of-the-russian-feder ation-on-the-application-of-certain-special-economic-measures-to-ensure-thesecurit/14131574-bijlage.pdf.

TABLE 1 Causes of disruption during the crises of the 21st century

Factor	Impact during the crisis			Notes
	2007–2008	2010–2011	2022	
Strong demand	Strong	Strong	Strong	Includes direct but, particularly, indirect demand of cereal grains for their use in biofuel production and animal feed. A potentially common factor in demand for food and energy commodities.
High energy prices	Strong	Moderate	Strong	Affects production and distribution of cereal grains through costs of fuel and costs of fertilisers, which are closely linked with energy prices. The link is likely to be geographically heterogeneous.
Production issues	Mild	Strong	Moderate	During the 2010–2011 crisis, crop failure in Russia, and several other countries in the region, was a result of a major drought. During the 2022 crisis, while there was no weather shock of comparable proportions, although episodes of heatwaves impacted major crop-producing regions, issues associated with harvesting and storing of wheat in war-bound Ukraine resulted in outcome reminiscent of a failed crop.
Trade disruption	None	None	Strong	Refers to an inability to physically transport cargo due to reasons different from trade-restricting policies. Largely unique to the 2022 crisis. Both the pandemic-related and war-related disruptions have been at play.
Trade restriction	Strong	Strong	Moderate	While in all three instances, governments across the world have responded to rising cereal prices, there were less of such interventions during the 2022 crisis, possibly as a result of the lessons learned from the previous episodes. The most damaging of these responses appear to have been export restrictions by major producers.

3.1 | Price transmission

The global commodity price shocks matter because they can drive local food prices. Two dimensions of this price transmission are relevant: first, the horizontal price transmission, that is the transmission of the price of a commodity from global to local markets and, second, the vertical price transmission, that is locally, the transmission of the price of a commodity to the price of the food item produced from that commodity. The transmission of price shocks from global to local markets is not perfect, nor homogeneous across countries or markets within the countries (Baffes et al., 2019; Dillon & Barrett, 2016; Shively & Thapa, 2017; Svanidze et al., 2021).

Baquedano and Liefert (2014) investigate the integration of global markets of major cereal grains with local markets across large number of LMICs around the world, finding aggregate

elasticities of price transmission from global to local markets ranging from 0.16 for sorghum to 0.32 for wheat, with individual country-specific elasticities ranging from statistical zero to almost 0.8, with vast majority of estimates being under 0.5. The authors find that the speed-of-adjustment of local prices to global shocks varies across countries as well, ranging from under a month to several months. Focussing on European Union countries, and using price indices, instead of specific commodity prices, García-Germán et al. (2016) estimate largely similar elasticities of price transmission from global to local markets.

Different factors impact the degree and extent of global-to-local commodity price transmission. In their meta-analysis of 57 published studies, Kouyaté and von Cramon-Taubadel (2016) find that markets within countries are 23 per cent more likely to be co-integrated than markets separated by an international border, while markets separated by 1000 km within a country are 6%–20% slower to adjust prices and have 7% lower co-integration, while international markets are 13% slower to adjust prices. Distance between origin and destination countries has negligible effects on trade flows.

3.2 | Poverty and undernutrition

In the wake of the commodity price boom leading to the great financial crisis of the late 2000s, and shortly after the 2010–2011 spike in cereal prices, a number of studies that examined the poverty impact of these shocks were published. Ivanic and Martin (2008) studied the commodity price increase between 2005 and 2007 in a sample of low-income countries and found that it led to the increase in poverty for most of the considered countries, primarily in response to higher prices of wheat, followed by those of rice, dairy and maize.

Examining the 2010–2011 commodity price spike, Ivanic et al. (2012) found the effect in accord with that of the previous work, with an estimated poverty increase by 1.1 percentage points in low-income countries and 0.7 percentage points in middle-income countries, together accounting for a net of 44 million people falling into poverty.

While there may be indications that commodity price spikes may benefit agricultural producers, by no means does this effect apply to the entire rural population. Indeed, much to the detriment of rural poor, who are net buyers of food, an increase in prices leads to a higher incidence of poverty in this group (Warr & Yusuf, 2014).

Poverty and undernutrition are intrinsically linked. Higher food prices pose risk on the food security of most vulnerable groups. Empirical evidence points to a considerable reduction in caloric intake and the dietary diversity in response to global food and agricultural commodity price shocks (Anríquez et al., 2013; D'Souza & Jolliffe, 2014).

An important characteristic of cereal grains is that they are storable and transportable, unlike such perishable items as dairy products or eggs, for example (Headey & Masters, 2021). To that end, changes in global cereal markets can directly impact the levels of nutrition in LMICs that rely on imports. As alluded above, this is less of the case for landlocked countries, or places located inland—distant from coastal areas, where the global-to-local price transmission is somewhat muted.

3.3 | Conflict and violence

Another crucial effect of increasing food prices is the elevated risk of conflict and violence. A case in point is the wheat price spike of 2010 that partly contributed to the Arab Spring of 2011 (Lybbert & Morgan, 2013)—the political turmoil that spanned wheat-importing countries of the Middle East and North Africa region, ousting several governments and, in some instances, leading to the civil war in years to follow. The political effect of food price spikes is

not endemic solely to conflict-prone countries. The food price spikes of 2008 and 2011 contributed to protests among urban residents of the otherwise peaceful nation of Burkina Faso, for example (Barrett & Upton, 2013).

During the past decade, a mounting body of literature has examined potential linkages between the availability and access to food and agricultural commodities as well as their prices and civil conflict of various forms predominantly in Africa but also in Central America and Southeast Asia (Berman & Couttenier, 2015; Crost & Felter, 2020; Fjelde, 2015; Koren, 2018; McGuirk & Burke, 2020; Raleigh et al., 2015; Smith, 2014). Evidence points to a positive relationship between cereal commodity prices and conflict, in general, although the relationship is hardly unequivocal. The ambiguity in the findings is driven by the complexity of the issue, as different factors may be at play depending on socio-economic and political contexts in which the impacts of the shocks are manifested (Hendrix & Haggard, 2015). Possible endogeneity of conflict to local food prices further complicates the matter (de Winne & Peersman, 2021) and calls for caution in making causal claims in the income-conflict nexus. With these caveats in mind, we summarise the key effects the increase in cereal prices can have on conflict and violence.

In discussing the effect of food and agricultural commodity price shocks on conflict and violence, a sensible approach is to make a distinction between urban and rural sectors. Such distinction is motivated by the diverging income effects associated with price shocks.

For urban consumers, who are not involved in agricultural production, an increase in the price of a commodity, particularly of a cereal, will reduce real income, ceteris paribus. This lends to the so-called *'relative deprivation hypothesis'*, which suggests grievance and anger by people whose well-being is worse either compared with others or relative to their expectations based on past experiences (de Winne & Peersman, 2021; Hendrix & Haggard, 2015). In instances when the income effect of the commodity price increase is negative, social unrest of some form (e.g. protests and riots), fuelled by people's inability to satisfy their basic needs, is expected. Recent empirical evidence confirms this (Bellemare, 2015; Hendrix & Haggard, 2015; Smith, 2014). Findings of Bellemare (2015), for example, point to the 2008 and, especially, 2010–2011 food crises as the key drivers of 'food riots'.

For rural consumers, and specifically those engaged in agricultural activities, the commodity price increase can have a positive or negative income effect, depending on whether they also produce or just consume that commodity.

In instances when the commodity price increase facilitates increased income, two effects of opposite sign are possible. The so-called *'opportunity cost mechanism'* would explain the negative relationship between income shocks and conflict incidence. In rural areas, where the main source of legal income is agricultural production, it is understood to be a trade-off between 'farming' and 'fighting' so that the opportunity cost of enrolling in a paramilitary unit is an increasing function of income—a positive income shock thus reducing the violence (e.g. Collier & Hoeffler, 1998; Dube & Vargas, 2013). Such effect, notably, is of longer term type. That is, the effect of an income shock will manifest into a change in the propensity of conflict and violence in years to follow, but not necessarily immediately.

On the contrary, the *predation* or *rapacity mechanism* would explain the positive relationship between income shocks and conflict incidence (Crost & Felter, 2020; McGuirk & Burke, 2020). To the extent that a positive commodity price shock increases the value of the 'prize' to be appropriated, households that are involved in producing the commodity may attract perpetrators, thus leading to more violence. Such an effect, in contrast to that described above, is of shorter term type, with conflict and violence occurring soon after the price shocks, typically involving the existing armed forces or paramilitary groups.

4 | CONCLUSION

While no country is fully insulated from the repercussions of the present global market disruption, there is a considerable degree of heterogeneity in the effect among countries and groups of people within countries. High-income countries are relatively better equipped, financially and institutionally, to weather the shock, than LMICs, where the issues of food access and affordability impacted a larger share of the population even before the pandemic (Bai et al., 2021). Famines are not as widespread and detrimental as they used to be, but they still affect vulnerable countries and regions to this day. They tend to be highly localised, and primarily driven by local climate shocks rather than global market disruptions, however. To that end, the main and direct impact that the current global commodity market disruption will have on food crises around the globe will channel through affordability rather than availability of food, particularly those derived from cereal grains.

LMICs may find this global agricultural market disruption more difficult to navigate than comparable disruptions from the past because historically, assistance from high-income countries and international organisations has played a considerable role in mitigating the repercussions of global food crises. For obvious reasons, the usual donors' immediate focus presently is on addressing the socio-economic issues of their own, as well as towards providing much-needed assistance to people of Ukraine, who have been in harm's way since the beginning of the war. Moreover, local and regional procurement—the favoured method of food assistance due to its cost–effectiveness (Lentz et al., 2013)—may require adjustments for regions such as the Middle East and North Africa that typically have relied on supplies from the Black Sea region.

At the same time, many of the LMICs may have exhausted financial and possibly also political resources during the pandemic years, leaving with little wiggling room in mitigating the socio-economic consequences of global market shocks. Moreover, some of the policy changes directed towards mitigating local food security issues—such as India's export ban, for example—have exacerbated existing shortages on the global cereal market.

To the extent that the current state of affairs is an outcome of many factors that has impacted every country in some way or another, it very well may be that the existing estimates of the repercussions of a global commodity market disruption are the lower bound of what may unfold in months and years to come. In any case, a mindset of urgency is required by policymakers, both nationally and internationally, to ensure that the crisis does not evolve into a catastrophe.

In the early days of the war, there was a hope that it would not linger. It has lingered. This war in conjunction with other inflationary pressures—directly or indirectly linked with the pandemic—as well as less-than-favourable weather conditions in some parts of the world, has contributed to a 'perfect storm' that has disrupted agricultural commodity markets.

Times are dire, but the global society has not been better prepared—through accumulated knowledge, at the very least—to tackle these adversities. A key to success is in the coordinated action targeted towards mitigating the repercussions of global market disruption, which affects all, but disproportionally so those who are in need even during the times of relative normalcy.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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