

## *The Ukrainian-Russian war and food security (wheat model)*

### الحرب الأوكرانية الروسية والأمن الغذائي (القمح نموذجاً)

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**Abstract:** The Russo-Ukrainian war caused significant price fluctuations in agricultural markets. For wheat, price levels and price volatility reached their highest levels. Both have declined to pre-war levels over the past six months, volatility remains high compared to historical levels, indicating continued significant market uncertainty, creating continued vulnerability to global food security. Before 2022, volatility as measured by implied volatilities in the wheat futures market had risen and remained high shown by the gray bands. Markets then remained relatively calm until the recent rally following the Russian invasion of Ukraine in February 2022. Extreme volatility continues due to market uncertainty over the war and the relative tightness in inventory levels, which offer little protection against unexpected production shortfalls.

**Keywords:** war, conflict, Ukraine, Russia, food security, export restrictions, food supply

**Jel Classification Codes :** N5, Q18, Q38.

**المخلص:** تسببت الحرب الروسية الأوكرانية في تقلبات كبيرة في الأسعار في الأسواق الزراعية. وبالنسبة للقمح، فقد وصلت مستويات الأسعار وتقلبات الأسعار إلى أعلى مستوياتها. وقد انخفض كلاهما إلى مستويات ما قبل الحرب خلال الأشهر الستة الماضية، ولا تزال التقلبات مرتفعة مقارنة بالمستويات التاريخية، مما يشير إلى استمرار حالة عدم اليقين الكبيرة في السوق، مما يؤدي إلى استمرار الضعف أمام الأمن الغذائي العالمي. قبل عام 2022، ارتفعت التقلبات، مقاسة بالتقلبات الضمنية في سوق العقود الآجلة للقمح، وظلت مرتفعة كما تظهرها النطاقات الرمادية. ثم ظلت الأسواق هادئة نسبياً حتى الارتفاع الأخير الذي أعقب الغزو الروسي لأوكرانيا في فبراير/شباط 2022. وتستمر التقلبات الشديدة بسبب حالة عدم اليقين في السوق بشأن الحرب والضييق النسبي في مستويات المخزون، والتي لا توفر حماية تذكر ضد النقص غير المتوقع في الإنتاج.

**الكلمات مفتاحية:** الحرب، الصراع، أوكرانيا، روسيا، الأمن الغذائي، قيود التصدير، الإمدادات الغذائية.

**تصنيف JEL:** N5, Q18, Q38.

## **1. Introduction:**

Food security happens when “all people at all times have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life”. Food security has four standard dimensions: availability (having enough food available regularly); access (having enough resources to acquire suitable and healthy food); utilization (having a reasonable food use based on knowledge of essential nutrition and care); and stability of availability, access, and utilization of food. Although these four dimensions remain fundamental, they lack other features, such as agency and sustainability that have come to be recognized as critical for altering food systems in the direction required to accomplish the SDGs. Evidence shows that wars and conflicts are the most important drivers of food insecurity globally. Indeed, in 2021, 139 million people were in crisis or severe food insecurity in 24 countries and territories, with war and instability being the primary drivers.

The war triggered a panic buying movement at country and individual levels. Finally, the war may jeopardize the implementation of the Sustainable Development Goals, no poverty, zero hunger, and Responsible consumption and production. However, the consequences of the war on food security are being exacerbated by a variety of underlying rigidities, vulnerabilities, and inefficiencies in global food systems. Accordingly, the transition toward healthy, equitable, and ecologically sustainable food systems must be strengthened by adopting urgent and long-term reforms and policies.

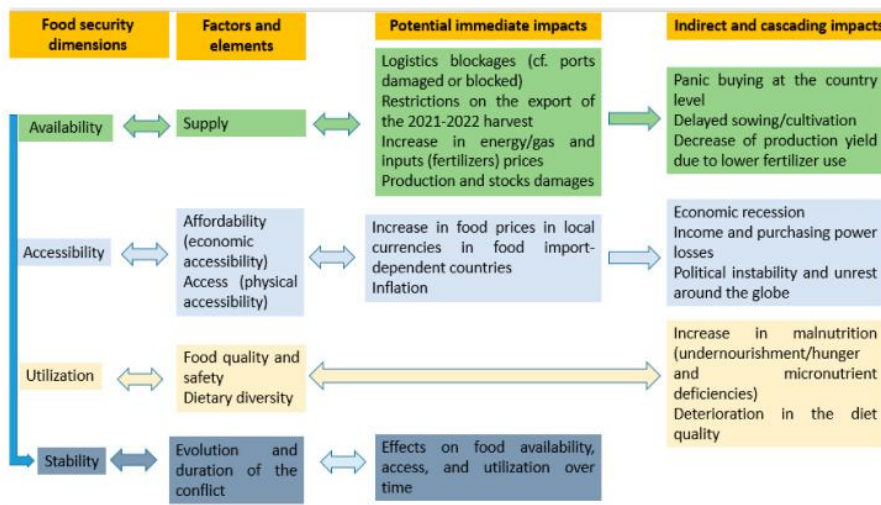
Our manuscript is founded on a review of older literature, with reports, policy documents/briefs, and working/discussion papers produced in English, French, and Arabic by a variety of organizations, including international organizations, International Food Policy Research Institute (IFPRI), International Monetary Fund (IMF), United Nations Conference on Trade and Development (UNCTAD), United Nations Development Program (UNDP), Organisation for Economic Co-operation and Development (OECD), regional organizations and international news platforms.

Understanding how conflict-related distractions in global food and richer markets might have large-scale and long-term implications on price and availability is critical for understanding the overall impact on global food security.

## 2. An intermediate and long-term effects of the War's

We can suggest that the recent war has a multitude of immediate and long-term indirect impacts on global food security (Figure 1).

Figure 1: Impacts of the Russia–Ukraine war on global food security.



Source: Tarek Ben Hassen et al (2022) PMID: PMC9368568, PMID: 35954068

Figure 2: Wheat price volatility



Source: Tarek Ben Hassen et al. (2022) PMID: PMC9368568, PMID: 35954068

For the wheat price volatility. Volatility is measured as the implied price volatility in the underlying futures/options market. Price volatility can, in part, be traced to uncertainty over the continuing flow of supplies, which depends on a number of factors, principally current production and existing stocks. For example, a 13.5% stocks-to-use is the second lowest on record behind 13.1% in 2007-2008, another extremely volatile time for wheat prices. The recent five-year average in exportable

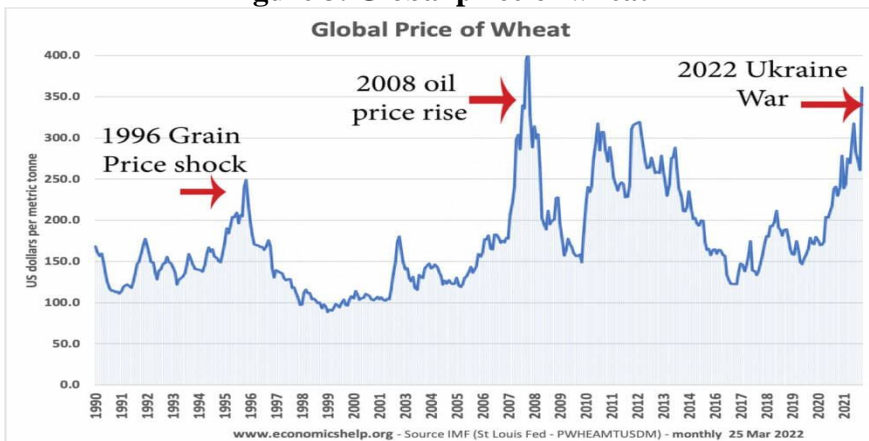
wheat stocks-to-use is 15.7% and the highest within the last decade was 18.9% in 2017-2018.

## 2.1 Reasons for price fluctuation

Uncertainty regarding the continued flow of supplies, which depends on a number of factors, primarily current production and existing inventories. It studies the relationship between global wheat stocks and price volatility. As well as how and to what extent the fluctuations in global inventories have worsened over the past eighteen months and the prospects for the future. The price of wheat is determined by supply and demand factors in particular the price of oil, global population, income growth, price of substitutes and climate factors affecting the supply.

The price increases were rapid and sharp: between January and May 2022, wheat prices increased by more than 30 per cent. This was widely blamed on the Ukraine War, which involved two major exporters of wheat, Ukraine and Russia. Wheat is the fifth most traded commodity after oil, coffee, gas and gold. It accounts for approximately 21% of the world's food and the gross world trade in wheat is greater than all other crops combined. Wheat is a key ingredient of bread, flour, and pasta and is also used in the production of whiskey and beer.

**Figure 3. Global price of wheat**



Source: St Louis Fed (recent months, market data)

The price of wheat is determined by supply and demand factors in particular the price of oil, global population, income growth, price of substitutes and climate factors affecting the supply. In recent months, the conflict in Ukraine (which produces around 10% of the global supply) has

pushed up wheat prices and prices could continue to rise due to the negative effect on supply surrounding the conflict.

## **2.2 Explanation of global stocks:**

Stockpiles are necessary to cushion the effects on market prices caused by production shocks such as drought, extreme weather, conflicts, or other disturbances. When production shortfalls occur, available stocks can help support markets until the next harvest, thus mitigating price impacts. Conversely, when the global harvest is large, wheat can be carried forward for sale in the following marketing year, thus establishing an effective floor for current prices. In this way, stocks help moderate the peaks and troughs of prices and thus reduce price volatility. However, when inventories are already at low volumes, as they have been over recent months, the ability to mitigate the effects of shocks is more limited. Countries with public stock programs account for about 65% or more of global wheat stocks. Governments hold public stocks for food security purposes, to enhance producers' incomes, or both. Globally, the balance of publicly owned stocks has shifted in recent years from the United States and the European Union to other countries, particularly China and to a lesser extent India. Historically, the United States and the European Union held large wheat reserves as part of price support programs but policy reforms in the 1980s and 1990s eliminated those programs. Recently, publicly traded companies, such as the Food Corporation of India and the state-owned Chinese Food Corporation COFCO, have been buying, selling, and storing large quantities of wheat and other grains.

## **3. Global stocks:**

The remaining third or more of global stocks (including individual farmers). A distinction is often made between private shares held for discretionary purposes (sometimes called "speculative" shares) and so-called "linear" or "performing" shares. Discretionary stocks are held by commercial interests that purchase grain in one period in the hope of selling it later at a price high enough to offset the costs of purchasing and storing the crop. Pipeline stocks are stocks held to run the marketing chain and are generally less responsive to price than discretionary stocks.

### **3.1 Global stocks: difficulties**

The diversity of governments and private entities involved means that data on global stocks are incomplete and often of poor quality, meaning that it is difficult to have full confidence in the eventual global stock figures. Many countries (including some advanced economies) fail to collect or publish data on inventories, and therefore analysts must calculate the level of inventories based on production and consumption data. While improving the quality of inventory data has been the focus of organizations such as the Agricultural Market Information System (AMIS), there remains a great deal of uncertainty about data quality. In addition, the physical quality of the stocks is often unknown. If stored properly, wheat can be kept for several years, but if the quality deteriorates enough, it may become unusable for milling purposes and must be used as animal feed or for industrial uses such as biofuels.

### **3.2 How do stocks affect price fluctuations?**

Inventories typically serve to limit potential price impacts caused by rises and falls in production. In the event of a bumper crop, private traders buy grains with the intention of selling them in the coming period to make an expected profit. This effectively puts a cap on market prices. Likewise, when carryover stocks from the previous year are high and there is a shortage in production, traders will sell the grain rather than carry it over to the following year. This helps moderate prices and mitigates the impact of production shortages.

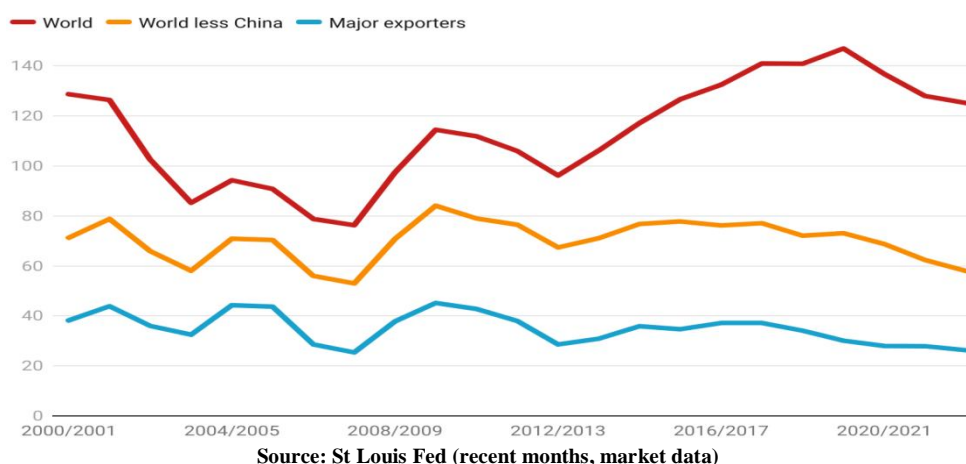
### **4. Current Analysis of the results:**

The current global market environment with its mix of post-pandemic effects, droughts, war impacts and other issues is anything but typical, and has led to overall stock shortages. The ability of stockiest to cushion production shocks is limited. When discretionary inventories are limited and a production shock occurs, pipeline inventory holders (such as mills) are reluctant to release grain to ensure adequate supplies for millers and other users. Consumers are often willing to pay more for supplies of scarce grains, forgoing other expenses. Therefore, prices continue to rise. Only large price increases can reduce demand enough to counter the full impact of a supply shock. As a result, price volatility tends to be much higher when inventories are low. How tight are wheat ending stocks?

#### 4.1. Global wheat stocks are shrinking:

The ongoing war in Ukraine has reduced wheat production and disrupted markets around the world. The relative tightness of global stocks suggests that price volatility will remain high compared to the past ten years. Going forward, rebuilding stocks of wheat and other major global crops would help reduce prices and price volatility. Similarly, tight stocks mean that unexpected production shortfalls in one of the major wheat-producing regions are likely to cause prices to rise sharply and lead to increased price volatility. The scarcity of reliable data on grain stocks remains a challenge for market analyses. Despite efforts to improve data collection over the past fifteen years, progress has been slow.

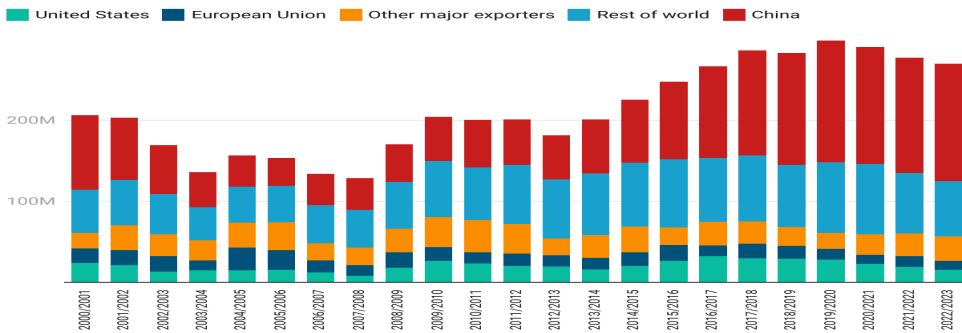
**Figure 4. Global wheat stocks are shrinking.**



Since the start of the war, Western sanctions on Russia have exempted Russia's food and fertilizer exports, which U.S. government officials have announced on numerous occasions and the Department of the Treasury has reiterated. Nonetheless, the war has affected the global price of fertilizers through higher prices of natural gas, an important feedstock for nitrogen-based fertilizers. Despite carve-outs for agriculture, some firms have been wary of doing business with Russia, resulting in reduced exports, particularly of fertilizers, with Russia's exports of anhydrous ammonia hit particularly hard. Prewar, Russia exported anhydrous ammonia via pipelines to Odesa, which Russia has not accessed since its invasion.

Furthermore, while Western sanctions exempt Russia’s food and fertilizer exports, prewar sanctions against Belarus imposed by the European Union have limited Belarus’s ability to export potash. As a result, though fertilizer prices have retreated from their spike around Russia’s invasion, prices for all forms of fertilizer nitrogen, phosphate and potassium remain 80 to 100 percent above 2020 levels.

**Figure 5. Wheat exportation**



Source: St Louis Fed (recent months, market data)

## 5. Conclusion and Recommendations:

Understanding the risks posed by current volatility depends on measuring the size of global inventories relative to global consumption. The USDA estimates that final global wheat stocks for the 2022/2023 marketing year will be 267 million metric tons. More than half of these stocks are owned by China, while the European Union, the United States and other major exporters account for another 20%. China's wheat stocks rose by more than 160% between 2012 and 2020. This is largely due to changes in Chinese agricultural policy that have increased producer support prices and led to large government stockpiles. By contrast, wheat stocks held by the rest of the world fell by 12% over the same period.

- 1- Conduct an awareness-raising media campaign aimed at rationalizing the consumption of these basic materials and commodities in times of emergencies and crises.
- 2- Adding some materials, such as dates, for example, among the locally produced commodities and classifying them as strategic food in times of emergency, thus including them in food security plans.
- 3- Regulating agricultural and livestock production and directing farm owners and food security projects in the country to the need for production to be organized with respect to the types and quantities of products so that

there is no surplus production that exceeds the need at the expense of a decrease in other commodities and the resulting losses for farmers and the state.

4- Paying attention to the biological development of the product through developing specific types of seeds and fertilizers that are environmentally friendly.

5- Encouraging countries to increase their support for farmers and productive food security projects, such as supporting electricity, financing, marketing and exhibitions. As well as trying to exempt seeds and customs duties from seeds and what goes into agriculture, educating the public and opening high export markets to increase production and reach self-sufficiency and providing relevant numbers and information.

6- Encouraging food manufacturing to benefit from agricultural and animal production and transform it into a long-term process.

7- Ensure that food products of all types are free of any traces or chemical residues harmful to health.

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