
Food Prices and the Right to Food: Assessing Trends in Ukraine During Wartime

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Abstract:

Purpose: The purpose of the article is to investigate and analyse the changes in food prices in Ukraine following Russia's full-scale armed aggression in February 2022, with a detailed focus on key food groups, as well as national and regional peculiarities.

Design/Methodology/Approach: The methodology for the analysis of changes in food prices depends on various factors, primarily determined by the objectives of the analysis. This analysis is intended to offer insights into critical areas and provide direction for further deepening the analysis of prices, laying the groundwork for justifying approaches and focusing on further government interventions (regulations) in this field. As the war significantly impacts all sectors and regions of the country; this influence is more vivid for regions closer to the front line. Consequently, substantial differentiation among regions can be expected in terms of food prices and their fluctuations in response to the new challenges of wartime. The level of price changes will also vary across different types of food. As military actions have varying impacts across different regions and markets, the analysis focused on average prices at the regional level, as provided by the State Statistics Service of Ukraine.

Findings: The analysis reveals that price changes in March 2022 were most prominently depicted across all three heatmaps, reflecting the shock impact of the onset of full-scale warfare. Regions directly affected by hostilities and those nearby stand out distinctly. In other areas, additional factors contributing to food price escalation include heightened demand from population migration flows, increased supply chain costs, particularly for non-local products, and other influencing factors. Throughout 2022, people, especially in rural areas, increased production, such as vegetables – potatoes, cabbage, beets, etc., leading to a lesser growth or even a decrease in prices for these products. In the group with moderate year-on-year growth, a portion of processed products, where large food producers or major traders and retailers are involved, experienced a relatively lower impact. An analysis of price changes in March 2022 compared to January 2022, unlike annual comparisons, reveals extremely sharp monthly price fluctuations, for which the population had little time to adjust. Such rapid price changes call for prompt food support programs. During this short period, there is minimal impact from inflation, but a maximal impact from the shockwaves of the onset of full-scale war. These shockwaves partially subside in the subsequent months but

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include inflationary factors. For many products, there is a minimal increase in prices in March; however, in April, the increase becomes quite significant, indicating delayed market reactions to price shocks. In the medium-term perspective, the summer prices (June 2022) reflect stronger inflationary effects, along with seasonal influences on certain goods (as we compare summer and winter prices). Some shocks diminish as logistics are streamlined, producers and the population adapt, while for certain goods, on the contrary, previous stocks are depleted, and new logistics options prove more costly. When comparing the prices in January 2023 to January 2022, there is already a minimal impact of seasonality as the system has reached a relatively balanced state. These changes indicate the cumulative impact of all annual factors.

Practical Implications: The findings highlight the urgent need for targeted policy interventions to stabilize food prices and safeguard access to food during armed conflict. They also underscore the importance of integrating human rights principles into national food security strategies, particularly in conflict-affected regions like Ukraine.

Originality/Value: The findings highlight the urgent need for targeted policy interventions to stabilize food prices and safeguard access to food during armed conflict. They also underscore the importance of integrating human rights principles into national food security strategies, particularly in conflict-affected regions like Ukraine.

Keywords: Right to food, food security, food prices, wartime economy, Ukraine.

JEL codes: D12, I38, Q18.

Paper type: Research article.

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1. Introduction

The right to food is one of the fundamental human rights (UN, 1948; 2018). The internationally recognised approach, as articulated by the United Nations and its Food and Agriculture Organization, stresses that food security is a key precondition for the full enjoyment of the right to food (OHCHR and FAO, 2010). This entails that to achieve success in food security policy, countries should employ a human rights-based approach. The concept of food security has evolved over the decades.

Currently, the most prevalent understanding, also utilised by the FAO, is expressed

as follows: 'Food security exists when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 2002). According to this definition of food security, it encompasses four dimensions: 1) physical availability of food; 2) economic and physical access to food; 3) food utilisation; 4) stability of the other three dimensions over time.

Some approaches to understanding or assessing food security also consider food affordability as a key component within its broader framework. For instance, Economist Impact developed the Global Food Security Index (GFSI), which takes into account factors such as food affordability, availability, quality and safety, sustainability and adaptation (Economist Impact, 2022a). To assess affordability, the index gauges consumers' capacity to purchase food, their susceptibility to price fluctuations, and the existence of programs and policies to aid consumers during shocks.

According to this impact approach, to estimate food affordability the following indicators are taken into account: 1) change in average food costs; 2) proportion of the population under the global poverty line; 3) inequality-adjusted income index; 4) agricultural trade; 5) food safety net programmes (Economist Impact, 2022b).

According to the Economist Impact Assessment of the Food Security Environment in Ukraine, in 2022, the first year of the full-scale Russian military invasion, the Global Food Security Index decreased by 2.7 – to 57.9 (100=best conditions). However, the most significant reduction occurred in the Affordability block, decreasing by 9.6 – to 66.6 (Economist Impact, 2022c). As the most substantial decrease is observed in affordability, it emphasises the need for a more in-depth analysis of this particular component.

According to the Economist Impact assessment, Ukraine ranks 65th globally and 26th out of the 26 countries in Europe for Food Affordability, with a score of 66.6 (100=best conditions). Between 2021 and 2022, there has been a decline of 9.6 points in this pillar. The Economist Impact explains the country's relatively weak performance in this pillar by low scores within two elements: "Change in average food cost", and "Food safety-net programs".

In both of these indicators, Ukraine scores in the "weak" range (40-54.9). Ukraine's score in "Change in average food costs" dropped dramatically in 2021-22, falling by 40 points. This indicates a high level of food cost volatility amplified by Russia's invasion of the country (Economist Impact, 2022c). This also serves as motivation to investigate deeper into the analysis of food prices in this research.

Taking into account the aforementioned decline in Ukraine's ranking for food affordability and the significant volatility in food prices, it becomes evident that a more in-depth analysis of price dynamics and their impact on food accessibility is

crucial. Thus, the aim of the article is to investigate and analyse the changes in food prices in Ukraine following Russia's full-scale armed aggression in February 2022.

2. Research Methodology

The methodology for the analysis of changes in food prices depends on various factors, primarily determined by the objectives of the analysis. This analysis is intended to offer insights into critical areas and provide direction for further deepening the analysis of prices, laying the groundwork for justifying approaches and focusing on further government interventions (regulations) in this field.

To some extent, the war significantly impacts all sectors and regions of the country; however, this influence will be more vivid for regions closer to the front line. Consequently, substantial differentiation among regions can be expected in terms of food prices and their fluctuations in response to the new challenges of wartime. The level of price changes will also vary across different types of food.

As military actions have varying impacts across different regions and markets, the analysis focused on average prices at the regional level, as provided by the State Statistics Service of Ukraine.

3. Research Results and Discussion: Analysing Food Price Dynamics in Ukraine during Wartime

First, an illustration of the monthly average variation in food prices in Ukraine for the two years – from November 2021 to October 2023 (Figure 1). A line chart illustrating average monthly prices allows us to observe general trends. However, for comparing prices of various food items across different regions, constructing heatmaps proves more beneficial.

Heatmaps offer a more visually intuitive representation of territories and food categories where the most significant price increases occur. Using heatmaps facilitates the comparison of prices across different regions or periods, as it occurs on a single graph. Additionally, it makes it easier to identify anomalous price changes, as they can stand out through their intensity or deviation from the typical pattern.

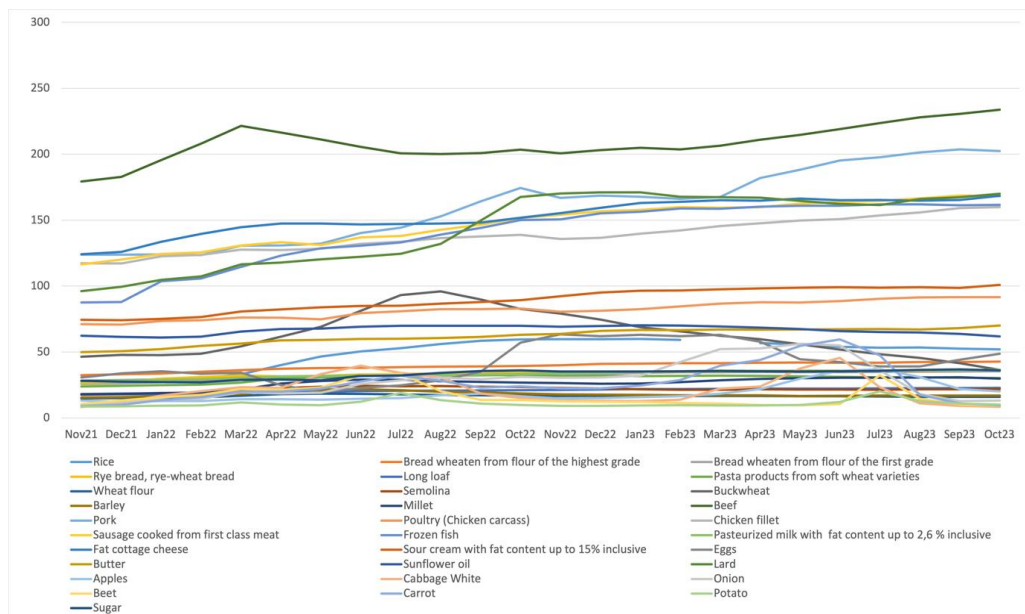
Thus, we use heatmaps for price analysis, which offers numerous advantages compared to linear graphs. This approach contributes to a better understanding, detection, and visualisation of patterns and changes both over time and in space. It can facilitate decision-making processes and enhance a profound understanding of the dynamics of food prices.

Methodologically, as we analyse incomparable prices of different food products, expressed in varying weight units on a single heatmap, it is practical to normalise

and make them comparable within one figure. To achieve this, instead of depicting the actual price levels, representing the percentage change in these prices is advisable.

Therefore, it is crucial to determine a baseline period for comparison and reference periods for assessing the relative change in price from one month to another, such as 'Baseline Month Price' and 'Reference Month Price'.

Figure 1. Average monthly food price changes in Ukraine, January'22 - October'23, in UAH/unit



Source: Authors' calculations based on data of the State Statistics Service of Ukraine.

This approach allows for a standardised assessment of price fluctuations, providing a quantitative measure for analysing and comparing the dynamic shifts in prices over consecutive months. The baseline month for comparison is January 2022, the last peaceful month before the onset of the full-scale war invasion.

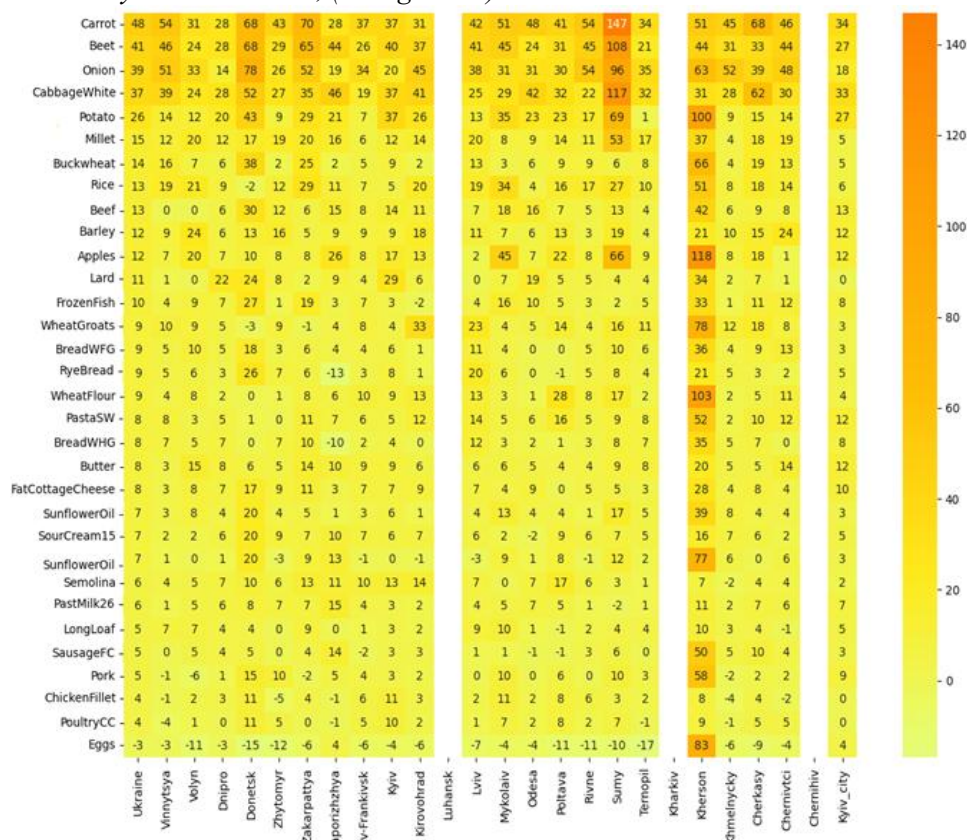
Considering the availability of the data and the specificity of each region, three key reference months were chosen for analysis: March 2022, June 2022, and January 2023. Considering the data for March 2022, June 2022, and January 2023 as reference months allows us to estimate the short-, middle-, and long-term food price dynamics on a maximum number of territories (regions). Such an approach to selecting comparison periods ensures objectivity and comprehensiveness in analysing the impact of the war conflict on food prices in different regions.

No data is available for the Luhansk region after February 2022, as almost the

entire territory of this region has been engulfed in hostilities immediately since the onset of the invasion in February and subsequently was temporarily occupied during the following months. However, data for February 2022 still reflects the situation before the onset of the invasion. Data for the Donetsk region is still available for March 2022, allowing for the estimation of short-term price shocks, but is not available for the subsequent months.

Heatmaps in Figures 2-4 illustrate percentage changes in food prices across regions from January to March 2022, to June 2022, and to January 2023. Rows represent food categories, columns represent regions, and values in cells denote the percentage change in prices, calculated according to formulas 1-2. On each heatmap, products are sorted in descending order based on the percentage change in overall Ukrainian average prices from the baseline month to the reference month.

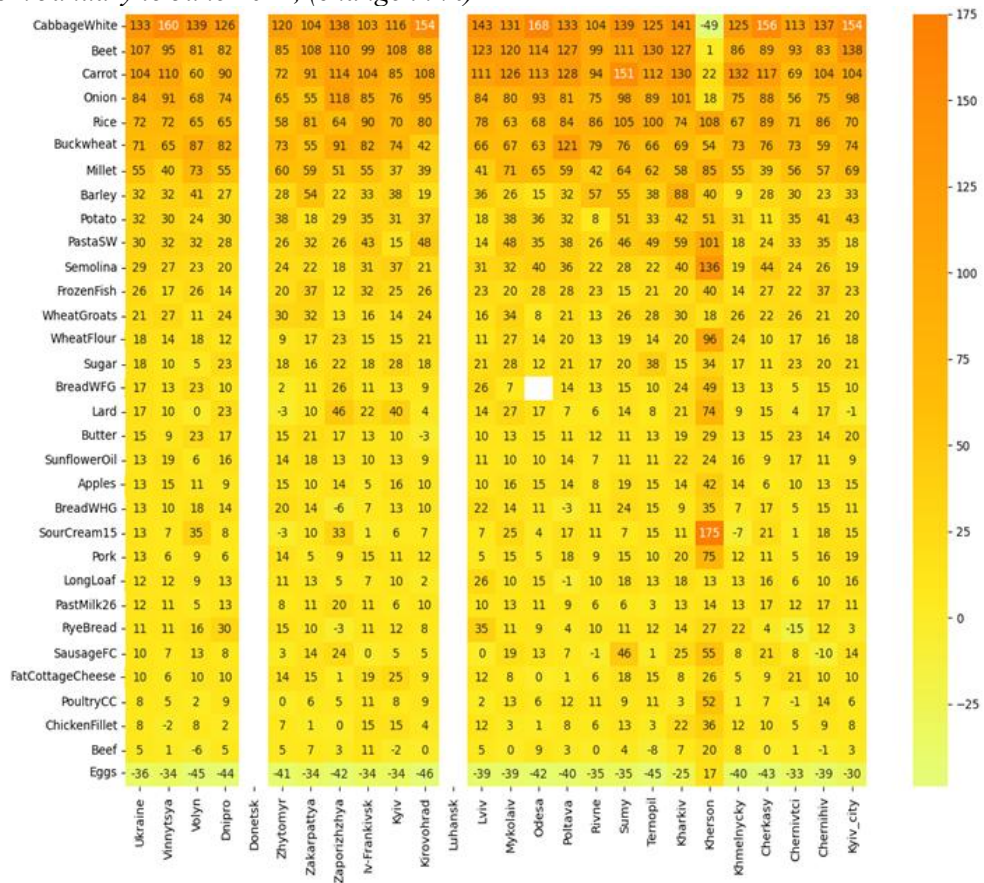
Figure 2. Heatmap illustrating percentage changes in food prices across regions from January to March 2022, (change in %)



Note: No data available for March 2022 in the Luhansk, Kharkiv, and Chernihiv regions.

Source: Authors' calculations based on data provided by State Statistics Service of Ukraine.

Figure 3. Heatmap illustrating percentage changes in food prices across regions from January to June 2022, (change in %)



Note: No data available for June 2022 in the Donetsk and Luhansk regions, and for BreadWFG in the Odesa region

Source: Authors' calculations based on data provided by State Statistics Service of Ukraine.

The price changes in March are most prominently depicted across all three heatmaps, reflecting the shock impact of the onset of full-scale warfare. Regions directly affected by hostilities and those nearby stand out distinctly. In other areas, additional factors contributing to food price escalation include heightened demand from population migration flows, increased supply chain costs, particularly for non-local products, and other influencing factors.

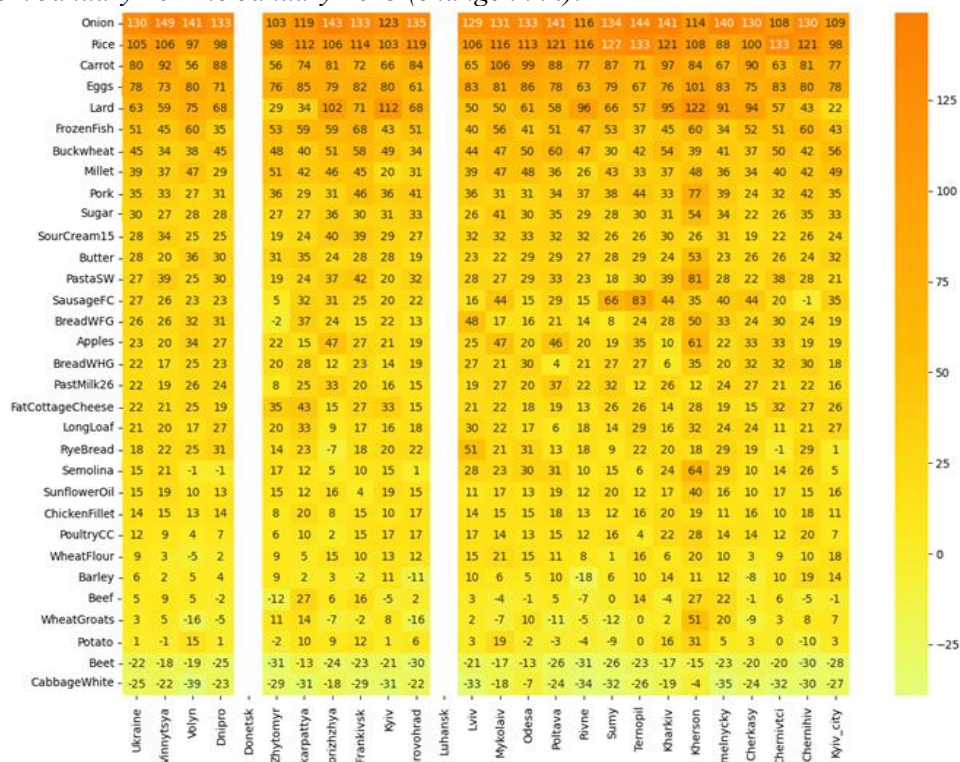
The decline in chicken egg prices is attributed to a seasonal factor, as in January, the reference month for comparison, the supply of this product is lower, and its production cost is higher. However, against this backdrop, the Kherson region stands out, where, despite the active phase of hostilities in the region, no similar price reduction occurred. It is logical to assume that a similar situation may have occurred in the then-controlled parts of Luhansk, Kharkiv, and Chernihiv regions,

for which data is unavailable.

May 2022 and June 2022 are the months when data for the Chernihiv and Kharkiv regions become available after the first month of full-scale invasion. Therefore, June was chosen as the common month for assessing short-term impacts. Simultaneously, June is a month when, compared to the baseline month of January, the influence of seasonal factors becomes particularly noticeable, as the summer enhances the availability of many agricultural products like vegetables and eggs. The seasonal decrease in egg prices became even more pronounced than in March, though to a lesser extent for the Kherson region.

The price changes in June reflect the cumulative impact on prices from all preceding months since February. These changes predominantly mirror the inflationary component and the rising cost of production due to factors such as fuel price increases and other heightened expenses, which in March might not have fully influenced the cost of food production. Nevertheless, the influence of the initial shocks from the onset of war on prices has already diminished.

Figure 4. Heatmap illustrating percentage changes in food prices across regions from January 2022 to January 2023 (change in %).



Note: No data available for January 2023 in the Donetsk and Luhansk regions.

Source: Authors' calculations based on data provided by State Statistics Service of Ukraine.

Throughout 2022, people, especially in rural areas, increased production, such as vegetables – potatoes, cabbage, beets, etc., leading to a lesser growth or even a decrease in prices for these products. In the group with moderate year-on-year growth, a portion of processed products, where large food producers or major traders and retailers are involved, experienced a relatively lower impact.

These entities, in resolving logistics issues, fill gaps in remote regions, mitigating price peaks in the long term (here, over the course of a year). Prices in these regions rose due to additional logistics, but not as significantly. Meanwhile, the highest price increases occurred for onions – a traditionally commercially grown crop in the southern regions on irrigated lands, and rice – in areas of former domestic production, particularly in the southern regions, including the Kherson region.

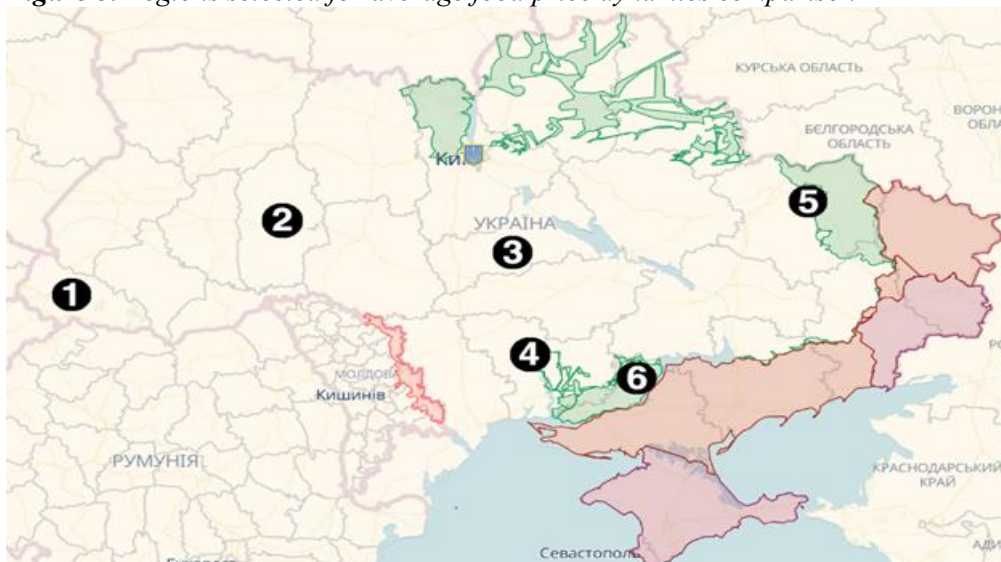
As for exported products, such as frozen fish, price hikes were attributed to additional burdens and increased logistics costs. Price increases also affected all major cereals, which are an essential part of the dietary intake for most Ukrainians.

To observe potential regional differences in price variation, additional graphs have been constructed for six selected regions differing in proximity to the zone of military operations (Figure 5). Temporarily occupied territories by Russia are coloured red, while liberated territories are coloured green. The six regions of Ukraine for which the price variations have been analysed are (the numbers are correlated with indicators on the map in Figure 5): 1) Zakarpattia; 2) Khmelnytskyi; 3) Cherkasy; 4) Mykolaiv; 5) Kharkiv; 6) Kherson.

These selected regions have experienced various types of impacts and risks since the onset of full-scale military operations since February 2022. The highly safe Zakarpatska region, despite being the most distant from the conflict zone, experienced a significant influx of migrants, especially in the first months following the onset of the full-scale invasion, which increased the demand for food. The relatively safe Khmelnytskyi region, however, consistently faces bombardments targeting both military and civilian infrastructure.

Cherkasy region, although already quite close to regions where military actions took place, experienced relative safety. Additionally, Mykolaiv region, which witnessed active combat at the beginning of the full-scale invasion and continues to face bombardments, is adjacent to Kherson region, where such military actions have not ceased since February 2022.

Finally, Kharkiv and Kherson regions, where active combat with changes in the frontline occurs, are subjected to frequent bombardments, with significant agricultural areas filled with landmines and substantial civilian population outflows, among other challenges.

Figure 5. Regions selected for average food price dynamics comparison

Source: The basic map provided by <https://deepstatemap.live>, modified by the authors.

Among the selected regions, Kherson region stands out as the most illustrative in terms of both short-term and long-term impacts on food prices during wartime. In the Kherson region, where active combat operations were underway in the first months following the invasion, a distinct shock in prices is evident in March-April 2022, particularly notable for certain essential food items such as various types of meat, eggs, cheeses, and so on.

A similar situation with a sharp increase in prices occurred in the fall of 2022 when this region witnessed an escalation of hostilities, leading to the de-occupation of significant territories. At the same time, when examining the change in average prices across Ukraine, the peak price increases in critical regions are not evident on the graph; they are smoothed out on the overall chart due to more prosperous regions, and the overall trend appears smoothed, like if it were a continuation of pre-war trends or seasonal fluctuations.

While the difference in the impact levels on food price dynamics between remote and proximate regions to the conflict zone is evident, it would be incorrect to assert that this difference is solely attributed to distance and associated factors. Even in remote regions, there are inherent risks and challenges during wartime that exert pressure on local food prices, such as additional migration and logistical burdens, among others.

This underscores the need for a deeper analysis of regional peculiarities in the functioning of food markets and the influence of factors on price formation, taking into account local seasonal, climatic characteristics, and more.

4. Conclusions

Therefore, regarding the analysis of prices in different reference months and changes compared to the baseline level in January 2022, the following summary can be drawn. An analysis of price changes in March 2022 compared to January 2022, unlike annual comparisons, reveals extremely sharp monthly price fluctuations, for which the population had little time to adjust. Such rapid price changes call for prompt food support programs.

During this short period, there is minimal impact from inflation, but a maximal impact from the shockwaves of the onset of full-scale war. These shockwaves partially subside in the subsequent months but include inflationary factors. For many products, there is a minimal increase in prices in March; however, in April, the increase becomes quite significant, indicating delayed market reactions to price shocks. In the medium-term perspective, the summer prices (June 2022) reflect stronger inflationary effects, along with seasonal influences on certain goods (as we compare summer and winter prices).

Some shocks diminish as logistics are streamlined, producers and the population adapt, while for certain goods, on the contrary, previous stocks are depleted, and new logistics options prove more costly. When comparing the prices in January 2023 to January 2022, there is already a minimal impact of seasonality as the system has reached a relatively balanced state. These changes indicate the cumulative impact of all annual factors.

The analysis of food prices shows it is crucial to consider the regional context to access food affordability and food security, as the impact of the war varies across different regions. Additionally, a methodology that allows for the separation of seasonal price fluctuations is desirable.

For the full picture, it is also necessary to take into account the changes in the incomes of households. Further analysis is also required to verify whether the price increase was indeed lower for those types of food for which the population's self-sufficiency level is higher.

Another essential aspect is the need for an indicator or criteria to distinguish sharp and significant price fluctuations in a specific region caused by additional crisis factors rather than seasonal variations, etc. This necessitates urgent intervention from governmental executive bodies to ensure the food security of the local population.

Therefore, we can identify what is acceptable in the context of the season and other “peaceful” factors and what fluctuations serve as markers of a crisis, requiring immediate intervention from the government and other relevant structures.

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