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«The impact of the Russian - Ukrainian War on the food supply chain: A review
of the effects on the global economy and malnutrition».

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Abstract

Humanity suffers catastrophic effects from war, particularly in terms of lives and livelihoods. War is a subject that has been studied extensively in history, but it is still largely unexplored in the domain of logistics. To address this gap, this thesis examines how war between Russia and Ukraine affects the world's food supply chain and how international sanctions have led to increased food insecurity. The study conducts an analysis of the recent war between Ukraine and Russia due to the fact that both of these countries are exporters of essentials like gas, oil and food grains to many countries. To do so, this survey assesses the effect of the conflict on the global financial system and how this resulted in global inflation and specifically in rising consumer prices, energy and commodity prices as well as food prices. The paper concludes with the challenges of the impact of the Russia Ukraine conflict that the whole world has to face; challenges such as food insecurity and malnutrition.

Keywords: Russia-Ukraine conflict, sanctions, economic impact, food supply chain, security, food crisis, logistics, malnutrition

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Chioti Erifylli

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Abbreviations

FAO Food and Agriculture Organization of the United Nations

IFAD International Fund for Agricultural Development

UNICEF United Nations International Children's Emergency Fund

WFP World Food Programme

WTO World Trade Organization

WHO World Health Organization

OECD Organisation for Economic Cooperation and Development

UNSD United Nations Statistics Division

IOM International Organization for Migration

ICMPD International Center for Migration Policy Development.

UNCTAD United Nations Conference on Trade and Development

non-GMO non-genetically modified

ILO International Labor Organization

GRFC Global Report on Food Crises

Introduction

The Covid-19 epidemic has had a significant impact on international economies during the past two years (Jackson, 2021). Countries around the world and their economies are barely recovering from the imbalance that has been observed between supply and demand on the food and energy markets, which has increased worldwide living expenses (Canuto, 2022). Canuto (2022) refers that the current Russian invasion of Ukraine increases prices for food and fuel; Russia is a major supplier of gas to Europe. As a result of the conflict and sanctions, energy prices have increased by three to four times (Ozili, 2022). The most vulnerable nations are those whose food and feed industries rely largely on agricultural exports from Ukraine and Russia as well as those whose reliance on nitrogenous fertilizers for agricultural output comes from Belarus and Russia (OECD, 2022).

The international community agreed to eliminate hunger and malnutrition in all of its forms by 2030 (UNSD, 2022)¹. Nevertheless, the number of those who are malnourished for many years is steadily rising (WHO, 2022). The United Nations define food security as "People having at all times, physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life" (United Nations Committee on World Food Security, 1996; FAO, 2006 p.1). The availability of a range of nutritious foods at the local, regional and international levels is a factor that affects food security. A nation's ability to import a variety of healthy foods as well as produce food locally for consumption determines the availability of food on a national scale. So, maintaining food security requires a steady and sustained global food supply (IFAD, 2022; UNICEF, 2022; WFP, 2022).

In 2007 and 2008, previous food supply chain shocks and price rises are widely documented and include the food export bans forced on by droughts, floods and conflict in various countries, which led to fuel price increases and sudden two-fold rise in food costs (Lang & Barling, 2012). Recently, the World Food Programme announced that "Up to 828 million people, more than one in ten of the world's population – still go to bed hungry each night. Acute food insecurity has

¹ The United Nations Statistics Division is committed to the advancement of the global statistical system.

reached unprecedented highs, affecting a record 345 million people – up from 135 million in 2019. A total of 50 million people in 45 countries are teetering on the edge of famine" (WFO, 2022). And this extremely rising rate is due to the combination of aftermath of the COVID-19 pandemic, climate change and the conflict.

Using the Ukraine-Russia crisis as a case study, this paper aims to examine how Russia's invasion of Ukraine affected the world economy and the disruption of the world supply chain. The research's central argumentation is that the conflict between Russia and Ukraine will have a significant influence on the efficiency and responsiveness of the world's food supply systems. The related research questions are as follows: first, which is the impact of the international sanctions on Russia and, correspondingly on global food supply chains. Second, which are the consequences of the said impact on global food insecurity?

The following part is organized as follows: The next section is devoted to a brief history through the relationship between Russian and Ukraine nations and what is the reason for the 2022 invasion in order to provide readers with some important background information. The section after that summarizes the economic impact that the war has in many sectors, then the international sanctions on Russia and how Russia answers to these sanctions. The fourth chapter analyzes the threats of this conflict to exacerbate the globe's food crisis and hunger and the final paragraph concludes and discusses the approaches that International Organizations should examine for fighting famine. The last section concludes by providing a thoughtful call for future research on war, economy and society. The ongoing conflict between Russia and Ukraine is now contributing to worldwide famine, food shortages and rising food prices across the board. This conflict also threatens to exacerbate the globe's food crisis and hunger, as well as political instability in many regions of the world. Russia's invasion of Ukraine has shocked the global food supply chain. In particular, this paper aims to answer the following questions: which are the impacts of the international sanctions on the global economy and the society and which are the effects of the crisis in Ukraine on global food security?

Literature Review

Several studies from scholars have been published on the effect of war conflicts before the most recent crisis in 2022; these were published from the perspectives of economics, environmental science, public health and sociology (Korovkin & Makarin, 2021). From a historical point of view, conflicts have always been companions to the advancement of human civilization (Lim et al. 2022). Glick & Taylor (2010), Imai & Weinstein (2000) and Lim et al. (2022) argue that a war, either armed conflict or economic embargo, is a devastating fight that has significant negative economic impact on a nation's ability to grow and at the same time it can disrupt economic activity in a number of areas, including global economic welfare such as inflation, human capital, international trade such as sanctions and national income such as GDP per capita. However, which are the reasons to start a war? Are there different kinds of war and how do we specify them? Scholars observed that countries engage in conflicts to safeguard their resources or to maintain regional dominance (Vayrynen, 2016), while other countries engage in conflicts in order to defend their rights (Averre, 2016).

In case of the war between Russia and Ukraine the reason was mainly to manage more shared resources or colonial resources, heritage or ideals or equally, in other words, to safeguard the Russian border and retain regional dominance in Eastern Europe (Mankoff, 2014); (Malyarenko & Wolff 2018). According to Lim et al., (2022) there are many kinds of war; for example the war arising from armed conflict such as the World War, the Traditional Trade War involving economic sanctions such as the case of China and the United States and contemporary warfare involving a global pandemic or situations in the global agenda such as the climate change and poverty. Underlying the conflict between Russia and Ukraine, Cohen and Ewing (2022) highlight that the war has a social, economic, political and military impact not only on Europe but also on the Middle East, Africa as well as Asia. And the reason why, based on their survey, is that Russia and Ukraine account for over a quarter of all exports and are considered as the "biggest supplier of wheat in the world" (Cohen & Ewing, 2022; OECD, 2022).

Rubel on the other hand (2022) specifies that right now the conflict raises geopolitical tensions between Russia and Western nations, affecting global economic prospects and growing warnings about the crisis's influence on the global supply chain. In addition, Hufbauer et al. (2009) argues that the League of Nations' legal framework reflects the lengthy discussion about the effectiveness of economic sanctions, which was started by US President Woodrow Wilson in response to the horrors of World War I. Specifically, speaking In Indianapolis in 1919, President Wilson said: "A nation that is boycotted is a nation that is in sight of surrender. Apply this economic, peaceful, silent, deadly remedy and there will be no need for force. It is a terrible remedy. It doesn't cost a life outside the nation boycotted but it brings a pressure upon the nation which, in my judgment, no modern nation could resist". Hence, his speech gives prominence to the collective use of economic sanctions as a means of deterring aggression.

Kaempfer and Lowenberg (2007) also agree that international sanctions are an instrument of foreign policy and are increasingly used to constrain countries, while Caruso (2003) refers that an embargo restricts exports to the target countries and a boycott restricts imports from the target countries. Some years later, three researchers: Sedrakyan et al., (2022) came to thoroughly analyze this claim while creating a new dataset in order to quantify each instance of Western and US sanctions against Russia and, in specific, how they have affected 27 transitional economies in the former Soviet Union, Central and Eastern Europe and the former Soviet Union. For the years 2014 to 2018, the impact of these spillovers on bilateral trade and direct investments was measured. The data analysis, called Poisson which is a pseudo-maximum likelihood econometric technique, was carried out utilizing the gravity models of bilateral trade and direct investment. Based on their prediction they concluded that mainly minor, unrelated countries were affected by the sanctions imposed by the West and the United States against Russia. Due to these sanctions, exports from transition economies, Russian imports into transition economies and Russian direct investments into transition economies all experienced considerable declines.

Evenett (2002), Caruso (2003) and Lamotte (2012) have evaluated the impact of international sanctions on trade. However, none of the above take into consideration this correlation when calculating the impact of sanctions on global trade. In order to fill in this gap, Glick & Taylor (2010), who studied and calculated a sample of 172 countries spanning the years 1870–1997, concluded that wars have lowered the average mutual trade of combatant states and demonstrated that wars in general have a considerable impact on global trade. Furthermore, Korhonen et al. (2018) reported that the sanctions imposed by the EU and the US as a result of Russia's illegitimate annexation of Crimea and military involvement in eastern Ukraine, not only resulted in the decrease of exports to Russia from the EU, the US and other sanctioned nation, but also in the contraction in demand in Russia and substantial depreciation of the ruble. With this state, Shapran et al. (2022) argued that international sanctions affected Russia, without military activity and no destruction of civilian assets or industrial facilities on the territory of the Russian Federation. On the other hand, Hufbauer et al., (2007) have had a totally different opinion and came to the conclusion that sanctions are often ineffective and have hurt mainly international trade instead of hurting Russia perse; as a result energy, gas, finance, the world's food supply system and peace are all at danger, especially in developing nations.

Rutner and Langley (2000, who analyzed the definition of logistics mostly through the logistics and academics-professionals' view (Deloitte, 1999), said that logistics is an essential function of business. Their analysis was based mainly in the definition that was adopted by the Council of Logistics Management, which states "Logistics is that part of the supply chain process that plans, implements and controls the efficient, effective flow and storage of goods, services and related information from point of origin to point of consumption in order to meet customers' requirements" (Council Of Logistics Management, 1998). In their study, they highlight the idea of cost and profit and the value of logistics for customers, increasing supply chain efficiency and the advantages of competitive improvement.

As far as global logistics is concerned Vitaliy (2017) concluded that the globalization of the sphere of logistics services is due to the globalization of the world economy. Recent scholars have also issued that logistics are inseparably linked with the food supply chain. Academics such as Beamon (1998), Little (1999) and Pienaar (2009) have given a high emphasis on the development and functioning of Supply Chains and at the same time have tried to define the food supply chain. A few years later, Harvard University (2021) completed the phrases and now it defines as a food supply chain "the procedures that explain how food from a farm ends up on our tables are referred to as a food supply chain or food system. Accordingly, food moves from producer to consumer via the processes of production, processing, distribution, retailing and consumption in the food supply chain; as a result, food moves in a domino way from farmer to consumer". Haleem and Mohd (2020) provide an improved definition for the traditional food supply chain into food supply chain management; and this definition is not only for any particular type of food. It combines all types and also includes six characteristics of the food supply management which are coordination and collaboration, quality and safety, sustainability, logistics, supply and demand management and efficiency-performance.

On the other hand, Clapp (2022) explains the importance of the food crisis not only on the economic field but also in society by giving a plethora of examples in order to understand how vulnerable the global food system is; examples such as the following: the food crisis in 1973–74 which resulted in a sharp rise in food prices globally and had negative effects on food security on a large scale. Conceição & Mendoza (2009) and Clapp (2022) concurred that in 2008 a financial crisis, skyrocketing fuel costs and an increase in the use of food crops for biofuels, all contributed to market instability in the food sector. Official statements confirmed their study with official reports which stated that famine is declared when there is widespread malnutrition and when people begin to starve to death due to a lack of access to enough nourishing food (The Food and Agriculture Organization of the United Nations (2010); The United Nations World Food Programme (2020).

At the same time, Hellegers (2022) analyzes its contribution to worldwide famine, food shortages and rising food prices across the board, as well as political instability in many regions of the world. According to Erokhin & Gao (2020) the majority of the staples that Ukraine and Russia export are to developing nations, which are more vulnerable to price increases and shortages. Countries such as Sudan, Somalia, Libya, Lebanon, Egypt and Somalia, all rely heavily on Russian and Ukrainian wheat, corn and sunflower oil imports (Sahu et al., 2022).

Ultimately, all researchers end up with the result that the Russian-Ukrainian conflict can be viewed as a multidimensional disaster that is likely to get considerably worse in the near future. Noteworthy, Batul (2019) and Hugo (1984), who came to specify the relationship between famine and migration through a systematic review of scholarship centered on famine and its demographic, political and socioeconomic effects, reveal a definite connection between migration and food insecurity. The World Food Program states that "Among the most vulnerable groups are internally displaced people and refugees caught between the frontlines of hunger, many of whom are totally dependent on food assistance for their survival" (WFP, 2022). Last but not least, according to Smyth et al. (2015), continuous increases in agricultural production will be necessary to achieve global food security over the next 40 years. Consequently, there would be a greater need for agricultural research and development funding. Finally, Leventon and Laudan (2017) provide a much more subtle analysis concluding that achieving food security requires a localist perspective and countries should use their unique strategies in accordance with their country's topography and environmental changes.

Research methodology

The research article is attempting to inspect the effects of Russia's invasion of Ukraine on the global economy and the supply chain's disruption and answer the "what" and "how many" impacts on the geopolitical aspect of Russian invasion on Ukraine. Different information requirements, time constraints and need patterns have led to the development of a variety of research methods, however the aim of all research methods is the same: to gather information. Any research method is

used in order to generate the best findings. This kind of thesis is literature review and is based on the analysis and discussion of secondary data. The secondary data was gathered from websites, annual reports and other reports that had been published and the collected information has been carefully reviewed and scrutinized.

Chapter 1

1.1 Background of the Russian-Ukraine War

The Russian military aggression against Ukraine is exceptional, due to the fact that it is the first significant post-Soviet combat in which regular army and auxiliary volunteer troops on both sides are fully engaged. Not only the military components of the conflict, but also the political implications have an impact on the evolution of global geopolitics. However, considering the evolution of the situation that led to the deployment of Europe's largest-scale combat in the new millennium is extremely conceivable, because we are facing the return of a long-dormant struggle that has lasted more than a century. Russian and Ukrainian ties are "overshadowed" by Russia's imperial heritage, in which free Ukraine, the richest "colony" of the Romanov Empire, has no place. Although the demise of the Soviet Union, the Bolshevik empire, and the 1990s economic decline delayed the "solution of the Ukrainian question", the Kremlin elite, led by V. Putin, employed all available financial, personal and diplomatic resources to try to restore previous Russian conquests (Kovalska-Pavelko et al., 2022). As a result, the goal of the research is to perform a short historical examination of the Russian-Ukrainian War.

The origins of the Russian-Ukrainian War can be traced back to a specific culture. Ukraine arose from the growth of the Kyiv-Russian culture origin, whereas contemporary Russia arose from the ruins of the Mongol Empire. For ages, there have been hostilities between the two peoples, and only the Russian Empire's acquisition of Ukrainian areas and the Romanovs' dominance "muted" these fights. The USSR replaced the Romanov monarchy and repressed Ukrainian attempts to build their own state in 1918-1921, therefore the policy of

denazification of Ukrainians persisted. Following the collapse of the Soviet Union, Ukraine was given the freedom to develop independently (Ghilès, 2022).

Ukraine played an important part in the functioning of the USSR and the eventual collapse of the Soviet Union (Ishchuk, 2020). The conflict in eastern Ukraine began in early 2008 when Ukraine announced its intention to join the North Atlantic Treaty Organization (NATO), but Russia did not accept it (Bebler, 2015). Thereafter, in 2014, Russia first entered Ukraine and insurgents supported by acting President Putin took control of a significant portion of the country's east, resulting in violence in Donbas and fierce fighting in the Russian-Ukraine border (Bebler, 2015). Though the reason is located in late 2013 for the Maidan upheaval which was provoked by Russian opposition to Ukraine's EU membership, which in turn precipitated Russia's annexation of Crimea and intervention into eastern Ukraine (Kovalska-Pavelko et al., 2022).

However, when the Cold War ended, NATO expansion was the most annoying irritation in the relationship between Russia and the West, a relationship that put Ukraine in the middle. The first phase was when NATO showed their power with the alliance's operation in Kosovo in 1999. It was, first and foremost, an intervention in what Russia saw as an internal war. Kosovo was a part of Serbia at the time. It was effectively no longer a part of Serbia following the NATO invasion. Meanwhile, the Russians were dealing with their "own Kosovo" scenario; that one in Chechnya, and it suddenly appeared to them that NATO could intervene in that situation as well. The second one was some years later, in 2002 - 2004, when NATO expanded the alliance with Bulgaria, Estonia, Latvia, Lithuania, Romania, Slovakia and Slovenia. Almost all of these countries were once part of the Soviet bloc, and Estonia, Latvia and Lithuania, known as the "Baltics," were once part of the Soviet Union. They had now joined the West. Consequently, the relationship between these two sides has severely deteriorated resulting in an ultimate downfall.

Over the period of eight years, from 2014, Ukrainian government forces fought Russian-backed separatists for control of much of the Donetsk and Luhansk regions, often known as Donbas (Fisher, 2019). Fight in 2014-2015 ended in the

occupation of one-third of the region's area, by two Russian proxy statelets, the self-proclaimed Donetsk and Luhansk People's Republics. Russia took advantage of the power vacuum in Kiev and annexed Crimea. Between September 2014 and February 2015, Russia, Ukraine, France and Germany signed various iterations of the so-called Minsk agreements, which eventually aimed to put an end to the conflict in Donbas between armed Russian separatist organizations and the Ukrainian Armed Soldiers, in which Russian regular forces played a crucial role (Åtland, 2020). The first, known as the Minsk Protocol, was never fulfilled, and the combat continued after that. The Minsk II agreement, which was signed on 12 February in 2015, was a revision and update of the original Minsk agreement because it failed to put an end to fighting. This agreement included a number of actions, such as a cease-fire, the removal of heavy weapons from the front lines, the release of prisoners of war, constitutional reform in Ukraine that granted certain Donbas regions self-government, and the return of state border control to the Ukrainian government (Åtland, 2020). Fighting decreased after the agreement was signed, but it was never totally resolved, and its terms were never fully carried out (Hernandez, 2022).

Several reports claim that Putin, the president of Russia, has occasionally asserted that Ukraine is a puppet of the West and has never been a sovereign nation. Another explanation could be that, although being recognised as a nation, Russia and Ukraine share close social and cultural ties as members of the former Soviet Union (Knispel, 2022). Putin has also previously stated that the current Ukraine is actually "old Russian land" (Knispel, 2022). Another motivation for the attack is Ukraine's desire to join NATO and the EU (Kocho-Williams, 2022). Considering that Russia has traditionally opposed that, Russia has demanded guarantees from Western countries that Ukraine would not join NATO. The conflict decimated the area's economy and heavy industries, displaced millions, and rendered the combat zone one of the most mine-contaminated areas in the world (Kovalska-Pavelko et al., 2022).

1.2 The cause of Russia' s invasion of Ukraine in 2022

During his speech on 21 February, President Putin made references to Russian-Ukrainian history claiming Russian ownership of Ukraine. Ukraine to

Russia is an "inalienable part of our own history, culture, and spiritual space", said Putin. "Since time immemorial, the people living in the south-west of what has historically been Russian land have called themselves Russians and Orthodox Christians" (Address by the President of the Russian Federation 2022).

It is true that Russia's and Ukraine's economy were inexorably connected and without Ukraine's people, industry and agriculture, Russia would not be a great power in the early twentieth century. Furthermore, the majority of the country was ethnically Ukrainian, there was a large ethnic Russian minority, mainly in the east. While Ukrainian was the official language, Russian was the "lingua franca" in most of the major cities. Perhaps more importantly, the vast majority of people spoke both languages. For example on television, it was usual to have a journalist pose a question in Russian and receive an answer in Ukrainian. It was a truly bilingual country, which was unusual (Gessen, 2022).

Russia's invasion of Ukraine is the biggest military mobilization in Europe since World War II. After the Soviet Union collapsed in the early 1990s, NATO expanded eastward, eventually taking in most of the European nations that had been in the Communist sphere (Bilefsky, Pérez-Pena and Nagourney, 2022). The Baltic republics of Lithuania, Estonia and Latvia - all parts of the Soviet Union - joined NATO, exactly like Poland, Romania and others. This resulted in NATO moving hundreds of miles closer to Moscow, thus directly bordering Russia. Russia not only has been protesting NATO expansion since the very beginning but also the Russian president calls NATO's expansion menacing, and the prospect of Ukraine joining it a major threat (Bilefsky, Pérez-Pena and Nagourney, 2022).

Specifically, when it comes to Russia's invasion of Ukraine in 2022 there are those who support the Russian account and there are also those who support the pro-West or Western account of what caused the invasion. The invasion of Ukraine is justified by pro-Russian claims that it is being influenced by Western nations, that its military is being used to oppress Russian citizens in separatist regions, and that it is committing genocide against its own people (Ozili, 2022). The Russian government also asserted that Ukraine's intent to join NATO's military alliance posed a real threat to Russia's national security since it would

cause NATO to expand eastward and draw closer to its border, endangering Russia's very existence (Ozili, 2022). This would allow the West to potentially sabotage Russian national security by infiltrating the country. According to Russia, these two reasons were the stepping stone in order to intervene militarily in Ukraine. Additionally, Russia asserted that both invasion and diplomacy were used as alternatives for resolving the conflict. However, the Russian government claimed that it chose the least dangerous option, which was to invade Ukraine in order to remove the pro-Western government in Kyiv, install a new government, and sign a peace agreement with the newly installed government because Ukraine refused to negotiate before the invasion. The peace agreement would forbid accession to the European Union and NATO (Ozili, 2022).

On the other side there were now NATO weapons and NATO personnel in Ukraine. According to Al Jazeera², the pro-Western or Western explanation of what precipitated the invasion is that Russia felt threatened by Ukraine's ambition to be a democratic country free from Russian influence and seek cooperation with the West in politics, security and trade, including the possibility of joining NATO and the European Union (Al Jazeera, 2022). Putin's attempt to assert control over Ukrainian politics by establishing independent republics in Donetsk and Luhansk had failed, because many Ukrainians who had previously been ambivalent about Nato now they supported membership, and many who had maintained pro-Russian views had witnessed what Russian puppets had done in the separatist republics. The pro-Western media claimed that Russia disagrees with Ukraine's decision to adopt Western democracy and alliance because Russia's national security might be threatened by Ukraine's western affiliation with the European Union and NATO (Gessen, 2022). According to Western media, Russia initiated a "special military operation" in Ukraine to overthrow the country's president and the current administration in Kyiv and install a new pro-Russian one in their place (Ozili, 2022).

² Al Jazeera Arabic was the first independent news channel in the Arab world dedicated to providing comprehensive news and live debate. Al Jazeera English, which was launched in 2006, is part of a growing network comprising more than 10 channels and divisions.

The current Ukrainian issue has extensive and naturally global roots. According to the United States and the majority of Western and Central Europe Vladimir Putin, the president of Russia, has chosen Ukraine as the central focus of his efforts to rebuild the Soviet Union because of his strategic location in Central Europe (Rubel & Hossain, 2022). Moreover, Russia's strategy and plan to influence Ukraine include a specific effect over the power, politics and Baltic States. Putin had achieved considerable success and he thought that he could execute this stunt on a country the size of Ukraine because he had recent military wins in Chechnya, Georgia, Crimea and Syria (Gessen, 2022).

The Western view of the reason for the Russian invasion is that Russia is threatened by Ukraine, which is a liberalized country that seeks cooperation with Western countries in trade, security and politics, including the possibility of access to NATO and the EU, which threatens Russia's national security and pushes her towards this military operation in order to establish a new Ukrainian government loyal to Russia. On the other hand, Russia's justification for invasion is that Western powers are exploiting Ukraine's influence and it has been using its military to crush citizens in separatist regions who are loyal to the Russian government, as well as committing genocide against its own people. The Russian government has also argued that Ukraine's desire to join the NATO military alliance poses a severe threat to Russia's national security, since this desire will move NATO closer to Russia's borders, posing an existential threat to Russia. Russia maintains that these two issues motivated it to intervene militarily in Ukraine, particularly after Ukraine refused to discuss prior to the invasion (Reuters, 2022). While the economic implications of the Russian-Ukraine war will not be fully known until the conflict is over, early economic indications reveal that the war is having a substantial influence on the global economy. The most important is that conflict caused energy supply shocks, commodity and trade supply shocks, increased energy, food and commodity prices, resulting in worldwide inflation in many countries and that a war is always a human tragedy (Balbaa et al., 2022).

Chapter 2

2.1 The Economic Impacts of the War

It is a humanitarian catastrophe that Russia and Ukraine are at war. The conflict has a significant short-term negative impact on a global scale and significantly increases inflationary pressures. The invasion of Ukraine by Russia on 24th of February has called into question the region's ability to recover from the pandemic COVID-19 and caused a disaster that has damaged people, infrastructure and businesses. The effects are being felt on a global scale since prices have skyrocketed as a result of the interruption, particularly for natural gas and oil. Additionally, wheat shipments from Russia and Ukraine, which make up 30% of world exports, have as a result the takeoff in the food prices (Kammer et al., 2022). The effects of the battle will be felt primarily through three pathways: First of all, the inflation rises due to higher commodity costs, such as those of food and energy, which leads to a negative impact on demand and diminishes the value of incomes. Second, there are significant disruptions to trade, supply chains and remittances in bordering economies, in addition to a dramatic rise in refugee flows. Third, lower investor and company confidence have an impact on asset values, tightening financial conditions and possibly causing capital outflows from emerging markets (Kammer et al., 2022). The severe humanitarian crisis that the war has created has been the most noticeable of the initial shock waves to hit the world and is likely to be one of the war's most enduring effects. In less than a month following the invasion, more than 4 million refugees, half of them children, fled from Ukraine (World Bank, 2022). An additional 6.5 million people are estimated to be internally displaced within Ukraine, with about one-third of the total population requiring emergency humanitarian assistance (World Bank, 2022).

2.2 Impact on the supply chain and finance market

Besides a humanitarian disaster, the Russian invasion in Ukraine has had and continues to have significant negative economic effects; Russia's invasion in Ukraine disrupted international supply lines, impacting business operations across a range of industries. The global supply chain has been affected by the ban on Russian exports, Russia's embargo on international imports, as well as Russia's refusal to permit foreign commodities to travel through its airspace and waterways

during the conflict. This situation led to shortages and drove up the cost of imported goods (Tampubolon, 2022).

Characteristically, the main factor that causes disruption on supply networks is land-based trade. As transit through Russia becomes increasingly difficult or impossible from a compliance, reputational or safety viewpoint, land-based trade routes between Europe and Asia are interrupted. In addition, disruption to supply chains came from sea sources, meaning that due to Ukraine's decision to suspend commercial shipping, sea freight routes through the Black Sea were blocked for a number of weeks (Economic Intelligence, 2022). Despite the fact that 36 nations are barred from entering Russian airspace and vice versa, certain airlines currently advise against scheduling overland shipments between Europe and Asia. Due to the war forcing freight forwarders to travel longer routes and spend more on fuel, it reduced the world's air cargo capacity and raised air freight rates (UNCTAD, 2022).

The conflict has shocked the world's markets at a time when they are already struggling due to rising food costs and problems brought on by the COVID-19 epidemic. According to the United Nations, 1.7 million people live in 107 economies that are severely exposed to at least one of the three global channels of transmission of this crisis: rising food prices, rising energy prices and tightening financial conditions (UN, 2022).

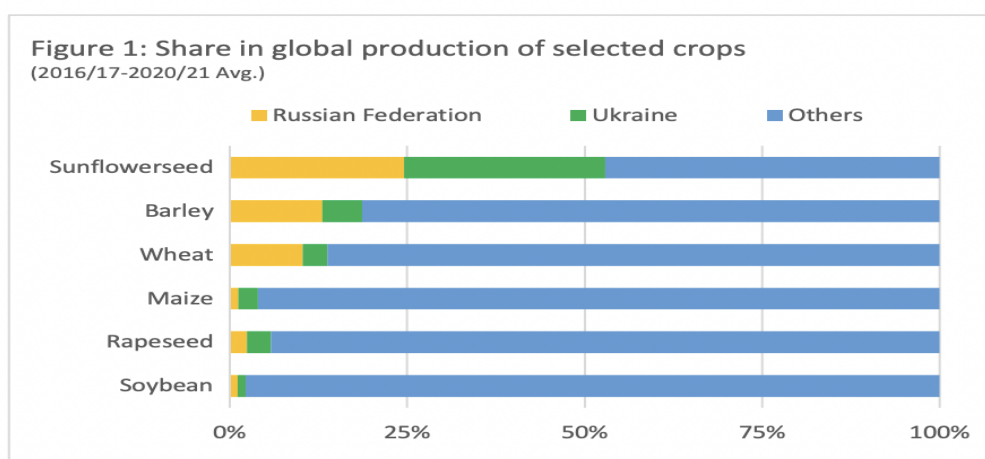
2.3 Impact on global food resources

The world's top producers and exporters of arable crops, including wheat, barley, maize, sunflower seeds and rapeseed are Ukraine and Russia. To be more specific, Ukraine produces enough food to feed 400 million people worldwide, including 10% of the world's grain, 13% of its corn and 50% of the world's sunflower oil (FAO, 2022). According to the average of the last few seasons, Russia produced 10% and Ukraine produced 3% of the world's wheat. Russia and Ukraine are the top two exporters of wheat with 20% and 10% of global exports, respectively (FAO, 2022). Additionally, both nations are essential in delivering wheat to international markets, particularly those in the Near East and North Africa, where it is the primary source of food. Russia and Ukraine, which are the third and

fourth largest exporters, produce 20% of the world's barley. Both nations employ a significant portion of their barley production for domestic animal farming (FAO, 2022).

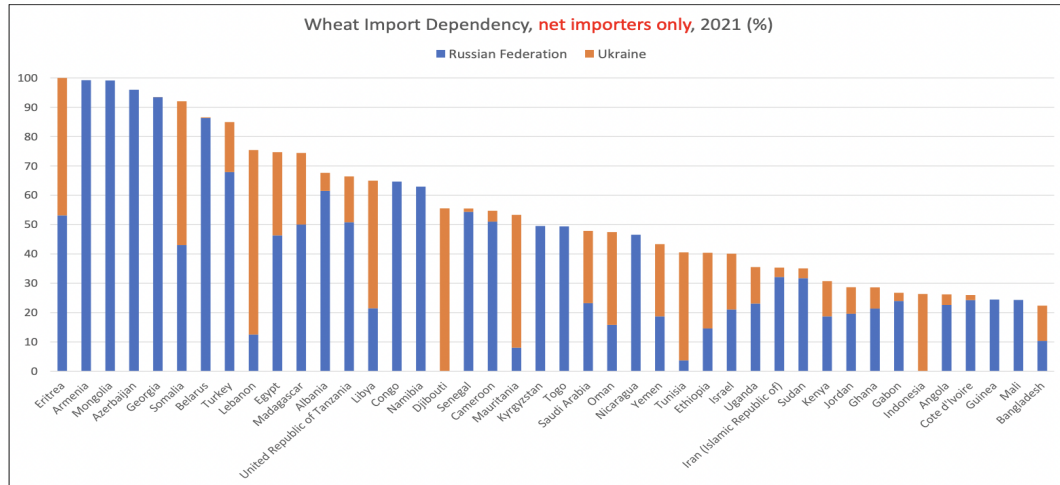
Furthermore, both countries are the two countries that produce the most sunflower seeds globally. They collectively represent more than 50% of the world's production. The majority of the crop is locally crushed to produce sunflower meal and oil. The fourth-largest exporter of vegetable oil is Ukraine, which also exports sunflower oil to the international market. Less than 5% of the world's rapeseed, maize and soybean production is split between Ukraine and Russia, with Ukraine producing the majority of those commodities. (FAO, 2022). The majority of their production is exported because there isn't much demand for it domestically; Ukraine is the third-largest exporter of both rapeseed and maize and the largest soybean exporter outside of the Americas. According to the Food and Agricultural Organization (FAO), Ukraine is the largest non-GMO³ exporter and a significant exporter of organic feed and thus it has a unique position in the international markets.

The figure below shows the share in global production of some agricultural commodities and why both countries play leading supply roles in global markets of foodstuffs and fertilizers.



Source: FAO XCBS system

³ The Non-GMO Project is a nonprofit organization offering North America's most trusted third-party verification program for non-GMO food and products



Source: FAO calculations, based on TDM data

The figure above indicates, many Least Developed Countries (LDC) and Low-Income Food-Deficit Countries (LIFDC) as well as a large number of other nations that depend heavily on imported foodstuffs and fertilizer rely on Ukrainian and Russian food supply to meet their consumption needs.

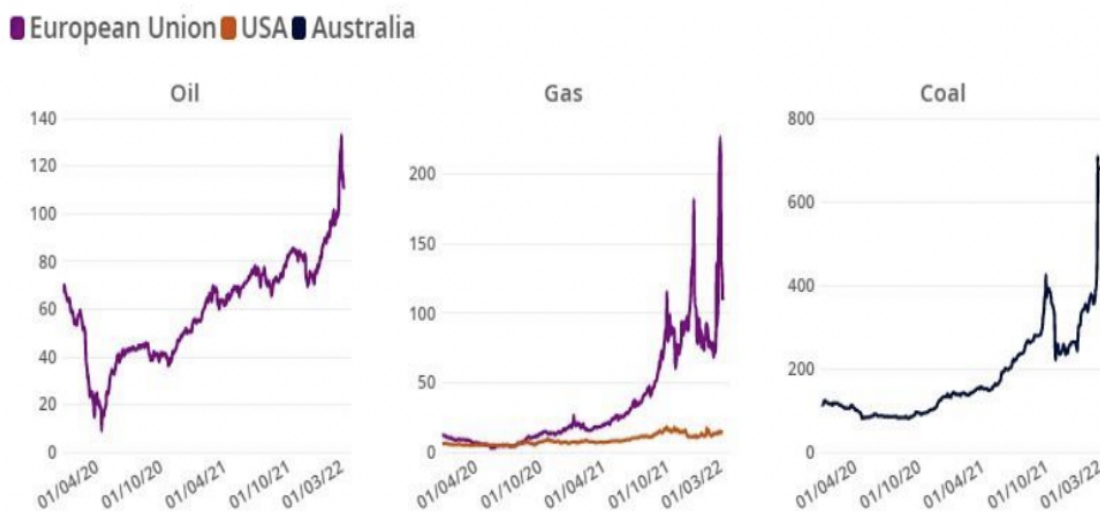
Before the conflict, many of these nations were already struggling with the increased food and nutrient costs that the COVID-19 pandemic created. During the period of conflict up to 30% of Ukraine's agricultural lands could not be planted or harvested. The result of the municipal blockades, the shortage of seeds and the shortage of fertilizer is the wheat prices to increase by almost 25%; and ultimately this has an impact on the availability of food for people all around the world (Tampubolon, 2022).

Specifically, numerous emerging-market and developing economies would experience severe shortages if wheat supplies from Russia and Ukraine were to completely stop. In addition to economic issues, there would be greater humanitarian catastrophes with a corresponding rise in poverty and hunger in some nations. By stressing the agricultural supply for the following year, the disturbance in fertilizer production runs the danger of making these disruptions longer-lasting. Around 75% of all wheat imports into various Middle Eastern economies come from Russia and Ukraine (OECD, 2022). The invasion of Ukraine has provoked a larger economic conflict, which includes the current food

crisis. Since prices would rise in the short term and shortages will intensify in the long term, the crisis won't just have a big impact on Ukraine but also on other Eastern European countries.

2.4 Impact on the oil market and gas market

Prior to Russia's invasion of Ukraine, energy costs had been growing as a result of a number of factors, including the COVID pandemic, limited energy sources and undoubtedly the recent escalating tensions between Ukraine and Russia. Now after the invasion and due to the fact that Russia is the second-largest producer of oil in the world, supplying about 19% of the world's natural gas and 11% of its oil, energy prices skyrocketed alarmingly with oil prices increasing to \$100 per barrel (Poitiers et al., 2022). Europe in particular is highly dependent on Russian gas and oil. The prices for gas in Europe are now more than 10 times what they were a year ago, while the cost of oil has almost doubled in the same period (European Central Bank, 2022). The price shock risks disrupting the production of goods and services worldwide and increasing poverty. According to the figure below, from 2020 to 2022, there is a crucial change in the rise of energy prices among the continents.



The figure shows the rise of the energy prices.

Source: Brent oil prices (USD/barrel), EU TTF and US Henry Hub natural gas prices (EUR/MWh) and coal Newcastle (fob) prices (USD/Mt). <https://www.oecd.org/economic-outlook/>

Actually, Russia has supplied more than 50% of the energy needed by five European nations⁴, and between 50% and 25% for nine additional nations in 2019. A lot of industry processes and the production of energy both need natural gas. Finding substitute suppliers, moving to alternate energy sources and altering production procedures are all necessary to reduce this dependence. Each of these choices could result in long-term financial costs and require investment and time to realize (OECD, 2022).

The impact of this shift is likely to be bigger in European regions heavily reliant on natural gas industries. Increasing energy efficiency, charging consumers more for inputs and switching to alternative energy sources are just a few measures businesses can take to lessen the effect on profitability. However, most of these actions are expected to be expensive, at least in the short term, with the greatest effects in areas where manufacturing is concentrated in industries that use a lot of gas (OECD, 2022)

There are three major ways that industries can adapt to increasing natural gas prices: Businesses may decide to boost production prices, absorb the higher expenses or reduce their reliance on natural gas by improving efficiency or switching to alternative energy sources. Prices are expected to fluctuate more quickly than natural gas suppliers or production methods and some nations will be more adept at assisting their industries in switching energy sources or providers than others. Additionally, production may move to regions with less likely increases in gas costs; for example, perhaps outside of Europe, where gas supply chains differ), which might lead to job losses and possibly higher worldwide emissions (ILO, 2022; IMF, 2022).

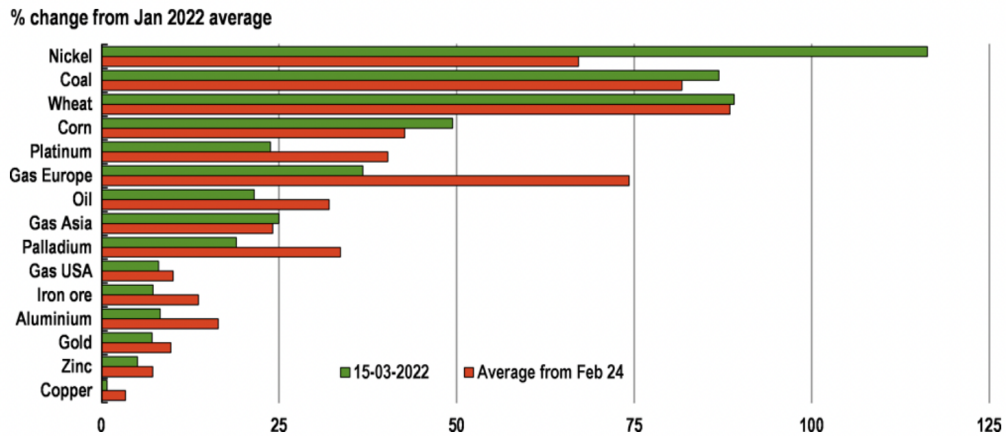
⁴ The five countries are Lithuania, Hungary, Slovakia, the Netherlands and Finland. The next nine countries are Austria, Greece, Poland, Latvia, Belgium, Germany, Italy, Czech Republic and Turkey.

Countries with direct trade, tourist and financial exposures will face additional pressures on top of global spillovers. Although some exporters, such as those in the Middle East and Africa, may benefit from higher prices, economies that rely on oil imports would see greater fiscal and trade deficits and more inflation pressure. Although, in some areas, including Sub-Saharan Africa, Latin America, the Caucasus and Central Asia, steeper price increases for food and gasoline may lead to a larger risk of instability, while food insecurity is likely to worsen in several areas of Africa and the Middle East (Kammer et al., 2022).

2.5 Impact on prices and industrial applications

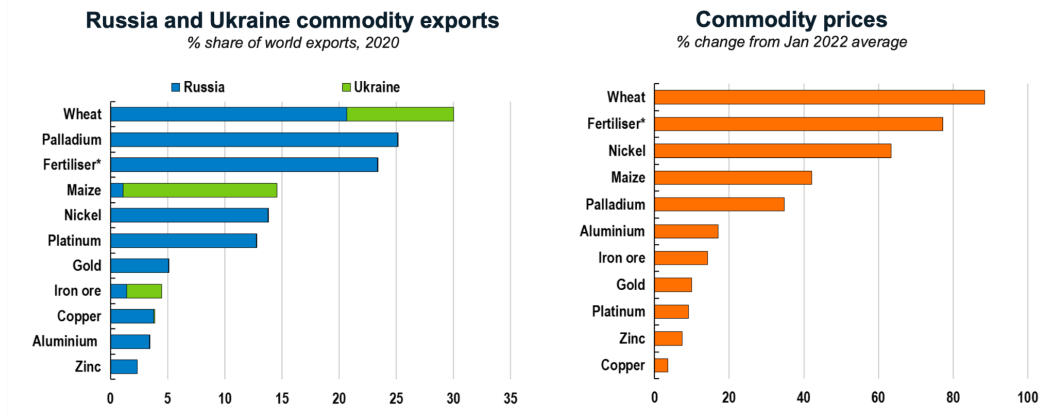
Russia's war on Ukraine has severely disrupted international markets, exposing weaknesses in the security of the raw material supply that is essential for industrial production and the green transition (Orhan, 2022). Russia and Ukraine have an important role in the global economy, due to the fact that they are the principal producers of commodities. Russia and Ukraine together account for about 30% of global wheat exports, 20% for corn, mineral fertilizer and natural gas and 11% for oil. In addition, supply chains around the world depend on exports of metals from Russia and Ukraine (OECD, 2022 ; Oil World, 2022). Russia is a major supplier of palladium, used in catalytic converters for automobiles and nickel used in steel production and battery manufacturing (U.S. International Trade Commission, 2022). Additionally, both countries are important manufacturers of titanium sponge, which is used in the aerospace sector, as well as noble gasses like argon and neon that are utilized in the production of semiconductors (Orhan, 2022). Prices of these commodities have risen sharply since the war began (OECD, 2022).

The figures below shows the rising prices of export commodities of Russia and Ukraine beginning from January 2022:



The prices of the principal export commodities of Russia and Ukraine (% change from January 2022)

Source: <https://www.oecd-ilibrary.org/sites/4181d61b-en/index.html?itemld=/content/publication/4181d61b-en>



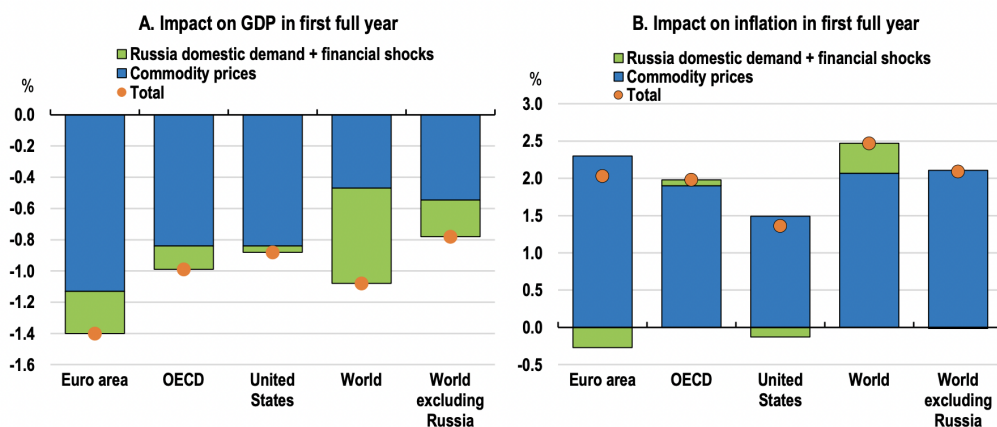
Source: Brent oil prices (USD/barrel), EU TTF and US Henry Hub natural gas prices (EUR/MWh) and coal Newcastle (fob) prices (USD/Mt). <https://www.oecd.org/economic-outlook/>

2.6 Rising global inflation and cost of living

The severe cost of Russia's aggression against Ukraine on the world economy is higher prices and lower GDP (OECD, 2022). According to OECD (2022) prices were already rising slowly because of the pandemic's quick recovery and the ensuing supply chain problems, but after Russia invaded, inflation skyrocketed

and spread rapidly throughout the entire planet. In detail, due to this situation, many businesses across economies deal with higher energy, transportation and labor costs, inflation is reaching levels not seen since the 1980s, forcing central banks to rapidly tighten monetary policy settings faster than anticipated.

Moreover, global financial conditions have tightened significantly, due to high policy by central banks in recent months, weighing on interest-sensitive spending and adding to the pressures faced by many emerging-market economies. Labour market conditions generally remain tight, but wage increases have not kept up with price inflation, weakening real incomes despite the actions taken by governments to cushion the impact of higher food and energy prices on households and businesses. Global GDP growth is projected to be 3.1% in 2022, around half the pace seen in 2021 during the rebound from the pandemic, and to slow further to 2.2% in 2023, well below the rate foreseen prior to the war.



Note: See the Technical Appendix for full details of the shocks applied.
Source: OECD calculations using the NiGEM global macroeconomic model.

In general, there is a huge effect on the finance markets and on the supply chain which is quite different among several regions. The European economies collectively are suffering the hardest hit and, in particular, those that have a common border with either Russia or Ukraine. Such a fact has as a result "greater gas prices in Europe than in other parts of the world and the relative strength of business and energy linkages with Russia prior to the conflict" (OECD, 2022). According to OECD:

advanced economies in the Asia-Pacific region and the Americas have weaker trade and investment links with Russia, and some are

commodity producers, but growth is still hit by weaker global demand and the impact of higher prices on household incomes and spending. Growth outcomes in the emerging-market economies reflect a balance between stronger output in some commodity-producing economies and deeper declines in the major commodity-importing economies, and the adverse impact of higher investment risk premia. Higher food and energy prices also push up inflation more than in the advanced economies. Monetary policy reacts to the upturn in inflation around the world, with policy interest rates raised by a little over 1 percentage point on average in the major advanced economies and 1½ percentage point in the major emerging-market economies (OECD, 2022 p.7).

All in all, the huge impact on several aspects of our everyday life as well as the financial system is visible with effects that one can simply not deal with. Unfortunately, it seems unrealistic to expect any expected growth in the markets in the following months or even years to come.

Chapter 3

3.1 International Sanctions in Response to Russia's Invasion of Ukraine

On the 24th of February 2022 Europe entered a new era; its peace was severely attacked by Russia. By invading Ukraine, Russia occupied the first position in the black list of the vast majority of Europe and of the Western countries. Several nations, including the United States, the European Union and the United Kingdom, have imposed a variety of sanctions in response to Russia's invasion of Ukraine (Wang, 2015). The sanctions approved by the EU have been imposed on the finance, energy and transport sectors and as well as on technology exports. Additionally, Belarus has come under harsh restrictions, due to the fact that Belarus is regarded as a collaborator in the armed conflict because its territory was used to invade Ukraine.

According to current estimates, Russia is the nation with the most sanctions. By the end of March, financial sanctions had affected about 75% of the assets in the Russian banking sector (Dreger, 2016). Due to the sanctions, Russia's access to the international financial markets has been hampered, among other things by the

exclusion of seven Russian banks from the SWIFT network⁵ (Orhan, 2022). The most devastating sanctions are those imposed on the Central Bank of the Russian Federation (CBR), as the freezing of Russia's gross abroad impairs its capacity to pay its debts.

At the same time, in response to the invasion of Ukraine, the certification of Russia's Nord Stream 2 gas pipeline project, which would have provided energy to Europe, was halted by Germany (European Parliament, 2021). Despite the huge impact on the energy capacity of the country, Germany still preferred to freeze the Nord Stream 2 gas project since the war in Ukraine was an utter attack on a European country and one with no foreseeable end. According to Reuters, "Europe's most divisive energy project, worth \$11 billion, was finished in September, but has stood idle pending certification by Germany and the European Union" (Marsh & Chambers, 2022). No matter how tough, such a decision seemed only reasonable in the face of the catastrophe that Russia brought upon Europe. At the same time, New Zealand forbade the supply of commodities to Russian armed forces and security personnel (Wang, 2022).

Moreover, the United States banned the export of war technology to Russia to severely limit Russia's ability to advance its military and aerospace sector (Ozili, 2022). The restriction constrains US exports to Russia of technologies related to navigation, avionics, semiconductors, telephony, encryption security, lasers, sensors and maritime transport. The United States also denied access to the dollar external reserves held by Russian financial institutions and the Russian Central Bank. As a result, neither Russian financial institutions nor the Russian Central Bank can conduct business in US dollars. Not only this but also the US forbade the import of any Russian gas or oil (Luthra, 2022).

Concomitantly, the European Union imposed financial sanctions on Russia; the sanctions targeted important state-owned firms and 70% of the country's banking industry. It banned selling assets denominated in euros to Russian customers as well as Russian deposits over €100,000 in EU banks and on Russian accounts

⁵ SWIFT is a high security network that facilitates payments among 11,000 financial institutions in 200 countries.

held by central securities depositories (OECD, 2022). Furthermore, the listing of Russian state-owned company shares on EU trading platforms was prohibited by the EU. The sale, supply, transfer or export of oil refining technologies to Russia was also outlawed by the EU (European Council, 2022). In particular, the export of any aircraft, spare parts or machinery to Russian airlines or the Russian space industry has been prohibited by the EU (European Council, 2022). Moreover, the EU stopped providing visas to important Russians. This means that the provisions for visa facilitation that grant privileged access to the EU will no longer be available to diplomats, Russian officials and businesses. Of course, as far as all sporting and cultural competitions are concerned, Russia was banned by the EU from participating in all such cultural events, including the Eurovision and the UEFA Champions League (European Council, 2022).

Last but not least, countries outside of the EU contributed to the establishment of further sanctions towards Russia. Australia did not remain passive amidst this crisis and imposed financial and travel restrictions on eight Russian Federation Security Council members. Additionally, Japan prohibited the primary and secondary market trading of new Russian sovereign debt (Ozili, 2022). Canada, on the other hand, revoked all active export licenses related to Russia. In addition, certain Russian citizens' assets held in Swiss and Japanese institutions were frozen by Switzerland and Japan (Wang, 2022).

To sum up, the main restriction consists not only of the prohibition of transactions with the Russian central bank - due to the fact that the Russian Central Bank lends to both commercial banks and foreign exchange - but also of the prohibition of the aviation sector as well as maritime transport. In particular, the Russian and Belarusian road transport operators are banned from entering the EU.

3.2 Russia's response to the international sanctions

On the other side, an important group of Russian measures are directly connected to the restrictions that other nations have placed on Russia. The United States, all EU member states, Albania, Andorra, Australia, Canada, Iceland, Japan,

Liechtenstein, Micronesia, Monaco, Montenegro, New Zealand, North Macedonia, Norway, San Marino, Singapore, South Korea, Switzerland, Taiwan, Ukraine and the UK are currently included on the Russian government's list of such "unfriendly states" Russia has established restrictions, such as buyers of Russian natural gas are obliged to pay invoices for gas and energy imports in Russian rubles (Orhan, 2022). Furthermore, the special payment procedure, which requires gas buyers to open accounts at Gazprombank in both Russian rubles and non-ruble currencies, somewhat lessens the requirement. Although this sanction has supported the ruble, it accelerates Europe's ambitions to reduce its reliance on Russian energy in the long term and limit Russia's capacity to fund exports (World Bank, 2022).

Additionally, as far as the Russian residents are concerned, they are not allowed to neither provide loans in rubles to foreigners based in "unfriendly states" and persons controlled by such foreigners without a prior clearance by the Government Commission for Control over Foreign Investments, nor to transfer ownership of securities or real estate (Bank of Russia, 2022). Characteristically, the latter refuses to transfer funds to accounts outside of Russia from "unfriendly states"; nonresidents, including companies and individuals, are blocked for a period of six months (Bank of Russia, 2022).

Except for sanctions, Russia has imposed travel restrictions with "unfriendly states" in many nations such as the United States, EU, UK and other countries, imposing on them the threat of being banned from entering Russia from air, land or sea.

Apart from the restrictions that have been described above, Russia has taken a number of additional measures that do not particularly target nations who have placed sanctions on Russia. Measures such as efforts which intended to minimize the effects of international sanctions on the Russian economy, as well as to suppress free expression and prevent critical media coverage of the government.

To conclude, due to these restrictions that Russia has internationally imposed, a lot of foreign businesses are giving up on the Russian market. Such a thing results

in the fact that the combination of Western sanctions and Russian countermeasures will continue to generate challenging dilemmas for corporations with worldwide operations, particularly those with Russian connections. Based on the World Trade Organization, "the sanctions have not yet had a significant impact on oil and gas exports, but the crisis may hasten the worldwide shift to renewable energy sources" (WTO, 2022).

3.3 The Economic Impact of the Russia-Ukraine Crisis on Europe

The EU has imposed a variety of import and export restrictions on Russia as part of the economic sanctions. This means that certain products cannot be exported from Russia to Europe, and certain things cannot be sold from the EU to Russia. According to the European Council:

The list of banned products is designed to maximize the negative impact of the sanctions for the Russian economy, while limiting the consequences for EU businesses and citizens. The export and import restrictions exclude products primarily intended for consumption and products related to health, pharma, food and agriculture, in order not to harm the Russian population. The bans are implemented by the EU's customs authorities. Moreover, the EU, in collaboration with other like-minded partners, has adopted a statement reserving the right to stop treating Russia as a most-favored-nation within the WTO framework. The EU has decided to act on this not through an increase in import tariffs, but through a set of restrictive measures that include bans on the import or export of certain goods. The EU and its partners have also suspended any work related to the accession of Belarus to the WTO (EU Council, 2022).

In other words, the European Union has taken serious steps into minimizing the favorable treatment of Russia. As the turmoil continues, not only exports of several products have been restricted but also imports.

As a result of the trade sanctions imposed on Russia and Belarus, the significantly increased prices and adversely affected economic growth, raising the risk of stagflation. As far as European nations are concerned, the Central and Eastern

European nations and particularly those with closer trade ties to Russia, suffer the most among the European nations. In detail, between February 2022 and July 2022, gas prices in Europe increased by 170%, and efforts are being undertaken to rapidly reduce dependence on Russian supplies (OECD, 2022). In addition, the Central European nations, particularly Poland, the Czech Republic, Slovakia, Austria and Slovenia, as well as Sweden, Finland and Northern Italy, have the greatest employment shares in Europe's gas-intensive sectors.

Consequently, the regions of Europe with heavily reliant industries and enterprises on natural gas are more severely impacted. For example, the majority of British businesses cite the conflict in Ukraine as the biggest source of uncertainty for their industry due to the fact that the most significant factors influencing business uncertainty are energy usage, demand, trade and ownership. However, the majority of these actions are probably going to be expensive, at least in the near run, and their effects will be concentrated in areas where production is relatively specialized in gas-intensive industries. Due to Europe's growing reliance on foreign oil and gas suppliers, gas prices have dramatically escalated as a result of conflict and are likely to stay high in the near future. On account of this, many nations have agreed to search for renewable energy sources (World Trade Organization, 2022).

Finally, although Russia has established from its part some restrictions, such as the need that invoices for European energy imports be issued in rubles, the odds are not in favor of Russia (Orhan, 2022). While this has supported the ruble, it may accelerate Europe's ambitions to reduce its reliance on Russian energy in the long term and limit Russia's capacity to fund exports (World Bank, 2022). Furthermore, a lot of foreign businesses are giving up on the Russian market due to all these restrictions. Supply chains and trade will be impacted by financial restrictions since businesses will find it harder to manage their trade with Russia through financial channels. In addition, the possible loss of key infrastructure—particularly Ukrainian ports—will make already difficult supply chains for Russia much more difficult (Orhan, 2022). Therefore, it seems only natural to take for granted the unfavorable position that the country of Russia has put itself into.

Chapter 4

4.1 Impact on Food Transport Logistics

With today's rising global economic interconnection, the importance of international logistics is developing, with unique characteristics resulting from the fact that the points of delivery and receipt of commodities are located in various countries. Thus, it is an issue of planning, implementing and controlling cross-border information and products flows. First of all, it is important to examine the definition of logistics. According to Council of Supply Chains Management Professional logistics is the process of managing the production, movement and storage of materials and commodities, as well as related information flows, through the management of goods movement channels and related information between the point of origin and the point of consumption with present and future costs minimized by highly effective order execution and delivery. Overall, the main aim is to satisfy the needs of the consumer. Finally, this definition includes inbound, outbound, internal and external movements (CSCMP, 2013). In international level, logistics is a functional area of logistics aimed at optimizing the flow of goods beyond national economies. Of course, there are certain ways that can be obstacles in the completion of international logistics activities.

Currently, global food supply chains are subject to disruptions and mostly in land and air freight. The changes in demand, the cessation of production and the introduction of restrictions crisis led into an imbalance in cargo flows (Melnyk & Nehoda, 2022). As far as the Russia and Ukraine conflict is concerned the war has had a wide-ranging impact on the global logistics business. When the Russia Ukraine War began to damage the sector, the impacts of the epidemic on storage capacity and container availability had only recently started to fade. In other words, not only did the global food supply chain suffer from Covid-19 but also from the war. In particular, the Russia-Ukraine war delayed the flow of goods, fueled price increases and product shortages and created catastrophic food shortages around the globe (Wajszczuk & Kozera-Kowalska, 2022).

Explicitly, the closure of Ukrainian ports has created significant disruption in European and other supply chains. Additionally, an international food crisis is emerging as a result of a lack of maritime logistics and connection. The consequence of the conflict became visible first of all in the maritime transport sector and specifically in ports. Due to the fact that commercial ships have been damaged in the conflict, companies have redirect freight transport and divert boats (European Parliament, 2022). The majority of shipping companies have blocked cargo to and from Ukraine and Russia, citing unknown operational consequences. According to the Atlantic Council⁶:

Russian naval ships have hit at least 10 commercial ships since Russia's assault. About 80 commercial ships have been blocked in the Black Sea and the Sea of Azov for months. Before the war, Ukrainian Black Sea ports accounted for up to 90 % of the country's grain and oilseed exports, of which one third is destined to Europe, China and Africa.

Such a fact resulted in the blocking of important Black Sea maritime routes. Particularly, Odesa and the Sea of Azov, are closed and occupied; around 2.000 seamen were trapped onboard 94 boats in Ukrainian ports at the start of the war (European Parliament, 2022).

On the other side, a severe number of canceled orders and delayed shipments has caused port congestion in the United States. Cargoes are being diverted away from the US West Coast and the number of container ships anchored off the coasts of Savannah and Houston is increasing. As a result, ocean carriers are canceling shipments and sailings and ultimately leading to significant productivity issues at the ports (Larocco, 2022). On the East and Gulf coasts, the container delivery volume is high and this is pushing the prices up. As a result the increase of containers on the East Coast is benefiting the warehouse sector, something which is leading to fast-increasing warehousing costs with prices reaching in August 2022 up to around 8% since January (Larocco, 2022). The manufacturing orders are being pulled back which is resulting in a decrease in container bookings and

⁶ The Atlantic Council is an American think tank in the field of international affairs, favoring Atlanticism, founded in 1961. It manages sixteen regional centers and functional programs related to international security and global economic prosperity. It is headquartered in Washington, D.C. It is a member of the Atlantic Treaty Association.

impacting the congestion conditions at the port. China tries to find ways with several new projects to help and provide relief in the logistics sector. Ways such as the creation of long freight trains connecting China with Europe and reduced the days for the delivery (Melnyk & Nehoda, 2022). Specifically, when it comes to rail freight traffic between China and Europe, approximately 4% was transported via Russia, the Trans-Siberian route, and 2% via Ukraine. While services through Ukraine have been blocked, other routes - including those through Russia and Belarus - continue to operate (Xiangming, 2022).

The general statement of the Ukrainian Minister of Infrastructure Oleksandr Kubrakovt at the European Parliament's Transport (TRAN) Committee meeting in May 2022, was that 70% of total Ukrainian exports are delivered by sea. While a lot of supply chains are heavily disrupted, the rerouting of goods to road and rail would most probably not be enough, when considering the volumes which are implicated. This situation worsens terminal congestion, putting in danger maritime logistics and connections, as well as maritime safety and security (European Parliament, 2022). In defense of the latter, the International Maritime Organization has called for safe maritime corridors, while the International Transport Forum has urged for measures to free trade routes and seaports in the Black Sea in order to resume international trade. Apart from this the UN is attempting to construct a protected shipping route in the Black Sea in order to avoid an international food crisis. Meanwhile, in order to break the blockade of Ukrainian ports, the Lithuanian Foreign Minister Gabrielius Landsbergis advocated the formation of a non-military international maritime alliance (European Parliament, 2022).

Another way for transporting is through the air. Air cargo capacity has been reduced by one-tenth, and costs have skyrocketed as a result of rising demand and lower passenger aircraft capacity. With the closing of Russian and Ukrainian airspace and the imposition of airspace bans on Russian-owned aircraft, air transport capacity severely reduced and rates are most likely to soar. Tariffs have already risen as a result of the uncertainty and rising gasoline prices. Airfares are projected to continue to be expensive, potentially affecting the expedited delivery of time-sensitive food goods with high ticket prices (Melnyk & Nehoda, 2022).

As far as the road imports and exports based on the European Commission: The last few years and until 24 February 2022, Russia and Ukraine had absorbed a major percentage of EU road imports and exports. The major road carriers have ceased business with the two countries; although there are still some smaller companies that continue to operate but without delivery deadlines. Alternative road transport routes, such as those through Turkey and the South Caucasus, have benefited from the continued interruptions due to their adaptability. At the same time, labor risks remain, with drivers unable to work in the conflict zone. All borders to and from Ukraine remain closed, with just a few exceptions for defense and government movements (European Commission, 2022).

Overall, the conflict has had a significant influence on global trade. With Russia completely blocking the Sea of Azov and Black Sea ports, notably Odesa, closed for an indefinite period, Ukraine, the EU and the UN are taking measures to redirect trade and cargo away from Ukrainian ports. According to the World Bank, Ukrainian accession to the WTO was vitally important for agricultural trade. It would improve the constancy, transparency and predictability of trade relations and adherence to multilateral rules and disciplines and this would lead to a more stable framework for domestic and foreign agents, thus reducing risk and encouraging investment. Transport costs would also be reduced due to the guaranteed freedom of transit through the territory of WTO member states (The World Bank, 2004). According to the United Nations Conference on Trade and Development, the war in Ukraine is impeding trade and maritime operations, particularly in the Black Sea region, resulting in increased worldwide vessel demand and higher global shipping costs. Not only the conflict but also the epidemic have had an impact on worldwide shipping costs (UNCTAD, 2022). Because of disruptions in logistics and port operations, infrastructure destruction, and trade restrictions, maritime insurance and fuel prices have risen. Shipping distances have increased, as have transit durations and therefore expenses. Among the outcomes are an increase in transportation and logistics expenditures, supply chain interruption, higher gas and power prices, and so on.

4.2 The Coming Global Food Crisis

The current conflict in Ukraine not only has a disastrous impact on the national economy, but it also threatens global food security, particularly in low-income Asian and African countries.

Food insecurity is defined as a lack of consistent access to adequate quantities of nutritious food and it is also identified as a factor in migration (Sadiddin et al., 2019). Detailed, people are dying in large numbers in Ukraine, crops and warehouses containing food reserves are being destroyed, agricultural land is being rendered worthless by shelling and well-established supply systems of products and resources are being devastated. Many countries that are heavily reliant on imported foodstuffs and fertilizers, including many that are classified as least developed countries (LDCs)⁷ or low-income food-deficit countries (LIFDCs),⁸ rely on Ukrainian and Russian food supply to meet their consumption demands. Many of these countries were already dealing with the detrimental consequences of high international food and fertilizer prices prior to the conflict (FAO, 2022). This is only a partial list of the impacts of continuous wars. It is already clear that the scenario will result in a large (by 30% - 35%) drop in Ukraine's output of its global food specialties, specifically grain, this year (Shubravska & Prokopenko, 2022).

In the past, previous food supply chain shocks and price rises were widely documented, including droughts, floods and conflict in multiple nations, which resulted in the prohibition of food exports, an increase in fuel prices and a sudden two-fold increase in food prices. Not all industries and goods have been equally impacted, and different items have faced disruptions at different points throughout

⁷ According to the United Nations: Least developed countries (LDCs) are low-income countries confronting severe structural impediments to sustainable development. They are highly vulnerable to economic and environmental shocks and have low levels of human assets. There are currently 46 countries on the list of LDCs which are reviewed every three years by the Committee for Development (CDP). LDCs have exclusive access to certain international support measures in particular in the areas of development assistance and trade (United Nations, <https://www.un.org/development/desa/dpad/least-developed-country-category.html>)

⁸ According to the United Nations: There are currently 46 economies designated by the United Nations as the least developed countries (LDCs), entitling them to preferential market access, aid, special technical assistance, and capacity-building on technology among other concessions (United Nations, <https://unctad.org/topic/least-developed-countries/list>)

the supply chain. For example, in the 1970s, Bangladesh experienced severe famine and starvation due to a combination of local food availability, price rises and speculative behavior, which resulted in the deaths of up to 1.5 million people (Jones, 2017); or with the most recent example Covid-19. Pandemic has put shocks on all parts of the food supply chain and has introduced unexpected stresses on food systems, creating many immediate challenges and affecting farm productivity, food processing, transportation and logistics and final demand all at the same time (Aday & Seckin-Aday, 2020).

However, the Russian invasion of Ukraine has been creating chaos in general and certainly in global agricultural commodities markets, putting pressure on wheat supplies and inventories and thus food prices. And this is why there is an interdependence inherent in global trade due to the broader repercussions that are felt all over the world. But how do we assess a country's food security vulnerability and how do we deal with it? Dependencies, as well as a set of coping capacity indicators to absorb shocks, must be determined in order to assess which countries' food security is at risk. Addressing vulnerabilities on this scale necessitates a global food security approach, because vulnerable countries' food security is dependent on measures taken by other countries, as well as a holistic approach to water, energy and food security. The Russian invasion highlights the necessity to reconsider the socioeconomic significance of agriculture and open commerce in terms of food security and regional stability.

It is known that there is an important dependence on basic agricultural commodities and food markets of both Russia and Ukraine. Although India has not traditionally been a big wheat exporter, exceptional harvests in recent years have contributed to increased exports and the anticipation that India would be able to provide the world market with approximately 10 million metric tons of wheat this year. However, due to rising costs and a heat wave that limited yields, the Indian government stopped wheat exports on May 13, 2022 (Wesley & Peterson, 2022). Export bans have traditionally been a typical response to global food prices, as governments aim to prevent rising worldwide prices from affecting the home market (Wesley & Peterson, 2022). So, according to the U.N Food and Agriculture Organization Russia and Ukraine are responsible for importing more

than half of the wheat trade and global sunflower oil which is imported by 36 countries (FAO, 2022). Particularly, they account for 53% of global commerce in sunflower oil and seeds and 27% of global trade in wheat (UNCTAD, 2022). At the same time, Russia is also a significant worldwide fertilizer supplier, so any limited access has a global impact on crop production.

In 2020, the main EU destinations for Ukrainian wheat, maize, sunflower seeds and oil were Bulgaria, Cyprus, Estonia, Greece, Hungary, Italy, Lithuania, the Netherlands, Portugal and Spain (FAO, 2022). In 2021, prior to the conflict, Ukraine was expected to export approximately 50 million tonnes of grain and predicted a 3% increase in global marine exports of grain. However, the exports contracted by 3.8% and global shipments of fertilizer and related inputs such as potash were decreased by 7% in 2022 (UNCTAD, 2022).

During the war Russia destroyed Ukraine's agricultural infrastructure, causing the entire supply chain to be disrupted. Russia had closed the Black and Azov Seas and Ukrainian grain shipments had been hijacked in the early months of the attack. To alleviate shortages, Russia and Ukraine, in July, reached a United Nations (UN) agreement to unblock Ukrainian grain shipments from three Black Sea ports. Despite the agreement, Russia launched cruise missiles against Odesa's ports just hours after it was signed (Krasnolutska, 2022). This was something that not only was crucial but also it created uncertainty which has had a domino effect on supply chains all over the world. It is affecting political stability around the world, with the removal of Pakistan's Prime Minister Imran Khan, turmoil in Peru, and violence in Sri Lanka all implying that rising food and fuel prices are causing discontent. At the same time, it has created a crisis in France, Germany, Italy and Spain, where the consequent energy allowances, price decreases, and levies amount to government fiscal intervention to address rising energy prices (Welsh, 2022).

Additionally, the national capability to cultivate soils, sow and harvest crops has been decreased since the commencement of the war (FAO, 2022). The disruption of winter harvesting and spring planting, the availability of agricultural labor, the availability of agricultural supplies, crop damage caused by military activities

and the destruction of the food system are all major food security problems. According to FAO, 20-30% of winter cereal, maize, and sunflower seed production regions will not be harvested or planted this spring. In addition, a shortage of fertilizers and pesticides will reduce agricultural productivity. Because of accessible stocks and low import requirements, the availability of seeds for planting in 2022 is relatively high, particularly for vegetable crops. The key constraint in this aspect is logistics, and maize and sunflower seeds are predicted to be scarce (FAO, 2022). Food shortages for the local population and export sector are a result of these effects, both in the short and medium term.

In Ukraine, agriculture contributed to the gross domestic product with around 9.3% and employed nearly 17% of the working population (The World Bank, 2004). Ukraine exported more than \$9.4bn worth of cereals in 2020, around one-fifth of its total exports, and it is ranked second global cereal exporter, whereas the US is first ranked (Barklie, 2020). The impacts of the war in Ukraine's agricultural and food sectors are also expected to affect the economy of the country significantly.

The importance of Russia in global food supply chains can be understood using information on reported output and local supply (Barklie, 2020). Ukraine produces 3.2% of global wheat production and exports 9.1% of global wheat exports (FAO, 2022). Russia is the world's leading wheat exporter, with Ukraine ranking fifth and serving as a vital source of wheat to the World Food Programme. In terms of agricultural and food production exports, Ukraine and Russia play a significant role not only in Europe but also and beyond the European borders. As a result, this will increase global food security pressures and the UN is currently raising worries about wheat supply to Syria and many other countries (Jagtap et al., 2022). For example, Ukraine's maize production represents 2.6% of global production, while the country exports almost 15% of global maize, ranking fifth behind the United States, Argentina and Brazil. Ukraine's barley production accounts for 4.9% of global production, and it is the world's second largest exporter, trailing only France with 13.2% of total global exports. Ukraine produces 29.1% of global sunflower oil and exports 44% of global sunflower oil supply. Ukraine is the world's top exporter of sunflower seeds (Jagtap et al., 2022).

As noted above a Russian blockade has halted food shipments from Ukraine's principal ports and grain stocks within Ukraine have been destroyed or seized by Russian soldiers. The conflict and the broad distribution of land mines and abandoned artillery shells have hindered the winter wheat harvest and planting for the new season in Ukraine (Wesley & Peterson, 2022). Aside from the war's impact on food supplies, Russia and Ukraine are important manufacturers and exporters of fertilizers. A Russian blockade has halted food shipments from Ukraine's principal ports while grain stocks within Ukraine have been destroyed or seized by Russian soldiers. The conflict and the broad distribution of land mines and abandoned artillery shells have hindered the winter wheat harvest and planting for the new season in Ukraine (Wesley & Peterson, 2022). In addition to stresses on food supply arising from the war, Russia and Ukraine are important manufacturers and exporters of fertilizers, with Russia generating around 10% of world nitrogen fertilizer (Hammond & Gadanakis, 2022). Rising input costs, such as those for fertilizer and energy, will also put upward pressure on food prices.

The war not only has raised humanitarian needs in Ukraine and the situation has worsened during the winter of 2022-2023 (FAO, 2022), but also it has exacerbated the needs of millions of people who have already been displaced or require aid as a result of the country's eight-year-long war in the east. By directly decreasing agricultural productivity, limiting economic activity and boosting prices, the war has further eroded local residents' purchasing power, resulting in increased food poverty and malnutrition (FAO, 2022).

4.3 The risks of famine and severe food insecurity, the impact of malnutrition

The COVID-19 pandemic, as well as the effects of Russia's invasion of Ukraine on food security, nutrition and agrifood systems, as well as climate change and the unprecedented global occurrence of drought, highlight the urgency with which agrifood systems must be transformed and made much more resilient globally (Callens et al., 2022). According to the Food and Agriculture Organization, the number of people affected by hunger in the globe was increased in 2020, reaching between 720 and 811 million. More than half of the world's undernourished

people dwell in Asia and more than one-third live in Africa (FAO, 2020). Many of these countries have recently become major importers of Ukrainian agricultural products. As we already mentioned before, Ukraine before the war was the fourth largest exporter of corn in the world after the USA, Brazil and Argentina; and by the end of 2021, Ukraine was the fourth supplier of food to the EU. According to estimates of the Kyiv School of Economics⁹, more than 400 million people in the world depend on Ukrainian grain supplies (Shubravska & Prokopenko, 2022).

Due to the conflict, food supply shortages and rising costs are projected to have a disastrous impact on consumers in many low-income countries. Russia and Ukraine account for 34.8% of Sub-Saharan African wheat imports. The proportion of wheat imports from the two fighting countries is considerably higher in Pakistan with 87.8%, Egypt 85.6%, Turkey with 76.5%, Lebanon with 75.5% and 54.8% in Bangladesh (The Economist¹⁰, 2022). According to the United States Department of Agriculture (USDA) food costs are especially volatile in low-income nations because food expenses consume a considerable portion of customers' disposable income. Consequently, food expenditures constitute more than half of total consumer spending in Bangladesh, Myanmar, Kenya and Nigeria. Nigeria, Ethiopia, Yemen, South Sudan, Afghanistan, the Democratic Republic of the Congo and Haiti are among the twenty nations listed by the FAO as being at risk of widespread hunger (FAO, 2022). In 2021, over 276 million people were either facing or on the verge of experiencing acute food insecurity and the situation can only become worse in 2022 as a result of the war in Ukraine (Food Security Information Network, 2022). Hunger and poverty exacerbate migration pressures caused by climate change, increasing the likelihood of displaced persons and international migration from the most severely impacted countries.

⁹ Kyiv School of Economics (KSE) is an undergraduate and graduate school of economics and management in Kyiv, Ukraine, founded in 1996 by the Economics Education and Research Consortium (EERC) and the Eurasia Foundation.

¹⁰ The Economist is a British weekly newspaper printed in demitab format and published digitally. It focuses on current affairs, international business, politics, technology, and culture.

There is very little that can be done to counterbalance the causes of the current food crisis in the short run. And in the current food crisis we mean during armed conflict periods where the developing nations are one of the major contributors to food insecurity in these countries (Martin-Shields & Stojetz, 2018). The World Food Program (WFP) is striving to offer emergency food aid, but because of the magnitude of the situation, international financing is insufficient. Rising food prices, in particular, decrease the quantities that the WFP can acquire given its resources (World Food Program, 2022). Apart from food assistance, changes in the policies restricting exports could be aided in order to address supply shortages and price rises. Longer-term solutions to food hunger will necessitate measures to minimize conflicts like those in Ukraine, Yemen, Ethiopia and South Sudan, address climate change and rebuild global supply systems in the aftermath of the Covid 19 outbreak (Zachmann & Weil, 2022).

At the same time, it is clear that a food crisis can affect a considerably larger percentage of the world's population in the event of a full-scale military confrontation between two nations that are among the top worldwide producers of grains and oilseeds (Ukraine and the Russian Federation). The challenges with export logistics, reduction of cultivated lands and likely drop in agricultural crop yield induced by the Ukraine war have already had a substantial impact on the current condition of global food security and malnutrition (Shubravska & Prokopenko, 2022).

Malnutrition remains at critical levels in countries affected by food crises, driven by a complex interplay of factors, including low quality food due to acute food insecurity and poor child-feeding practices, a high prevalence of childhood illnesses, and poor access to sanitation, drinking water and health care based on Global Report on Food Crises (GRFC, 2022).

The question here is which population groups are the most vulnerable to malnutrition? Slower economic development and rising inflation are likely to strike the poorest and most vulnerable countries and populations the hardest, leading to rises in hunger and malnutrition, as well as the expense of a healthy diet. Additionally, inequality considers disparities in urban and rural residence,

household wealth, maternal and female education, and gender. Moreover, based on FAO there is a rising age and gender disparity in food insecurity; food shortages and high food prices caused by the war in Ukraine considerably affect women and children. Historically, women have been impacted by health and economic crises in a variety of ways, including but not limited to food security and nutrition, health, time burden and productive and economic characteristics (FAO, 2022).

All of this is happening at a time when the world is still trying to recover from the recession caused by the COVID-19 epidemic (FAO, 2022). Additionally, developing countries are threatened by malnutrition such as the African nations for which wheat is important for various reasons. The majority of African countries are highly dependent on imports of basic food items for their survival – not only wheat, but also corn, rice, etc. According to some experts, the majority of Africans obtain their caloric intake from cereals, with most diets poor in proteins and micronutrients. This crucial reliance on wheat and other grains is partially the result of limited means for local production, but also the result of a complex system of land ownership. Based on the International Center for Migration Policy Development, varied countries in Sub-Saharan Africa have different land rights systems. Some fields are not technically owned by farmers, while several regions are subject to a traditional ownership structure designed to benefit a specific local community (ICMPD, 2022). Customary land tenure is considered to include almost two-thirds of all farmed land in Sub-Saharan Africa. This means that tiny farming communities have limited capacity (and sometimes lack interest) to respond to global market shifts. These structural constraints in farming and national production are among the reasons why most African countries are less likely to achieve self-sufficiency in the short term – and are more vulnerable to price and supply changes – than countries with larger reserves and access to alternative suppliers (ICMPD, 2022).

In the past, Egypt has been through several food crises, including a severe one in 2008 when drought and wildfires (Van Scheltinga, 2021). Egypt is the world's largest importer of wheat, with Russia and Ukraine providing 85 percent of its supply. Wheat prices have risen as a result of disruptions in production and

transportation from Ukraine, as well as restrictions imposed on Russian exports. As a result, the cost of basic products such as bread has risen (Bearak, 2022). Egyptian officials warn that, due to the country's sensitivity to rising costs, it is now compelled to rely more largely on its present inventories, which are expected to last between 2 and 4 months. Egypt is currently seeking alternative suppliers, both domestically and abroad, and is considering reducing its bread subsidy system (Abay et al., 2022). Bread subsidies have been a subject of controversy between Egyptian civilians and the government since the 1950s. Bread is an essential dietary item for many Egyptians, one-third of whom live in poverty. Bread subsidies cost the government approximately USD 2.8 billion, a figure that is expected to rise as wheat prices rise. Since the 1980s, the price of subsidized bread has been nominally unchanged. Talks of changing bread subsidies in the midst of an economic crisis risk causing societal unrest (Abay et al., 2022). In Libya, the situation is considerably worse, compounding the economic woes that have been endured since the outbreak of civil wars in 2011. Because Libya imports 75 percent of its wheat from Ukraine and Russia and has limited stocks, the Russian-Ukrainian War has aggravated food instability. Bread costs have risen due to disruptions in wheat supplies, which may contribute to the public pressure on Libya's government (ICMPD, 2022).

Tunisia imported 80 percent of its wheat supply from Ukraine prior to the commencement of war. Wheat prices have reached their highest level in 14 years as a result of the war, with many people struggling to purchase bread and other wheat-based essentials. Furthermore, oil prices were rising. This problem is especially crucial to highlight because rising fuel prices lead to price rises in other items and particularly in Tunisia, add to the government's budget deficit (Delpuech, 2022).

The situation in Ukraine is affecting food security in more than just North African countries. More than a third of the wheat consumed in Africa is imported from Ukraine and Russia. Countries that rely largely on wheat imports from Eastern Europe, such as Somalia, Sudan, Mauritania, Congo, Kenya and Eritrea, have inevitably suffered from the conflict's impact. Bread prices in Sudan, for example, have virtually doubled, with several bakeries forced to close due to a 60% decline

in wheat shipments since the war began two months ago. Wheat supply disruptions are definitely having a significant impact on food security across the continent (Bearak, 2022).

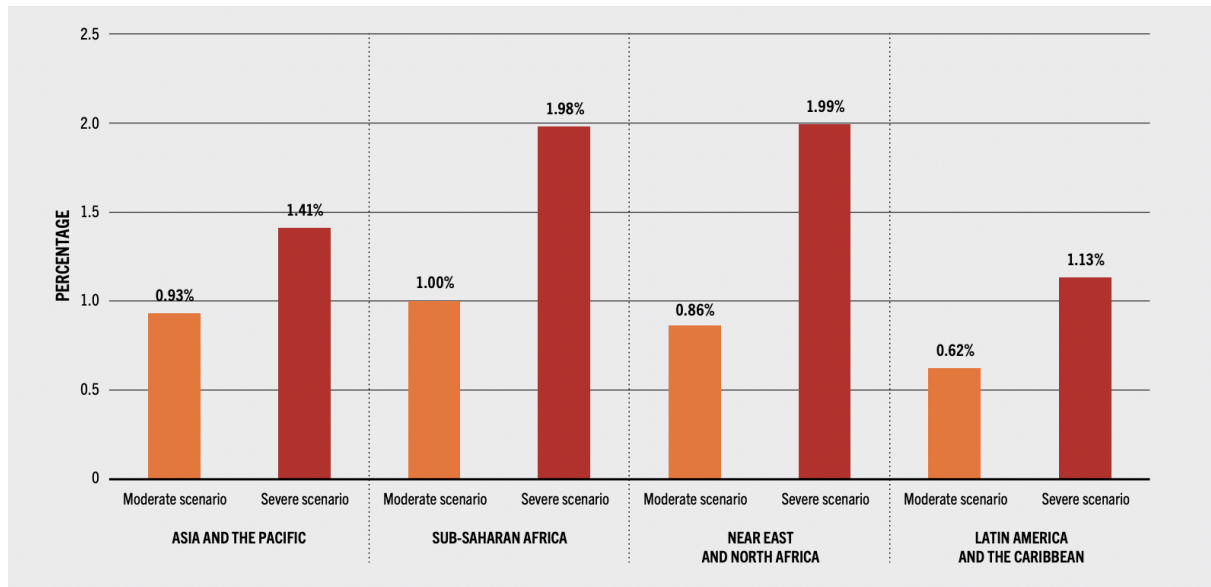
And we have to consider how food insecurity impacts migration? The recent disruption in wheat supply not only impacts populations' lives but it also fuels migration aspirations. Food insecurity influences migration patterns within countries, regions, and globally. Migration movements occur somewhere in a given country or region, with the poor often being the first to suffer, leading to an increase in rural-to-urban migration (ICMPD, 2022). However, the reverse occurs as well, with migrants fleeing the city for their family farms, where labor for food production is required to secure lives (Lee et al., 2019).

Food insecurity affects international migration dynamics, according to research from Sub-Saharan African countries; the more severe the level of food insecurity, the higher the propensity to migrate (ICMPD, 2022).

The ICMPD in detailed points out that:

It is also important to highlight that the changes in the global wheat supply and increasing food prices are compounded in Africa. Such a thing is visible due to the major environmental, political and financial hardships experienced across the continent. Consequently, these hardships are amplifying the struggles that the citizens experience on a daily basis – and they are fuelling the desire/decision to migrate. In the case that the disruption of wheat supplies continues, many states in North Africa might need to cut basic food subsidies. In the past, these basic cuts have resulted in widespread protests and even, as some have argued, to the Arab Spring that saw the toppling of regimes, civil wars and sizable displacement across the region and to Europe (ICMPD, 2022 p.4).

Estimated increase in the number of undernourished people in 2022 by region:



Source FAO calculations

According to FAO:

It is projected that nearly 670 million people will still be undernourished in 2030 – 8 percent of the world population, which is the same proportion as in 2015 when the 2030 Agenda was launched. This is 78 million more undernourished people in 2030 compared to a scenario in which the pandemic had not occurred. The projected gradual reduction in global hunger by 2030 is largely due to the significant improvements foreseen for Asia, where the NoU is projected to fall from the current 425 million to around 295 million (equivalent to about 6 percent of the population), and to a simultaneous worsening in Africa, where the NoU is projected to grow from almost 280 to more than 310 million (corresponding to slightly above 18 percent of the population). For Latin America and the Caribbean, the number of people affected by undernourishment is projected to remain stable until 2030 at around 56 million (which correspond to about 8 percent of the population) (FAO, 2022, chapter 2).

Malnutrition's impact may be less visible than hunger. Malnutrition, on the other hand, can increase the risk of sickness and mortality in the short term, as well as

having long-term, irreversible consequences if left untreated (Shekar et al., 2017).

5.1 Discussion on approaches and measures to deal with vulnerabilities

International organizations have responded with a variety of initiatives and policy recommendations to avoid or mitigate the impact of the shock. According to the International Food Policy Research Institute, sanctions against Russia and export limitations to protect local consumers should be tailored to maintain global food security and the ramifications for other parties should be examined (Glauber & Laborde, 2022). The European Commission will assist Ukraine in continuing to grow cereals and oilseeds by ensuring that inputs reach farmers as efficiently as feasible. It also pledges to take all necessary steps to guarantee that the EU contributes to global food security, particularly in Ukraine, North Africa and the Middle East, as well as Asia and Sub-Saharan Africa (EC, 2022).

FAO recommends to nations, first of all, to maintain open global food and fertilizer trade and find new and more diverse food suppliers while relying on existing food stocks and diversifying domestic production. At the same time, governments have to expand social safety nets with the main purpose to protect vulnerable people. However, another practice is avoiding ad hoc, immediate and unilateral policy responses and strengthening market transparency and dialogue. Thus, governments are urged to evaluate how their own policies to protect domestic food supply by restricting or prohibiting exports may affect international markets (FAO, 2022). Furthermore, the disparity between the low financial value of food production - which is sometimes overlooked - and the significant socioeconomic worth of food security - for social stability - emphasizes the significance of investing in agriculture while preserving an open and trade-based economy (Hellegers & Van Halsema, 2019). Policies aiming at increasing resilience through trade deregulation through the providing countries' best interests to build toward robust supply networks. In the long term, supply chain resilience must be strengthened by giving better and open information on potential concentrations and bottlenecks along global supply chains. Furthermore, it could be reinforced by performing stress tests on supply systems and also participating in strategic commodity hoarding (Hellegers, 2022).

Conclusion

To this end, this study has succeeded in its goal of investigating the impact of war on world economy, geopolitics, food security and society. Geopolitics and geoeconomics around the world have both been impacted by the conflict. The entire world has experienced delayed progress and high inflation since the invasion of Ukraine. The invasion of Ukraine by Russia has resulted in a great deal of human suffering, but it is also damaging logistics and international trade, which disproportionately affects low-income countries (WTO, 2022).

This survey discusses how the conflict between Russia and Ukraine has affected all components in the food supply chain. It is deduced that the war has resulted in the already global severe food insecurity problem, with the interruption of livelihoods throughout Ukraine's agricultural growth season and as a consequence had an impact on global malnutrition (FAO, 2022). Russia and Ukraine's economies are interconnected with the rest of the world, because these countries are major producers in terms of petrol, oil, wheat and other commodities. Food security, global growth, trade and development have all been negatively impacted by the ongoing situation. As a result, rather than having isolated effects on the sanctioned country, economic sanctions and visa restriction, geopolitical conflicts have economic blow effects on other countries which aren't part of the conflict. Although Ozili (2022) developed the global economic consequences and the effect of a global food supply disruption of Russian invasion of Ukraine, he doesn't refer to the impact on societies. Even before Russia invaded Ukraine, the growing frequency and severity of climate change, regional conflicts and the pandemic were all having an impact in affecting food production, delivery and driving up the cost of feeding people. The alarmingly high incidence of severe food insecurity and malnutrition highlights the vulnerability of global and local food systems. The interconnectivity of drivers is highlighted further by the ongoing conflict in Ukraine, which not only jeopardizes the food security of individuals immediately affected by the conflict, but also exacerbates existing issues faced by millions of acutely food-insecure people worldwide. Some nations facing food crises are particularly exposed to the threats to food markets posed by

the conflict in the Black Sea region, owing to their reliance on food, fuel, and agricultural input imports and vulnerability to global food price increases.

The humanitarian impact of the global food crisis is enormous, as are the financial consequences. It threatens world peace and seriously undermines the viability of new international institutions and democracies in North Africa, the Middle East, as well as Asia and Sub-Saharan Africa and other developing regions. According to Wesley & Peterson (2022) survey although over the past 30 years, significant progress has been made in reducing global poverty; specifically, the extreme poverty rate in low and middle income countries fell from 44% in 1990 to less than 10% today, the current food crisis threatens much of that progress (Wesley & Peterson, 2022). A holistic approach to food and energy security is essential, in order to guarantee that food and nutrition outcomes continue to be a priority for the governments. As a result, the conflict in Ukraine might lead nations to redirect their funding for programmes that aim to improve people's nutritional status to other initiatives. Programmes such as supplying emergency aid to the vulnerable, facilitating trade and the global food supply, increasing output and funding climate-resilient agriculture. For example, African states should concentrate more of an emphasis on intracontinental trade. The international community has to address the causes and implications of growing food crises from humanitarian, development and peace perspectives. Policymakers should reconsider the appropriateness of market design with a view to ensure energy security and create incentives in place to ensure the green transition in a publicly supported way. The future research can evaluate whether the resolution of conflict by peaceful means is effective in calming down countries going to war to protect the influence of the region.

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