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Russian-Ukrainian War and its Economic Implications on the Prices of Strategic Commodities

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Abstract: Russia–Ukraine war has increased systemic vulnerabilities of the global economy. Therefore, the purpose of this study is to identify the economic implications of the Russian-Ukrainian war (2022) on the global prices of strategic commodities. Strategic commodities were divided into three main types: energy commodities, food commodities, and mining commodities. According to World Bank reports, the monthly data of commodities prices from M05/2021 to M05/2022 has been used. In addition, a comparative analysis approach was used to compare the prices of commodities before and after the war. The study concluded that the Russian-Ukrainian war had a negative impact on the prices of energy commodities, especially crude oil, natural gas and coal. The results indicated that the Russian-Ukrainian war negatively affected the prices of food commodities such as wheat, maize and oil. The study found that some mining commodities such as aluminium, nickel and zinc were negatively affected by the war.

Keywords: Russian-Ukrainian War, Economic Implications, strategic commodities

1. Introduction

The Russian -Ukrainian war that started on 14th February 2022 has severe implications on the Global Economic Environment. Economic experts well anticipated that the Russo-Ukrainian war is going to have global economic repercussions, especially since the global economy is still suffering from the repercussions of Covid-19. Among the most prominent repercussions are the fluctuations in the prices of strategic commodities, including energy, mining and food commodities, especially wheat, which increases the possibility of an imminent global food crisis.

Strategic commodities are commodities that are used for inflation hedging and as a safe haven in times of political unrest and extreme market volatility (Jiang et al., 2020). In this sense, strategic commodities are considered to be of utmost importance to the country's economy, usually to the extent that if the open trading of the commodity is disrupted in some manner, the economy will suffer severely (Tatum, 2022). Regarding that, both Russia and Ukraine constitute a large proportion of the world's exports of a large number of strategic goods. Russia is a major exporter of natural gas and the second-largest exporter of crude oil. Russia accounts for about 25% of global natural gas exports, 18% of coal exports, 14% of platinum exports, and 11% of global crude oil exports (Gill, 2022). Hence, the potential risks will lead to a sharp decrease in the supply of these commodities, which in turn will lead to obstruction of construction, industry and transportation. This will be reflected in reduced economic growth. Besides Russia, Ukraine plays a major role in world food markets.

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Ukraine and Russia are major producers of food commodities, accounting for 27% of wheat exports, 23% of barley exports, and 15% of maize exports globally. Approximately 19% of the grains traded globally are exported from Russia and Ukraine combined (Hellegers, 2022). Both account for nearly two-thirds of sunflower oil exports. Ukraine accounts for almost half of all global exports, 42%, while Russia accounts for 21 % of sunflower oil (Ritchie, 2022).

The war prompted the World Trade Organization to cut its growth forecast for this year by almost half, from 4.7 percent to 2.5 percent, due to the impact of the war and related policies, according to Dngoz Okonjo, head of the World Trade Organization. Using Africa as an example, the former Nigerian Minister of Trade said that 35 out of 55 countries on the continent import wheat and other grains from Russia and Ukraine. She added that it is clear from studies currently being conducted by the African Development Bank that food prices will rise by 20-50 percent in a lot of countries (Josephs, 2022). The war is creating a food crisis as a result of rising food prices and possible shortages of food commodities in many countries that depend on exports from Russia or Ukraine. Some countries in the Middle East and North Africa like Egypt, Tunisia, Algeria, Lebanon and Syria import from 50% to more than 80% of their wheat from Ukraine or Russia, making them particularly vulnerable to the economic shocks stemming from the Russia and Ukraine crisis (Iliya, 2022). Some countries import large quantities of wheat from Ukraine and Russia. While some, such as the Arab Gulf states, have large reserves, others, such as Lebanon and Yemen, do not have any, making the possibility of shortages very real.

On the other hand, some countries benefited from the Russian-Ukrainian war as in the case of India, which increased its imports of Russian crude oil and started refining it into diesel and jet fuel and then selling it to Europe and other nations (Guruswamy, 2022). In addition, India is the second-largest wheat producer in the world (Vasudeva and Munjal, 2022), making it a potential supplier of wheat, food grains, and fertilizers. India can overcome the dwindling supplies of these commodities and seize the opportunity in the global economic environment. The full-scale Russian invasion of Ukraine is still raging internationally and has far-reaching effects on the economic, geopolitical and military realms. The Russian Federation has already been subjected to hitherto unheard-of economic sanctions that cover, among other things, imports and exports of products and services. Additionally, several hundred extremely wealthy people (often referred to as "oligarchs") with claimed ties to the Russian government have had their assets frozen or seized and placed under sanctions (Tosun and Eshraghi, 2022). While no one has yet imposed sanctions on Russian wheat imports, importers are facing increasing difficulty in purchasing wheat from Russia due to supply chain issues and difficulties transferring funds to Russian companies and ship insurance.

Despite the repercussions of the Russian-Ukrainian war on the prices of strategic commodities, especially energy and food, which may lead to a global crisis, there are no studies that have addressed this issue. Many studies have been done on the economic impact of past wars, including World War I, World War II, and the Iraq war. Some studies in this literature include Mazower (1991), Heydemann (2018), Kesternich et al (2014), Chassang and Miquel (2009), Koubi (2005), Glick and Taylor (2010), Bluszcz and Valente (2019), Nordhaus (2002), Ganegodage and Rambaldi (2014) and Collier (1999). However, there is little research on the economic implications of the Russian-Ukrainian war. This gives us the opportunity to investigate this research gap.

Consequently, this study seeks to identify the economic effects of the Russian-Ukrainian war on the prices of strategic commodities, based on the data of the World Bank and according to the comparative analysis method. Accordingly, this research paper will contribute to enriching the economic literature that explores the economic implications of war. Another contribution of this

research paper lies in examining the impact of war on the prices of three types of strategic commodities, namely energy, food and mining commodities. They are the commodities most affected by the Russian-Ukrainian war and the most affecting the global economy.

2. Literature review

In a world with an ever-growing integration of economies and interdependence, wars pose a severe challenge to the social, economic and political spheres. Many studies indicate that wars not only affect the countries directly involved in them but also affect the countries around the world as a whole, which is clearly evident from the Russian -Ukrainian war. For example, Mbah and Wasum (2022) aimed to review the economic repercussions of the Russian-Ukrainian war 2022 on the global economy, especially the economies of countries that have imposed sanctions on Russia, such as the European Union, the United States of America, the United Kingdom and Canada. The results of the study indicated that there are severe negative effects on most of the world's economies, including Russia. The main economic repercussion of the Russian-Ukrainian war, which the study referred to, are summed up in the high rates of inflation, a steady rise in the prices of strategic commodities such as energy, food and mining commodities, disruptions in global supply chains, high risks and uncertainty, low investments and a decline in economic growth. Iliya (2022) discussed the Russian-Ukrainian war and global shifts. According to the study, the Russian invasion of Ukraine negatively affected the global oil market. Exports of wheat and sunflowers were also severely harmed by Russia's invasion.

Ozili (2022) sought to reveal the consequences of the Russian invasion of Ukraine on the global economy. The results of the study showed that there are negative effects on the global economy that can be summarized in a global rise in commodities prices, high global inflation, and disruptions in global supply chains. On the other hand, the study pointed to a decline in the global stock index on the day of the invasion, a rise in transportation costs, and a shortage in global energy supplies. The study also confirmed that the sanctions imposed by countries on Russia had an indirect negative impact on the global economy.

Mohammed (2022) discussed the impact of the Russian-Ukrainian war on the Indian economy. The study relied on secondary data and the descriptive method was used in this study. The study indicated that countries importing Russian and Ukrainian goods suffered from an increase in the prices of energy and food commodities. The study emphasized that India in particular suffered from the high prices of edible oils and fuel prices.

Balbaa et al. (2022) examined the impact of the Russian-Ukrainian war on the global economy, where the study concluded that there was a negative impact of the Russian-Ukrainian war, which was reflected in the rise of prices of energy and basic food commodities, and the rise in global inflation rates for many countries. The study also indicated that the war created severe and unexpected disruptions in supply chains, especially for import-dependent firms form Russia or Ukraine, which had to reorganize their supply chain very rapidly against such major disruption. Supply chain disruption is ‘an event that disrupts the flow of goods or services in SC (Al-Hakimi & Borade, 2020; Al-Hakimi et al., 2022). Disruptions in supply chains often cause significant production delays and cost increases in addition to putting supply chain resilience into question (Al-Hakimi et al., 2021a,b; Goaill & Al-Hakimi, 2021). Jagtap et al. (2022) discussed the impact of the Russian-Ukrainian war on global food supply chains. The results of the study indicated that the Russian-Ukrainian war negatively affected the food prices and food supply chains, with significant

effects on manufacturing, production, sourcing and logistics. Hellegers (2022) indicated that the Russian-Ukrainian war negatively impacted wheat supplies and, consequently, global food prices.

Abbassi et al. (2022) examined the effect of the Russian-Ukrainian war 2022 on the companies that make up the leading stock market of the G7 countries. The study sample consisted of 531 companies. Using the method of studying the event from March 2021 to March 2022, the study concluded that companies' exposure to the risks resulting from the war leads to negative returns. A further finding of the study was that stock prices are susceptible to geopolitical uncertainties. Yousaf et al. (2022) discussed the impact of the Russo-Ukrainian war on the G-20. The study indicated that there are negative impacts of the Russian-Ukrainian war on the majority of stock markets in the G-20, especially in the Russian market. According to the regional analysis, the study confirmed the existence of a severe negative impact of the Russian-Ukrainian war on the economies of the countries from Asia and Europe. Shah et al. (2022) argued that the sanctions placed on Russia by Western would cause interruptions in the supply of crude oil, natural gas and other exports by Russia. Ukraine's wheat and sunflower oil exports will be hampered to varying degrees depending on how much Russian airstrikes harm the country's infrastructure and agricultural land. Rodríguez et al. (2020) aimed to assess the natural gas supply security in the European Union during the Ukrainian-Russian gas crisis (2006–2009). The study's results indicated that the security of gas supply of a group of European Union countries was negatively affected. Before that, Glick and Taylor (2010) discussed the economic effects of the war. The study concluded that there are severe and significant effects of wars on international trade, national income, and global economics. Koubi (2005) argued that the longer or intensified the war, the higher the long-term economic growth rate.

Although many previous studies have dealt with the repercussions of the Russian-Ukrainian war on the global economy, they did not focus on the impact of this war on the prices of strategic commodities, especially energy, food and mining, which are the commodities that have the most impact on the global economy, as the shortage of their supplies leads to a global crisis. Therefore, this study seeks to fill this gap in the literature.

3. Methodology and data

The study relies on the comparative analysis approach to compare the prices of commodities before and after the war in order to identify the impact of the Russian-Ukrainian war on prices. The study used monthly data of commodities prices during the period M05/2021 to M05/2022. The model of the study can be expressed as below:

Change Amount = Average Price (t) − Average Price (t−1)

$$= AP_t - AP_{t-1}$$

$$\text{Change Rate} = \frac{APt - APt-1}{APt-1} * 100$$

Where t = 1, 2, 3,…., N,

N: Number of Observations

4. Result and discussion

4.1. Economic Implications on the Prices of Energy Commodities.

According to a recent World Bank analysis, the Russian-Ukraine war has triggered the most significant energy price shock since the 1973 oil crisis (Merwe, 2022). Energy prices have skyrocketed since Russia invaded Ukraine. Natural gas and crude oil prices soared due to global supply interruptions, direct damage to pipelines and international sanctions, and the Russian response to the sanctions. In terms of natural gas and crude oil, Russia is the world's second-largest gas producer and third producer of crude oil (Cunningham, 2022).

a. Crude oil

With the beginning of the Russo-Ukrainian war, the price of crude oil continued to rise. Table 1 displays the global monthly change in the crude oil price (amount and percentage). Table 1 indicates that the price of Crude oil (Brent) reached 115.59 ($/bbl) at the end of March, where the monthly change in the price recorded an increase of 19.83 dollars and a percentage of 20.70% at the end of March 2022 compared to February 2022. In April 2022, the price of Crude Oil (Brent) declined by 8.48% compared to the price in March 2022 to rise again in May 2022, with an increase of 6.22%, to record a price of 112.37($/bbl). According to Table 1, the price of Crude Oil (Brent) recorded a significant increase after the war compared with the price before the war. The price of Crude Oil (Brent) in March 2022 after the war increased by 35% compared to January 2022 before the Russian-Ukrainian war. This is consistent with a study by Iliya (2022) which indicated that the Russian invasion of Ukraine negatively affected the global oil market.

Table 1 Discretion of the Monthly Change (Amount and Percentage) of the Price of Crude Oil (M05/2021 to M05/2022).

Period Monthly	Crude oil, Brent ($/bbl)	Change amount	Change (%)	Crude oil, Dubai ($/bbl)	Change amount	Change (%)	Crude oil, WTI ($/bbl)	Change amount	Change (%)
2021M05	68.04	_	_	65.98	_	_	65.18	_	_
2021M06	73.07	5.03	7.39	70.96	4.98	7.54	71.38	6.20	9.51
2021M07	74.39	1.32	1.80	73.00	2.04	2.87	72.46	1.08	1.51
2021M08	70.02	-4.37	-5.87	68.85	-4.15	-5.68	67.73	-4.73	-6.52
2021M09	74.60	4.58	6.54	72.24	3.39	4.92	71.56	3.83	5.65
2021M10	83.65	9.05	12.13	81.22	8.98	12.437	81.32	9.76	13.63
2021M11	80.77	-2.88	-3.44	79.80	-1.42	-1.748	79.18	-2.14	-2.63
2021M12	74.31	-6.46	-7.99	72.76	-7.04	-8.82	71.53	-7.65	-9.66
2022M01	85.53	11.22	15.09	83.11	10.35	14.22	83.12	11.59	16.20
2022M02	95.76	10.23	11.96	93.13	10.02	12.05	91.74	8.62	10.37
2022M03	115.59	19.83	20.70	113.11	19.98	21.45	108.49	16.75	18.25
2022M04	105.78	-9.81	-8.48	102.68	-10.43	-9.22	101.78	-6.71	-6.18
2022M05	112.37	6.59	6.22	108.32	5.64	5.49	109.60	7.82	7.68

Source: Authors' calculations according to World Bank Commodity Price Data. June, 2022. https://www.worldbank.org/en/research/commodity-markets.

On the other hand, Table 1 showed that the price of Crude oil (Dubai) and Crude oil (WT) rose to 113.11 and 108.49 ($/bbl) in March 2022, with a monthly increase of 21.45% and 18.25%, respectively, compared to the price in February 2022. Crude oil prices rose dramatically after the Russian-Ukrainian war compared to their pre-war level. After the Russian-Ukrainian war, prices of Crude oil (Dubai) and Crude oil (WTI) rose by 36% and 30%, respectively, in March 2022, compared to January 2022 before the conflict. Figure 1 shows the worldwide monthly change in crude oil prices before and after the Russian-Ukrainian war from M05/2021 to M05/2022.

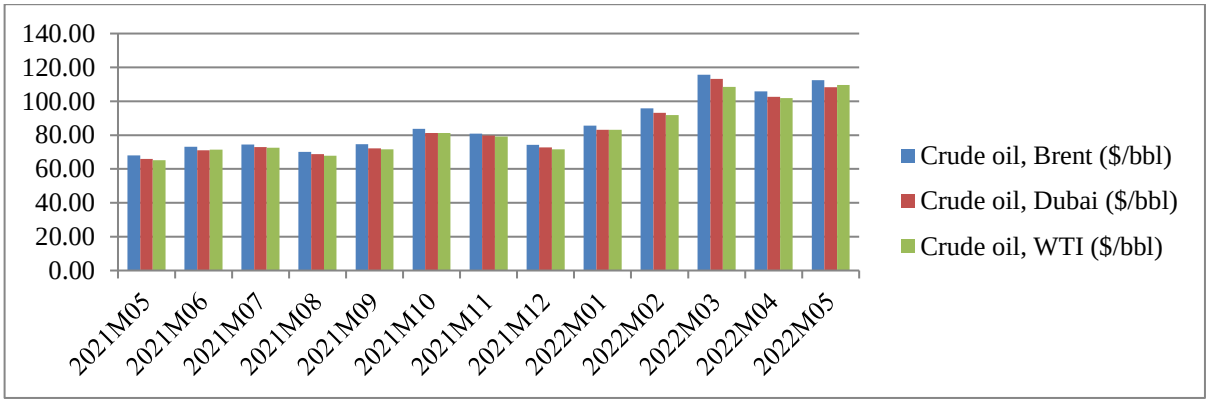

Figure 1 Discretion of the Global Monthly Price changes of Crude Oil (M05/2021 to M05/2022).

b. Natural gas and Coal

Table 2 shows the worldwide Natural gas and Coal price fluctuation month-to-month (amount and percentage) from M05/2021 to M05/2022. As shown in Table 2, Natural gas (Europe) price reached 42.39 ($/MMBtu) at the end of March, with a monthly price change of 15.16 dollars and an overall rise of 55.68 % from February to March 2022. After the Russian-Ukrainian war, the price of Natural gas (Europe) jumped by 50% in March 2022 compared to January 2022 before the war. In May 2022, the price of Natural gas (Europe) declined to reach 29.85 ($/MMBtu). However, as long as the Russo-Ukrainian conflict continues, natural gas prices are expected to climb (Wong, 2022). Regarding the Natural gas (US), the price continued to rise to reach 8.14($/MMBtu) in May 2022, a 78% increase over the price in January 2022 before the war.

On the other side, Coal (South African) prices continued to rise to 302 ($/mt) in April 2022, a 79% increase over the price in January 2022 before the war, according to Table 2. The soaring price is a consequence of the constraints due to Western sanctions on Russia. Coal exports from Russia rank third in the world. The increase in the price of natural gas had driven Europe toward coal (Almendral, 2022). Figure 2 shows the global monthly change level in natural gas and coal prices before and after the Russian-Ukrainian war during the period M05/2021 to M05/2022.

Table 2 Discretion of the Monthly Change (Amount and Percentage) of the Price of Natural gas and Coal (M05/2021 to M05/2022).

Period Monthly	Natural gas, Europe ($/mmbtu)	Change amount	Change (%)	Natural gas, US ($/mmbtu)	Change amount	Change (%)	Coal, South African ($/mt)	Change amount	Change (%)
2021M05	8.91	_	_	2.89	_	_	99.31	_	_
2021M06	10.30	1.39	15.62	3.23	0.34	11.88	112.92	13.61	13.70
2021M07	12.51	2.21	21.44	3.80	0.57	17.69	122.33	9.41	8.33
2021M08	15.43	2.92	23.31	4.05	0.25	6.44	137.92	15.59	12.74
2021M09	22.84	7.41	48.06	5.11	1.06	26.24	146.05	8.13	5.89
2021M10	31.05	8.21	35.95	5.48	0.37	7.17	199.65	53.60	36.69
2021M11	27.62	-3.43	-11.0	5.02	-0.46	-8.40	128.00	-71.65	-35.88
2021M12	38.03	10.40	37.66	3.73	-1.28	-25.60	142.50	14.50	11.32
2022M01	28.26	-9.77	-25.68	4.33	0.60	16.06	168.50	26.00	18.24
2022M02	27.23	-1.03	-3.64	4.66	0.33	7.50	196.40	27.90	16.55
2022M03	42.39	15.16	55.68	4.88	0.23	4.85	294.42	98.02	49.90
2022M04	32.20	-10.19	-24.03	6.53	1.65	33.71	302.00	7.58	2.57
2022M05	29.85	-2.35	-7.32	8.14	1.61	24.60	280.00	-22.00	-7.28

Source: Authors' calculations according to World Bank Commodity Price Data. June, 2022. https://www.worldbank.org/en/research/commodity-markets.

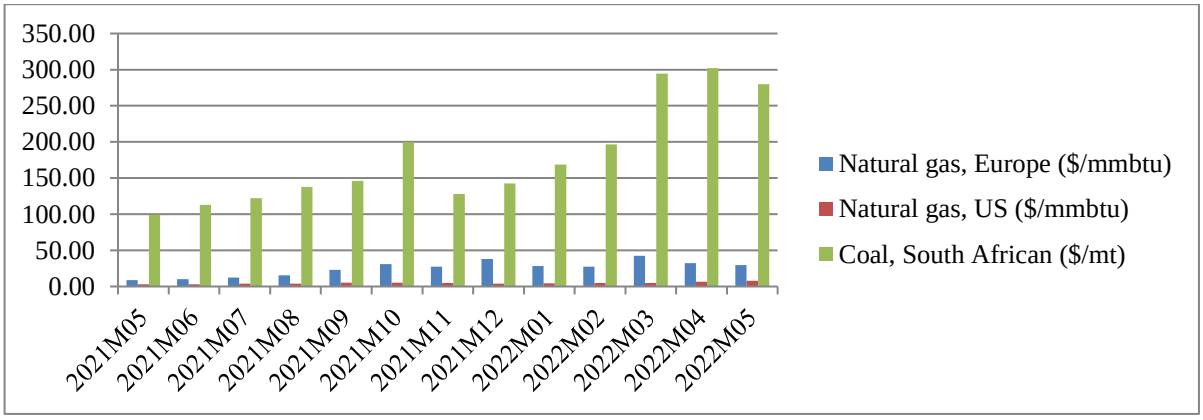

Figure 2 Discretion of the Global Monthly Price changes of Natural gas and Coal (M05/2021 to M05/2022).

4.2. Economic Implications on the Prices of Food Commodities.

For the Food Commodities, the Ukraine–Russia area is a significant food producer and exporter of basic foodstuffs like wheat. Approximately 30% of world wheat exports come from Ukraine and Russia, whereas 65% of global sunflower exports come from this area. Considering how integrated and constrained these markets have become, even a slight change in supply may significantly affect pricing (Ellyatt, 2022).

a. Wheat and Oil

Table 3 shows the Monthly Change in the Price of Wheat and Oil from May 2021 to May 2022 (in terms of both dollar amounts and percentages). Based on data in Table 3, wheat (US) attained a price of $522.29 ($/mt) in May 2022, an increase of 5.45% from April to May 2022 and a monthly change of $27.01. The price of wheat (US) rose by 40% in May 2022, compared to January 2022 before the war. This is supported by previous studies (e.g., Jagtap et al., 2022; Hellegers, 2022) that found the Russian-Ukrainian War negatively impacted wheat prices worldwide.

Table 3 Discretion of the Monthly Change (Amount and Percentage) of the Price of Wheat and Oil (M05/2021 to M05/2022).

Period Monthly	Wheat, US HRW ($/mt)	Change amount	Change (%)	Palm oil ($/mt)	Change amount	Change (%)	Sunflower oil ($/mt)	Change amount	Change (%)
2021M05	297.25	_	_	1136.46	_	_	1584.59	_	_
2021M06	285.55	-11.70	-3.93	1004.42	-132.0	-11.61	1296.75	-287.8	-18.16
2021M07	294.27	8.72	3.05	1062.99	58.57	5.83	1282.01	-14.74	-1.13
2021M08	324.52	30.25	10.27	1141.82	78.83	7.41	1355.69	73.68	5.74
2021M09	337.55	13.03	4.01	1181.38	39.56	3.46	1309.52	-46.17	-3.40
2021M10	354.67	17.12	5.07	1310.25	128.87	10.90	1420.53	111.01	8.47
2021M11	379.45	24.78	6.98	1340.65	30.40	2.32	1415.62	-4.91	-0.34
2021M12	376.81	-2.64	-0.69	1270.29	-70.36	-5.24	1361.83	-53.79	-3.79
2022M01	374.24	-2.57	-0.68	1344.79	74.50	5.86	1411.73	49.90	3.66
2022M02	390.50	16.26	4.34	1522.36	177.57	13.20	1499.12	87.39	6.19
2022M03	486.30	95.80	24.53	1776.96	254.60	16.72	2361.13	862.01	57.50
2022M04	495.28	8.98	1.84	1682.74	-94.22	-5.302	2275.76	-85.37	-3.61
2022M05	522.29	27.01	5.45	1716.92	34.18	2.03	2079.30	-196.4	-8.63

Source: Authors' calculations according to World Bank Commodity Price Data. June, 2022. https://www.worldbank.org/en/research/commodity-markets.

According to Table 3, Palm oil and sunflower oil prices increased to 1776.96 ($/mt) and 2361.13 ($/mt) in March 2022, respectively, up 16.72% and 57.50% from their February 2022 prices. Prices of palm oil and sunflower oil increased by 32% and 67%, respectively, in March 2022 after the Russian-Ukrainian conflict, compared to January 2022 before the war. Wheat and oil global monthly average prices before and after the Russian-Ukrainian war are shown in Figure 3 from M05/2021 to M05/2022. This is consistent with a study by Iliya (2022) which indicated that the Russian invasion of Ukraine negatively affected the wheat and sunflower oil exports.

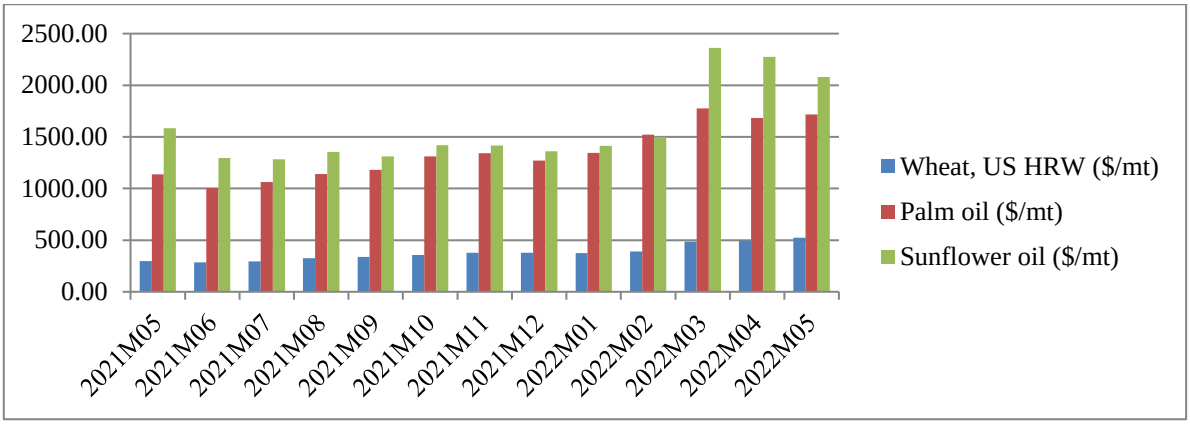

Figure-3: Discretion of the Global Monthly Price changes of Wheat and Oil (M05/2021 to M05/2022).

b. Sugar and Maize

According to Table 4, the global price of sugar was not much affected by the Russian-Ukrainian war. Table 4 shows that the average price of sugar (world) and sugar (US) reached 0.42 ($/kg) and .80 ($/kg) by the end of March 2022, with an increase of .03 and .02 dollars and by a percentage of 7.6% and 2.5% respectively from the February 2022 price, which is not a large percentage compared to the prices of other commodities. Sugar prices before and after the war were not affected much, as shown in Table 4. The prices of sugar before and after the war were not affected much, as Table 4 indicates. The price of sugar (world) and sugar (US) in March rose by 5% and 2.5%, respectively, compared to January 2022 before the war. This is because Russia and Ukraine are outside the top 15 world sugar exporting countries, of which Brazil and India represents 52% of the world's exports (Workman, 2022).

Table 4 Discretion of the Monthly Change (Amount and Percentage) of the Price of Sugar and Maize (M05/2021 to M05/2022).

Period Monthly	Sugar, world ($/kg)	Change amount	Change (%)	Sugar, US ($/kg)	Change amount	Change (%)	Maize ($/mt)	Change amount	Change (%)
2021M05	0.38	_	_	0.71	_	_	305.31	_	_
2021M06	0.38	0.00	0.00	0.73	0.02	2.8	292.56	-12.75	-4.17
2021M07	0.39	0.01	2.6	0.80	0.07	9.5	278.43	-14.13	-4.82
2021M08	0.43	0.04	10.2	0.76	-0.04	-5	256.61	-21.82	-7.83
2021M09	0.43	0.00	0.00	0.79	0.03	3.9	235.62	-20.99	-8.18
2021M10	0.42	-0.01	-2.3	0.82	0.03	3.7	239.65	4.03	1.71
2021M11	0.43	0.01	2.3	0.82	0.00	0.00	248.72	9.07	3.78
2021M12	0.42	-0.01	-2.3	0.81	-0.01	-1.2	264.54	15.82	6.35
2022M01	0.40	-0.02	-4.7	0.78	-0.03	-3.7	276.62	12.09	4.56
2022M02	0.39	-0.01	-2.5	0.78	0.00	0.00	292.62	16.00	5.78
2022M03	0.42	0.03	7.6	0.80	0.02	2.5	335.53	42.91	14.66
2022M04	0.43	0.01	2.3	0.81	0.01	1.2	348.17	12.64	3.76
2022M05	0.43	0.00	0.00	0.80	-0.01	-1.2	344.84	-3.33	-0.95

Source: Authors' calculations according to World Bank Commodity Price Data. June, 2022. https://www.worldbank.org/en/research/commodity-markets.

On the other side, the global price for Maize reached 335.53 dollars ($/mt) in March 2022, with a monthly price change of 42.91 dollars and a 14.66% increase over February 2022, as shown in Table 4. The price of Maize in April 2022 after the war jumped by 26% compared to January 2022 before the Russian-Ukrainian war.

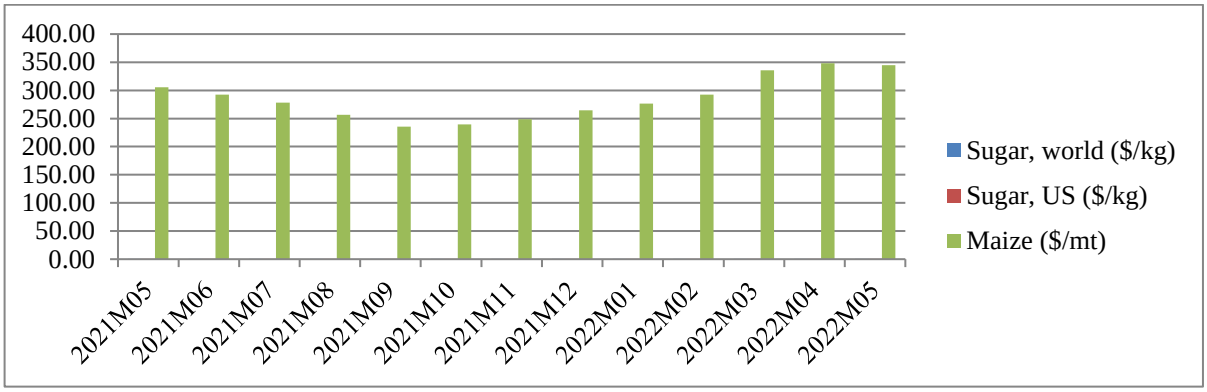

Figure 4 Discretion of the Global Monthly Price changes of Sugar and Maize (M05/2021 to M05/2022).

4.3. Economic Implications on the Prices of Mining Commodities.

Russia is one of the wealthiest countries in terms of mineral resources. Russia is a vast country, rich in raw materials, so the diversity of minerals found on its territory gives it an important place in several sectors globally. Russian nickel accounted for 9.2% of global production in 2021, while Russian copper and refined copper accounted for around (4%) and (3.5%) respectively, of the worldwide output (Hache, 2022). As the world's second-largest aluminium producer, Russia accounted for around 3.6 million metric tonnes in 2020 (Deaux, 2022). Russia is the tenth exporter of Lead metal globally, accounting for 2.8 per cent of global exports in 2020 (Workman, 2021).

a. Nickel, Tin and Copper

Monthly changes in Nickel, Tin, and Copper prices from May 2021 to May 2022 are shown in Table 5 (In terms of both dollar amounts and percentages). According to Table 5, the price of Nickel reached 33924.18 ($/mt) at the end of March, where the monthly change in the price recorded an increase of 9908.63 dollars and a percentage of 41.25% at the end of March 2022 compared to February 2022. The price of Nickel in March 2022 after the war increased by 52% compared to January 2022 before the Russian-Ukrainian war.

The global price of Tin in February 2022 (the month in which the war began) reached 43983.35 ($/mt) with a monthly change rate of 5.24% compared to January 2022 before the Russian-Ukrainian war as shown in Table 5. Concerning copper, the global price in March 2022 increased by 4.5% over the price in January 2022 before the war, according to the data in Table 5. Figure 5 shows the monthly worldwide average prices of nickel, tin and copper before and after the Russian-Ukrainian conflict from M05/2021 to M05/2022.

Table 5 Discretion of the Monthly Change (Amount and Percentage) of the Price of Nickel, Tin and Copper (M05/2021 to M05/2022).

Period Monthly	Nickel ($/mt)	Change amount	Change (%)	Tin ($/mt)	Change amount	Change (%)	Copper ($/mt)	Change amount	Change (%)
2021M05	17577.06	_	_	32246.21	_	_	10161.97	_	_
2021M06	17979.57	402.51	2.28	32502.55	256.34	0.79	9631.50	-530.47	-5.22
2021M07	18818.51	838.94	4.66	34020.18	1517.63	4.66	9450.82	-180.68	-1.87
2021M08	19141.30	322.79	1.71	35024.00	1003.82	2.95	9370.14	-80.68	-0.85
2021M09	19376.88	235.58	1.23	34887.30	-136.70	-0.39	9324.71	-45.43	-0.48
2021M10	19362.39	-14.49	-0.07	37722.92	2835.62	8.12	9829.22	504.51	5.41
2021M11	19932.86	570.47	2.94	39158.69	1435.77	3.80	9728.90	-100.32	-1.02
2021M12	20015.55	82.69	0.41	39422.52	263.83	0.67	9551.18	-177.72	-1.82
2022M01	22355.40	2339.85	11.69	41791.70	2369.18	6.00	9782.34	231.16	2.42
2022M02	24015.55	1660.15	7.42	43983.35	2191.65	5.24	9943.17	160.83	1.64
2022M03	33924.18	9908.63	41.25	43949.67	-33.68	-0.07	10230.89	287.72	2.89
2022M04	33132.74	-791.44	-2.33	42991.11	-958.56	-2.18	10161.38	-69.51	-0.67
2022M05	28062.55	-5070.1	-15.30	35769.39	-7221.7	-16.79	9377.15	-784.23	-7.71

Source: Authors' calculations according to World Bank Commodity Price Data. June, 2022. https://www.worldbank.org/en/research/commodity-markets.

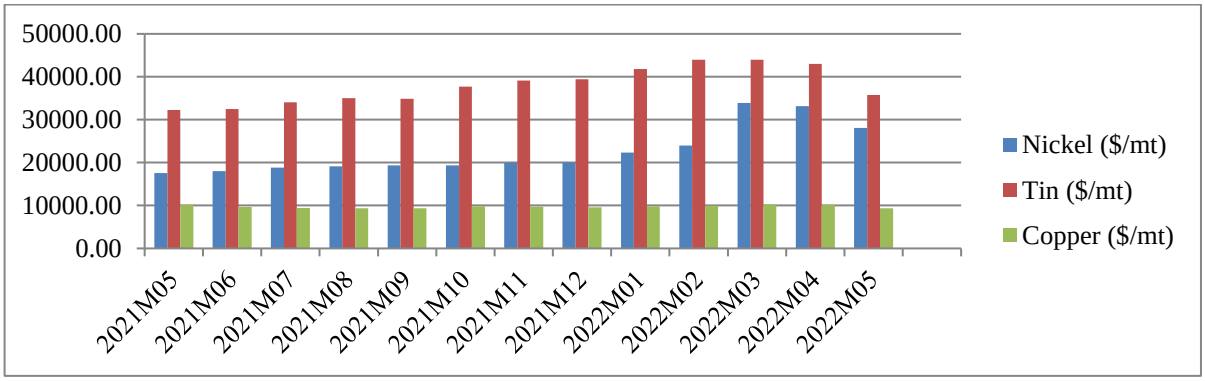

Figure 5 Discretion of the Global Monthly Price changes of Nickel, Tin and Copper (M05/2021 to M05/2022).

b. Aluminum, Zinc and Lead

According to Table 6, Aluminum increased to 3498.37 ($/mt) in March 2022, up 7.78% from its February 2022 price. The price of Aluminum increased by 16% in March 2022 after the Russian-Ukrainian war compared to January 2022 before the war. In May 2022, the price of aluminium declined by 12.76% compared to the price in April 2022 to record a price of 2830.32($/mt).

Table 6 indicated that the global price of zinc in April reached its highest level during the research period (M05/2021 to M05/2022). The global price of zinc in April 2022 reached 4360.43($/mt), an increase of 10.05% over the price in March 2022. Compared to the price of zinc in January 2022 before the Russo-Ukrainian conflict, zinc price rose by 21% in April 2022 after the war.

Table 6 Discretion of the Monthly Change (Amount and Percentage) of the Price of Aluminum, Zinc and Lead (M05/2021 to M05/2022).

Period Monthly	Aluminum ($/mt)	Change amount	Change (%)	Zinc ($/mt)	Change amount	Change (%)	Lead ($/mt)	Change amount	Change (%)
2021M05	2433.53	_	_	2965.73	_	_	2181.81	_	_
2021M06	2446.65	13.12	0.53	2951.85	-13.88	-0.46	2191.03	9.22	0.42
2021M07	2497.64	50.99	2.08	2947.52	-4.33	-0.14	2337.51	146.48	6.68
2021M08	2602.99	105.35	4.21	2987.95	40.43	1.37	2414.47	76.96	3.29
2021M09	2834.56	231.57	8.89	3036.02	48.07	1.60	2248.30	-166.17	-6.88
2021M10	2934.39	99.83	3.52	3359.91	323.89	10.66	2344.83	96.53	4.29
2021M11	2636.45	-297.94	-10.15	3311.27	-48.64	-1.44	2329.98	-14.85	-0.63
2021M12	2695.53	59.08	2.24	3399.21	87.94	2.65	2301.69	-28.29	-1.21
2022M01	3005.98	310.45	11.51	3599.14	199.93	5.88	2331.85	30.16	1.31
2022M02	3245.79	239.81	7.97	3620.04	20.90	0.58	2296.86	-34.99	-1.50
2022M03	3498.37	252.58	7.78	3962.21	342.17	9.45	2344.84	47.98	2.08
2022M04	3244.41	-253.96	-7.25	4360.43	398.22	10.05	2380.41	35.57	1.51
2022M05	2830.32	-414.09	-12.76	3751.48	-608.95	-13.96	2142.48	-237.93	-9.99

Source: Authors' calculations according to World Bank Commodity Price Data. June, 2022. https://www.worldbank.org/en/research/commodity-markets.

The Ukraine-Russia conflict has had little effect on lead prices. There is a reason for this: Russia and Ukraine make up a small percentage of the world's lead metal exports. Table 6 indicates that the lead price increased in March 2022 by 2.08% compared to the price in February 2022, to decline again in May by 9.99% compared to the price in April 2022. Figure 6 illustrates the global monthly price changes of aluminium, zinc, and lead before and after the war between Russia and Ukraine from M05/2021 to M05/2022.

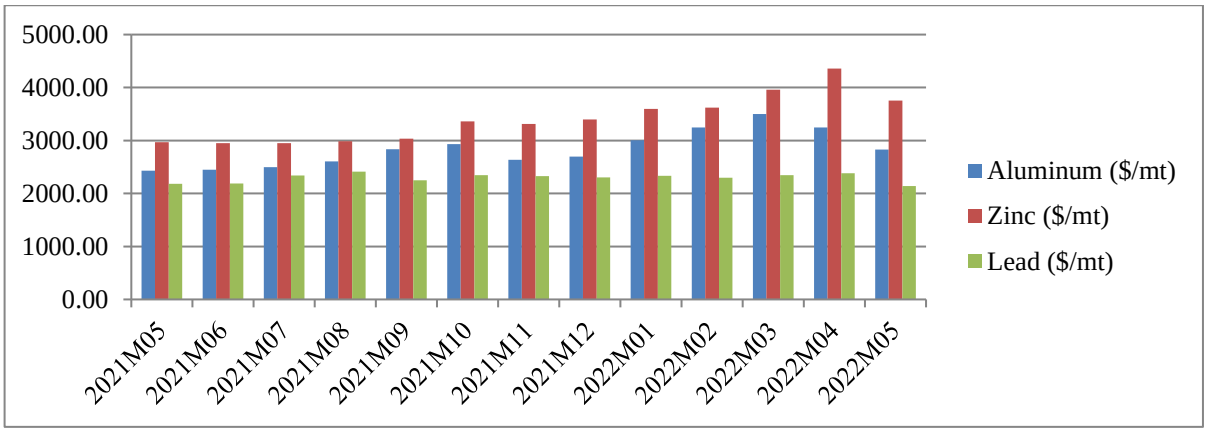

Figure 6 Discretion of the Global Monthly Price changes of Aluminum, Zinc and Lead (M05/2021 to M05/2022).

5. Conclusion

The Russian-Ukrainian war has caused significant damage to the world economy and great uncertainty in international trade. This significantly impacts the prices of strategic and essential commodities across the world. Russia and Ukraine are among the leading players in terms of the world's supply and export of energy, food, and some mining commodities. As a result, the Russian-Ukrainian war harmed the global supply of key commodities, notably wheat, cooking oil, maize, natural gas, and crude oil. The results of the study indicated that there are negative effects of the Russian-Ukrainian war on the price of strategic commodities, especially food and energy commodities. The results of the study showed that, in terms of energy commodities, the price of Crude Oil (Brent) and Natural gas (Europe) in March 2022 after the war was affected negatively and increased by 35% and 50%, respectively, compared to January 2022 before the Russian-Ukrainian war. Concerning Natural gas (US), the price was affected negatively and continued to rise to 8.14($/MMBtu) in May 2022, a 78% increase over the price in January 2022 before the war. On the other side, Coal (South African) price was affected negatively to reach 302 ($/mt) in April 2022, a 79% increase over the price in January 2022 before the war. Regarding food commodities, wheat (US) price was affected negatively and rose by 40% in May 2022, compared to January 2022 before the war. According to data analysis, Prices of palm oil and sunflower oil were affected negatively and increased by 32% and 67%, respectively, in March 2022 after the Russian-Ukrainian conflict, compared to January 2022 before the war. On the other side, the price of Maize in April 2022 after the war was affected negatively and jumped by 26% compared to January 2022 before the war. In terms of mining commodities, the study's results showed that the price of nickel and aluminium in March 2022 after the war was affected negatively and increased by 52% and 16%, respectively, over the price in January 2022 before the war. Compared to the price of zinc in January 2022 before the Russo-Ukrainian conflict, zinc price was affected negatively and rose by 21% in April 2022 after the war. The results of the study also indicated that the Russian-Ukrainian war had an insignificant negative impact on the prices of tin, copper, and lead.

In view of this war and the possibilities of such wars in future, the study recommended that there is a need to accelerate the transition towards clean energy by increasing investment in clean technologies such as solar, wind, green hydrogen, and environment-friendly fuel, as many nations now aim to achieve net-zero energy systems by or before the year 2050 (Steffen and Patt, 2022). Create new supply chains to facilitate the export of crops from Ukraine and Russia. Search for suitable alternatives to cover the shortage in the global food supply, such as India, the second-largest wheat producer in the world. India can emerge as potential supplier for wheat, food grains, and fertilizers. The ongoing issues and challenges due to war has created scope for OPEC to supply Oil to countries that were not their regular Buyers across the world. OPEC must increase oil production in order to cover the deficit of energy caused by the Russian-Ukrainian war.

Future studies can be conducted to discuss the repercussions of Western sanctions on Russia on the prices of strategic commodities and on the global economy in general. Future studies can also examine the impact of the Russian-Ukrainian war on supply chains.

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