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Article

The Transmission of the Repercussions of the Russia–Ukraine War through Global Supply Chains

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Abstract: This study aims to analyze the repercussions of the Russia–Ukraine war on global supply chains and its implications for the world economy. It adopts a descriptive-analytical approach to examine the variables of the conflict and supply chains, relying on data analysis, academic references, and international reports. The findings reveal that the war has caused severe disruptions in supply chains, including rising shipping costs, container shortages, disruptions in maritime and land trade, and surging global energy and food prices. The crisis has also exposed the fragility of dependence on specific geographic regions and highlighted the need for diversifying sources and enhancing supply chain resilience. The study concludes with the importance of adopting proactive strategies, diversifying suppliers, strengthening infrastructure, and transitioning toward renewable energy to ensure the stability of supply chains in the face of future crises.

Keywords: Russia–Ukraine War, Global Supply Chains, World Economy.

INTRODUCTION

The Russia–Ukraine war represents one of the most shocking geopolitical conflicts of the past decade, with far-reaching implications for the global economy, particularly in the field of global supply chains. Following the outbreak of military operations in February 2022, the flow of goods and services was severely disrupted, impacting key sectors such as energy, food, and metals.

Both Russia and Ukraine are major suppliers of numerous commodities, including natural gas, oil, wheat, and critical metals such as nickel and aluminum. The conflict disrupted the flow of these goods, causing sharp increases in global prices and widespread supply chain interruptions.

Furthermore, the war reshaped global trade routes and redirected investment flows, compelling countries and companies to reconsider their business strategies to ensure the sustainability of their supply chains.

In light of these circumstances, it is evident that the conflict does not only affect the warring parties, but also extends its impact to the global economy. This reality imposes the need for governments and businesses to adopt proactive measures to adapt to the new situation and to guarantee the continuity of essential goods and services. Based on this, the following research problem can be formulated:

MAIN RESEARCH PROBLEM:

How have the repercussions of the Russia–Ukraine war been transmitted through global supply chains to the world economy?

Research Hypotheses:

- Geopolitical conflicts (such as the

Russia–Ukraine war) cause significant disruptions in global supply chains, reflected in increased shipping and logistics costs.

- Shortages of raw materials and energy resulting from the Russia–Ukraine war lead to a slowdown in global industrial production and rising prices of essential goods.
- Supply chain disruptions caused by wars have uneven effects across economic sectors, with resource-dependent industries (such as energy and metals) being the most affected.

METHODOLOGY:

To address the main research problem and test the validity of the hypotheses, the study adopts a descriptive-analytical approach. This involves describing the study variables (the Russia–Ukraine war and global supply chains) and analyzing their dimensions in order to draw meaningful conclusions.

I. Definition and Importance of Supply Chains

1. Definition of Supply Chains

Supply chains exist in all companies and business organizations, whether in manufacturing or services. Although they vary from one industry to another and from one company to another, they generally represent a sequence of stages (facilities, functions, and activities) integrated into the production and delivery of goods or services.

A supply chain can be defined as a network or system of professional entities directly involved in the production, assembly, transformation, and distribution of goods and services from suppliers to customers in line with their requirements. It is considered one of the modern approaches to addressing the challenges of the era of economies, technology, and information. The supply chain encompasses an integrated set of functional activities and recurring processes that pass through specific channels, with the purpose of transforming raw materials into final products while adding tangible value from the perspective of the end customer. Since raw material sources, factories, and markets are not located in a single place, logistical activities are repeatedly performed across multiple stages before the final product reaches the market .

Another definition of the supply chain views it as a network of suppliers, producers, distributors, and customers through which raw materials, inputs, products, information, and funds flow between the actors. Many companies have adopted the supply chain concept in their pursuit of building competitive advantages, especially in light of globalization and intensified competition. However, as the number of actors in a supply chain increases, it becomes longer and more complex, making it slower to respond to environmental changes .

Accordingly, a supply chain can be understood as a set of methods and processes aimed at achieving integration among suppliers, manufacturers, warehouses, and distribution systems to deliver products in the required quantity, at the right time, and in the appropriate place, while minimizing costs and maintaining the desired level of service .

2. The Importance of Global Supply Chains

Global supply chains are the backbone of the world economy, connecting producers and consumers across borders and facilitating the flow of goods and services worldwide. They are essential for enabling industries to access raw materials, engage in manufacturing, and distribute products across diverse markets. Through this integrated system, companies can reduce costs, increase efficiency, and enhance competitiveness. The following points highlight the importance of global supply chains:

- Enhancing efficiency and cost reduction: Global supply chains allow firms to take advantage of production efficiencies in multiple locations around the world. Manufacturing in low-cost regions and then exporting finished products to high-demand markets improves profitability .
- Supporting innovation and specialization: Through global supply chains, companies can focus on their core activities while outsourcing other processes. This specialization fosters innovation and encourages improvements in quality and efficiency .
- Linking global markets: Global supply chains give companies access to new markets, expanding opportunities for growth and expansion. This interconnectedness ensures a continuous flow of goods, meeting the rising demand in both developed and emerging economies .
- Resilience in the face of crises: One of the key advantages of global supply chains is their ability to provide flexibility during crises and shocks. For instance, in times of natural disasters or economic downturns, companies can shift to alternative suppliers in other locations to maintain production continuity .
- Contribution to global economic growth: Global supply chains significantly drive global economic growth by promoting international trade and the flow of foreign direct investment. This interconnection among economies enhances productivity and creates job opportunities worldwide .

- Promoting sustainability and environmental innovation: Global supply chains encourage sustainability through the adoption of eco-friendly practices and the efficient use of resources. Companies are increasingly investing in green technologies to improve efficiency and reduce their carbon footprint .
- Stimulating free trade and reducing barriers: Global supply chains foster free trade and help reduce trade barriers among countries, which lowers costs and boosts competitiveness. By promoting international cooperation, they facilitate smoother cross-border flows of goods .
- Strengthening interdependence among economies: In today's globalized economy, countries rely on global supply chains to secure essential resources and final products. This mutual dependence enhances interconnectedness and reduces the likelihood of conflicts, as national interests become economically interlinked .

II. Origins of the Russia–Ukraine War

In 1918, Ukraine gained independence from Russia under the Treaty of Brest-Litovsk, drafted by Germany. However, this independence was short-lived, as Ukraine was incorporated into the Soviet Union in 1920. From that time until Russia's recognition of Ukraine's independence—following the handover of nuclear weapons under the 1994 Budapest Memorandum—Ukraine remained under Soviet domination. For decades, the Ukrainian government was consistently aligned with Russia, until the eruption of the Euromaidan protests, which brought to power a pro-Western government and set Ukraine on a path toward joining NATO.

Ukraine's pursuit of NATO membership revived the historical ideological tension between Russia and the Alliance. Although NATO and the Warsaw Pact never engaged in direct conflict, particularly in Europe, the United States and the Soviet Union continuously competed for influence on the international stage, employing strategic policies aimed at containing each other across Europe.

Over the past decade, Ukraine moved closer to Western alliances, but this shift was accompanied by internal divisions that the country failed to fully resolve. These divisions culminated in the annexation of Crimea by Russia in 2014, followed by the declaration of the self-proclaimed Luhansk and Donetsk republics in eastern Ukraine—regions largely dominated by Russian-speaking populations favoring stronger ties with Russia and rejecting Kyiv's westward orientation. By contrast, western Ukraine remained largely loyal to the Ukrainian government.

On February 24, 2022, Russia launched a full-scale invasion of Ukraine, coinciding with a speech by Russian President Vladimir Putin. In his address, Putin set forth his justifications for the invasion, declaring the use of military force on Ukrainian territory under the label of a "special military operation." As Ukraine continued to strengthen its alliances with Western institutions such as NATO and the European Union, Russia sustained its war effort, claiming that its actions were not intended as an occupation of Ukraine, but rather as measures to safeguard its national security, protect Russian-speaking populations in eastern Ukraine—allegedly facing linguistic genocide—and to achieve the "demilitarization and denazification" of Ukraine .

III. Export Specialization of Ukraine and Russia before the War

Prior to the war, Ukraine's main exports were agricultural products (46%), followed by manufactured goods (42%), largely consisting of semi-finished products. Ukraine imported certain raw materials, processed them into semi-manufactured goods, and then exported them abroad. Ukraine's main export destinations were the European Union (39%), China (12.1%), Turkey (6.1%), and Russia (5.1%).

In contrast, Russia's principal exports were fuel and energy products (63%), followed by metals (10%), machinery and equipment (7.4%), and chemical products (7.4%). Its major export destinations included China (12%), Germany (9%), and the Netherlands.

It is noteworthy that Russia produces around 25% of the world's nitrogen fertilizers and is a key energy supplier to the European Union. Additionally, wheat exports from Russia and Ukraine together accounted for 28% of global wheat exports .

IV. The Impact of the Russia–Ukraine War on Global Supply Chains

The disruption caused by the Russia–Ukraine war to the flow of goods within global supply chains has been both severe and far-reaching. This disturbance can be analyzed across multiple layers, including the direct physical impact on trade routes, geopolitical tensions, and the interconnected nature of modern supply chains.

1. International Trade and Manufacturing Industries

1.1. Direct Physical Impact on Trade Routes

One of the immediate consequences of the conflict was the blockade of vital maritime trade routes, particularly the Black Sea and the Sea of Azov. These waterways function as major arteries for

transporting goods between Europe and Asia, affecting a wide range of industries dependent on these routes. The disruption of these channels led to shipping delays, rerouting, and even cancellations, thereby disturbing the established rhythm of supply chain operations.

Grain exports from Ukraine dropped sharply at the start of the war, with partial recovery achieved through the Black Sea Initiative (an agreement allowing Ukraine to export grain). Nevertheless, agricultural exports saw major declines: sunflower oil by 50%, corn by 25%, and wheat by 10% .

In addition, Russia's fertilizer exports fell significantly—a particularly troubling development, given their essential role in grain cultivation and harvesting .

1.2. Rising Risks for Manufacturing Industries

According to Jennifer McKeown, an economist at Capital Economics (UK), the cancellation or redirection of flights posed further indirect risks, disrupting supplies in other regions. Without timely provision of inputs such as platinum, aluminum, sunflower oil, crude oil, and steel, factories across Europe, Russia, and Ukraine faced shutdown risks. Escalating geopolitical tensions also drove up energy prices sharply, raising transportation costs.

Ukraine has long supplied around 50% of the world's neon gas and 40% of krypton—byproducts critical for semiconductor production. Supply interruptions caused by the war prevented these inputs from reaching manufacturers, exacerbating component shortages, delivery delays, and rising raw material costs. Companies dependent on chips, such as automotive manufacturers, also faced production delays.

Some firms in Japan and South Korea managed to rely on reserves, but the rush to secure suppliers outside Eastern Europe resulted in shortages and price hikes, not only for neon but also for other industrial gases such as xenon (Nikkei). Currently, sourcing neon gas outside Ukraine remains highly challenging, as purification to 99.99% purity requires highly specialized facilities, with only a handful of companies worldwide capable of such processing—including those based in Odesa.

Compounding these challenges, the growing number of shipping companies suspending operations in Russia represented about 62% of total global maritime shipping capacity (FreightWaves) .

2. International Transportation

2.1. Container Shortages

Average container prices have continued to rise. The conflict triggered a surge in one-way freight rates in India amid container shortages, causing severe disruptions during peak shipping season. A wave of canceled orders and delayed shipments led to congestion at U.S. ports, with cargo diverted from the West Coast to other ports. This shift increased the number of container ships docked at Savannah and Houston.

As congestion intensified at U.S. ports, shipping lines canceled sailings, worsening productivity challenges. On the East and Gulf Coasts, high container volumes drove up prices, boosting the warehousing sector but also pushing storage costs sharply upward. By August 2022, rates had risen by around 8% compared to January.

Meanwhile, container volumes in China declined as manufacturing orders were withdrawn, reducing bookings and affecting port congestion conditions. To mitigate these pressures, several new initiatives were launched.

In July 2022, Fuzhou (Fujian Province, China) inaugurated the "Mindu" China–Europe freight train route, spanning 9,900 kilometers and cutting transport times by about 20 days compared to sea routes. Another new train departed from Chongqing to Melzo, Italy, in July 2022, with an estimated transit time of around 22 days. The logistics sector will require more such initiatives to maintain resilience in these volatile conditions.

2.2. The Interconnected Nature of Supply Chains

Modern supply chains are intricately interconnected, with components and raw materials often crossing multiple countries before reaching their final destination. Disruptions in one segment of the chain can have cascading effects on various other sectors. The Russia–Ukraine conflict, through its impact on transport routes and obstruction of goods movement, has demonstrated how disruptions that appear local at first glance can quickly escalate into global supply chain issues .

2.3. Congestion and Costs

In an interview with CNBC, Dylan Alperin, Head of Services at Keelvar, a supply software platform based in Ireland, noted that the maritime route in and out of the Sea of Azov is one of the few access points to overland trade. At present, access to the sea in Ukraine is no longer possible, as Ukrainian and Russian military forces have closed the entrance. This has left a large number of vessels waiting to pass through the Kerch Strait. Alperin explained: "Seventy percent of Ukraine's exports are shipped by sea, and congestion is worsening by the hour."

Christian Roeloffs, Managing Director of Container xChange (Germany), a container leasing technology

platform, added that areas surrounding the Black Sea and the Sea of Azov are currently extremely dangerous or inaccessible. Reports have emerged of missile attacks on passing commercial vessels and crews being detained. The damaged vessels include oil tankers, container ships, and cargo ships from Japan, Turkey, Moldova, and Estonia, carrying goods such as diesel, rare earths, and grains.

Many supply companies have suspended deliveries to and from Russia and Ukraine. Others noted that cargo movement has halted altogether due to the closure of seaports in Odesa and Mariupol as a result of bombardment damage. Container shipping has now come to a standstill, leaving large volumes of goods stranded at these ports.

Air transport is facing similar challenges. Ukrainian airspace is closed to civilian flights, and airlines are avoiding Russian airspace, leading to a spike in air freight costs and a significant reduction in cargo volumes transported through this mode.

2.4. A Worrying Shortage of Shipping Crew from Russia and Ukraine

The International Chamber of Shipping (ICS) recently warned that supply chain disruptions could worsen due to a shortage of seafarers from Russia and Ukraine, as the war directly impacts crew availability. According to ICS, Ukrainian and Russian seafarers make up 14.5% of the global shipping workforce. Concerns over crew safety, along with surging insurance premiums for vessels entering Ukrainian or Russian waters, have discouraged shipowners from accepting shipments to these countries.

Additionally, seafarer wages must continue to be paid through the international banking system. However, the United States, Canada, and their European allies simultaneously cut major Russian banks off from the global SWIFT payment system, which connects more than 11,000 banks and financial institutions in over 200 countries and regions .

2.5. Rail Transport

The impact of the war on rail transport in Europe, briefly covered by Arts, was analyzed in more depth by Pascal Wolff, Assistant Professor at NISCI, during a webinar.

Pascal explained that in 2020/2021, China managed to maintain its manufacturing capacity but faced transportation failures and equipment shortages due to the COVID-19 pandemic. Port congestion became a major problem, while air transport was also hit hard by canceled flights. As a result, many freight companies turned to rail to move goods between China and Europe, driving up demand for this mode of transport.

In 2021, around 15,000 trains carried approximately 1.5 million TEUs of cargo between the two trading giants. While modest in overall freight volumes, rail became critical in certain sectors, notably automotive and electronics. Rail transport offered relatively competitive lead times—about 18 days for some shipments from China to Europe.

However, when Russia invaded Ukraine in 2022, rail transport between China and Europe effectively came to a halt, primarily due to sanctions on Russia. Companies scrambled to adapt to this sudden change. Lenovo, Hewlett-Packard, and several automotive companies regularly relied on rail for up to 40% of their shipments from China. HP's main facility in China, located inland, was particularly affected, as it required rail links to move products thousands of miles to Shanghai port.

One reason HP chose this location was the availability of efficient, low-cost railways. Similarly, some Chinese automakers exporting to Europe had built their sales cycles around faster rail transit times compared to sea freight, which takes 40–50 days—an unacceptable delay for European consumers. These companies suddenly lost access to that advantage when the invasion disrupted rail routes. In some cases, companies rerouted via less affected rail corridors.

As a result, the so-called Middle Corridor rail routes, where shipments travel from China to European markets through Kazakhstan, the Caspian Sea, the Black Sea, and Turkey, saw a slight increase in volumes.

European manufacturers also had to adjust rapidly to the unexpected drop in rail transport. For example, German automakers shipping to China by rail were forced to redesign their manufacturing networks, particularly product allocation strategies. Relatively high labor costs in Germany drove some companies to shift car exports to China through other European countries, such as Hungary.

Pascal noted that such adjustments are difficult to implement and highly disruptive for affected companies.

In contrast, Chinese freight forwarders and logistics companies continued to promote rail transport, as they were largely unaffected by sanctions on Russia. For these actors, the conflict provided an opportunity to expand their shipping capacity.

Not all Chinese stakeholders, however, benefited. The national government had invested heavily in rail lines to Europe and required the network to thrive to

realize its expansion goals. For local Chinese governments, the rail disruptions proved disastrous. They had attracted multinational companies by promoting the advantages of efficient rail connections to and from their regions, and the war undermined these efforts .

The COVID-19 pandemic caused major disruptions in global supply chains. As the pandemic spread, the global trend shifted away from just-in-time manufacturing toward maintaining stockpiles of products. Countries and firms began shortening supply chains by seeking to produce inputs and technologies closer to their production sites.

The Russia–Ukraine war further aggravated ongoing disruptions in global supply and logistics chains, particularly through port congestion and soaring maritime freight costs. Charter rates for container ships rose to unprecedented record levels, as illustrated in Figure 1. This surge in container shipping costs translated into an additional increase of about 1.5 percentage points in consumer prices compared to pre-pandemic levels .

Figure 01: Charter Rates for Container Ships (ClarkSea Index, in USD thousands per day)

Source: United Nations

3. Energy and Food Sector

3.1. Rising Oil and Gas Prices

Inevitably, rising oil and gas prices—together with the geopolitical risks stemming from the conflict—have paralyzed global supply chains, especially in energy-intensive logistics sectors. The Black Sea, alongside many other routes, became blocked after the outbreak of war, halting the supply of numerous products and goods, including transport equipment, machinery, electronics, metals, chemicals, fertilizers, and food products.

The European Union also struggled due to its heavy dependence on Russian energy imports. The EU sources around 35% of its natural gas imports, 20% of its crude oil imports, and 40% of its coal imports from Russia. The surge in oil and gas prices has had a paralyzing global effect, forcing organizations involved in supply chain operations to adopt effective risk mitigation measures to cope with both soaring prices and energy shortages .

3.2. Food Supply Shortages and Price Increases

In Europe, natural gas prices rose by about 120–130% within the six months following the start of the war, while coal prices increased by 95–97% over the same period. Prices of soybeans, corn, and crude oil—commodities in which Russia is a major producer—have also climbed since the invasion. Fertilizer costs, especially for crops and animal feed, were already high due to increased demand during the pandemic. Panic buying and household stockpiling of many products further contributed to shortages, while the recent shipping crisis worsened the situation.

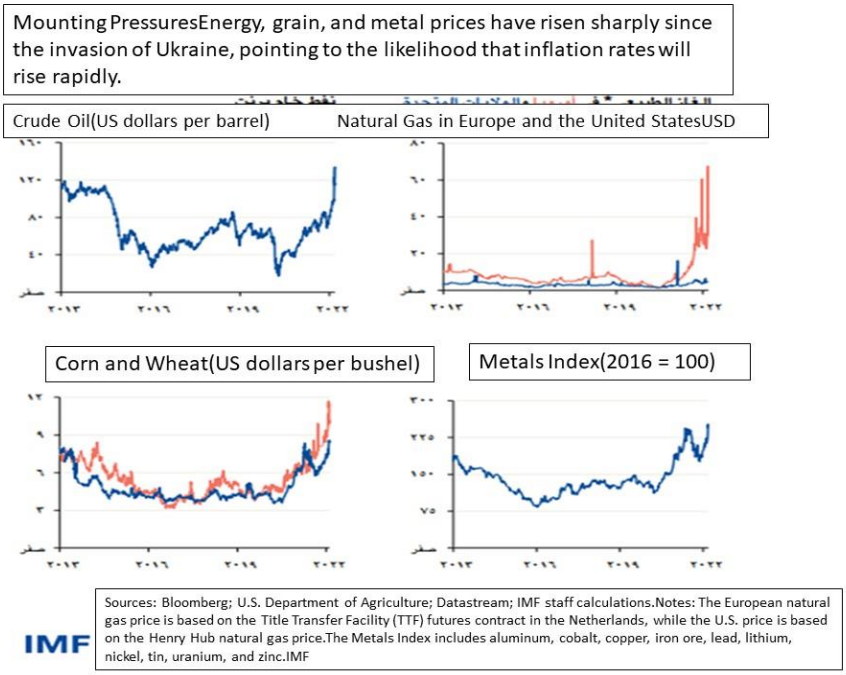
Russia and Ukraine are among the world's leading fertilizer suppliers. The destruction of agricultural land and trade restrictions resulting from the war have raised serious concerns about fertilizer exports, and consequently, food and grain supplies .

3.3. Global Dependence on Russian and Ukrainian Resources

Ukraine plays a critical role in global agriculture, particularly in grain and oilseed production. Its disruption due to

the conflict has destabilized global food and feed markets, impacting supply chains that rely on Ukrainian exports. This highlights the vulnerability of supply chains that are heavily dependent on specific geographic regions for essential resources. Global trade in cereals—excluding rice—accounts for just under 20% of total world production (around 620 million out of 3.3 billion tons produced in 2020/2021). While total output is sufficient to feed the world's 8 billion people, production in semi-arid countries falls short, and some nations underperform relative to their potential. For this reason, trade plays a key role in balancing global supply and demand.

In the 2020/21 season, Russia supplied 52.32 million tons (7.8%) and Ukraine 69.82 million tons (11.3%) of the world's grains. Ukraine also exports oilseeds (sunflower, soybean, and rapeseed) with a well-established crushing industry for sunflower oil production. In 2020, 52% of globally traded sunflower seeds and oil originated from Ukraine. Currently, supply chains for edible oils have been disrupted, pushing edible oil prices even higher than grain prices .



The consequences of the Russia–Ukraine war have flowed through three primary channels:

- Rising prices of primary commodities such as food and energy are fueling inflationary pressures, eroding household incomes, and weakening demand.
- Neighboring economies in particular are grappling with trade and supply chain disruptions, reduced remittances, and a historic surge in refugee inflows.
- Weakened business confidence and heightened investor uncertainty are undermining asset prices, tightening financial conditions, and potentially triggering capital outflows from emerging markets.

Since Russia and Ukraine are among the world's largest commodity producers, supply chain disruptions have caused a sharp spike in global prices, particularly for oil and natural gas. Food costs have also surged, with wheat prices reaching historic highs—given that Russia and Ukraine together account for 30% of global wheat exports.

Looking beyond the immediate global repercussions, countries facing the greatest strain are those with direct trade, tourism, and financial linkages. Oil-importing economies are expected to experience larger fiscal and trade deficits, along with higher inflationary pressures. However, higher prices may benefit some oil-exporting countries, such as those in the Middle East and Africa.

The intensification of food and fuel price hikes increases the risk of social unrest in regions ranging from Sub-Saharan Africa and Latin America to the Caucasus and Central Asia. Food insecurity is also likely to worsen in parts of Africa and the Middle East. Although it is difficult to measure the full extent of these ripple effects, forecasts for global growth are already being revised downward. This will be reflected more clearly in forthcoming updates to the World Economic Outlook and regional assessments.
Over the longer term, the war may fundamentally reshape the global economic and geopolitical order if energy trade patterns shift, supply chains are reconfigured, payment networks fragment, and

countries reconsider their reserve currency holdings. Intensified geopolitical tensions raise the risk of further economic fragmentation, particularly in trade and technology.

4. Geopolitical Tensions and Uncertainty

The Russia–Ukraine conflict has introduced an element of geopolitical uncertainty that reverberated across the global trade landscape. Businesses rely on stable political environments to make informed decisions regarding sourcing, production, and distribution. The geopolitical uncertainty generated by the conflict has created a climate of unpredictability, compelling firms to reconsider their strategies, minimize risk exposure, and, in some cases, suspend operations altogether—further disrupting the flow of supply chains .

5. Restructuring of Global Supply Chains

- Strategic shift toward supply diversification: Due to supply chain disruptions, companies began restructuring their supply networks to be less dependent on conflict-affected regions, which accelerated the move toward diversification.
- Reliance on local and regional production: Many countries started to strengthen domestic production and reduce reliance on imports from conflict zones, as part of efforts to enhance resilience and mitigate risks .

CONCLUSION

The Russia–Ukraine war represents one of the most significant geopolitical crises that has deepened the fragility of global supply chains, demonstrating how regional conflicts can exert wide-ranging and unexpected impacts on the international economy. Since the outbreak of the conflict in early 2022, severe crises have emerged in multiple industrial and commercial sectors that heavily depend on the flow of raw materials and energy from Russia and Ukraine—particularly in oil, natural gas, wheat, and metals such as nickel and palladium. These disruptions have triggered price inflation and increased operational costs, forcing many countries and firms to confront major challenges in securing vital resources and identifying immediate alternatives to meet rising demand amid market instability.

On the political front, Western sanctions on Russia imposed additional challenges, leading to paralysis in logistics operations, higher international shipping costs, and the redirection of global trade routes away from traditional paths. It has become evident that heavy reliance on specific geographical areas to meet the world's energy and raw material needs poses a genuine risk to global economic stability in times of conflict. This underscores the importance of diversifying supply sources and reducing dependence on conflict-affected states.

The turmoil witnessed in global markets as a result of the war highlights the urgent need to build more resilient and diversified supply chains, capable of adapting to geopolitical crises and sudden economic shifts. This crisis also stresses the necessity of strengthening international cooperation to safeguard supply networks, alongside developing more effective strategies to enhance adaptability to future shocks. In today's interconnected and complex world, supply chain resilience remains a decisive factor in ensuring sustained economic growth and stability in the face of forthcoming challenges, regardless of their origin.

Study Findings

The Russia–Ukraine war has left a tangible impact on global supply chains, with repercussions transmitted across various sectors and industries. Key findings include:

- A massive increase in one-way freight rates to India amid container shortages, causing severe disruption at the peak of shipping season.
- The conflict, by disrupting transport routes and obstructing the flow of goods, has demonstrated how seemingly local disturbances can rapidly escalate into global supply chain issues.
- The Russia–Ukraine war has exacerbated ongoing supply chain disruptions worldwide, resulting from port congestion and surging maritime freight costs. Container ship charter rates have soared to unprecedented record levels.
- Inevitably, the rise in oil and gas prices—alongside geopolitical risks from the conflict—will paralyze global supply chains, particularly in energy-intensive logistics sectors.
- The effects of the war will flow through three main channels: (i) higher prices of primary commodities such as food and energy will push inflation further upward, eroding incomes and weakening demand; (ii) neighboring economies will especially struggle with trade and supply chain disruptions, reduced remittances, and an unprecedented influx of refugees; (iii) declining business confidence and heightened investor uncertainty will weaken asset prices, tighten financial conditions, and may trigger capital outflows from emerging markets.
- Since Russia and Ukraine are among the largest producers of primary commodities, supply chain disruptions have sharply driven

up global prices.
- The Russia–Ukraine conflict has introduced an element of geopolitical uncertainty that has echoed across the global trade landscape.

Recommendations

To mitigate the repercussions of the Russia–Ukraine war on global supply chains and strengthen their sustainability in the future, a set of recommendations can be made at both the national and international levels:

- Diversification of supply sources: Countries and companies should avoid excessive reliance on specific geographical regions for raw materials and energy supply, and instead seek multiple and diverse alternatives from different regions to reduce risks associated with regional conflicts.
- Strengthening international cooperation: Improving the stability of supply chains requires enhanced international cooperation between governments and major companies to exchange information on potential risks and strengthen coordination to address trade crises.
- Investment in logistics infrastructure: Greater investment is needed in improving transport and shipping infrastructure, including roads, ports, and storage facilities, to ensure greater flexibility in the movement of goods and to overcome geographical and logistical obstacles that may arise during crises.
- Accelerating the transition to renewable energy: Renewable energy contributes to reducing dependence on conventional energy sources concentrated in conflict areas. Countries should therefore expand investments in solar, wind, and other alternatives to minimize the impact of shocks in global energy markets.
- Building strategic reserves: Countries and companies can maintain strategic reserves of essential commodities such as oil, food, and minerals to ensure continuity of production and meet domestic demand during crises.
- Developing risk forecasting technologies: Advanced technology and data analytics should be utilized to identify potential risks in supply chains, enabling proactive measures to prevent supply disruptions.
- Enhancing resilience of domestic supply chains: Countries must strengthen local supply chains to meet their essential needs during crises by supporting local industries, encouraging innovation, and promoting self-production.
- Improving free trade policies: Countries should promote free trade policies that facilitate smoother flows of goods across borders, reduce customs barriers, and simplify trade procedures, particularly in times of crisis.

Lessons Learned

From the impact of the Russia–Ukraine war on global supply chains, several lessons can be drawn to guide countries and companies in improving their strategies to cope with future crises:

- The importance of supply chain resilience: The war revealed the fragility of overreliance on long supply chains concentrated in specific geographical regions. Resilience must therefore be a core element of future planning, enabling governments and companies to adapt quickly to sudden crises.
- Excessive dependence on geographic suppliers poses a strategic risk: The crisis highlighted the dangers of depending on conflict regions as primary sources of raw materials and energy. Diversifying suppliers is necessary to avoid the adverse impacts of political and geopolitical tensions.
- The interconnection between politics and economics: The war emphasized the close linkage between political decisions, geopolitical conflicts, and global economic stability. This requires developing strategies that account for this interdependence and prepare for unforeseen outcomes.
- The importance of proactive planning: Countries and companies with contingency plans and proactive measures managed the crisis more effectively. Emergency planning and maintaining strategic reserves can help mitigate the effects of sudden shocks.
- The urgency of transitioning to renewable energy: Heavy dependence on energy from conflict zones such as Russia makes the shift toward renewable energy a strategic priority. Alternatives such as solar and wind energy can provide greater stability in the face of geopolitical disruptions.
- Fostering innovation in supply chain management: Technologies such as artificial intelligence, machine learning, and data analytics can enhance the efficiency and resilience of supply chains by predicting potential risks and improving decision-making.
- The importance of international cooperation during crises: The crisis demonstrated that the most effective solutions come from international cooperation and cross-border coordination. This requires improving communication channels and collective action to ensure supply chain stability.

- ❖ The high cost of unpreparedness: The war showed that failure to prepare for major crises can cost the global economy dearly in terms of financial losses and rising prices. Investment in backup infrastructure and stronger supply chains is a necessary cost for ensuring the sustainability of the global economy in the future.

These lessons emphasize the importance of resilience, diversification, and forward planning as key elements in maintaining the stability of supply chains in the face of future challenges.

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