China's Supply Chain During COVID-19: Disruption and Mitigation

Suixuan Chang[1, *]

[1]Interdisciplinary Studies, University of British Columbia, Vancouver, Canada

*Corresponding author: suixua78@student.ubc.ca

Abstract. COVID-19 (SARS-CoV-2) is a contagious virus that damages the respiratory system and has been spread worldwide from the end of 2019 until present. Most countries have implemented border closures, city closures, and quarantine to stop the spread of the virus, which led to mobility restrictions. China, being one of the most critical roles in the global supply chain, has faced stress from product supply, inefficient logistics and transportation, and financial crises on firms. Thus, this paper suggests three solutions to resolve China's supply chain disruption: unclog the foreign logistics system, strengthen foreign cooperation, and ensure financial security. In this way, China's supply chain can regain its robustness and resilience, which benefits the global supply chain and the global economy as a whole.

Keywords: Supply chain disruption; COVID-19; China's supply chain.

1. Introduction

As of September 2022, more than 603million cases of COVID-19 were diagnosed and 6.47million people were killed (WHO, 2022). Countries around the globe have obtained measures such as city closure, quarantine, work-from-home, and social-distancing to limit contacts between people. Many industries have been hurt due to mobility restrictions, including tourism, automobile, transportation, and retail. All sectors of the society are concerned about the survival of those industries. In order for the industries to overcome this tremendous hit, in addition to strengthening the governmental support for businesses' finance and innovation, it is to focus on the risk of supply chain disruptions and provide efficient mitigation strategies. This is because in an era of a tightly connected global economy, disruptions in China's supply chain would impact all of its business partners, no matter if it is a country as a whole or individual firms. Therefore, there is an urgent need for the Chinese government and companies to familiarize supply chain risk management (SCRM) and the uncertainties of this epidemic to ensure the competitiveness of Chinese companies and strengthen the position of China's supply chain in a global context.

Understanding China's supply chain from a macro perspective is vital as the difference between pre-epidemic and post-epidemic is immense. China currently accounts for 18.8% of global gross domestic product (GDP) (Richter, 2022), which 93% of secondary industry (processing, manufacturing, construction companies) plus tertiary industry (service sector), which tertiary industry solely covers up to 54%. According to UNCTAD's 2019 Investment Report (SONG, 2020), Foreign Direct Investment (FDI) inflows to mainland China in 2018 were $139 billion and outflows were $130 billion, both ranking as the second-best across the world. The sudden outbreak of COVID-19 has undoubtedly hurt the Chinese economy. The National Bureau of Statistics of China reported on April 17, 2020, that the Chinese GDP contracted 6.8% year on year in the first quarter of 2020 (Liu, 2020). The Chinese economy has not encountered a performance as poor as this one since 1992 in its national economic accounting system (Liu, 2021). For the past 30 years, China has been a substantial base for manufacturing industries and an essential link in the global supply chain. Driven by the epidemic, the impact on the global supply chain was also incredibly intense. For example, the shortage of key materials and the difficulty in allocating them made normal acquirement difficult to the point where it was mandatory for companies to halt their production. Even after the production process was resumed, problems such as cross-regional logistics difficulties also caused gaps in production between the various segments, interfering with the regular supply of products. In addition, as the production and operation process was disturbed by the abrupt epidemic, firms have encountered financial pressure, including reduced capital turnover rate, decrease in revenue, and insufficient cash flow.

This paper aims to discover how China's supply chain has been disrupted by the outbreak of COVID-19, and provide adequate solutions to resolve the problems. First, the three issues, namely product supply, inefficient logistics and transportation, and financial crisis faced by firms, will be expanded in detail concerning China's supply chain. Second, solutions regarding the three issues will be discussed. Last but not least, a comprehensive conclusion and further areas of research will be presented.

2. Worldwide and China's Disruptions from COVID-19

2.1 Product Supply

The outbreak of COVID-19 has brought great harm to the production of the global supply chain. Current international discussions have suggested that within the manufacturing sector, the ones that were the most disrupted by the epidemic were the automobile and machinery industry. These two industries were the dominant ones in China's supply chain and are anticipated to suffer a severe economic blow if they fail to recover and develop within a short time. Taking raw materials as an example, the semiconductor and microchip sectors are necessities in the automobile industry, and the sudden shortage of chips caused a loss of 11.3million units of car production worldwide in 2021, along with a $21 billion loss in revenue (Priddle, 2021). According to The New York Times, Hyundai faces a threat of supply chain disruption within weeks due to a shortage in Chinese parts (Ewing et al., 2020).

This is because the delayed return-to-work and quarantine measures in many parts of China, together with the implementation of city closures, have caused mobility restrictions and thus slowed down the entire process of China's supply chain recovery. Adjustment in the planning of enterprises and logistics decluttering are both crucial in order to regain the supply chain robustness and resilience.

2.2 Inefficient Logistics

Logistics and transportation are the center of global supply chain as they were the only channel to get the shipments to its destination. When the pandemic first started spreading, countries around the world generally adopted practices such as custom restrictions, cancellation of flights, suspension of shipments, rejection to parcel delivery, and tariff increment to reduce logistic channels. As for the few logistic channels that were allowed to transport, they were also negatively affected in several aspects including extended payback period, slow capital turnover rate, and a rise in shipping cost. Studies show that at least 90% of goods are transported by freight shipping, and even the smallest changes to shipping cost would shift the balance of supply chain. For instance, the global average cost of shipping a container increased from $1,362 USD in November 2019 to $9,628 USD in February 2022 (SONG, 2020). The most costly routes are from China/East Asia to the North American East Coast, with a total of $16,893 USD, and from China/East Asia to the North American West Coast, which was $15,218 USD. Given these numbers, the manufacturers and consumers that are located in Canada, the United States, and Mexico, who are also a consumer of Chinese exports, would be going through a larger expense and possibly a financial burden (SONG, 2020). Small companies and farmers would not be able to withstand the continuous increase in shipping costs. Even retail business giants like Walmart, Amazon, Kroger, and Home Depot were facing larger than expected financial expenses (Ricaurte, 2022).

2.3 Financial Crisis on Firms

COVID-19 has seriously disrupted the normal production and operation order of the supply chain, causing many enterprises to fall into a financial dilemma, resulting in slow cash flow, lower expected revenue, and tight cash flow. According to a survey conducted by the United Nations Conference on

Trade and Development on March 27, 2020, 5,000 multi-national companies around the world are expected to see their average profit level to shrink by 30% this year compared to last year, including 35% in developed countries and 20% in developing countries. According to the survey conducted by Bartik et. al(2020) across 5,800 small businesses during March 2020, the financial fragility of small businesses were determined to be far worse compared to the large multi-national businesses: Median firms who account for over $10,000 monthly expenses indicate that the cash they have on hand would only last them about two weeks. What's more, 75% respondents reveal that they had just enough cash to sustain 2 months of operation. Only a small portion of firms had more cash and was able to remain open until the end of 2020. The decline in profits will expose companies to long-term capital flow pressure, threatening future growth and is detrimental to supply chain recovery and development.

3. Solutions to Recover Worldwide and China's Supply Chain Disruptions

Numerous studies suggest a connection between supply chain robustness and resilience and organizations' SCRM activities. Businesses must implement strategies to cope and hopefully lessen supply chain vulnerability, which includes identifying risks and resolving them before they arise, in order to strengthen supply chain robustness (Baz & Ruel, 2021). Additionally, businesses that examine their network for risk sources are better able to resist the effects of disruption and recover more quickly. In general, businesses that understand how to recognize threats from their supply chain environment can establish proactive capabilities that enhance their responsiveness to supply chain disruptions. Utilizing and rearranging resources turns into a crucial component for performance maintenance and disruption recovery (Baz & Ruel, 2021). Thus, businesses' reconfiguration and deployment of resources/capabilities through SCRM allow them to overcome disruption impacts and preserve supply chain resilience and robustness in a context of disruption like the COVID-19 epidemic. The firm's capacity to reconfigure resources may function as a method to enhance resilience and robustness to supply chain disruptions in circumstances with high disruption impact.

From a supply chain perspective, robustness is commonly defined as the extent to which the supply chain can withstand internal and external disruptions (Monostori, 2018). Once the robustness is repaired, the supply chain can be restarted quickly and functionally, and on this basis, the relevant nodes can be unblocked gradually, and the overall network of the supply chain can be restored. Three strategies regarding the enhancement of supply chain robustness are being proposed.

3.1 Unclog the Foreign Logistics System

The time when COVID-19 first becomes a global issue, sudden changes in worldwide legislation regarding the epidemic have made the international logistics system out of order. This chaotic situation has limited the recovery of China's supply chain towards the rest of the world because logistic channels were not stabilized. Therefore, it is important to eliminate regional restrictions and to unblock the logistics network in order for the global supply chain to stay connected with each other. As of now, China has been an active role in negotiating and cooperating with foreign trade countries on how to restore cross-border logistics routes through maritime transportation, air transporation, railroad transporation, and many more. Statistics have shown that the number of trains running between China and the European Union in the first quarter and the number of goods transported increased by 12% and 18% year-on-year. This has helped China in transporting goods outside of the country border as international trading countries were able to receive it (SONG, 2020). However, the Chinese government should also actively encourage domestic logistics to provide cross-border and even overseas logistics services in order to develop overseas markets and achieve a steady customer base. If the connection between domestic logistics is better connected to the global network, it would further alleviate the dilemma regarding COVID-19.

3.2 Adhere to Strengthen Foreign Cooperation

Preserving the current framework of the international free trade while ensuring the successfulness in the restoration of global supply chain with the aim of combating the pandemic as a whole is essential and meaningful towards the entire revival of foreign trade. The earlier its done, the more efficient on the stimulation of foreign trade industries to resume work and production. To this end, China persists in sharing its experience in fighting the epidemic with other countries in the world in various forms, including: carrying out medical cooperation, promoting epidemic prevention, and introducing control methods to countries with serious epidemic spread. China also simplifies customs clearance procedures and facilitates business development, stabilizing foreign investment and optimizing the business environment to ensure that the open and favourable development environment remains unchanged under the epidemic. However, because small-to-medium enterprises were being hurt the most by the pandemic, adequate policies or financial support should be provided to help the businesses to survive. Alternatively, the Chinese government could also encourage small-to-medium companies to innovate, such as transforming from local businesses to cross-border e-commerce and provide a platform to do so. This would broaden the customer base of those companies and thus achieve a strong bond with the foreign market.

3.3 Ensure Financial Security

Due to the long chain of foreign trade, the payback cycle is often longer, which causes firms to be prone to liquidity difficulties, high loan ratios, default risk and other problems. To ensure the financial security, help to ease the pressure of supply chain operation and market development, and enhance the anti-risk ability of enterprises. To this end, China should vigorously promote supply chain financial services to activate the flow of funds, optimize the efficiency of the overall collaborative management of funds, so that the supply chain has stronger financial flexibility to cope with the international market.

4. Conclusion

The outbreak of COVID-19 caught everyone by surprise. It causes severe damage to human health, and has led to millions of deaths around the globe. Countries have took actions to combat the epidemic, such as closing boarders and implement quarantine. Companies have dealt with huge financial pressure, and laid off workers for survival. Many small or startup companies have been corrupted due to this long-lasting epidemic. All of the factors have contributed to an unstable global economy. China, being one of the world's strongest economy, have also contracted since the start of the epidemic. What's more, China's supply chain have faced disruptions in three aspects: inefficient logistics and transportation, lack of product supply, and financial crisis on firms. The three disturbances have affected the global economy even more because China could not transport essential raw materials to other countries for manufactural purposes, meaning firms such as car manufacturers would not be able to produce car anymore, resulting in a shortage in revenue and cashflow. Therefore, it is extremely important to first unclog the foreign logistics system, and so trades between international firms and Chinese firms can flow smoothly. This requires negotiations and cooperations with major foreign trade countries, allowing restoration of a large number of cross-border logistics routes (railway, maritime), and China's supply chain would be back on track. Second, the entire world should combat the epidemic as a whole. China has always shared experiences in resolving the coronavirus with the rest of the world, optimizing the international environment and stimulating foreign trade industries to resume work and production. Restore the global economy as a whole. Third, China should promote supply chain financial services to activate the flow of funds, to prevent companies from bankruptcy. In this way, China's supply chain would be strong and flexible enough to cope with the international market.

5. Further Areas of Research

This paper has suggested three solutions to tackle with China's supply chain disruption. However, the solutions were coming from a macro perspective as it only gives suggestions to the Chinese government on how supply chain can be restored under their policy implementation and negotiation with countries abroad. There was a lack of suggestions to firms, on how they could operate internally to make the supply chain more robust and resilient. Studies on firms' performance in supply chain management could imply the responsiveness of businesses to unprecedented problems, such as COVID-19, where other firms can learn from successful supply chain management skills, and could attract more audiences who are interested in this field of study.

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