The Impact of the Corona Virus Disease 2019 on China’s External Transportation Industry

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Abstract. In order to study the impact of the Corona Virus Disease 2019 epidemic on China's foreign transportation industry, this article summarizes the impact of a sudden major epidemic on trade and transportation, and applies statistical data trend analysis, case analysis, graphic analysis, and comparative analysis. The preliminary research on the Corona Virus Disease 2019 epidemic in the external transportation industry such as ports, shipping and civil aviation. The conclusion of the study is that the Corona Virus Disease 2019 epidemic has concentrated on industries such as ports, shipping, and civil aviation. It is expected that the volume of containers in major coastal ports will decline by more than 20% in March. 30%. Before and after the Spring Festival, the number of international routes decreased by 19, and the number of flights and seats decreased by 28%. The air cargo market was affected by the epidemic. As the epidemic situation is controlled in the short term, production will gradually recover. Correspondingly, countermeasures should be taken to stabilize foreign trade, stabilize production, stabilize channels, and stabilize investment to turn dangers into opportunities and minimize negative impacts. This research will provide a reference for the industry to scientifically respond to the Corona Virus Disease 2019 epidemic.

Keywords: public health emergencies, the impact on the External transportation industry, statistical analysis, case study, the Corona Virus Disease 2019 (COVID-19).

1. Introduction
The Corona Virus Disease 2019 outbreak has been listed by the World Health Organization as a public health emergency of international concern. What is the impact of this international public health emergency on China’s foreign transportation industry? It is the focus of the industry's attention and the starting point of scientific decision-making in the industry.

The external transportation industry is an important carrier of foreign trade, so it is necessary to study the impact of public emergencies on trade. In terms of impact on trade, sudden large-scale epidemics are different from common epidemic diseases, and are often characterized by sudden outbreaks, rapid spread, relatively concentrated areas of influence, high levels of social panic, large impacts on individual industries, and obvious short-term effects. [1]-[3]. Looking back at the SARS epidemic in 2003, the epidemic situation significantly affected China's foreign trade. The foreign trade activities of some foreign trade companies with severe epidemics, such as Beijing and Guangzhou, were all interrupted; orders for Chinese goods decreased or lagged. According to statistics from the National Information Center, SARS has made Foreign trade orders decreased by approximately US $
20 billion; foreign investment decreased or was delayed. In May 2003, China's contracted foreign investment amounted to $ 7.695 billion, a decrease of 32% over the previous four months. [4]-[5] However, SARS has the properties of sudden public health events and cannot evolve into an economic crisis. It is not the same as the Asian financial crisis in 1998, which caused a large-scale exchange rate depreciation, short-term capital flight, and a large number of corporate bankruptcies. Its impact on China's economy and trade is still short-term and limited. In 2003, China's GDP growth rate still reached 10.4%, compared with 9.13% in 2002.

In terms of the correlation and impact of sudden large-scale epidemics on transportation, domestic scholars have combined the spread characteristics of SARS epidemics and used system dynamics to establish SARS diffusion dynamics models. By comparing the speed of epidemic expansion with or without the use of transportation corridors, It is clear that the epidemic situation can be rapidly spread by means of transportation channels without taking any preventive measures. [6]-[9] Because of this, when large-scale epidemics occur, international and domestic measures have been adopted to control transportation and call on people to reduce travel, which has a direct impact on transportation, such as the 2003 SARS epidemic peak, railways, Highways and civil aviation decreased by 64%, 42.4%, and 75.1%, respectively. However, this effect quickly subsided with the end of the epidemic, and kept pace with the development of the epidemic. Other studies have shown that a similar situation occurred during the H1N1 flu epidemic. The long-distance travel rate to the affected areas in the United States decreased by 59%, and the crowded public places and unnecessary travel decreased by 23% and 15%. Long-distance travel in the affected areas and public transportation in the city decreased by 17% and 22%, respectively. [10]

Based on a new perspective of the impact of the Corona Virus Disease 2019 international transportation industry, this paper uses statistical analysis and logical review methods to study its internal correlation and evaluate its effects. It provides a reference for the industry to effectively respond to the impact of the epidemic and formulate countermeasures.

2. Impact of corona virus disease 2019 epidemic on China's foreign trade
In 2019, China's total value of imports and exports of goods trade was 31.54 trillion yuan, an increase of 3.4% over 2018, of which exports were 17.23 trillion yuan, an increase of 5%; imports were 14.31 trillion yuan, an increase of 1.6%. After years of rapid growth, China's foreign trade has shown a steady growth. However, due to the outbreak of the Corona Virus Disease 2019 epidemic, the uncertainty of China's trade in the short term has increased, mainly as follows:

From the analysis of domestic factors, the delay in the resumption of work and production will directly affect foreign trade imports and exports. The epidemic caused delays in the resumption of work for most export companies after the Spring Festival. Holidays in regions with the most active import and export trades, including Shanghai, Zhejiang, Jiangsu, and Guangdong, were generally extended by more than 10 days, and the pressure on companies to sign contracts was high. If the epidemic is better controlled in February, most companies will resume work in time, and production capacity is fully restored, the impact on China's foreign trade will be concentrated in the first quarter; and if the epidemic is extended to April or even June, it will be difficult for relevant industries to resume work. The impact of trade will continue into the second quarter or even the third quarter.

From the analysis of international factors, the spread of the epidemic will affect China's normal economic and trade relations, but if it can be ended in the short term, the impact will be controllable. The World Health Organization (WHO) has designated the epidemic as an "public health emergency of international concern" (PHEIC). In this scenario, although the WHO 's subsequent temporary recommendations do not recommend travel and trade with China Restrictions, but many countries have adopted restrictions on our personnel and goods. On the other hand, the current epidemic situation has shown the characteristics of a global pandemic, which has increased the uncertain impact on international trade. But looking back at history, there have been 5 PHEIC incidents since 2009. However, by analyzing the cases of the United States, Mexico, and Brazil that are not restricted by the World Trade Organization by the WHO, it is found that the epidemic only affects international trade in
the short term and cannot make trade trends fundamental Sexual reversal (see Table 1). According to the International Health Regulations (2005), temporary recommendations in the case of PHEIC will automatically expire after three months. If the epidemic is effectively controlled before April, the impact of PHEIC on China's foreign trade will be controllable.

3. Impact of coronavirus disease 2019 on China's foreign transportation industry
The epidemic will have a short-term impact on China's foreign trade. As the carrier of international trade is mainly ocean shipping, and some air transportation, the impact on the transportation industry is mainly concentrated in industries such as ports, shipping and civil aviation.

3.1. Adverse effects on major coastal ports
With the development of the Corona Virus Disease 2019 (COVID-19), some Foreign customers cancelled orders due to the refusal of the goods due to the epidemic, and some domestic suppliers caused delays in delivery and compliance difficulties due to epidemic control measures, affecting the supply of major coastal container ports. At the same time, the PHEIC recommendations published by the WHO explicitly require additional inspection and inspection steps, stricter declaration and disinfection measures for import and export of goods, resulting in lower port operation efficiency. At the same time, due to the shortage of personnel and equipment, including the normal berthing and overhaul of ships, the management and services of crew, the supply of required materials, and the application for certificates, etc., cannot be performed normally. Containers are not circulating. At present, the major container ports in the Yangtze River Delta, the southeast coast and the Pearl River Delta, which are closer to the outbreak of Hubei Province, have been affected to some extent. According to the Port Express of the Ministry of Transport, in January 2020, the cargo throughput growth rate of Shanghai Port was -12.2%, Guangzhou Port was -9.1%, Xiamen Port was -13.6%, and Shenzhen Port was -5.5%. According to China Ports Association's business production survey of various ports, with the current adjustment of short-term routes and services by a large number of shipping companies, some flights have been cancelled or "jumped" to some domestic port routes. It is expected that the container volume of major coastal ports will decline by more than 20% in March.

Table 1. Impact of PHEIC on trade in major epidemic countries.

| Event                      | Stabilization time | Release time | Major epidemic countries | Whether the WTO restricts tourism and trade | Impact on the macro economy |
|----------------------------|--------------------|--------------|---------------------------|-------------------------------------------|-----------------------------|
| H1N1 influenza epidemic    | April 2009         | August 2010  | Mexico, United States     | No                                        | Less impact on goods exports, but causing huge losses to the tourism economy. |
| Wild poliovirus epidemic   | May 2014           | Not yet lifted | Afghanistan, Pakistan and Nigeria | No                                        | Short-term impact on Pakistan’s exports, and the growth rate of Afghanistan and Nigeria’s exports has not been affected by the epidemic. |
| Ebola virus outbreak in West Africa | August 2014 | March 2016 | Western Africa | Some restrictions on travel and trade in major affected countries | have affected the economies and exports of major affected countries. |
| Zika virus outbreak        | February 2016      | November 2016 | Brazil                    | No                                        | Brazil's economy has fallen into a temporary recession, but exports of goods have not been impacted during the same period. |
period. Due to the Olympic Games, the number of Brazilian tourists increased slightly compared to 2015.

Ebola outbreak in the Congo
July 2019 Not yet lifted Congo (DRC) No Has not yet had a negative impact

Corona Virus Disease 2019 outbreak
January 2020 Not yet lifted China No Has caused short-term impact.

Source: Based on WHO and KPMG data.

3.2. Impact on ocean routes
Affected by the slowdown of China's trade growth, China's ocean routes are operating at a low level in 2019. Taking the typical Far East / North America route as an example, the transportation volume of the Far East/North America route decreased by 10.4% year on year in the fourth quarter of 2019 (Table 2). After the outbreak of Corona Virus Disease 2019, the international shipping market has further accelerated its bottoming. As of the end of January, the Baltic Dry Bulk Index and Crude Oil Freight Index have fallen by 45% and 27% respectively in one month. On January 31, the Baltic Dry Freight Index dropped to 487 points, a new low in two years.

Table 2. 2017-2019 container traffic on the US-East route.

| Far East / North America routes | 2017  | 2018  | 2019  | Year-on-year change rate (%) |
|---------------------------------|-------|-------|-------|-----------------------------|
|                                 |       |       |       | 2019/18         | 2018/17         | 2017/16         |
| January                         | 123.43| 136.77| 141.93| 3.8%           | 10.8%           | -11.9%          |
| February                        | 102.09| 128.33| 120.54| -6.1%          | 25.7%           | -12.0%          |
| March                           | 100.82| 107.07| 106.63| -0.4%          | 6.2%            | 12.0%           |
| April                           | 118.67| 116.62| 122.76| 5.3%           | -1.7%           | 11.3%           |
| May                             | 132.88| 121.52| 120.27| -1.0%          | -8.6%           | 12.3%           |
| June                            | 119.70| 131.59| 131.21| -0.3%          | 9.9%            | -1.7%           |
| July                            | 132.45| 143.47| 148.00| 3.2%           | 8.3%            | 7.1%            |
| August                          | 142.38| 142.19| 144.40| 1.5%           | -0.1%           | 6.9%            |
| September                       | 133.15| 140.86| 138.66| -1.6%          | 5.8%            | 8.8%            |
| October                         | 130.55| 146.49| 140.81| -3.9%          | 12.2%           | 1.2%            |
| November                        | 130.18| 139.22| 126.52| -9.1%          | 6.9%            | 6.8%            |
| December                        | 117.32| 152.43| 125.21| -17.9%         | 29.9%           | -2.0%           |
| First quarter                   | 326.34| 372.17| 369.11| -0.8%          | 14.0%           | 0.7%            |
| Second quarter                  | 371.26| 369.73| 374.24| 1.2%           | -0.4%           | 7.0%            |
| Q3                              | 407.97| 426.52| 431.06| 1.1%           | 4.5%            | 7.6%            |
| Q4                              | 378.04| 438.14| 392.53| -10.4%         | 15.9%           | 2.0%            |
| annual                          | 1483.61| 1606.56| 1566.95| -2.5%          | 8.3%            | 4.4%            |

Source: Clarkson.

According to data from container shipping consultancy Alphaliner, since January 20, the docking of ships arriving or passing through China's major ports has been reduced by 20%. The measures aimed at controlling the spread of the Corona Virus Disease 2019 (COVID-19) have brought a greater impact on the international supply chain. It is expected that The closure of factories and other restrictions that affect China's economic output will reduce the number of global shipping containers by about 6 million TEUs throughout the year, a decline of about 0.7%. Large international shipping companies such as Maersk, Mediterranean Shipping, Hapag-Lloyd and CMA CGM have said that they have reduced the number of ships on routes from Mainland China and Hong Kong to Europe and the United States, and related route adjustments have been planned to the end of March. In the last week
of January, the global fleet's idle capacity reached 750,000 TEU, accounting for 3.4% of the total capacity. The number of suspended flights in February will increase by 30% from the beginning of the year, and many container liner companies have begun flights Most of the arrangements for capacity shrinkage have delayed the return to work after February 10. It is expected that under the strong response of the Chinese government, the epidemic will be effectively controlled in the short term. Considering that the export of goods will increase sharply after the resumption of the factory, it will also lead to the growth of shipping company bookings, especially in the second and third quarters. It appears that the market will change to benign.

3.3. Bring great impact to the international civil aviation routes

After the WHO announced the Corona Virus Disease 2019 (COVID-19) as PHEIC, in order to reduce the import risk, more than 70 countries such as the United States announced varying degrees of air entry restrictions, and Delta, British Airways and other 64 airlines around the world cancelled or partially canceled to China flights. According to the latest flight plan, the capacity of international routes has been significantly reduced. Comparing the data of the week before and after the Spring Festival, the number of air routes on international routes decreased by 19, and the number of flights and seats decreased by 28%. The carrier capacity investment of Chinese and foreign carriers decreased by a considerable amount. Overseas carriers account for about one-half of China's aviation international market capacity, and the sharp reduction in foreign capacity will inevitably have a greater impact on China's international airline network. In particular, there has been a certain degree of panic in the international aviation market. It is very likely that foreign carriers will further reduce their capacity. In order to ensure the accessibility of the international air route network in China, the Civil Aviation Administration requires domestic airlines to cancel some flights in consideration of market demand, and in addition to the implementation of navigation restrictions by the other country, to ensure continuous navigation in the navigation country.

At present, China has adopted strict control measures for the epidemic situation. If the epidemic situation is short, the peak of the epidemic situation will appear in mid-to-late February and end before April. According to relevant forecast data [Peng Yi. Impact Analysis of Corona Virus Disease 2019 Outbreak on Civil Aviation and Policy Suggestions, Research on Transportation Development and Reform, No. 5 of 2020 (Issue No. 167). ], From January to April, the number of civil aviation passengers will decrease by 30% year-on-year. If the epidemic situation continues into the second quarter, the passenger traffic of China’s civil aviation will decrease by 37% year-on-year.

(Data source: Organized and drawn according to OAG data)

**Figure 1.** Comparison of Chinese and foreign carriers' operations on international routes before and after the Spring Festival.
From the analysis of air cargo, the situation of air cargo in China in 2020 is still not optimistic. The international trade situation is severe due to the impact of the epidemic. Although WHO does not recommend travel and trade restrictions, exports may still be significantly affected. It is worth noting that the WHO defines the epidemic area as a unit of "province / city". Therefore, Hubei, which has the worst epidemic situation, is still more likely to be defined as an "infected area". Hubei has gathered a number of high-tech manufacturing industries such as optoelectronics, information, automobiles, and medicine, and the trade in related industrial chains may be further affected by this. Although the share of Hubei's export share in the country is limited, the identification of Hubei as an epidemic area has led to lower acceptance of Chinese exports, more complicated procedures, and higher transportation costs. International trade will be restricted to a certain extent, which will affect International air cargo market.

4. Countermeasures

4.1. Stabilizing foreign trade: Grasp the general requirements for the development of foreign trade in transportation services, and make overall plans for epidemic prevention and control and industry development

Taking epidemic prevention and control as the starting point, strengthening the monitoring and analysis of economic operations in industries such as ports, shipping, and civil aviation should not only be based on epidemic prevention and control, but also focus on the overall requirements of transportation services for foreign trade development. First, in the international shipping market, closely follow the research and judgement of the possible fluctuations in the international shipping market in the second and third quarters, and strengthen the sharing of cargo information to reduce communication costs, improve matching efficiency, optimize operational effects, and accurately deliver capacity. Second, on the international civil aviation routes, guide airlines to do the seasonal changes of summer and autumn 2020, guide airlines to scientifically formulate annual plans for capacity introduction, reasonably match the changing trend of market demand, and avoid excess capacity. At the same time, we strictly implemented the requirements for epidemic prevention and control, conducted personnel recruitment and professional skills training in an orderly manner, and reserved human resources for civil aviation to resume normal production. The third is to further strengthen the communication and coordination mechanism between relevant government departments of transportation and ports, shipping, civil aviation and other enterprises, strengthen information sharing and linkage mechanisms, and take multiple measures to promote the stable development of the industry and ensure the stable operation of foreign trade.

4.2. Stabilizing production: take effective measures to reduce the burden on transportation companies and minimize economic losses

The Corona Virus Disease 2019 (COVID-19) has caused the slowdown or even stagnation of the real economy development of ports, shipping, and civil aviation, resulting in increased pressure on production and operation of enterprises. It is necessary to study and formulate targeted policies and measures in time to promote the industry out of short-term difficulties. First, it is recommended that governments at all levels help Hong Kong Airlines, civil aviation and other enterprises overcome difficulties through measures such as tax reduction and exemption, appropriate subsidies, and financial discounts for damaged enterprises. The second is to increase the resumption of production and logistics at major node parks such as logistics and dry ports to a higher priority. The major logistics hubs that affect the distribution of materials and the transshipment of different modes of transport should be used as key projects for service epidemic prevention, epidemic prevention, transportation, and promotion of resumption of work and production. Priority should be given to the main ports for railway connection, such as ports, dry ports, and parks involved in railway logistics bases. Thirdly, on the basis of ensuring the prevention and control of the epidemic, efforts were made to solve the problem of road closures at the provincial and municipal boundaries in road freight. Accelerate the
handling of freight transport permits, and vehicles with permits should ensure passage. Priority should be given to highway container transportation. The fourth is to optimize the work process, give full play to the role of the network platform, strengthen the "Internet +" government service application, further simplify the work process, and achieve online office, online approval, remote collaboration and digital management.

4.3. Stable access: Establish and improve a special green channel for the supply of important materials and unblock the global supply chain system
At the moment of the epidemic, it is necessary to set up a special green channel to prioritize the protection of ships and flights that transport key materials for epidemic prevention and control. The first is to unblock the global green channel and provide free international warehouses and international transportation of epidemic prevention materials for international logistics companies. The second is to simplify the green channel inspection procedures, ensure priority inspection, priority traffic, reduce or exempt charges, and under normal circumstances, do not implement isolated observation measures for transportation practitioners. The third is to improve the service level of transport corridors, strengthen the early-warning analysis of the situation of emergency supplies, timely grasp the forecast of domestic and foreign emergency supplies transportation needs, formulate and implement emergency protection plans, ensure coordinated transportation and smooth logistics. Fourth, in accordance with relevant WHO requirements on PHEIC, strengthen the ventilation and disinfection of transportation stations such as ports, airports, and other means of transport, such as ships and aircraft, and establish and improve a normalized early warning mechanism for full coverage of temperature monitoring. Install an automatic thermometer in the place.

4.4. Stable investment: Do a good job of project investment and capital guarantee, and complete the year-round target tasks with high quality
After the epidemic situation recovers, comprehensively promote the planning of traffic construction projects "should start as fast as possible and can be opened quickly" to ensure high-quality completion of the year's construction goals. First, in the construction of infrastructures such as water transport and civil aviation, all localities are encouraged to start a batch of services to implement the major national strategies with the direction of the 14th Five-Year Plan and investment policies based on the completion of the 13th Five-Year Plan. Transportation construction project. The second is to establish and improve the department-province linkage mechanism for key projects, to provide ideas and help and to grasp the progress of the project in a timely manner, to carry out full-process docking services, and to actively coordinate and resolve outstanding difficulties encountered in project construction. The third is to actively seek policy and funding support, implement self-raised funds in a timely manner, and at the same time strengthen debt risk prevention and control, and resolutely hold to the bottom line of not having systemic debt risks.

5. Conclusion
This article compares and analyzes public health events of previous international concerns to analyse the impact of the Corona Virus Disease 2019 (COVID-19) on International trade; 2. Analysis of the statistical data trend of the civil aviation market, to judge the impact of the Corona Virus Disease 2019 (COVID-19) on International transportation, and draw the following conclusions.

1. Impact of Corona Virus Disease 2019 epidemic on international trade. From the analysis of domestic factors, the delay in the resumption of work and production will directly affect foreign trade imports and exports. From the analysis of international factors, the spread of the epidemic will affect China's normal economic and trade relations, but if it can be ended in the short term, the impact will be controllable.

2. The impact on the transportation industry is concentrated in industries such as ports, shipping and civil aviation. In terms of ports, major container ports in the Yangtze River Delta, the southeast coast, and the Pearl River Delta, which are closer to Hubei Province, have been affected to a certain
It is expected that the container volume of major coastal ports will decline by more than 20% in March. In terms of shipping, the number of suspended flights in March will increase by 30% from the beginning of the year, and most of them have postponed the work resumed after February 10. It is expected that the epidemic situation will be controlled in the short term. Considering that the export cargo will increase sharply after the factory resumes work, it will also lead to the increase of bookings by shipping companies, especially in the second and third quarters, and the market will change to a healthy one. In terms of civil aviation, compared with the data of the week before and after the Spring Festival, the number of international routes decreased by 19, and the number of flights and seats decreased by 28%. At the same time, Hubei Province was identified by the WHO as an epidemic area, which led to lower acceptance of Chinese exports, more complicated procedures, and higher transportation costs, which affected the international air cargo market.

3. Suggestions for countermeasures: First, stabilize foreign trade: Grasp the general requirements for the development of foreign trade in transportation services, and make overall plans for epidemic prevention and control and industry development. The second is to stabilize production: take effective measures to reduce the burden on transportation companies and minimize economic losses. The third is to stabilize the channel: establish and improve a special green channel for the supply of important materials, and unblock the global supply chain system. The fourth is to stabilize investment: do a good job in project investment and financial guarantee, and complete the year-round goals and tasks with high quality.

Because the new coronary pneumonia epidemic has the nature of a public health emergency, it has high requirements on the timeliness of the study, which is limited to the time of investigation and the availability of data. This article only points out the impact of the new coronary pneumonia epidemic through statistical analysis and logical demonstration. The possible impact of the transportation industry is intended to provide a basis for discussion in industry decision-making, and further research will be carried out in the future.

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