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The Analysis of Global Mask Import and Export During the Epidemic

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Abstract: Since late 2019, the worldwide disease outbreak has been identified as a new coronavirus. The virus rapidly disseminated all around the world, resulting in the COVID-19 pandemic. Lockdown measures, social distancing protocols, and the use of face masks have been implemented in order to mitigate the transmission of the virus. Healthcare systems globally confront significant obstacles as researchers strive to expedite vaccine development and carry out clinical trials. International medical professionals are collaborating to exchange knowledge and expertise in combating the outbreak. This paper employs a literature review and case study methodology to examine the worldwide import and export of masks during the outbreak period. This study reveals that masks were imported and exported with greater frequency worldwide over the specified time period. The quantity of masks exported and imported varied in accordance with the production levels of different countries.

Keywords: pandemic, mask, export and import

1. Introduction

In September 2019, the world faced a serious outbreak of COVID-19 pandemic. From then on, cases have been distributed globally except for Antarctica. By June 12th 2020, more than 7,500,000 people were confirmed cases of COVID-19, and have been reported globally. Approximately 3,500,000 cases were cured and more than 421,000 infected were died, with a global death-to-cases ratio 5.61 %. [1]. The research conducted by the Johns Hopkins University Center for Systems Science and Engineering clearly shows that the regions with the highest number of deaths are mainly concentrated in northern Asia (Russia), North America (United States), South America (Peru, Brazil, Colombia, Argentina, and Chile), Europe (Bulgaria, Hungary, Croatia, Bosnia and Herzegovina), southern Africa (South Africa and Namibia), and the Middle East (Iran) [2]. This signifies that the COVID-19 pandemic has impacted nearly every region of the globe, emerging as a pressing global health concern that requires immediate attention.

The Role of Masks in Preventing Novel Coronavirus Infection and Their Selection and Use published by Guangzhou Institute of Respiratory Health states that the primary ways the novel coronavirus spreads are through respiratory droplets and close contact. Aerosol transmission can occur in enclosed spaces where individuals are exposed to high quantities of particles for an extended period of time [3]. Aerosol transmission is the phenomenon in which droplets in the air lose their water content, resulting in the formation of droplet nuclei composed of protein and microorganisms. These particles can travel significant distances in the form of aerosols, resulting in the transmission of

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diseases over large distances. Aerosols have the ability to acquire an electric charge, and their particles are relatively large, usually exceeding 10 micrometers, with a significant number being larger than 50 micrometers. The most crucial preventive actions include avoiding the inhalation of virus-containing droplets and aerosols, as well as practicing frequent handwashing. As a result, there has been a significant increase in the worldwide demand for masks, leading to a shortfall of supply.

Through a method of literature review, this paper helps people to have a comprehensive understanding of the global overview of the novel coronavirus epidemic and the protective effect of masks on people during the period, which will pave the way for further understanding of the global trade of masks in the epidemic.

2. Global trend

From an international perspective, countries choose to export or import masks based on their own needs and production capacities, leading to a significant increase in the global circulation of masks. For China, the primary trend in mask movement is export.

2.1. Trend of other countries

The bar chart illustrates a significant surge in the sales volume of COVID-19 preventative products in Russia between February 17 and March 8, 2020, in comparison to the sales at the end of 2019. In only three months, the sales of medical masks had a significant increase of 380%, while Rotivoviral medications saw a rise of 220%. Additionally, antiviral and immune-stabilizing treatments witnessed a more modest growth of 16%. Undoubtedly, the sales of medical masks experienced a significantly higher increase compared to the sales of Rotivoviral medications and antiviral and immune-stabilizing pharmaceuticals. This underscores the substantial surge in the need for medical masks within a brief timeframe of approximately eight months, showcasing the heightened consciousness and significance individuals attribute to their well-being and safeguarding against the COVID-19 pandemic.

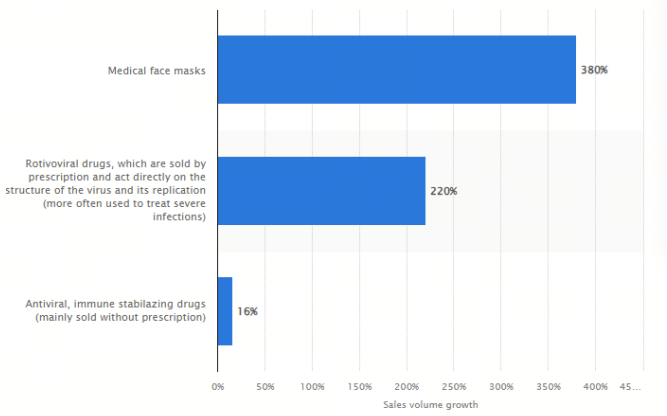

Figure 1: sales volume growth of masks and other things [4]

Based on the Value of Breathing Appliances and Gas Masks Imported to the UK from 2003 to 2022, the importation of masks in the UK was consistently low and stable prior to 2020, with yearly imports not surpassing 1,000,000 units. During the pandemic outbreak in 2020, the United Kingdom experienced a significant spike in mask imports, which were nearly three times higher than that in prior years. By mid-2020, the number of imported masks reached 370,000 units. These findings unequivocally demonstrate a substantial increase in the demand for masks in the UK during the duration of the pandemic.

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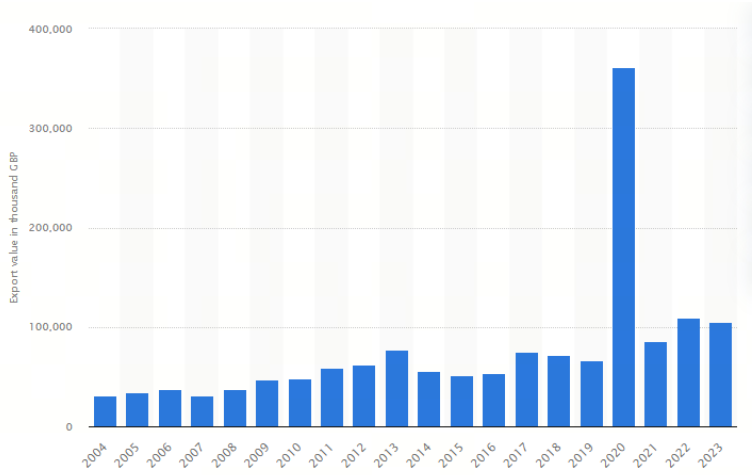

Figure 2: Value of masks imported to UK [5]

2.2. National trend

Having analyzed the mask import and export status in different countries worldwide, this paper will redirect the attention to China in order to comprehend its mask export scenario amidst the pandemic.

The following figure illustrates the trajectory of mask exports from China in 2020. During the year, the figure rose sharply to 224.2 billion units, which represents a sharp rise of the usage of respiratory masks. This substantial volume illustrates the substantial growth in China's mask exports amid the pandemic.

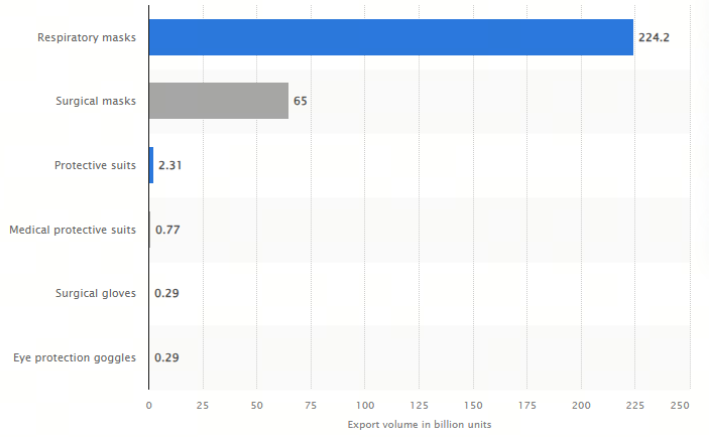

Figure 3: China's mask export volume in 2020 [6]

According to a report by New Delhi Television, China produced over 220 billion masks in 2020. From the pie chart that illustrates the share of exports of face masks by country in 2017, it is evident that before the pandemic, China already accounted for 41% of the world's total mask exports. Based on the previous line chart, we can infer that after the pandemic outbreak, China's mask export share of the global total should be significantly higher than 41%.

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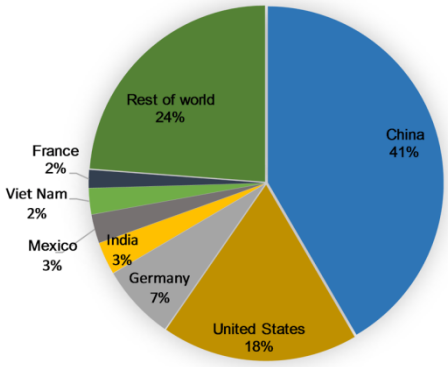

Figure 4: Share of exports of face masks by country in 2017 [7]

3. Data analysis

The Heckscher-Ohlin (HO) model posits that traded commodities can be understood as combinations of inputs of production, namely land, labor, and capital. International commodity trade involves the indirect arbitrage of factors, allowing the movement of immobile factors of production from areas where they are plentiful to areas where they are scarce. In certain situations, this form of indirect arbitrage has the ability to entirely eradicate disparities in factor prices. The HO model suggests that when factor services can be sold internationally through the exchange of commodities, it expands the scope of the market from local to global. Consequently, the demand for inputs that are sourced from other industries becomes more responsive to changes in price, and this responsiveness is also more consistent across different countries [8].

Based on the basic understanding of China, China is a country with relatively abundant labor force, that is, the labor-capital ratio in China is larger than that in developed countries [9]. The mask process is simple, do not need advanced technology, but need a lot of labor resources, so the mask is a labor-intensive industry. In this case, masks are mainly produced in China and exported to most developed countries. From the pie chart, it can be found that relatively underdeveloped countries, such as Africa, exported little or no masks. Learning from the news that, on May 31, 2020, African countries had established a platform to fight the COVID-19, and it would be put into operation in June. By then, Chinese government would provide 80 million masks to the African every month through the platform, which would greatly alleviate the shortage of medical supplies on the African continent, and every African countries would benefit from it. This suggests that China produced masks and exported them to Africa during the COVID-19.

The Ricardian model is a trade theory model that explains the phenomenon of international trade based on the differences in labor productivity between countries. Through the data, China and Africa have a big difference in the production of masks technology.

The fully automatic mask production machine was developed in China during the COVID-19. It can produce 100 masks a minute. In a factory ,there were 3 million masks produced per day. The produced mask is a standard surgical mask that can isolate viruses. While in Kenya, each tailor can produce 120 masks a day, and the entire factory can produce only 8,400 masks a day.

Combining with the Ricardian model, the opportunity cost of producing masks in China is much smaller than that in Africa. Therefore, China has a comparative advantage in producing masks, which is why masks are produced in China and exported to Africa.

According to the Hirschman Herfindahl Index, we can know from this formula that the square of the export volume of masks in the total export volume is 0.0004, which is a very small number. As

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can be seen from the figure 5 and the table 1 below, China's HHI in 2020 was 0.05. The HHI of masks accounted for a very small proportion of the total HHI. so China's exports are not concentrated on masks, which indicates that China's foreign trade is rich even during the COVID-19 and is developing steadily.

$$HH = \sum_{i=1}^{n} \left(\frac{x_i}{\sum_{k=1}^{n} x_i} \right)^2 \quad [8]$$

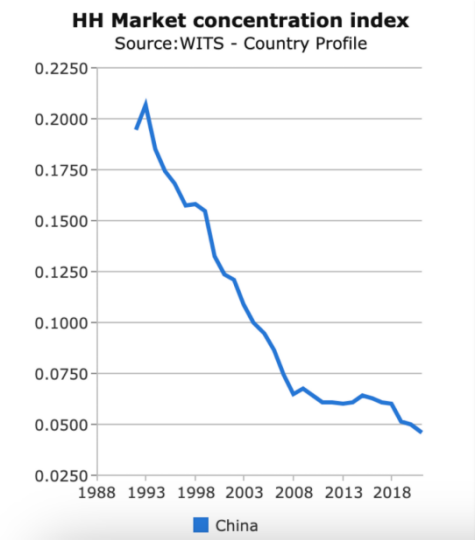

Figure 5: HH market concentration index[8]

Table 1: China's HH index from 2019 to 2021 [8]

Country name	before 2019	2019	2020	2021
China	0.06	0.05	0.05	0.05

4. Conclusion

During the epidemic, the import and export of medical masks has become an important part of international trade. Some countries may face a shortage of medical masks due to the surge in demand caused by the outbreak. At this time, imported medical masks can help meet domestic demand and ensure the normal operation of the medical system. On the other hand, some countries may export medical masks because of their strong production capacity. Through the import and export of medical masks, international cooperation and resource sharing can be achieved to help those regions facing shortages of medical supplies. Such international cooperation not only helps control the spread of the epidemic worldwide, but also reflects the spirit of solidarity and cooperation of the international community.

Without data analysis and field investigation, the arguments in the article mainly refer to existing literature and data, and some places may not be comprehensive and lack their own unique insights. Having experienced the epidemic, medical personnel around the world have been on high alert, the medical level and research and development level of countries have been greatly improved, and there are many friendly co-operations between the international community during the epidemic. It is believed that in the future, if there are such major medical problems, countries will learn from the experience of the COVID-19 outbreak, deal with new problems in a more leisurely manner, and strengthen international cooperation and help to minimize losses.

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References

[1] *Peng, M. (2020). Outbreak of COVID-19: An emerging global pandemic threat. Biomedicine & Pharmacotherapy, 129, 110499.*

[2] *Dong, E., Ratcliff, J., Goyea, T. D., et al. (2022). The Johns Hopkins University Center for Systems Science and Engineering COVID-19 Dashboard: data collection process, challenges faced, and lessons learned. The lancet infectious diseases, 22(12), e370-e376.*

[3] *Wang, P., Ye D., Zheng Z. (2020). The role of masks in preventing novel coronavirus infection and their selection and use. Guangdong Medical Journal, 41(9), 4.*

[4] *Statista. (2024). Sales volume growth of coronavirus (COVID-19) preventive products in Russia from February 17 to March 8, 2020, by type*. https://www.statista.com/statistics/1104626/russia-sales-growth-of-covid-19-preventive-goods/*

[5] *Statista. (2024). Value of breathing appliance and gas masks imported to the United Kingdom (UK) from 2004 to 2023. https://www.statista.com/statistics/517534/breathing-appliances-and-gas-masks-import-value-united-kingdom-uk/*

[6] *Statista. (2024). Export volume of personal protective equipment from China in 2020, by product type. https://www.statista.com/statistics/1269002/china-export-volume-of-medical-protective-equipment/*

[7] *Organisation for Economic Co-operation and Development. (2020). The face mask global value chain in the COVID-19 outbreak: Evidence and policy lessons. OECD Publishing.*

[8] *Leamer, E. E. (1995). The Heckscher-Ohlin model in theory and practice.*

[9] *Tayler, J. B. (1923). Labour and Industry in China. Int'l Lab. Rev., 8, 1.*