

China-EU Rail Freight: Analyzing TEU Traffic on the China Railway Express in 2019-2023

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ABSTRACT

Since its launch in 2011, China Railway Express has annually increased the number of trains and volume of cargo transported along the China-Europe-China route, and was originally conceived as a land bridge between China and Europe. Trade relations between China and Europe play a crucial role in international economic development, and the development of China Railway Express is important for strengthening economic ties between China and Europe, offering diversified freight transport options, with delivery times shorter than sea freight and cheaper, than air freight. In recent years, the growth rate of China Railway Express's main indicators has slowed down slightly, which may be due to the limited capacity of the main ports, as well as the global challenges that global logistics has faced in recent years due to the covid-19 epidemic, trade wars, sanctions and the unstable geopolitical situation in the world. In the literature, much attention is paid to the general indicators of China Railway Express and individual new routes, but there are practically no detailed statistics on specific directions of China Railway Express traffic to EU countries. Instead of the EU, general data is usually provided for the direction of Europe, which, in addition to the EU countries, also includes Russia, Kazakhstan and other countries along the Belt and Road that are not members of the EU. The purpose of this article is, based on a comparison of data from different statistical sources, to find out what volume of cargo transported along the China-EU-China route via China Railway Express and how this amount has changed since 2019. It turned out that, for example, the covid-19 epidemic did not negatively affect the volume of cargo transported along the China-EU-China route, however, starting in 2022 and after the imposition of sanctions against Russia, the main transit country for China Railway Express, the volume of cargo transported on the China-EU-China route decreased sharply, which, however, did not affect the overall freight traffic of China Railway Express, since the declining freight traffic to the EU was promptly redirected to Russia and other countries along the Belt and Road.

Keywords: China Railway Express, China-EU Rail Freight, EU sanctions against Russia, international trade and logistics, logistics management

INTRODUCTION

China-Europe Freight Trains, also known as China Railway Express, are overland freight transport routes between China and Europe. It connects many cities in China and Europe through railways and is an important trade and logistics bridge between China and Europe. China-Europe trains are international container trains operating between China and Europe, as well as countries along the Belt and Road. Container and other international railway intermodal transport trains operating between China and Europe, as well as countries participating in the Belt and Road, are an important carrier for deepening economic and trade cooperation between China and countries along the route, and an important starting point for the promotion of construction "Belt and Road". Development of China-Europe freight trains began in 2011. The earliest of these was the "Chongqing-Hamburg freight train". Since then, the China-Europe train network has continued to expand, connecting many Chinese cities with major European cities. China-Europe train route coverage continues to expand and currently connects more than 30 cities in China and more than 80 cities in more than 20 European countries. As a unique land logistics model, China-Europe freight trains are playing an increasingly important role in global trade. Its development is not only influenced by geopolitics and trade relations, but is also closely linked to the evolution of global logistics and supply chains. In the future, China-Europe trains are

expected to continue to play an important role in the new international trade model and inject more vitality into economic cooperation between China and Europe.

LITERATURE REVIEW

In the scientific literature, issues related to the China Railway Express have been studied very little by scientists from Europe. In academic circles, this topic is mainly developing due to the interest of researchers from China, for example, Li [1] notes that China Railway Express provides a new transport platform for China-Europe trade. The sustainable development of China Railway Express is of great importance in terms of promoting the growth of trade between China and Europe and meeting the demand for freight transport in Asia and Europe. Khoi [2] writes that China Railway Express is now seen as an important indicator of progress in achieving the goals of the Belt and Road Initiative and has the potential to become the most sustainable mode of long-distance transport. As the Eurasian trade and logistics environment changes, China Railway Express will become increasingly important as a third option to complement air and sea transport, while demand among shippers for China Railway Express services continues to grow. Among the publications, special attention is paid to the environmental agenda. For example, Qiu [3] writes that against the backdrop of global “carbon neutrality,” China Railway Express is contributing to the long-term development of low-carbon environmental protection while promoting economic growth. He [4] examined the unintended impact of China Railway Express's policy on reducing carbon emissions due to its promotion of industrial development, notes that China Railway Express can attract or stimulate new export-oriented industries, creating new profitable export opportunities and increasing access to European markets. Wang [5] writes that the empirical results show that China-Europe express rail can significantly improve the overall performance of urban green factors.

Another set of issues explored within the framework of China Railway Express is the development of China's railway network and the influence of China Railway Express on the development of cities located along the Belt and Road. Yin [6] as part of the study constructed a geographical railway network and studied how the indices of the characteristics of this network changed. Qian [7] illustrated the structural and spatial evolution of the China Railway Express network by using overall network structure indices (average degree, average path length, and average clustering coefficient) and node importance indices (degree centrality and betweenness centrality) in the networks. Hu [8] writes that countries' economic growth levels have been proven to be positively correlated with their foreign direct investment in China. He also concludes that the opening of China Railway Express brought mutual benefits, resulting in a win-win situation. Chen [9] writes that China Railway Express's practice towards high-quality development has been deeply studied on the basis of mutually beneficial joint construction. Yang [10] addresses the topic of Covid-19 in his work. He notes that during the Covid-19 epidemic, traditional transport channels such as sea and air transport have been seriously affected, while China Railway Express's volumes and product mix have grown against the trend.

Some China Railway Express researchers write about the problems of bottlenecks on the route, insufficient container loads, as well as geopolitical events in recent years and other problems. Thus, Liu [11] writes that the process of globalization has encountered obstacles: the growth of regional conflicts and unforeseen events, which creates even greater problems for global cooperation. In particular, transport bottlenecks impede international economic and trade activities and put significant pressure on economic recovery. Zhao [12] writes, China Railway Express faces problems such as insufficient cargo, low load factor and low profitability. Benard [13] examines the trajectory and future prospects of China Railway Express, a container rail freight service between China and Europe, and examines the associated infrastructure investment needs for expanding Eurasian freight services and believes that China Railway Express's growth potential faces obstacles in the form of infrastructure constraints and operational challenges.

In connection with the geopolitical events of the last few years, some researchers have become seriously concerned about the problem of route diversification and point to the need for the rapid development of alternative China Railway Express routes bypassing Russia. Zhang [14] in his article analyzes the work of China Railway Express after the conflict between Russia and Ukraine, exploring unresolved problems. As a solution, it proposes the development of new international transport routes, accelerating the formation of key infrastructure connections, the development of integrated transport and public trains and other transport

methods, promoting investment, strengthening international cooperation mechanisms and other aspects to provide a basis for improving stability and risk resilience China's international transport route.

In research articles on the topic of China Railway Express, the authors do not focus on statistics on specific destination countries of China Railway Express in the EU, but use publicly available general statistics of China Railway Express, which usually includes general data on the direction as cargo destinations instead of EU countries Europe, which, in addition to the EU countries, also includes Russia, Kazakhstan and other countries along the Belt and Road that are not members of the EU. However, in scientific publications, all attention is focused on cooperation between China and EU countries, for example, with Germany, while, as this study showed, most of the China Railway Express trains do not reach the EU, and their destinations are usually the EAEU countries, primarily Russia. Unfortunately, detailed statistics on the European countries where China Railway Express cargo are transported are not available in open sources.

Comparative analysis

China Railway Express has been growing year after year in both the number of trains and the volume of TEUs.

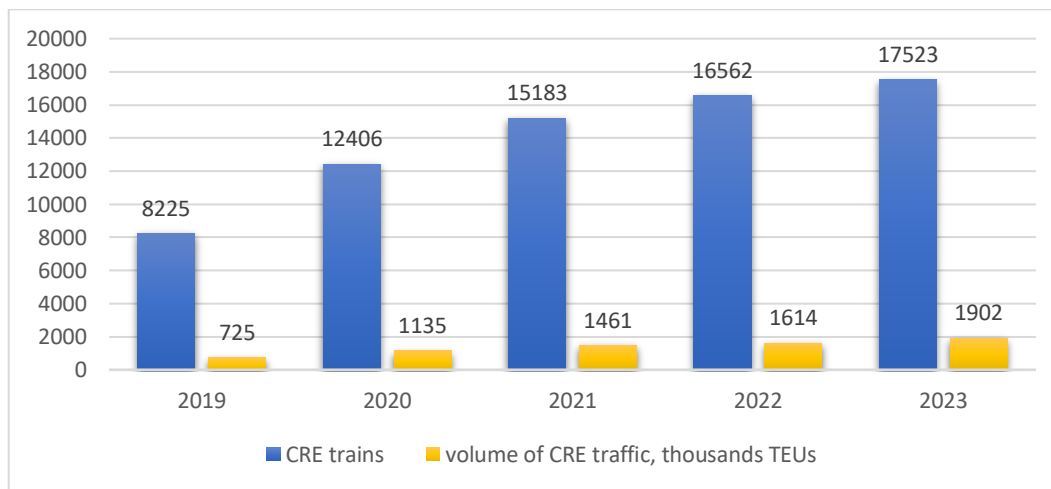


Fig. 1. Trains and the volume of China Railway Express traffic in 2019-2023. Source: CRCT.

As can be seen from the statistics shown in Fig. 1, the development of China Railway Express and the traffic in the direction China - Europe - China was not hindered by the covid-19 epidemic of 2020-2021, nor geopolitical changes in recent years, nor indirect sanctions that were imposed against Russia and Belarus, from the EU and the USA for the military actions of these countries against Ukraine. However, the main railway freight flows of China Railway Express heading to the EU transported by the territory of Russia and Belarus and to find out exactly how these factors affected the flow of cargo from China to the EU and back, that general statistics is not enough. Without detailed statistics of the EU countries of destination of the China Railway Express, the question of what volume of cargo is transported by the China-EU-China route out of the total volume of cargo transported by China Railway Express, can be answered using the statistics of the EAEU countries through which the main routes of China Railway Express pass.

China-Europe freight trains have formed an extensive network, including the Western Route, Central Route, Eastern Route and Southern Route or Trans-Caspian International Transport Route, which has been developing very actively in recent years. All of these routes pass through the territory of the EAEU. The development of the Southern route is intended to redirect part of the cargo heading to the EU, as well as expand the geography of the Belt and Road countries.

The southern route passes through the territory of Kazakhstan, the Caspian Sea, Azerbaijan and Georgia. This route is still underdeveloped, and its capacity leaves much to be desired. Cargos passing through this route need take more time to reach EU countries, then using other routes, however, this route is currently not as exposed to geopolitical risks as all other routes.

Following the Eastern route, China Railway Express first passes through the coastal regions of China, and then through the port of Manzhouli - Zabaykalsk enters Russia.

Trains of the Central Route pass through the Chinese port of Erehot, then enter Mongolia, and then through the Russian port of Naushki get to Russia, and from there they continue on their way to Europe.

Cargos transported by the Western route passes through the Chinese ports of Alashankou and Khorgos. Through them, cargoes first enter the Kazakh ports of Dostyk and Alatynkol, respectively, and then through the territory of Kazakhstan they enter Russia.

According to the Eurasian Rail Alliance [15], which unites rail carriers from Kazakhstan, Russia and Belarus and is the leading rail operator in the field of transit transportation of containers in the China-Europe-China route on the territory of the EAEU member states, the Western route has been the main route for transportation for many years in the direction China - EU - China, surpassing all other routes in terms of traffic volume by several times. Over the past years, the share of cargo in the China-EU-China direction following this route ranged from 82 to 95.8 percent of the total volume of cargo transporting along the China-EU-China route, as it shown in Fig. 2.

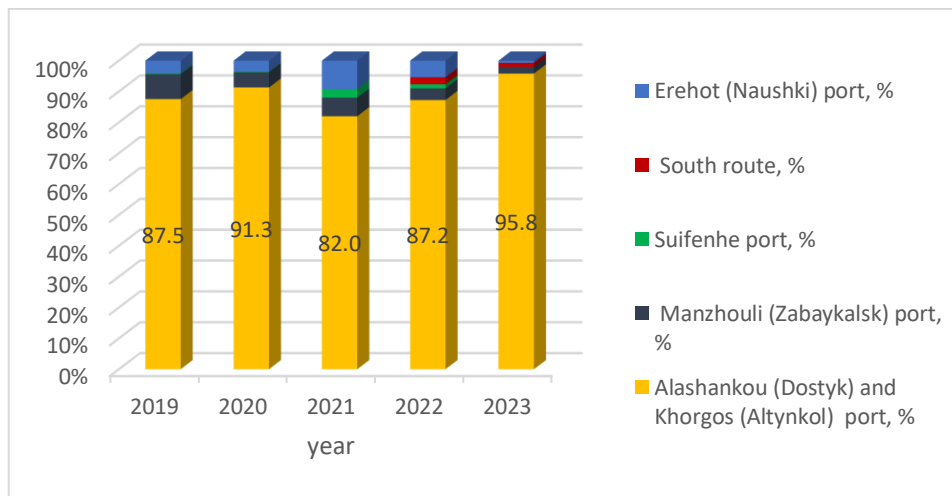


Fig. 2. China-EU-China TEU flow through the main transit ports and routes in 2019-2023. Source: ERAI Eurasian Rail Alliance Index.

If look in detail at the volume of TEUs transported along the China-EU-China route and passing through the ports of Dostyk (Alashankou) and Altyntkol (Khorgos), it is easy to notice an obvious downward trend that began in 2022, and already in the next 2023 the volume of TEUs , transported through the ports of Dostyk (Alashankou) and Altyntkol (Khorgos) in the China-EU-China direction amounted to only 211,110 containers, which is the lowest figure over the past five years, as it shown in Fig. 3.

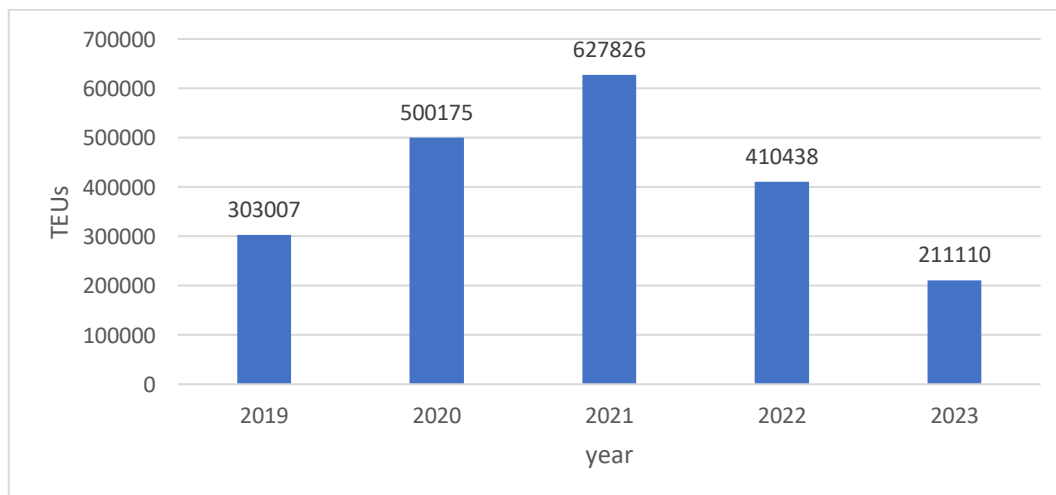


Fig. 3. volume of TEUs passing through Dostyk (Alashankou) and Altyntkol (Khorgos) ports on the route China-EU-China in 2019-2023. Source: ERAI Eurasian Rail Alliance Index.

Until 2022, the volume of containers transported on the China-EU-China route increased every year, although by 2021 the growth slowed down, which was most likely due to the limited capacity of the port of Malashewiche (Poland), through which the vast majority of cargos passes in the China-EU-China direction, in connection with which the question arose about the need to increase the capacity of this port and more active development of alternative ports and routes. Figure 4 shows the dynamics of changes in the volume of cargo transported through the ports of Dostyk (Alashankou) and Altynkol (Khorgos) in the China-EU-China direction, in the base year compared to the previous year. As can be seen from Fig. 4, in 2021 the volume of cargo in this direction continued to grow, however, the growth rate was significantly lower than last year, but by the end of 2022 a sharp drop began, which continued in 2023, but with even greater pace, as a result of which, in 2023, the volume of transported cargo in the China-EU-China direction decreased by almost half compared to the previous year.

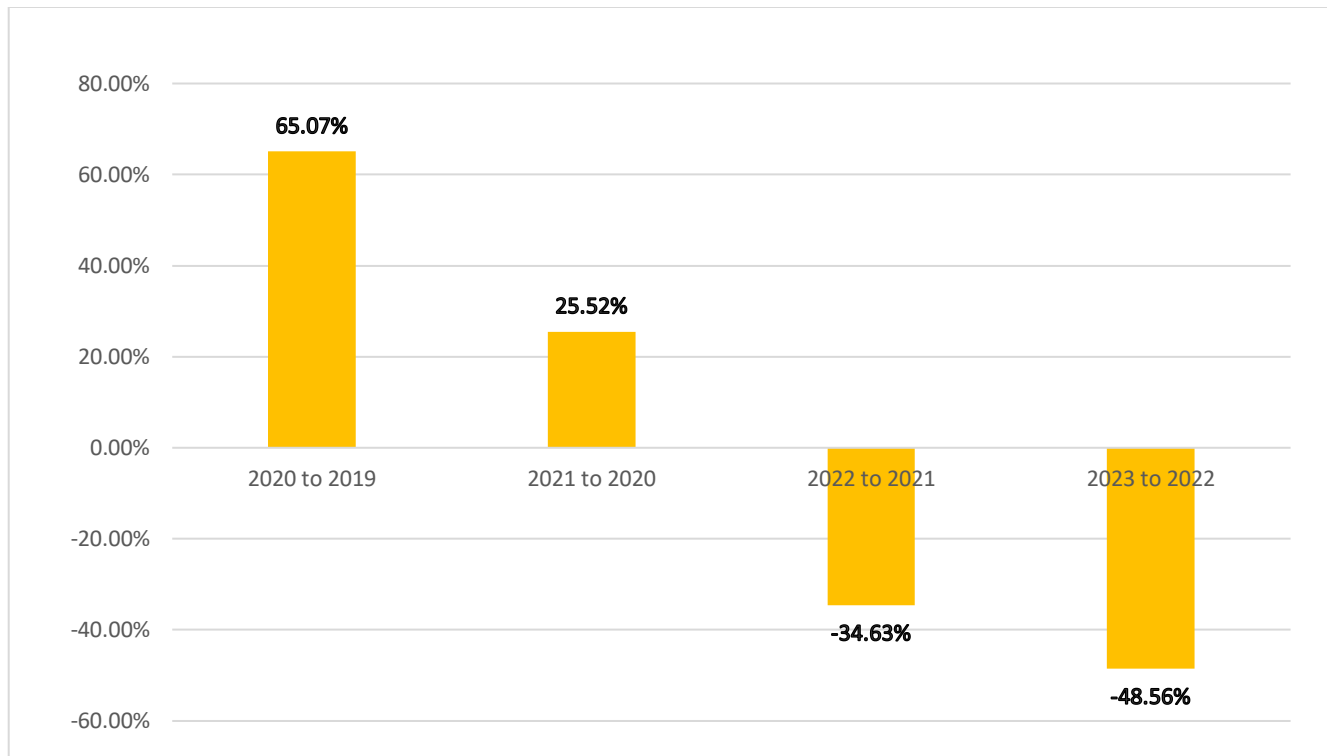


Fig. 4. growth rate of the volume of TEUs passing through the ports of Dostyk (Alashankou) and Altynkol (Khorgos) passes along the China-EU-China route in the base year to the previous year, %. Source: author's calculations.

To answer the question of what volume of TEUs passes along the China-EU-China route from the total amount of cargo transported by China Railway Express, the comparative analysis method can be used. Compare the general statistics of China Railway Express and more detailed statistics of the Eurasian Rail Alliance. The results of this analysis are presented in Fig. 5. From this Figure it can be seen that the share of trains going in the China-EU-China direction in the total share of China Railway Express in 2019-2021 remained almost unchanged and amounted to approximately 50%, that is, with the development of China Railway Express and as the number of trains and cargo transported by China Railway Express increased, the volume of cargo transporting along the China-EU-China route also increased in parallel. However, from 2022 this picture began to change significantly - China Railway Express freight turnover continued to grow, while far fewer volume of cargo began to move from China to the EU and from the EU to China along rail routes than before. This is primarily due to EU sanctions against Russia [16], including sanctions against the state company Russian Railways, which carries out cargo and passenger transportation across Russia, including transit transportation along the China-EU-China route, as well as restrictions on the transit of dual-use cargos through Russian territory and other sanctions and restrictions. In Figure 5 can be seen that in 2022, the share of cargos in the China-EU-China direction amounted to 29.1% of the total volume of cargo transported by China Railway Express in 2022, while last year 2021 this share was 52.4%. In 2023, this share decreased even more - to 11.6% of the total volume of cargo transported by China Railway Express.

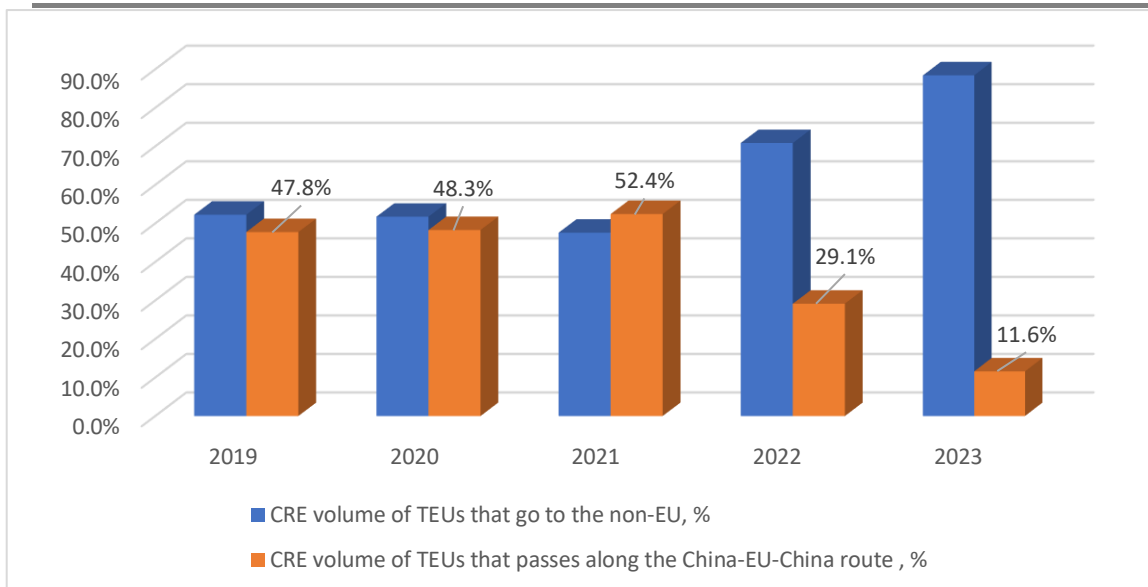


Fig. 5. share of CRE that passes along the China-EU-China route and CRE that goes to non-EU countries, %. Source: author's calculations.

CONCLUSIONS

As can be seen from the Figure 5, in 2023, more than 88% of TEUs transported by China Railway Express were destined for non-EU countries such as Russia, Kazakhstan, Belarus and other countries along the Belt and Road. By imposition of sanctions restrictions against Russia in 2022, EU countries also significantly limited the import of their goods to the Russian market, and therefore Russian imports and exports were redirected towards China, ensuring the loading of the China Railway Express. Thanks to this, even despite such a rapid drop in the number of TEUs transporting by the China-EU-China route, overall China Railway Express continues to increase the number of trains and the number of TEUs transported every year, thereby demonstrating that it is a very sustainable structure that responds flexibly to various global challenges and continues to develop; it is a good reliable alternative to sea or air transportation. However, despite all the positive signals, it is worth noting that the development of China Railway Express is becoming increasingly dependent on Russia. At first, this dependence was limited only by the fact that Russia was the main transit country for the transporting of cargos along the China-Europe-China route, but now it has also become the main destination country for these cargos. The development of alternative routes, mainly in the southern direction, where the transit country for China Railway Express will not be Russia, is somewhat late in time, but this is an area in which everyone needs to work more actively in the near future in order not to lose the railway transportation market in the China-EU direction, whose share in recent years has already dropped to a critically low level of 11.6%.

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