

RAIL CONTAINER TRANSPORTATION IN THE EURASIAN SPACE IN 2023



Contents

——	Brief Review: Stabilize and Grow	2
——	Summary	3
——	Mutual trade and the state of the freight market	4
	Decelerating EU — China trade.....	4
	Rail and sea freight rates: stability vs. volatility.....	5
——	The State of the Eurasian railway route in 2023	8
	Key traffic indicators and maintaining overall volumes.....	8
	The route's freight base and continued progress towards achieving full capacity.....	12
	Transforming the geography of transportation.....	16
——	Outlook for 2024	20

BRIEF REVIEW: STABILIZE AND GROW

The Eurasian rail container transport industry is evolving in response to a more complex landscape, shaped by heightened international political tensions. This adaptation to the new circumstances became particularly evident in 2023, as Eurasian railway routes navigated these challenges. Growing competition from maritime shipping services was another important factor. Deep sea freight rates remained below those of rail, making maritime transportation much more appealing. Still, rail freight has retained its core advantages, including consistent pricing, shorter delivery times and stable schedules.

Despite the fluctuating and uncertain external conditions, container traffic on the Eurasian railway corridor¹ in 2023 totaled 674 thousand TEUs, down just 1.1% compared to 2022. The fact that this volume has been maintained is attributable to higher traffic bound for the Eurasian Economic Union (EAEU), specifically the traffic from China to Russia and Belarus, offsetting the drop in freight volume in the China — Europe — China transit segment. Thus, the Eurasian corridor has been effective in overcoming external challenges.

In 2023, the rail freight sector further asserted its environmental efficiency as an unquestionable advantage. This climate-smart alternative remains relevant not only in Europe, but also in China, especially considering the trend towards decarbonization. The ERAI portal features a [CO₂ Counter](#) for better illustrating this strong advantage.

Most of the changes in trade relations stemmed from the deteriorating international and political environment, which impacted countries involved in rail transportation. However, the market is clearly on the path to adapting to present-day realities by reasserting the flexible nature of rail container services. Moreover, the sector has succeeded in maintaining freight transportation volumes compared to 2022. Higher freight transportation volumes within the China — EAEU — China freight service segment have offset the temporary drop in demand in Europe and China. Overall, this had a positive effect on Eurasian rail container transportation.

¹ The Eurasian rail corridor(route), a key artery along the East-West trade axis, passes through Kazakhstan, Russia, and Belarus (so it is not to be confused with the Trans-Siberian route). This vital link connects Europe with China via rail and has recently become increasingly important for facilitating trade between Russia, Belarus, and China. Primarily managed by UTLC ERA, the corridor serves as a crucial channel for goods moving between these regions.

SUMMARY

- 1.** Over the past year, freight traffic on the Eurasian railway transit corridor totaled 674 thousand TEU, down 1.1% compared to 2022. Transit traffic within the China — Europe — China freight services segment dropped by 49%, from 410.6 thousand TEU to 211.1 thousand TEU, while the development of other segments within the EAEU kept overall container shipping volumes steady, mainly driven by the growing export and import traffic between China and Russia/Belarus.
- 2.** In 2023, the Eurasian rail route transported goods totaling \$35.3 billion, with China — Europe — China freight transit of \$15.9 billion accounting for around 2.1% of the total annual trade between China and the EU.
- 3.** In Q1-Q3 2023, EU-China trade dropped 10% to \$671.7 billion, while the share of EU exports to China increased by 3 points, in terms of value, to 27% compared to the same period of the previous year. The balance of EU-China trade complicated efforts to balance freight traffic, even if the share of empty containers remains low at 6%.
- 4.** Over the past year, the WCI, a composite index representing ocean freight rates across various trade routes, experienced a decline, moving from an average of \$2,086 per FEU in January to \$1,682 per FEU in December. Ocean freight rates remained volatile with monthly fluctuations sometimes reaching 17%. At the same time, the ERAI index, used to measure the cost of transporting a container within the 1520 mm gauge railway network from one border to another, remained stable at \$3,057 per FEU.
- 5.** The average transit time for China — EU — China freight rail service increased compared to 2022, adding one day and reaching 7.51 days, while the average train speed dropped to 729 km/day. Average train occupancy hit a six-year high at 124 TEU. Despite the decline in speed, the railway still maintains a considerable transit time advantage compared to deep sea.
- 6.** Over the past year, the share of laden containers on the trans-Eurasian route dropped by 2 ppt to 94%, while for eastbound traffic this indicator came in at 92%, up 2.6 points compared to 2022, which presents the biggest challenge in terms of balancing freight transport.
- 7.** In 2023, the Eurasian rail route transported goods across 88 HS-2 classifications. Three main cargo types, namely mechanical equipment, electronics and automotive equipment – accounted for about 43% of the freight traffic, which means that the route's freight base was stable and immune to momentary fluctuations.
- 8.** The main points of departure and termination along the transit route were located in Germany and in western and central parts of China. Shipments from the EU to China accounted for 32.1% of total China-Europe-China container traffic, with Duisburg, Mannheim and Hamburg serving as the main hubs. Consequently, traffic from China to the EU accounted for 67.9% of volumes in this particular segment, with freight mainly originating in Xi'an, Chongqing and Chengdu.
- 9.** The Eurasian route crossing Belarus, Kazakhstan and Russia retained its lead among rail routes ensuring the China — EU — China freight service. Judging by statistics collected at the border crossings in 2023, the Eurasian route (Dostyk, Altynkol border crossings) accounted for 96% of container traffic.

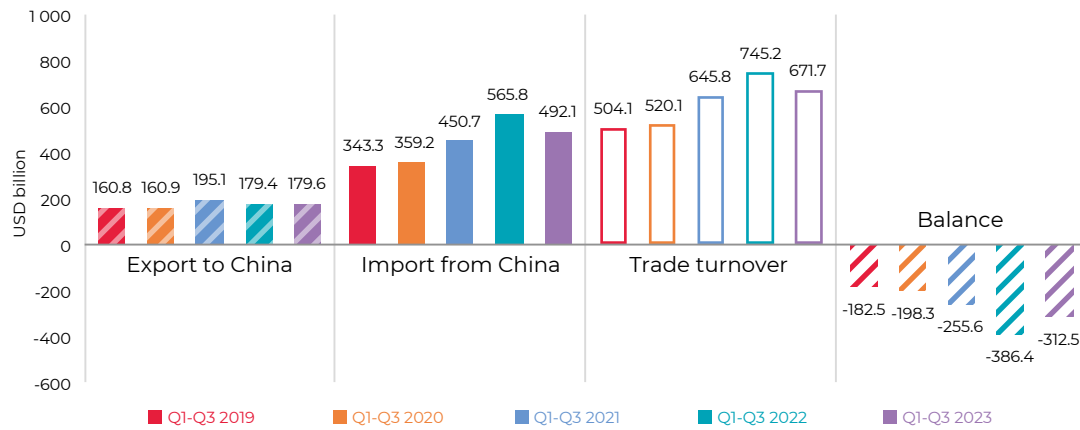
MUTUAL TRADE AND THE STATE OF THE FREIGHT MARKET

Decelerating EU — China trade

Trade between the European Union and China forms the backbone of international commerce and largely defines the operation of trans-Eurasian rail routes. The way their bilateral trade evolves determines the freight base and the balance of trans-Eurasian cargo flows.

In the first three quarters of 2023, cumulative trade between the EU and China totaled \$671.7 billion, down 10% or about \$73.5 billion year-on-year. EU exports to China were \$179.6 billion (-0.1%) and imports totaled \$492.1 (-13%). Therefore, China's trade surplus decreased by 19% compared to the same period in 2022 to \$386.4 billion. The EU's imports from China remained the main driver in their bilateral trade, so much so that slowing import growth results in a lower growth rate in trade turnover. However, positive dynamics continue to characterize bilateral trade, which will result in further expanding the freight base for Eurasian rail transit services.

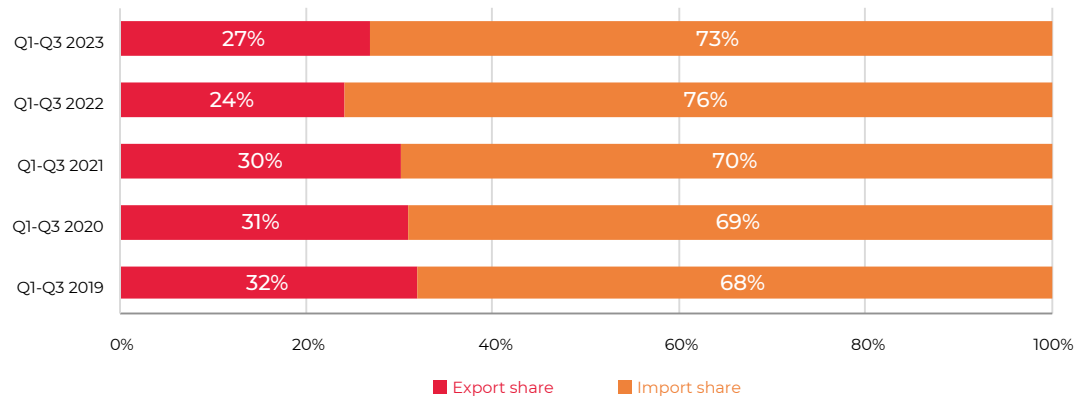
EU-27 MUTUAL TRADE WITH CHINA: Q1 - Q3



Source: Authors' calculations, based on International Trade Center (ITC) data

At the same time, the EU's deficit in trade with China makes it harder to balance freight traffic between the two, since there is more cargo heading from China to the EU than in the opposite direction. In Q1-Q3 2023, the EU reported a trade deficit of \$312.5 billion, down 19%. In 2022, EU exports accounted for 24% of bilateral trade, but in 2023 this share increased to 27%, while the share of EU imports dropped by 3 ppt to 73%. In terms of logistics, this may lead to a gradual decline in the share of empty containers in transit between the EU and China.

EU-27 EXPORT/IMPORT RATIO IN TRADE WITH CHINA



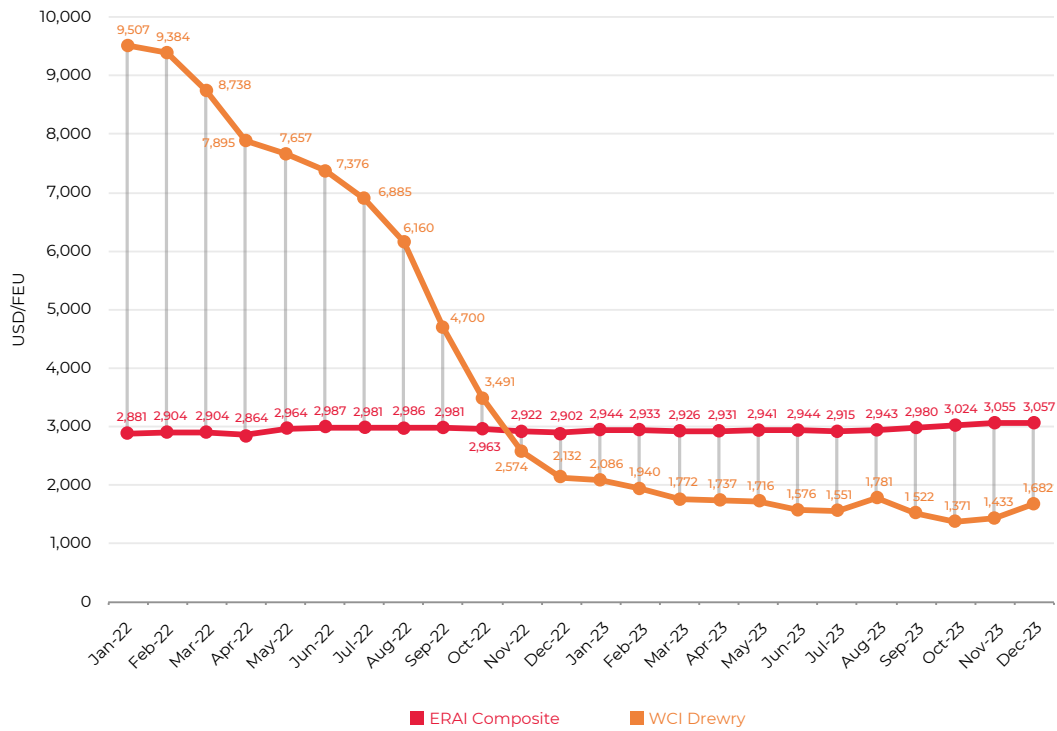
Source: Authors' calculations based on International Trade Center (ITC) data

Rail and sea freight rates: stability vs. volatility

Rail transportation enjoyed an uncontested advantage over maritime shipments between late 2020 and the middle of 2022 in terms of transportation costs. Moving a container by rail between China and the EU back then would cost almost three times less than maritime shipping. Nevertheless, in the second half of 2022, maritime transportation reclaimed its lead for the most cost-effective way to ship a container.

In 2023, the ERAI index, which measures the cost of transporting a container within the 1520 mm gauge railway network from border to border, remained stable at about \$2,900 per FEU, with monthly fluctuations not exceeding 1.5%. The index peaked in December 2023 at \$3,057 per FEU, while it was at its minimum of \$2,915 per FEU in July 2023.

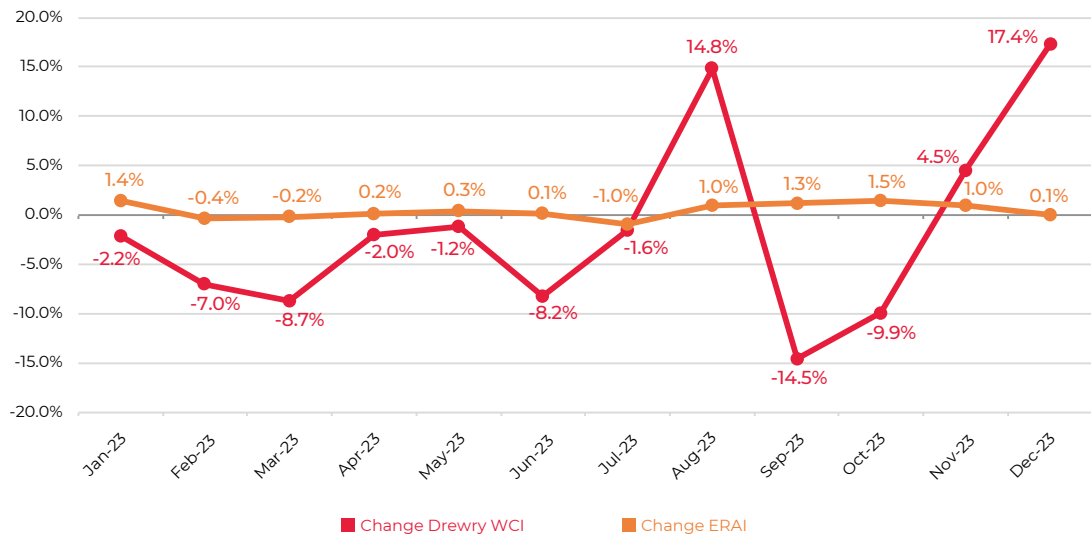
ERAI COMPOSITE AND WCI DREWRY INDICES IN 2022 AND 2023



Source: ERAI index portal, Drewry

At the same time, the WCI composite index was much more volatile with monthly fluctuations reaching 17%. With demand stagnating against the backdrop of growing supply, sea shipping rates gradually declined throughout 2023 from \$2,100 per FEU in early January down to about \$1,340 per FEU by late October, which is a 40% decline. Last summer, ocean carriers attempted a General Rate Increase (GRI), which failed to produce any lasting effect, and rates continued to decline. That said, there were major fluctuations at the end of 2023 caused by the dramatic events in the Red Sea. In mid-November, the Houthi rebels in Yemen announced their intention to target any Israeli vessels navigating through the area, leading to the targeting of numerous ships in the vicinity of the Bab al-Mandab Strait during November and December. This included container vessels operated by major shipping companies such as Maersk and Hapag-Lloyd. Against this backdrop, major ocean carriers decided to temporarily stop using the Suez Canal and redirect their ships around the Cape of Good Hope. Therefore, it was expected that carriers would raise their rates in response, culminating in a gradual uptick in spot freight rates in December. The WCI reached \$1,661 per FEU in the final week of December.

DYNAMICS OF ERAI AND WCI DREWRY RATES IN 2023



Source: ERAI index portal

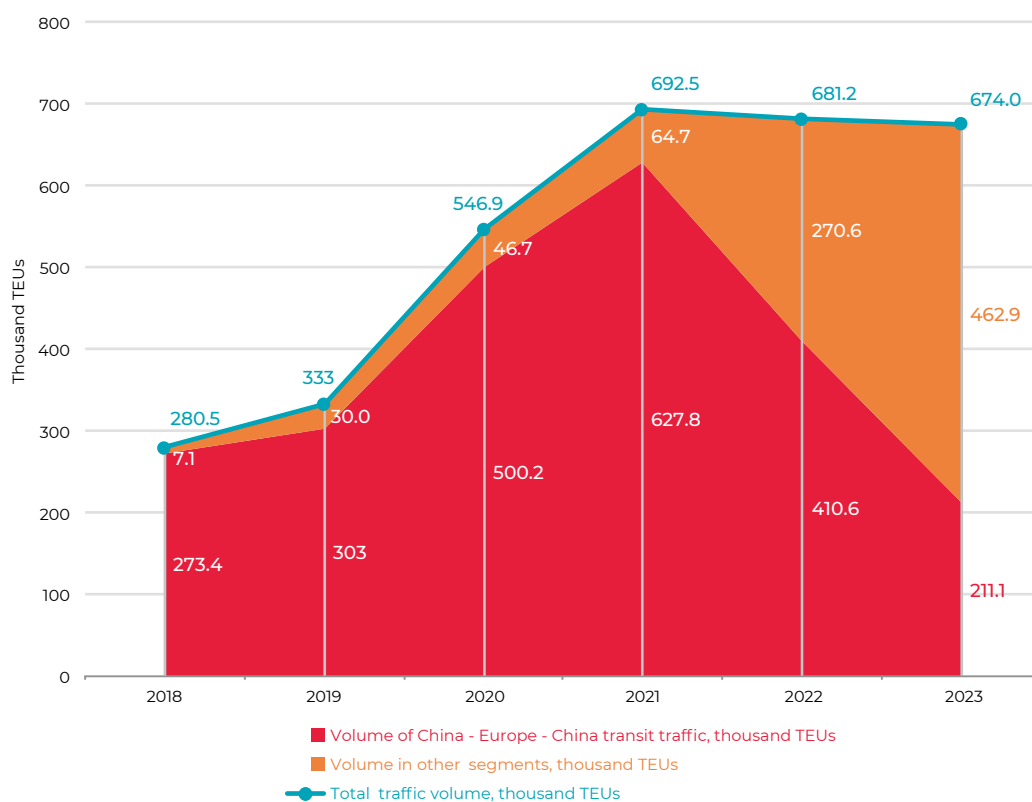
A gap averaging \$1,000 per FEU between rail and maritime transportation rates persisted throughout 2023, which had a negative impact on Eurasian rail volumes. In fact, it was the sharp increase in maritime shipping rates that forced consignors to consider rail as a reliable and stable alternative. However, the surge in maritime shipping rates and the upward trajectory they have been following in 2024 on the back of the disruption in maritime shipments via the Red Sea could serve as an additional impetus and create an incentive for consignors to opt for rail transportation again.

THE STATE OF THE EURASIAN RAILWAY ROUTE IN 2023

Key traffic indicators and maintaining overall volumes

In 2023, freight traffic on the Eurasian railway route totaled 674 thousand TEUs, down 1.1% compared to 2022, when this indicator stood at 681 thousand TEUs. Transit traffic volumes for the China — EU — China freight segment dropped 49% from 410.6 thousand TEUs to 211.1 thousand TEUs, while the development of other transit segments within the EAEU kept overall container traffic volumes steady, mainly driven by the growing export and import flows between China and Russia/Belarus.

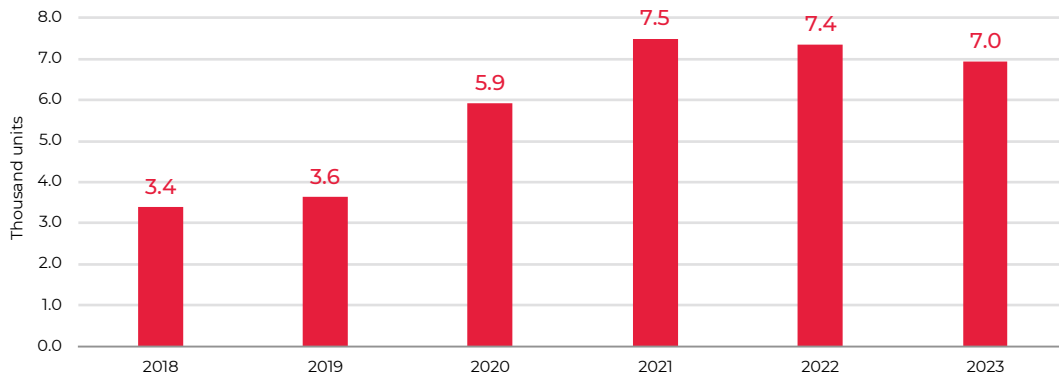
TOTAL FREIGHT TRAFFIC VOLUMES IN 2023 BY SEGMENT



Source: Authors' calculations

The total number of container trains dropped by 5% to about 7 thousand in 2023, which is attributable to the economic situation and competition from sea shipping. Transits by Chinese and European consignors account for an important share of Eurasian freight rail volume, even though it was the diversification of services which helped maintain traffic volumes at a relatively high level.

NUMBER OF CONTAINER TRAINS IN THE EAST — WEST — EAST SEGMENT



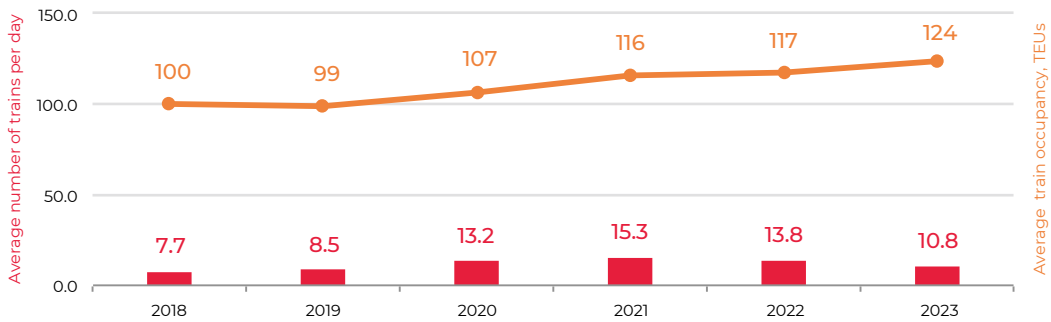
Source: Authors' calculation

In 2023, the daily number of trains on the route declined to 10.8, down from 13.8 in 2022, while the average container train load during the same period increased from 117 to 124 TEUs. This result can be attributed to improved efficiencies when marshaling container trains.

The approach to better use of train capacity consists of aggregating several freight trains within the 1520 mm gauge network, as well as improving efficiency when utilizing the throughput and the capacity of the infrastructure. The average number of trains per day marshaled outside the 1520 mm gauge network, primarily in China, offers a telling example in this respect. In 2023, this indicator was equal to 19 trains per day.

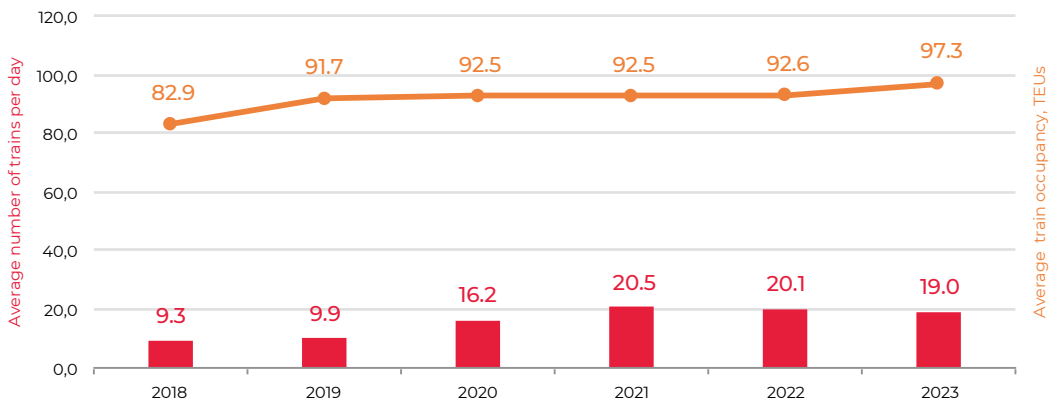
For example, when two trains arrive in Kazakhstan from China, on the 1435 mm gauge network, the loads are transferred into a single 1520 mm gauge train (a «two into one» and «three into two» train approach), thus streamlining logistics. This approach not only helps attract additional traffic to the China — Europe — China segment, but also reduces the burden on the rail infrastructure. In addition, this solution helps optimize train schedules, reduces the need to expand the railcar fleet and increases throughput capacity at the border crossings.

AVERAGE NUMBER OF TRAINS PER DAY AND THEIR LOAD, TEU (TRAINS BUILT WITHIN THE 1520 MM GAUGE NETWORK, INCLUDING TRAINS AGGREGATION)



Source: Authors' calculations

AVERAGE NUMBER OF TRAINS PER DAY AND THEIR LOAD, TEU (TRAINS BUILT OUTSIDE THE 1520 MM GAUGE NETWORK)



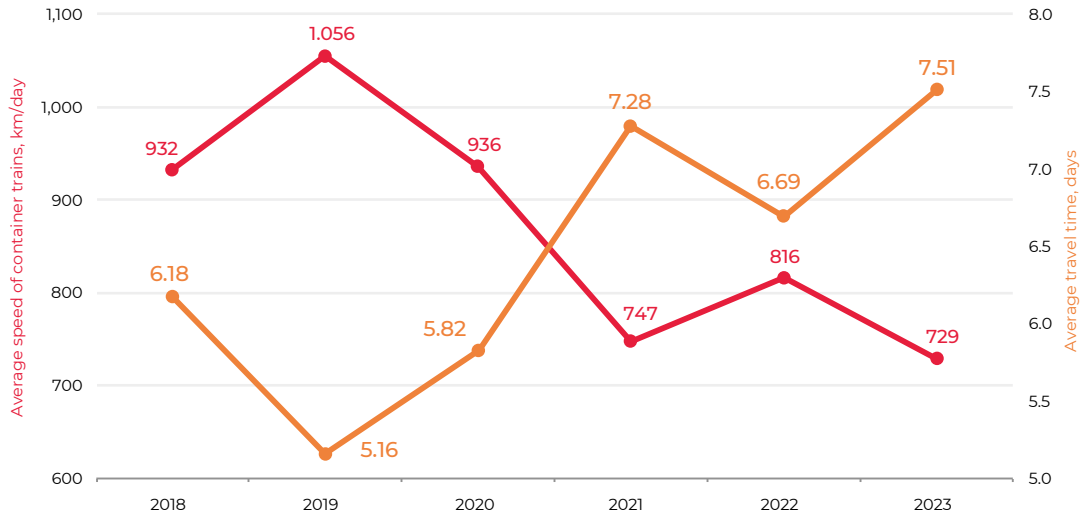
Source: Authors' calculations

The growing burden on the 1520 mm gauge network infrastructure can be attributed to economic and foreign policy factors, coupled with high freight volumes along the Eurasian rail route. Taken together, these factors have caused a slight decline in the average speed of container trains, extending their average transit time.

Transit times for container trains experienced a mix of divergent trends over the past five years: average transit speeds improved in 2018 — 2019 to 1,056 km/day. In 2019 — 2021, this indicator dropped to 747 km/day against the backdrop of a sharp increase in the volume of transported goods during the COVID crisis. The situation seemed to have stabilized in 2022 at an average speed of 816 km/day.

However, the situation changed again in 2023 when the average progress for container trains fell from 816 km/day in 2022 to 729 km/day, with the time spent on the Eurasian route averaging 7.51 days in 2023, up one day compared to 2022.

SPEED AND TRANSIT TIME FOR THE CHINA — EUROPE — CHINA FREIGHT SERVICE



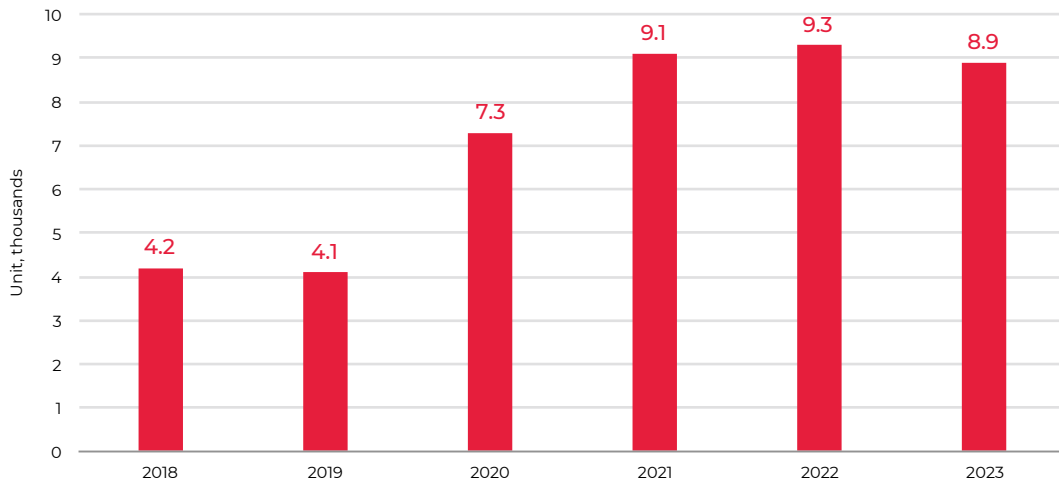
Source: Authors' calculations

Slower transit times across EAEU territory can also be explained by the fact that its infrastructure has been facing excessive loads all while undergoing upgrades. Upgrade projects on the Dostyk-Moyinty section and the limitations of transit capacity along the Dostyk-Elimai/Ozinki/Kanisai route affected train speeds. However, once the upgrades are completed in 2025, this section's throughput capacity is expected to increase from 12 to 60 freight trains per day. This way, new infrastructure will help the main China — Europe — China transit corridor increase throughput capacity through the territory of Kazakhstan. The efforts to introduce digital technology and streamline customs clearance procedures will also help improve transit times.

Despite these infrastructure-related challenges, the commitment by the governments of EAEU member states and their rail authorities to increase transit volumes and streamline freight transportation while reducing customs and administrative barriers in the long-term will help overcome the current challenges. In addition, slightly longer delivery times by rail cannot be compared to the delays in maritime shipments. Russia, Belarus and Kazakhstan signed a memorandum stating their commitment to harmonize the transport and logistics potential for rail transportation across EAEU countries.

Higher technical efficiencies on the Eurasian rail transit route helped reduce the need to increase the railcar fleet. For example, aggregating container trains while maximizing efficiency can be an effective solution. In 2023, the number of railcars used decreased by 4% to 8.9 thousand.

FLEET OF WAGONS IN SERVICES



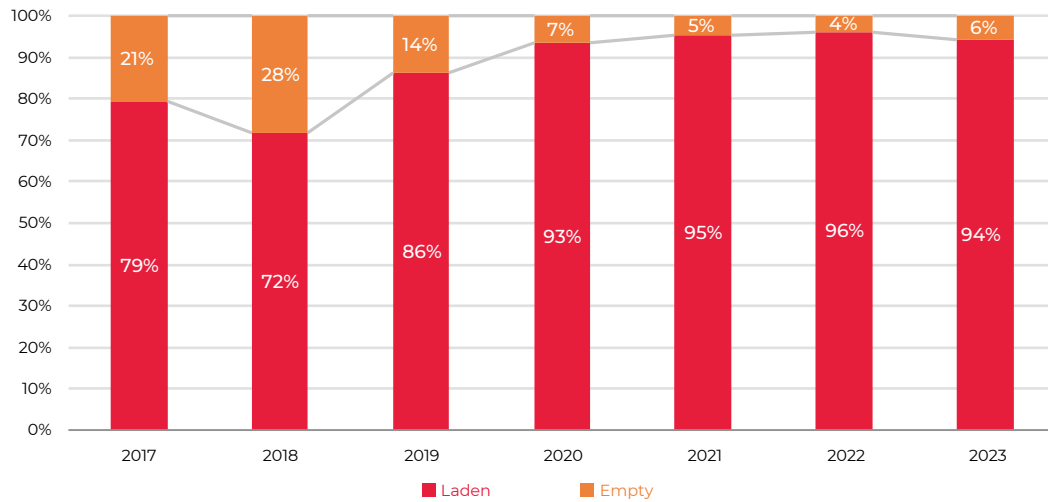
Source: Authors' calculations

The route's freight base and continued progress towards achieving full capacity

The ratio between empty and laden containers is one of the main indicators in transportation and logistics. What makes container transportation unique is that its operators must manage reverse cargo traffic in order to prevent an accumulation of containers at one end. The need to balance freight traffic stems from the specific nature of EU — China trade, i.e., the fact that the EU has a substantial trade deficit with China; it exceeded \$310 billion in Q1-Q3 2023.

Eurasian container shipments by rail have accomplished the transition from China-Europe-China transit to carrying out EAEU import and export operations, generating momentum towards achieving full capacity. In 2023, the share of empty containers was equal to 6%, approaching the pandemic-era 7% level in 2020. Over the past six years, the percentage of empty containers dropped from a peak of 28% in 2018 to the current 6% as efforts to achieve full capacity have continued, including efforts to improve efficiency along the route despite the international, political and economic challenges.

THE RATIO OF EMPTY AND LADEN CONTAINERS

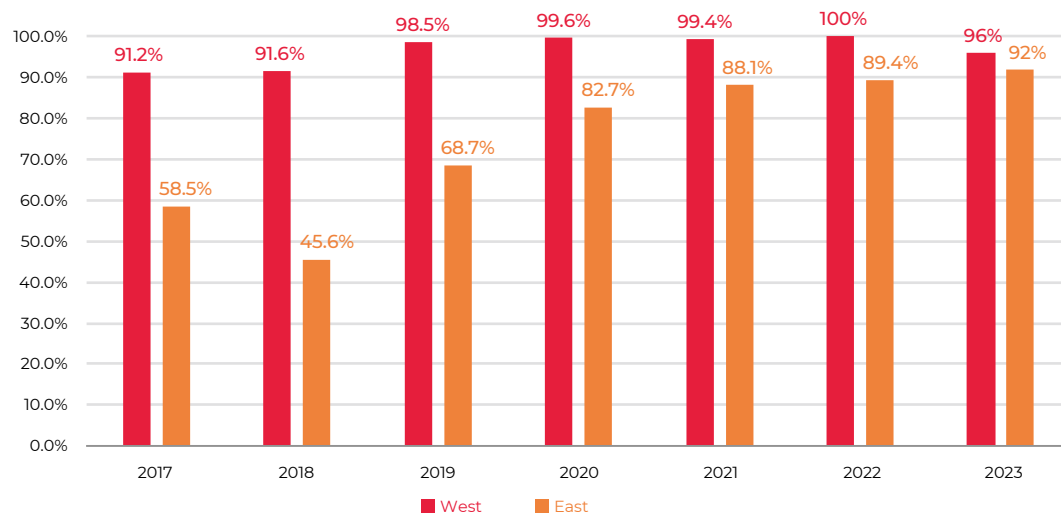


Source: Authors' calculations

Nevertheless, in 2023, the percentage of laden eastbound containers reached an all-time high of 92%, up 2.6 points from 2022. This trend may be attributable to efforts designed to draw European consignors into this process, as well as improving efficiency along the route.

The percentage of westbound laden containers declined for the first time in seven years. In 2022, this route reported its first-ever 100% laden rate, but the trend did not spill over into 2023, when this indicator declined by 4% to 96%.

SHARE OF LADEN CONTAINERS BY DESTINATION



Source: Authors' calculations

According to ERAI data for 2023, the Eurasian rail route carried goods under 88 HS-2 classifications, down from 92 in 2022. This reduction resulted from changes to the transportation mode for categories of goods. In 2023, goods shipped by all the segments within the Eurasian rail route totaled \$35.3 billion, including \$15.9 billion for the China — Europe — China segment, down 46% compared to 2022, which makes up 2.1% of the total annual turnover between China and Europe.

In terms of classification, the range of goods transported via this route has been quite stable. Electronics, mechanical and automotive equipment have traditionally dominated transits on the China — Europe — China freight corridor, and this remains the same. Their total share in the container freight traffic increased from 39.6% in 2022 to 44.3% in 2023.

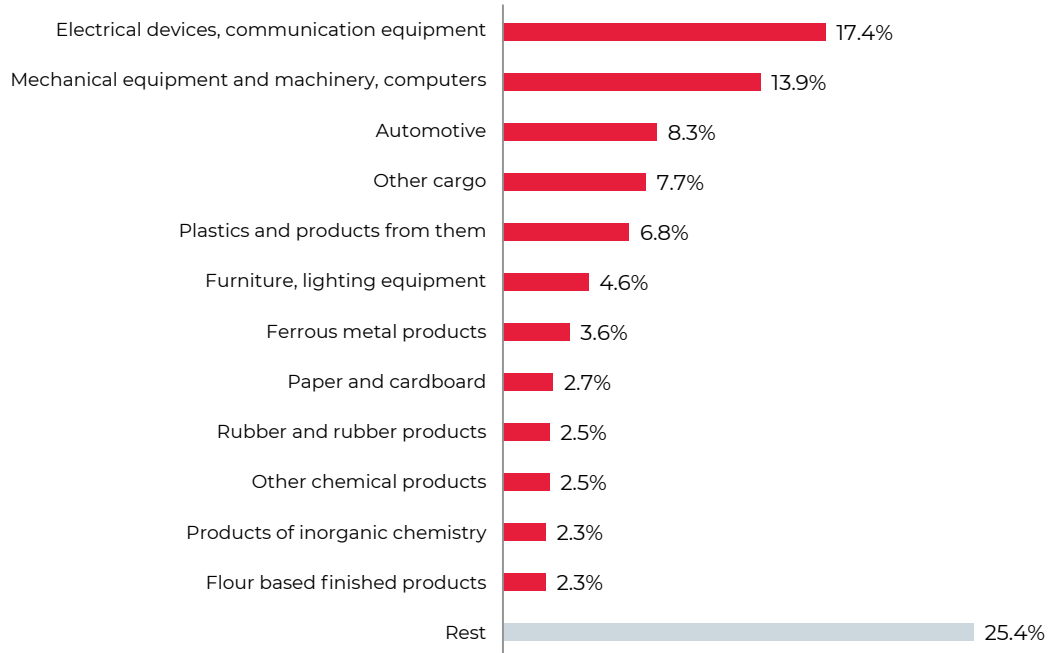
Compared to 2022, the share of mechanical equipment has remained virtually unchanged with a decline of 0.1 ppt to 13.8 in 2023, while the share of automotive equipment changed substantially with a 3.9% increase year-on-year to 8.3%. The share of mechanical equipment also increased by 0.9% to 18.3% in 2023. The surge in automotive equipment can be attributed to the increase in the production of electric cars in China and greater demand for these products in Europe.

Plastics (7.9%), furniture and lighting equipment (4.5%) were the next most important categories of goods transported on the Eurasian rail route. 2023 saw substantial increases in the share of iron and steel (4.2%), rubber and rubber products (2.7%), and inorganic chemical products (2.3%).

At the same time, shipments declined in flour-based finished products (1.5%), toys and sports equipment (1.4%), paper and cardboard (1.1%), textiles (1%) and leather products (1.4%) compared to 2022.

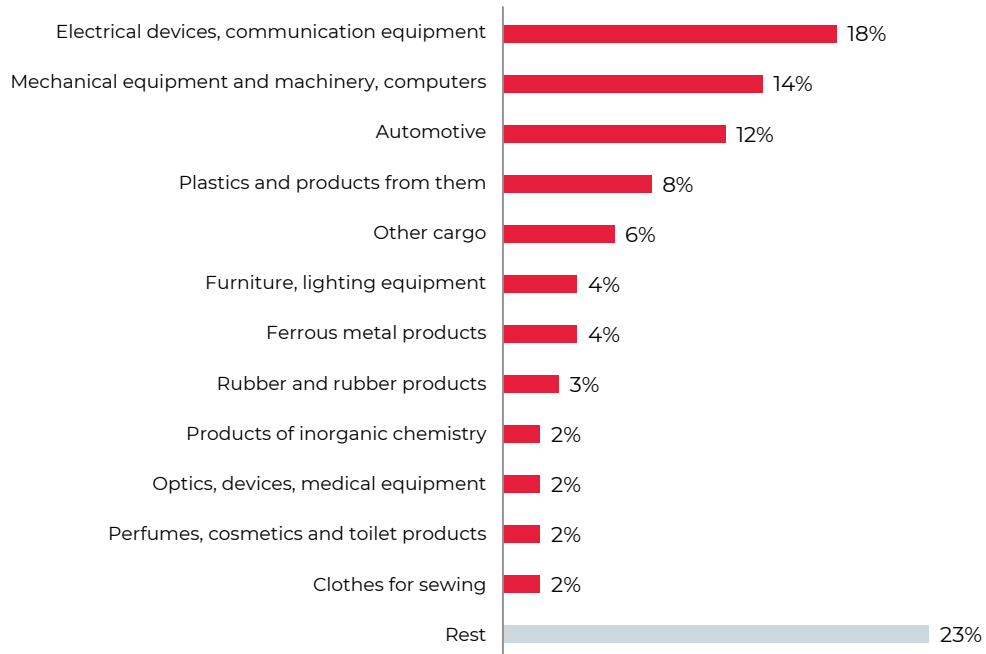
Central China serves as the freight base for Eurasian rail transportation, while Germany, drives the EU's demand, along with the Central European countries. This geography explains the dominance of industrial goods. Analysts expect China to gradually shift its manufacturing capacity to the less developed regions in central and eastern China, which would sustain as well as help expand the route's cargo base in the long-term.

MAIN CARGOES IN THE CHINA — EUROPE — CHINA SERVICES IN 2022



Source: ERAI index portal

MAIN CARGOES IN THE CHINA — EUROPE — CHINA SERVICES IN 2023



Source: ERAI index portal

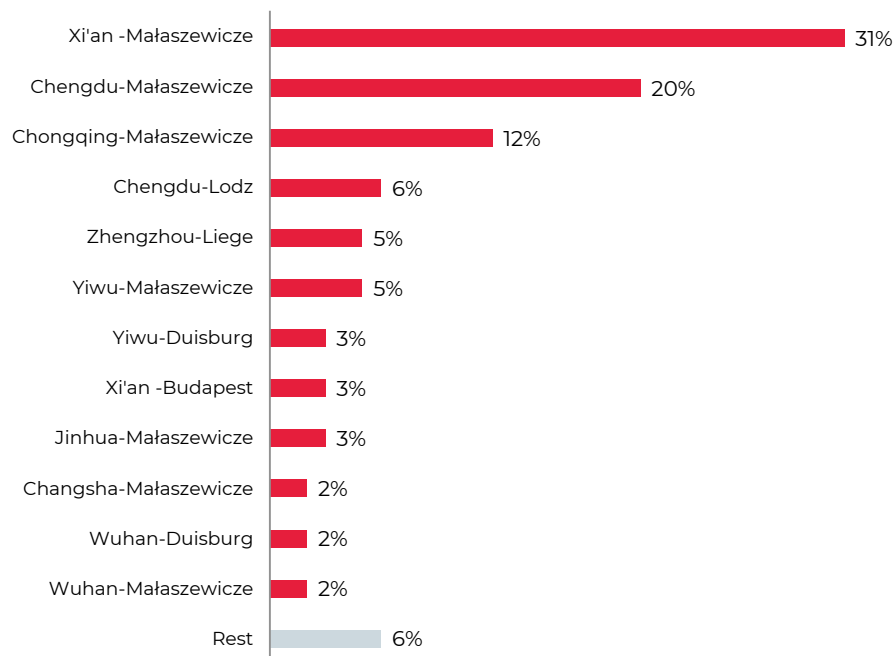
Transforming the geography of transportation

In 2023, the key locations in terms of transportation on the Eurasian international rail corridor included, in Europe, Germany's biggest ports in Duisburg, Mannheim, Hamburg and Bremerhaven, while Xi'an, Chengdu, Chongqing, Zhengzhou and Yiwu were the key transport hubs in China.

In 2023, the main routes from China to Europe included:

- Xi'an — Małaszewicze (44.5 thousand TEU)
- Chengdu — Małaszewicze (28.8 thousand TEU)
- Chongqing — Małaszewicze (17.8 thousand TEU)

MAIN ROUTES IN CHINA — EUROPE SERVICES IN 2023

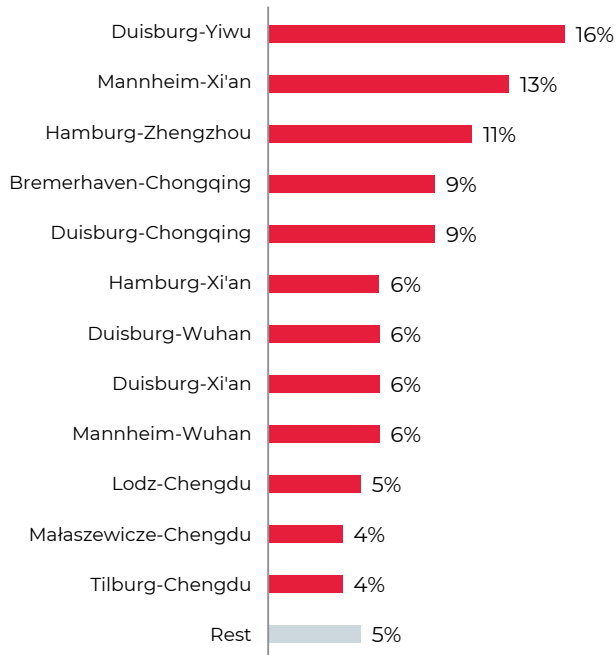


Source: Authors' calculations

In 2023, the main routes from Europe to China included:

- Duisburg — Yiwu (10.6 thousand TEU)
- Mannheim — Xi'an (9.1 thousand TEU)
- Hamburg — Zhengzhou (7.7 thousand TEU)

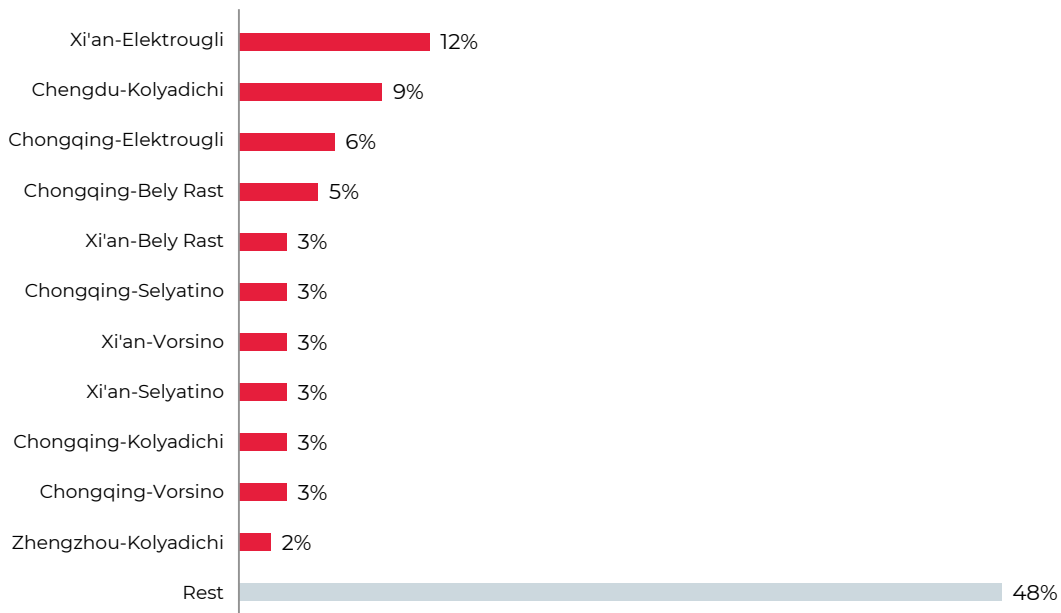
MAIN ROUTES IN EUROPE — CHINA SERVICES IN 2023



Source: Authors' calculations

Looking at the route network for exports and imports, it is dominated by routes linking China to Russia, such as Xi'an — Elektrougli (30.6 thousand TEU), Chongqing — Elektrougli (14.7 thousand TEU), Chongqing — Bely Rast (13.7 thousand TEU), as well as Xi'an — Bely Rast (8.1 thousand TEU). China — Belarus routes are also worth noting, including Chengdu — Kolyadichi (22.2 thousand TEU), and Chongqing — Kolyadichi (6.9 thousand TEU).

MAIN ROUTES IN CHINA — EAEU SERVICES IN 2023



Source: Authors' calculations

The Eurasian corridor remains dominant in China — Europe — China freight service, passing through Belarus, Kazakhstan and Russia. According to statistics at border crossings (Dostyk and Altynkol), it accounts for 96% of all container traffic.

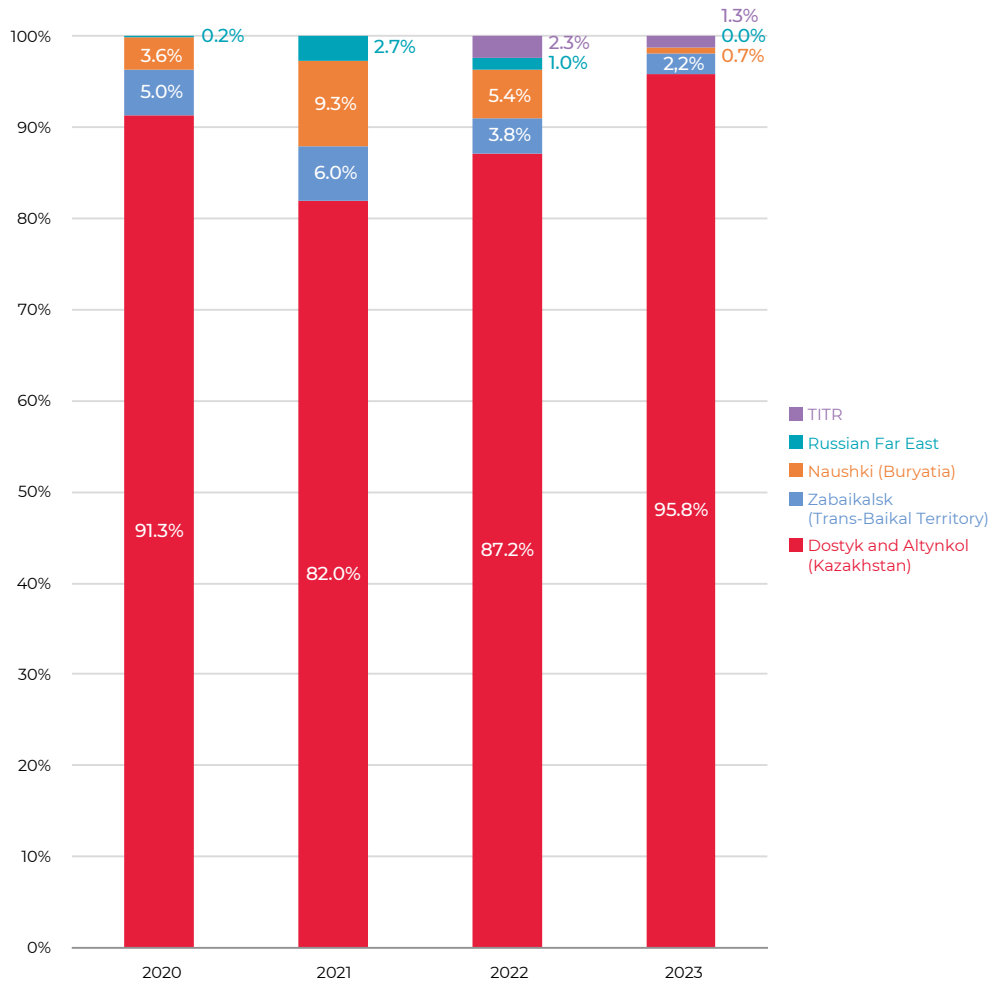
Container transits through Naushki crossing dropped 93.9% to 1.5 thousand TEU, while transit through Zabaikalsk were down 72.3% to 4.9 thousand TEU, despite a persistent effort to develop railway infrastructure on the Trans-Siberian routes. The border crossings in the Russian Far East did not receive any China-Europe-China container traffic in 2023.

This situation at the border crossings results from an all-out effort to overhaul Russia's import logistics. Under the pressure from the European countries, and facing, among other things, challenges when importing goods, Russian companies turned to ports and rail terminals in the country's east. They were also prompted to do so by the withdrawal of international carriers from the Russian market, as well as by the government's policy to prioritize ties with countries to the east in its economic policy.

This left infrastructure in Russia's Far East overwhelmed, with imports largely replacing any other flow as its priority mission.

Consignors have been searching for alternative continental freight shipping routes. In this context, the Trans-Caspian International Transport Route (TITR) has enjoyed some positive momentum. It crosses Kazakhstan, Azerbaijan and Georgia, with countries along the route seeking to attract more traffic. However, they have yet to offer a competitive alternative to the rail corridors through Russia. In 2023, TITR's container traffic was equal to 2.8 thousand TEU, down 75.1% year-on-year, accounting for 1.3% of total China — Europe — China freight traffic. Low speed and high costs are the main shortcomings of this route, since it combines several means of transportation for crossing the Caspian Sea, as well as the Black Sea, in certain cases.

SHARE OF MAIN ROUTES OF TRANSIT RAIL CONTAINER TRANSPORT CHINA — EUROPE — CHINA TRANSITING AT BORDER CROSSINGS



Source: Authors' calculations

The Eurasian route accounts for 96% of container transits on the China — Europe — China corridor. It has retained this lead by offering stable pricing and delivery times, as well as high throughput capacity. However, it must be noted that trans-Eurasian rail routes remain largely intercomplementary even in today's challenging environment.

It is worth noting that all economic and political challenges aside, the trans-Eurasian continental rail routes are largely intercomplementary. The ongoing effort to inject more momentum into developing all these routes makes trans-Eurasian rail transits and the 1520 mm gauge network even more attractive as an alternative to other means of transportation and routes.

OUTLOOK FOR 2024

In 2023, Eurasian freight rail route demonstrated its ability to respond to international and political challenges. The longstanding effort to develop Eurasian container freight transportation paid off. The coordinated rate policy across the 1520 mm gauge network helped maintain steady freight volumes, external challenges notwithstanding, which was not the case for maritime freight rates. They may offer lower rates compared to rail transportation but are more volatile and unstable.

Freight volumes have been increasing since late 2023 on the back of what has been happening in the Red Sea, since these waters serve maritime cargo shipments linking China and Europe. Faced with higher rates for maritime transportation and port delays, consignors and shipping agents have been increasingly eager to consider the China — Europe — China rail route. In addition, freight safety and preservation is another major performance indicator, and this is where this rail route shines. The share of containers on the trans-Eurasian rail transportation routes which were not separated from their trains for technical or other reasons, was 99.997% in 2023. However, the pressure from sanctions still restricts European consignors in their ability to dispatch their cargo through Russian territory. Nevertheless, the Red Sea has been a real threat, prompting many to reassess the risks. This creates an opening for increasing transits between China and Europe through Russia along the Eurasian rail corridor.

Apart from the infrastructure component, the commitment and dedicated efforts by national railway operators along the Eurasian rail corridor to expand freight volumes and promote innovation can play a meaningful role and make the Eurasian rail corridor even more effective. In December 2023, the authorized navigation seal operators from the EAEU countries signed a cooperation agreement, which came into effect in 2024. Navigation seals will ensure safe and reliable freight transport, while also requiring fewer controls along the way.

In 2023, rail transportation showed its ability to improve and adapt to the changing international environment. The development of the export and import segments within the Eurasian routes was among the key developments in this sector, helping offset a temporary drop in China — Europe — China freight traffic. In addition, tension in the Red Sea, considering its high use by maritime carriers, can increase demand for rail freight transportation in 2024. The Eurasian rail route may well attract more freight traffic due to the destabilization of maritime shipments.