

Rail freight from Europe to China and back: brakes and potential

George Raymond, Railweb GmbH, Binningen/Basel

Introduction

Containers have been rolling by rail between Asia and Europe for decades. The proposition is simple: rail should be faster than sea and cheaper than air. In recent years, China has subsidised trains to Europe. In the process, operators and customers have had to deal with problems of shipment visibility, political conflicts, different track gauges, inflexible trains from city to city and now the Covid crisis. Nevertheless, one major operator's rail traffic between China and Europe has grown by 324% since 2017.



Eastbound tank containers approach Ludza, Latvia, 10 September 2016. The Russian border is 40 km ahead. Here, as in Russia, the rails are 1520 mm apart; in China and most EU countries the standard is 1435 mm. Photo Konstantin Davidov.

The first railway line between Asia and Europe was the Trans-Siberian. Other routes opened after the 2012 customs union between Kazakhstan, Russia and Belarus. Since then, China has expanded - and subsidised – container transport by rail between ever more Chinese and European cities. One goal is to develop China's landlocked provinces. China also seems interested in creating a network of economically self-sustaining and politically effective connections with Europe. However, some customers have complained that because of the subsidies, some Chinese operators have little incentive to progressively improve service quality, especially in terms of real-time tracking of shipments and predicting their arrival time.

Political conflicts have also affected Europe-China rail. From 2014 to 2019, Russia blocked the transit of food from Europe to China. In 2021, Belarus threatened to block transit trains and China threatened

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to suspend train traffic to Lithuania.

Another obstacle is a technical one. The usual gauge between the rails is 1435 mm in China and Europe, but 1520 mm in Finland and the former Soviet Union. Where the gauges meet, a crane must hoist each container onto another train. These crossings between gauges have proven to be bottlenecks despite efforts to increase throughput. Congestion between Belarus and Poland and the search for more direct routes have led to the development of 1435/1520 crossings from Lithuania to Georgia.

Increasingly, ships are also linking the different gauges. They bring containers from intercontinental 1520-mm trains arriving in Kaliningrad, Helsinki and St Petersburg to seaports of the 1435-mm networks in the EU and UK. Intercontinental trains also carry containers to Chinese and Russian ports so that ships can take them to Japan, South Korea, Taiwan and Vietnam. Or the other way around.

The Chinese cities and provinces were the distributors of the subsidies. They only financed trains connecting a Chinese city with a European city. The visibility of such city-to-city trains is commercial, but also political. In 2020, for example, China publicised trains that transported masks and other anti-covid materials from a Chinese city to a European city. But city-to-city trains constrain rail operations. In a more market-oriented environment, rail operators and freight forwarders would focus less on city-to-city trains and more on the optimal rail transport of each container from its origin to its destination via hubs.

The Covid crisis has disrupted world trade and massively increased transport prices between China and Europe - both by sea and by rail. For a container in China destined for Europe, finding space for the container on some conveyance - be it a ship or train - is often more important than quality of service or the price. Subsidies are no longer relevant. As vaccination spreads worldwide and a wave of new ships and capacity arrives by 2023, prices will fall again. Rail and ocean shipping will then once again compete. The focus of actors will return to price and quality of service - and perhaps subsidies.

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In this report, we present the context of rail freight between China and Europe: The place of this transport in China's Belt and Road Initiative and in Sino-European conflicts; the history and growth of rail transport between China and Europe and its development in the pandemic; the vexing issue of 1435- and 1520-mm gauges; the dominance of westbound traffic; the management of empty containers; products - including chemicals and foodstuffs - with high export potential to China; and the problems and development of hubs, seaports and crossings between gauges that form the foundation of Eurasian rail transport.

The author wrote a draft of this report for the conference "[The State and the railways: rail transport in the mirror of public power](#)" organised by the association Ferinter / International Railway Studies and the Université Libre de Bruxelles on 27 and 28 September 2021. One focus is therefore on the impact of Chinese subsidies on rail transport to and from Europe before the pandemic, their loss of importance during the global shipping crisis of 2020-2021 and their possible resurgence in the near future.

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Rail: the belt in China's Belt and Road Initiative

To underpin China's rise as a global power, newly elected President Xi Jinping announced in 2013 what later became known as the Belt and Road Initiative (BRI), a programme of investments and projects to promote trade and prosperity around the world and consolidate China's role in it.

In the BRI, rail freight is the belt. The most visible aspect of China's railway development efforts is the organisation and subsidisation of trains between China and Europe. The development of these rail links, known as the New Silk Road, began about a decade ago and have now become the backbone of

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the BRI. [\[Nikkei Asia, 11 June 2021\]](#)

According to *Logistics*, China, as the initiator and main financier of most of these connections, called them the Chinese Railway Express. At least until the pandemic, China subsidised Eurasian rail freight as an intermediate solution between sea and air transport, which strengthened China's position as a supplier of a wide range of products to Europe. By linking certain Chinese and European cities, these connections strengthened political and economic ties. [\[Logistics, 22 March 2021\]](#)

Until and during the pandemic's massive disruption of maritime and air logistics chains, rail transport became an important trade artery between China and Europe. [\[Nikkei Asia, 11 June 2021\]](#) Rail freight from Europe to China is intended to offer European companies a fast, environmentally friendly and cost-effective route to Chinese industrial customers and consumers. [\[Logistics, 22 March 2021\]](#) Rail's carbon footprint - which admittedly does not come up much in discussions about transport between China and Europe - is comparable to ocean transport's and much smaller than air transport's.

China-Europe rail is part of European rail freight and is likely to foster its development, not least because rail freight's value tends to be higher between China and Europe than within Europe. High-value intra-European freight usually moves by truck, which is hardly an option between China and Europe.

China's goals with the BRI and Sino-European rail

The Sino-European trains seem to be a promising instrument for Chinese goals in three areas: developing a promising line of business, strengthening China's influence and opening landlocked regions in China, Central Asia and Europe.

A promising line of business

Rail transport between China and Europe is a promising line of business: rail should be cheaper than air transport and faster than sea transport. The railway would thus appeal to owners of high-value products who wanted to reach European markets faster than by sea without paying airfare.

Railfreight.com identified another factor expected to product a shift of Eurasian freight traffic from sea to rail: the trend of companies towards smaller inventories and smaller shipments with a higher delivery frequency. [\[Railfreight.com, 18 November 2020\]](#) Customers are expected to appreciate the "conveyor belt" of frequent departures from China to Europe by rail, which allows for less fluctuating transit times than transport by large container ships.

Another advantage of Sino-European rail transport for China is the involvement of its own companies. While China relies heavily on foreign suppliers for maritime and air transport, Chinese companies can play a leading role in the development of rail freight between China and Europe. [\[Area Development and Policy, 12 October 2019\]](#)

Strengthening China's influence

For Raffaello Pantucci, the BRI is a comprehensive foreign policy vision that offers China opportunities for deep engagement in virtually all areas of state and society in its partner countries. By framing its foreign policy in this way, China projects a positive image and offers potential partner countries a range of opportunities - trade agreements, infrastructure, scholarships and the like - all under the guise of the pursuit of shared prosperity. While their motives or outcomes may be questioned, this vision is attractive. Countries such as Italy and Hungary have shown openness to the

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BRI. The BRI aims to return China to its rightful place at the centre of a global network and to anchor these connections deeply in host communities. This creates a web of connections that will last for a long time.

Pantucci also reminds us that powerful nations have long used foreign aid and investment to build relationships with their external partners through a range of institutions. The BRI has given China a unique and comprehensive vision for its foreign policy. This vision is based on the notion that international relations are built on a web of contacts that reach deep into societies.

For Pantucci, this includes rail links between China and Europe. In order to strengthen economic ties, deepen cooperation and expand the development space in the Eurasian region, China is funding and promoting Eurasian rail freight. According to China, this will benefit people in all countries along the rail routes to Europe. China starts working in individual areas and over time connects them to cover the whole region. China is leaving a presence and a footprint that will help it maintain its influence in the future. [National Interest, 20 December 2020] Stuart Lau suspects that China is also trying to increase the dependence of the international supply chain on itself to enable retaliation and deterrence if other countries stop supplying China with goods. [Politico, 3 March 2021]

In January 2020, Bernhard Simon, CEO of the transport company Dachser, asked why the West should object to China pursuing these goals by exploiting its position as a global economic power. It is not the first country to promote its economic interests through direct investment and financing. Europe should also pursue a strategy to develop improved infrastructure for the transport of goods to and from China and Southeast Asia to ensure mutual trade. [Inbound Logistics, 31 January 2020]

Rail freight in the landlocked regions of China, Central Asia and Europe

China wants to develop its western inland provinces. The new rail connections would let these provinces quickly bring their products to the huge European market without travelling thousands of kilometres to reach Chinese seaports.

According to Logistics, remote areas far from China's coast are of growing importance as production and trade locations. China is pushing for the expansion of rail connections to and from Europe because these areas can be better connected to Europe by rail via Kazakhstan, Mongolia and Russia. [Logistics, 22 March 2021]

For the same reason, rail transport between China and Europe will be more important in the longer term in eastern European areas that are also far from seaports. These countries reportedly have the highest export rate to China after Central Asia. [United World, 2 January 2021]

As important as rail transport is between China and Europe, it could be equally important for Chinese trade with Russia and Central Asia. The location of these countries between China and Europe, their landlocked nature and the distance of their urban centres from the seaports make rail transport more viable. Only when trains can accommodate freight from transit countries will rail transport between China and Europe realise its true potential. [Area Development and Policy, 12 October 2019]

Diversification of sourcing countries and nearshoring

China was the only major economy in the world to record positive trade growth in 2020, the pandemic's first year. [Hellenic Shipping News, 17 March 2021] Despite increasing political tensions, China has now overtaken the US as the EU's main trading partner. The total value of EU-China trade in goods - excluding services - was €586 billion in 2020, around €31 billion more than between the EU and the US. [CNN, 17 February 2021]

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In March 2021, the *Harvard Business Review* noted that much of global sourcing over the past three decades has been driven by lower labour costs in China and elsewhere. This has led to savings that have more than offset the cost of transporting products long distances to market and the additional cost of storage in long pipelines. Low-cost air freight as well as ocean freight in ever-larger vessels have contributed to this trend. However, the pandemic's disruption of intercontinental supply chains shows their vulnerability. This is likely to lead to diversification of sources to countries closer to the consumer. [[Harvard Business Review, 12 March 2021](#)]. This reasoning does not just apply in the West. The Chinese leadership wants to boost domestic consumption and reduce dependence on exports. [[Handelsblatt, 9. Februar 2021](#)] But long-distance supply chains seem to have a long life ahead of them: Shipping companies are ordering a record number of new mega-ships. [Wall Street Journal Logistics e-mail Newsletter, 5 March 2021]

China as a factory and market for European companies

China is attractive to European companies for two reasons: as a *manufacturing location* generating freight volumes in both directions, and as a huge and growing *sales location* generating mainly eastbound freight.

Until now, China's role as a factory has dominated. The *Guardian's* Timothy Garton Ash argues that it is dangerously deluded to believe that economic interdependence necessarily prevents international conflict. At the same time, we do not want a world of self-sufficient economies. However, Western democracies must be careful not to become strategically dependent on China. We got a taste of this dependence in the first months of the pandemic when we discovered that much of our personal protective equipment came from China. [[The Guardian, 28 July 2021](#)] In August 2021, the *Weirton Daily Times* noted that it is not easy for manufacturers to leave China. Costs remain low. And specialised suppliers are concentrated in Chinese production centres, making it easy for factories to get the parts they need when they need them. [[Weirton Daily Times, 6 August 2021](#)]

An example of the alternatives: Turkey

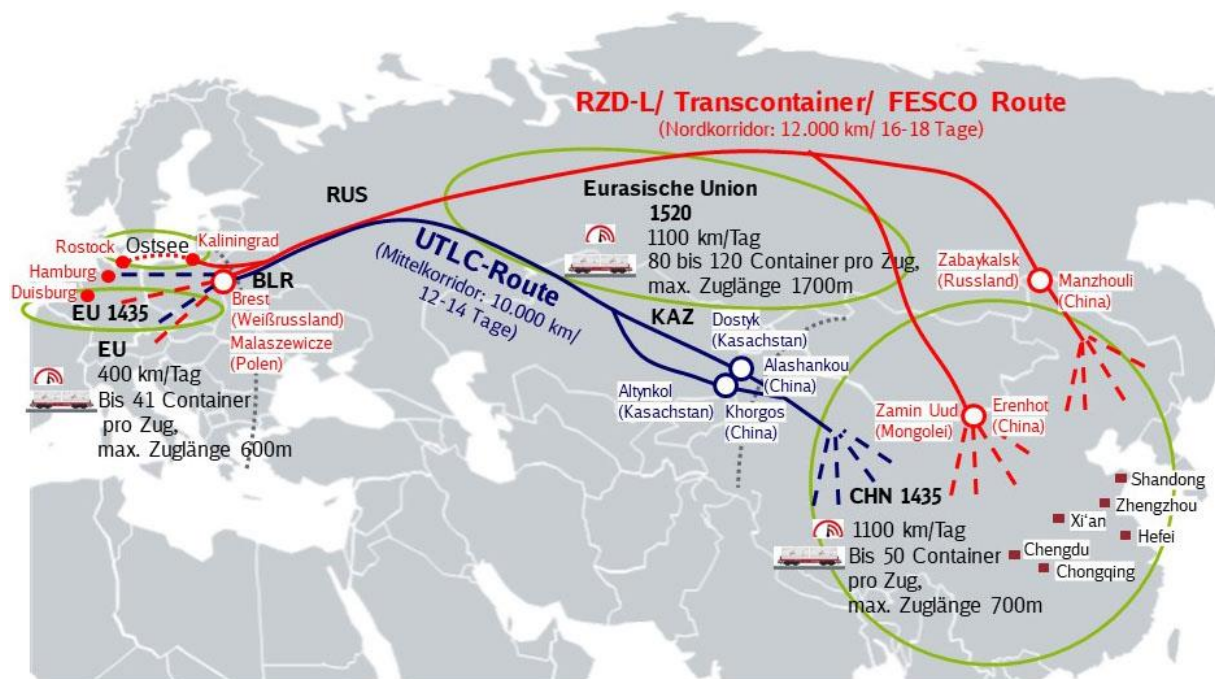
Turkey is an example of a major potential beneficiary of nearshoring of European production. In August 2021, it cost \$2,000 to transport a freight container between Turkey and Italy, compared to \$10,000 between China and Italy. The impact of higher logistics costs was less between Turkey and the EU than between China and the EU. Turkey could ship goods to Frankfurt for €6,000, while Chinese companies paid \$14,000. In July 2021, Turkish exporters posted their best-ever July result, and the country's rolling 12-month foreign sales also exceeded \$200 billion for the first time. As early as January 2021, the Turkish government planned to respond to the global shortage of containers by encouraging their production in Turkey. [[Daily Sabah, 22 August 2021](#)]

A brief history of Eurasian rail transport

Any history of Eurasian railways should begin with the different gauges. These were established in the 19th century by the builders of the railway networks. The reasons for their different choices are well documented elsewhere. The China-Europe rail freight service links the former Soviet rail network with its 1520-mm gauge with the 1435-mm rail networks of China and most of Europe. Today, the 1520-mm network covers Russia, the now independent states of Central Asia and the Baltic states of the EU. It also includes the Finnish railway.

The first railway between Asia and Europe was the Trans-Siberian from 1916. The Trans-Mongolian followed in 1961. [[Area Development and Policy, October 2019](#)]

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Source: [DB Cargo Eurasia](#)

The China-Kazakhstan-Russia corridor, opened in 1990, is much shorter than the routes through Russia further north. It has made rail freight between China and Europe attractive for products that require fast and reliable transit times. This has attracted electronics companies from western China supplying EU markets and EU car manufacturers delivering parts to their assembly plants in western China. Since 2008, trains with components from Hamburg have been travelling to China for the car assembly of the German joint ventures in Shenyang (BMW) and Jilin (VW/Audi). [Richard Pomfret, University of Adelaide, September 2020] In 2009, a test train followed between Chongqing and Duisburg. [Business and Management Studies, June 2017]

The rapid increase in rail freight traffic from China to Europe since 2012 is partly due to the creation of the EAEU customs union between Russia, Kazakhstan and Belarus. [China Global Television News, 26 August 2020] The EAEU has enabled the three countries to create a space based on the 1520-mm railway network in which tariff policies, transport regulations and timetables are harmonised. [Valdai Club, 20 May 2021]

In 2011, Hewlett Packard sent several hundred containers of desktops, laptops and LCD monitors from Chongqing to Duisburg. [Valdai Club, 5 November 2020] Regular train services on this route started in 2013. [Asian Development Bank, May 2021] In the same year, Xi Jinping made rail freight transport between China and Europe a key component of the BRI. [Nikkei Asia, 11 June 2021]

Traffic volumes

Today, rail freight transport between China and Europe carries products from more than 50 Chinese cities, including the three main hubs Chongqing, Chengdu and Xi'an, to around 150 cities in 22 European countries. [Nikkei Asia, 11 June 2021] And (partly) vice versa.

Volumes in 2020

Sino-European rail is the fastest growing rail freight service in the world. There are different figures

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for the number of 20-foot equivalent containers (TEUs¹) transported by rail between China and Europe, but they all paint a similar picture.

The United Transport and Logistics Company - Eurasian Rail Alliance (UTLC) operates container trains between China and Europe. The railways of Belarus, Kazakhstan and Russia each own a third of UTLC. The company publishes in [Eurasian Rail Alliance Index](#) detailed and consistent data on rail volumes between China and Europe. UTLC reports that in 2020, the 490,235 China-Europe-China TEUs it carried - all via Kazakhstan - accounted for 91.3% of China-Europe-China rail traffic. This would mean that the total rail traffic was about **536,950 TEUs**.

Other sources suggest that UTLC's share is lower, but publicly available details are few. The *Valdai Club* cites Russian Railways, which claims that **592,000 TEUs** travelled on the China-Europe-China routes in 2020. [[Valdai Club, 20 May 2021](#)] *Container Management* cites an estimate by the consultancy Roland Berger of **878,000 TEUs** China-Europe-China in 2020. [[Container Management, 18 May 2021](#)] The Chinese State Council reported that **1.14 million TEUs** passed through the five Chinese crossings between the 1435- and 1520-mm gauges in 2020. [[Chinese State Council, 29 January 2021](#)]

As always, to understand these numbers, one must know their definition. This essential element is almost always missing. For example, what proportion of these TEUs travelled the entire distance from China to the EU? Are they based on a definition of Western Russia as part of Europe?

In addition to or instead of TEUs, Chinese sources often state the number of trains each terminal handles. But the number of TEUs is more precise than the number of trains. The number of TEUs per train varies not least because trains on the Chinese and European networks are generally limited to 600-700 metres, while on the 1520-mm network they can be around 1000 metres long. The containers of three trains from China or Europe can thus become two trains when crossing the “1520”.

Region	Gauge (mm)	Train length (metres)	
Europe	1435	600-740	
Belarus, Russia, Kazakhstan	1520	1050	
China	1435	600-700	

In a 29 January 2021 video on *Railfreight.com*, Jet Young of the China Communication and Transport Association's International Freight Train Consulting Center said that about half of the containers passing through China's five 1435/1520 crossings are actually going to or from Russia, not to or from Europe. Young said the following trains were handled at the five Chinese crossings, including China-Russia and China-Europe trains in both directions.

¹ TEUs are twenty-foot equivalent units. In other words, they express container traffic volume in terms of an equivalent number of 20-foot containers.

Year	Trains
2011	17
2012	42
2013	80
2014	308
2015	815
2016	1,702
2017	3,673
2018	6,376
2019	8,225
2020	12,406

[[Railfreight.com](https://www.railfreight.com), 2 February 2021]

Nevertheless, the train numbers and TEUs reported at Manzhouli and Erenhot allow an estimate of TEUs at the other three Chinese 1435/1520 crossings. This lends credibility to both sources. The Chinese State Council provided the figures **in bold** in the table below. They underlie the estimates in *italics*.

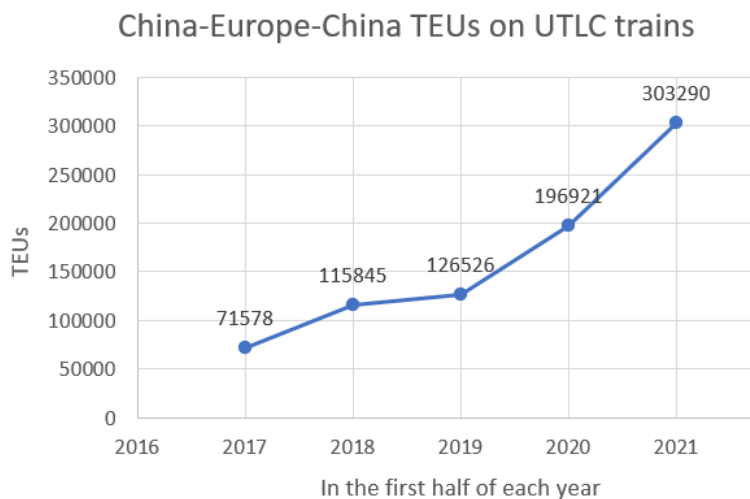
1435/1520 crossings on the Chinese border	Neighbouring country	Trains in 2020	TEUs in 2020
Total for the five crossings			1,140,000
Manzhouli / Zabaikalsk	Russia	3,548	324,310
Erenhot dry port	Mongolia	2,379	355,193
Manzhouli + Erenhot			679,503
Remaining TEUs to be allocated			460,497
Suifenhe / Grodekovo	Russia	218	<i>10,143</i>
Alataw Pass	Kazakhstan	5,027	<i>233,901</i>
Khorgos	Kazakhstan	4,652	<i>216,453</i>
Subtotal	Kazakhstan		<i>450,354</i>
UTLC's reported volume	Kazakhstan		490,235

[[Chinese State Council](#), 29 January 2021]

The estimated number of TEUs at the two Kazakh 1435/1520 crossings therefore differs by only 8% from the number of TEUs UTLC claims to have carried via Kazakhstan.

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Despite the obstacles we describe in this report, UTLC's volume has grown steadily since 2017.



Rapid growth in a niche

However, given UTLC's traffic volume, rail freight transport between China and Europe is a niche. It still fills only three container ships per month. As a niche product, however, this rail service offers something unique: a means of transport between China and Europe that is cheaper than a plane and faster than a ship.

Market share

It is often said that the market share of rail freight between China and Europe is around 2%. But a such a global figure is much easier to find than a rigorous definition. 2% of what, please? Finding a clear answer to this question is difficult. The “market” can be measured in TEUs - and one still has to define its scope - but also in terms of freight value. In the latter case, air freight transport has a significant impact and rail's market share is higher because it tends to carry more expensive products than ships.

In March 2018, *Railfreight.com* reported the findings of the research company Drewry that around 98% of the trade volume between Europe and China is by sea. [[Railfreight.com, 18 March 2019](#)] According to the International Union of Railways, the market share of rail transport between China and Europe ranged from 0.1% to 9.1% for different European and Chinese regions in 2018. [[UIC, 11 February 2020](#)]

Volume by country, 2017-2021

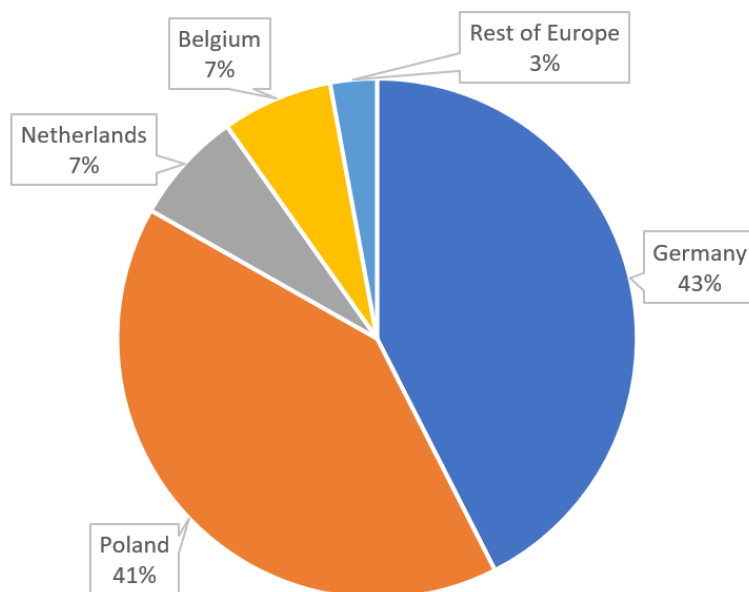
To understand the nuances of traffic volumes, we analysed UTLC traffic volumes and their east-west imbalances by European country and German city.

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	TEUs of UTLC in the first half of...					
	2017	2018	2019	2020	2021	2021 %
In both directions between China and...						
Germany	39,853	66,151	75,235	76,099	128,914	42.5
Poland	19,978	28,194	25,890	89,310	123,436	40.7
The Netherlands	8,103	12,802	13,744	11,958	21,308	7.0
Belgium	0	246	6518	9856	21,026	6.9
Other European countries	3,644	8,452	5,140	9,698	8,928	2.9
All European countries	71,578	115845	126,527	196,921	303,612	100

To exclude seasonal effects, we compared the first half of 2021 with the same period in 2017 to 2020. In terms of UTLC's TEU traffic between China and Europe in both directions, Germany and Poland dominate, followed by the Netherlands and Belgium to a much lesser extent. The other European countries are marginal. Here is the breakdown in graphic form for 2021:

Share of TEUs in China-Europe-China rail traffic by European country (UTLC trains, first half of 2021)



Other European countries served by UTLC trains in the first half of 2021, which together accounted for 3% of the volume, were Austria, Czech Republic, Denmark, France, Finland, Hungary, Italy and Norway.

Ratio of westbound to eastbound TEUs by country

For Europe as a whole, the ratio of westbound to eastbound traffic was around 1.65 in 2017-2019. This imbalance worsened to 2.39 in the pandemic months of the first half of 2020, as Chinese-produced medical supplies and masks flooded into Europe and the EU's own production faltered. However, in

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the first half of 2021, this ratio has dropped back to 1.66 and thus returned to the pre-pandemic level.

At the country level, however, Germany and Poland are notable exceptions. Germany showed balanced east-west traffic in the first half of 2020 and an eastbound surplus for the first time in the first half of 2021. This can possibly be explained by the ongoing capacity bottlenecks related to the pandemic and the high prices for maritime and air transport during this period - including for eastbound shipments. In Poland, on the other hand, westbound TEU traffic was even more dominant than in Europe as a whole.

One possible explanation for the difference between Germany and Poland is that some of the containers that arrived in Poland on UTLC trains were then transported (loaded or empty) on non-UTLC trains or trucks to Germany, from where they then travelled back to China on UTLC trains after loading. Further research - possibly based on unpublished data - would provide a better understanding of the German and Polish flows.

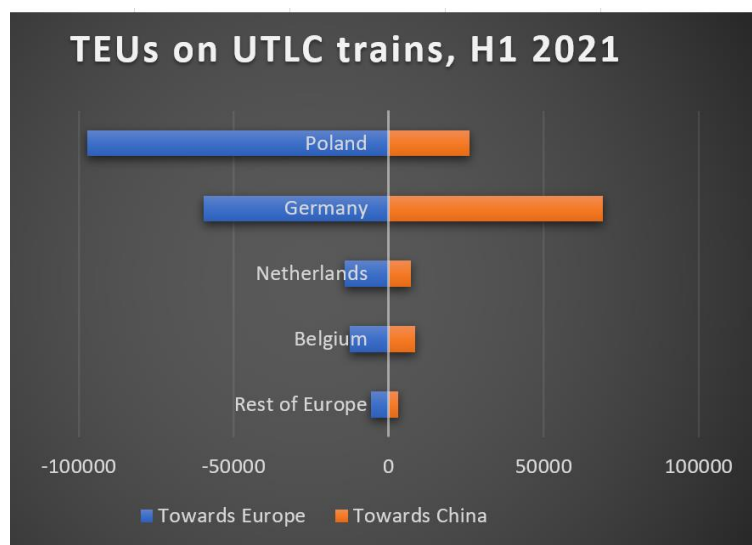
Furthermore, low or no UTLC traffic in a country or city does not necessarily mean a lack of rail traffic to or from China. Containers can travel to or from these locations on trains not managed by UTLC. In particular, such hidden traffic may be parts of the larger UTLC volumes at Eurasian hubs such as Hamburg and Duisport and Eurasian seaports such as Kaliningrad. The UTLC train may terminate at one of these hubs, but a container may then continue to another European city on another, non-UTLC train (or ship).

	UTLC: Ratio of westbound to eastbound TEUs in the first half of...					
	2017	2018	2019	2020	2021	TEUs in 1st half of 2021
Between China and...						
Germany	1,58	1 ⁵⁴	1,51	0,99	0,86	128,914
Poland	1,80	1,64	2,44	5,60	3,71	123,436
The Netherlands	1,62	1,08	0,88	1,45	2,01	21,308
Belgium	n.t.	0,50	0,73	21,20	1,50	21,026
Other European countries	◀	5,34	4,44	8,70	1,81	8,928
All European countries	1,79	1,61	1,55	2,39	1,66	303,612

n.t. = no traffic ◀ = westbound traffic only

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The following chart shows the TEUs on China-Europe-China rail by European country and direction (UTLC trains, first half of 2021).



Volumes in Germany by city, 2017-2021

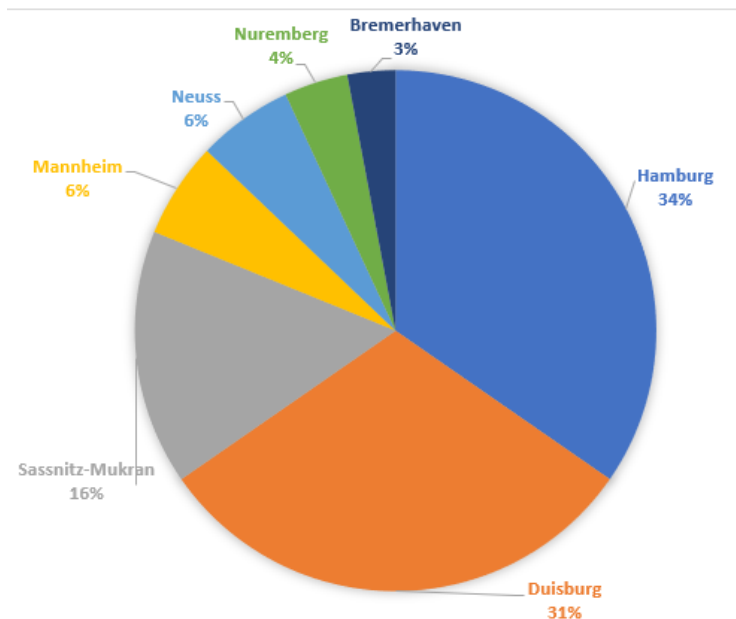
In the first half of 2021, UTLC moved 43% of its TEUs from or to Germany. In terms of volume for the individual German cities, Hamburg and Duisburg continue to dominate, although Mannheim, Neuss and Bremerhaven have gained market share. In Nuremberg, the volume is stable - presumably mainly in connection with the automotive industry. Sassnitz-Mukran came into play for the first time in 2021. This seems to reflect UTLC's new role in organising short-sea shipping between the Russian enclave of Kaliningrad and Germany.

	UTLC's TEUs in the first half of...						
	2017	2018	2019	2020	2021		2021%
In both directions between China and...							
Hamburg	13,189	28,035	37,072	29,062	45,030		34.9
Duisburg	22,636	33,208	31,930	31,656	40,056		31.1
Sassnitz-Mukran	0	0	0	0	20,294		15.7
Mannheim	0	0	712	4,720	7,354		5.7
Neuss	0	0	0	5,016	7,334		5.7
Nuremberg	4,028	4,676	3,224	3,838	4,636		3.6
Bremerhaven	0	0	738	7,40	4,048		3.1
Other German cities	0	232	574	1,077	162		0.2
All German cities	39,853	66,151	73,512	75,287	128,914		100

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Here the same distribution for the first half of 2021 in graphic form.

Shares of China-Europe-China TEUs among German origin or destination points, first half of 2021 (on UTLC trains)



Other German cities served by UTLC trains in the period 2017-2021 are Burghausen, Ludwigshafen and Munich. In the first half of 2021, they together accounted for 0.1% of the volume.

Ratio of westbound to eastbound TEUs in Germany, by city

With regard to east-west traffic balance, one interpretation of the following table could be that the surplus of *westbound* containers arriving in Duisburg and Neuss from China is redistributed so that a surplus of *eastbound* containers can leave Mannheim and especially Hamburg for China.

	Ratio of westbound to eastbound TEUs in the first half of...					TEUs in first half of 2021
	2017	2018	2019	2020	2021	
Hamburg	2.10	2.17	1.69	0.59	0.66	45,030
Duisburg	1.46	1.24	1.71	1.65	1.20	40,056
Sassnitz-Mukran	n.t.	n.t.	n.t.	n.t.	1.11	20,294
Mannheim	n.t.	n.t.	◀	0.66	▶	7,354
Neuss	n.t.	n.t.	n.t.	1.32	7.99	7,334
Nuremberg	1.04	1.03	0.39	1.23	1.35	4,636
Bremerhaven	n.t.	n.t.	▶	▶	0.03	4,048
Other German cities	n.t.	1.97	0.51	0.92	▶	162
All German cities	1.04	1.03	0.53	0.89	0.84	128,914

n.t.: no traffic ◀ Westbound traffic only ▶ Eastbound traffic only

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Public policy and Sino-European rail freight

In the context of Sino-European rail freight, European public policy has addressed the shortcomings of the European rail network, EU-China connectivity and the EU-China investment agreement. At the same time, political conflicts have continued and enthusiasm for the Chinese “17+1” bloc has waned.

Shortcomings of the European railway network

Europe, the slowest and most expensive segment of Eurasian rail freight, is a major challenge for rail transport between China and Europe. Trains run 1000 km/day on the Russian network, but only 300 km/day in the EU at double the cost.

At the same time, the value of products on trains between China and Europe tends to be higher than for intra-European rail transport: while between China and Europe the main alternative to rail is cheaper and slower maritime transport, within Europe the main alternative to rail is more expensive but also faster road transport.

In February 2019, the Dutch bank ING pointed out that rail capacity in Western Europe is limited. Especially in Germany and the Benelux countries, the rail network is congested and passenger trains often have priority. The management of European infrastructure investments is complex and capacity expansion can take 10 to 20 years. The higher value of goods to and from China should lead to improvements in EU rail lines and terminals, however. In Central and Eastern European countries, for example, the rail network has more space in which to expand. Cities like Budapest want to become a rail hub. [ING Economics Department, February 2019] The rapid growth of rail transport between China and Europe is driving investment and the establishment of new intermodal terminals in Europe. This promoting intermodal transport and leaving a long-term mark. [Railfreight.com, 3 August 2021]

EU-China connectivity platform

Since 2015, an EU-China Connectivity Platform has been seeking synergies between the Trans-European Transport Network (TEN-T) and the BRI and to make them interoperable and compatible in an efficient and sustainable way.

In April 2019, *Railfreight.com* reported that the EU and China would conduct a joint study on comprehensive and sustainable rail-based transport corridors between Europe and China. The study will examine rail corridors between China and Europe and analyse hard and soft connectivity issues. The study would propose the most sustainable corridors and the corresponding key projects. [Railfreight.com, 15 April 2019]

EU-China investment agreement

Brussels remains keen to deepen its economic relations with China, although it considers China a “strategic competitor” and a “systemic rival”. Europe shares US concerns about Beijing's trade and technology practices. However, it concluded a comprehensive investment agreement with China at the end of 2020 to improve market access. Main foci are mutual market access, open public procurement, fair competition and compliance with international standards. These objectives reflect the main problem EU companies face in relation to BRI projects: transparency. The European Commission said it set out “clear obligations for Chinese state-owned enterprises”, which are often heavily subsidised. [CNN, 17 February 2021] Under the agreement, China is committed to pursuing policies that ensure

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transparency, sustainability and a level playing field. [[Railfreight.com](https://www.railfreight.com), 28 December 2020]

Amid increasing political tensions in 2021, the EU has suspended the agreement's ratification.



Tank containers in Villeneuve-Saint-Georges, a south-western suburb of Paris, 11 March 2015. Photo Finn Møller.

Political conflicts

Political conflicts have also affected Sino-European rail freight. From 2014 to 2019, Russia blocked the transit of fresh food from Europe to China. In 2021, Belarus threatened to block transit trains and China threatened to stop train traffic to Lithuania.

China vs. Lithuania

According to *The Loadstar*, relations between China and Lithuania began to deteriorate in June 2021 when Lithuania “circumvented Chinese jurisdiction” by agreeing to donate 20,000 Covid-19 vaccine doses to the island of Taiwan claimed by China and establishing a representative office there. China threatened to suspend rail service to Lithuania. [[The Loadstar](https://www.loadstar.com), 19 August 2021]

In an opinion piece, *Railfreight.com* calls rail transport between China and Europe a crucial and evolving part of the global supply chain that puts rail freight at the forefront. However, it could apparently become a dangerous card in the diplomatic and political game. Should China be free to stop train traffic between China and Europe in case of political disputes? And shouldn't Sino-European rail traffic be focused exclusively on just that? That might give European decision-makers food for thought. Perhaps it is time to think about how to keep rail traffic between China and Europe out of this wheeling and dealing. What is the point of promoting rail freight as the future of intercontinental transport when it is so easy to cancel trains? That is the best way to lose the supply chain's confidence. [[Railfreight.com](https://www.railfreight.com), 25 August 2021]

Five days later, *Railfreight.com* reported that the GVT Group of Logistics, a Dutch transport and

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logistics company, had announced the launch of a direct train between Tilburg in the Netherlands and Kaunas in Lithuania. This new service put Kaunas on the map of European interchange stations, and Kaunas was to serve as a transit hub for GVT on its way to China. However, due to the current political conflict between China and Lithuania, GVT has suspended the train. [[Railfreight.com, 30 August 2021](#)]

Enthusiasm for China's "17+1" bloc wanes

In early September 2021, *MENAFN* reported on Lithuania's withdrawal from China's "17+1" bloc in Eastern Europe. This announcement follows the annual 17+1 summit on 9 February 2021, to which leaders of some EU states had rejected China's invitation.

The 17+1 initiative was launched in 2012 and 12 of its 17 members were EU states. China was supposed to close the infrastructure investment gap in the region by building and improving roads, rail infrastructure, ports, airports and electricity infrastructure. Chinese loans were to reach 18% of GDP in Montenegro, 12% in Serbia, 10% in Bosnia and Herzegovina and 7% in North Macedonia.

While China has announced many projects under the initiative, their implementation has been slow. The flagship project announced in 2013, the Budapest-Belgrade high-speed line, has turned into a normal-speed line. Construction work has not yet started on many sections. Disappointment with China is growing because investments are not reaching the expected scale or deadlines. The growing conflict between the USA and China has also increased concern in Europe. [[MENAFN, 1 September 2021](#)]

But China has been more persistent in another kind of BRI investment: its subsidy of Sino-European rail freight services. To this topic we now turn.

Chinese subsidies

In recent years, China has subsidised rail transport to Europe. But this statement needs context. Freight transport is riddled with direct and hidden subsidies worldwide. Like the EU and its member states, China subsidises intermodal terminals and intermodal operations.

In Europe, public subsidies to the rail sector include investment in track and terminal infrastructure, subsidy of track access charges and direct subsidy of intermodal operations. The countries through which Eurasian trains pass - mainly Russia, Belarus and Kazakhstan - have also invested public funds in their lines and terminals. Recently, Russia has also reportedly subsidised some trains between China and Europe.

In this sector, however, the scale on which one country has paid subsidies is remarkable. Before the pandemic, Chinese municipal and regional authorities were bearing about half the cost of rail freight to Europe. To motivate individual Chinese cities to run trains to Europe, the central government negotiated secret subsidy agreements with each city to encourage them to increase rail traffic. At least until the recent explosion in intercontinental freight prices for air, sea and rail, the Chinese rail operator in each city, also known as a *platform*, received undisclosed subsidies from local Chinese government agencies.

Rationale for the subsidies

Since 2012, China has been developing - and subsidising - container rail transport between more and more Chinese and European cities. One aim has been to promote the development of China's inland provinces. As we have already seen, China also seems keen to create a network of self-sustaining and

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politically effective links with Europe. The pandemic has disrupted global trade and significantly increased freight prices between China and Europe for all modes of transport, including rail. But the growth of rail transport is uninterrupted.

In April 2019, Jacob Mardell analysed China's rationale for these subsidies and also their impact. Fast rail freight at subsidised prices raises awareness of the of the rail option. In the longer term, the subsidised trains should contribute to the development of China's inland provinces and dry ports - a key objective of the BRI. Beijing, which wanted to boast about trade along the Eurasian rail freight route, subsidised each city according to the number of routes it operated. Cities thus competed with each other to operate the most routes. One Western think tank even said that the subsidies were an “advertising budget” for the BRI.

For Mardell, critics were right to question the commercial logic behind the increase in traffic, but wrong to give the phenomenon a purely propagandistic value. Like the BRI as a whole, Sino-European rail freight has an economic background that has gone hand in hand with Chinese government spending and political will. [[Berlin Policy Journal](#), 10 April 2019]

The role of Chinese local authorities in subsidies

The main rail freight services between China and Europe have been developed by local Chinese government agencies. In each Chinese rail terminal, the *platform* handles westbound container traffic and organises and tracks trains in both directions.

The Diplomat pointed out that subsidies are not only provided at the national level, but also by provincial and prefectural governments. [[The Diplomat](#), 13 November 2020] To encourage international traffic to Europe, many Chinese provinces, most of which are landlocked, subsidise rail prices. [[China Global Television Network](#), 26 August 2020]

In maritime and air transport, forwarders usually choose the Chinese port or airport closest to the origin of the cargo, while in rail transport, the choice of Chinese rail terminal also considers the European cities served, train frequency, service reliability and of course the (subsidised) price.

Estimates of the level of subsidies

No one really knows the level of subsidies, said Peter Pardoel, board member of the Dutch freight company Cabooter Group in 2019, pointing out that each rail departure terminal has a different subsidy agreement with the Chinese government. [[Journal of Commerce](#), 30 December 2019] However, various estimates are available.

Chinese media reported that state subsidies for rail transport to Europe reached 50% in 2018. [[Valdai Club](#), 5 November 2020] Another estimate for the same year says that Chinese companies would probably have to charge \$10,000 per container to make a profit, but the subsidies allowed them to charge only \$3,000 to \$6,000 per container. Some offered prices as low as \$1,000 per container, which was about the price of ocean shipping at the time. [[Reuters](#), 27 June 2018]

In 2019, the subsidies reportedly funded 40% of the cost of the trains. [[OWC-Verlag](#), 18 October 2019] According to another report the same year, subsidies covered up to 60 % of costs. [[Berlin Policy Journal](#), 10 April 2019] Also in 2019, the World Bank reported that subsidies for rail transport between China and Europe ranged from less than 50% to about 75% of costs. [[Logforum](#), 30 March 2020]

According to an estimate from 2020, subsidies account for 30-50 % of the costs. [[The Diplomat](#), 13 November 2020] Finally, *ORF Steiermark* reported in June 2021 that rail freight transport to and from

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Europe has been subsidised by China by up to 40% in recent years. [ORF Steiermark, 21 June 2021]

Effects of subsidies

Railfreight.com reported that with prices only slightly higher than ocean freight, traffic in Xi'an grew 537% in just one year between 2017 and 2018. The increasing number of trains was not a response to market demand, but instead meant to more subsidies from the central government. Traders in China transported their products thousands of kilometres eastbound to benefit from the Xi'an government's subsidies for westbound container transport. [Railfreight.com, 1 October 2019] In September 2020, the same publication estimated that the subsidised price for transport from Europe to China was lower than the price for transporting a container from Chengdu to Shanghai. [Railfreight.com, 17 September 2020]

Similarly, the existence of Chinese subsidies for rail freight to Hamburg, for example, could lead to containers moving by truck back to Warsaw to reach their true destination.

Jacob Mardell estimated that several Chinese logistics companies have become very competitive in Europe thanks to subsidised trade and that many European companies are doing “incredibly well” thanks to these same subsidies. [Berlin Policy Journal, 10 April 2019]

Subsidies for the transport of empty containers

Until 2018, in its drive to expand rail traffic between China and Europe, the Chinese government did not even require subsidised containers to be loaded. Many operators reportedly moved empty containers from China to Europe just to get the subsidies. [The Atlantic, 1 October 2019]

From 2018, the Chinese government started to centralise the commercial operation of China-Europe trains. It then decided to subsidise only full trains, to limit subsidies and to ban empty containers on the trains. [Journal of Commerce, 30 December 2019] In September 2018, the government imposed a new restriction on rail traffic between China and Europe. To benefit from a subsidy, only trains with loaded containers were allowed to leave China for the West. A train with 40 loaded containers and one empty container would not be subsidised. [Railfreight.com, 1 October 2019] This restriction led to new problems, because customers wanted to move some containers west empty, not to receive subsidies, but as a market reaction to imbalances in traffic. [Rob Brekelmans, Eurasian rail freight webinar, 17 October 2019]

Calls for reduced subsidies

In January 2021, *Railfreight.com* reported on an analysis of China-Europe rail subsidies by a team of economists. According to the analysis, the stated purpose of the subsidies was to ensure the stability and regularity of train services between China and Europe and to improve their competitiveness in the international transport market. However, if the subsidies are too high, they can sap the motivation of operators to improve their services and thus their attractiveness in the market. With less financial support, the economic and social benefits of China-Europe rail transport would be expected to rise as operators have an incentive to improve their operations and better meet shippers' expectations in terms of punctuality and reliability on their own. [Railfreight.com, 11 January 2021]

In mid-2020, the Chinese authorities became increasingly aware that market mechanisms were the only possible basis for sustainable development of rail links with Europe and that subsidies should be phased out. [China Global Television Network, 26 August 2020] Transport companies that were customers of China-Europe rail services did not want to build logistics chains that depended on subsidies. A contribution by the *Valdai Club* found that the sustainable development of trade relations

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with Europe must depend on market mechanisms. Subsidies for freight transport between China and Europe must be stopped. [[Valdai Club, 5 November 2020](#)]

Expected effects of an abolition of subsidies

In October 2019, *Railfreight.com* described the expected reduction in subsidies as a blessing for the market. Low prices are not good for the market in the long term, as customers will switch to sea or air transport once these subsidies are removed. [[Railfreight.com, 1 October 2019](#)]

The prospect of lower subsidy rates could be an incentive to increase China-Europe-China traffic, so that once subsidies are removed, economies of scale in operating these trains will be enough to reduce transport costs to sustainable levels. [[Area Development and Policy, 12 October 2019](#)]

In October 2019, consultant Rob Brekelmans predicted that the subsidies would end by 2022. The removal of subsidies will lead to a shift in rail traffic between China and Europe to higher value goods. This is the only way to be competitive on a realistic basis. [Rob Brekelmans, Eurasian rail freight webinar, 17 October 2019]

In early 2020, a report of the International Union of Railways (UIC) indicated that a cut in Chinese rail subsidies would lead to a redistribution of traffic flows, reshape the market and give rise to new offerings. A cut in Chinese subsidies is expected to lead to a radical redistribution of traffic flows among the corridors and change the relative importance of Chinese cities concerning Sino-European rail. Much of the freight currently railed between China and Europe is highly dependent on subsidies and would shift to maritime transport. The exception is time-sensitive products or those that require special transport conditions, such as food, engineering products and chemicals. [[UIC, 24 March 2020](#)] The higher the value of the cargo, the less likely it is that a given price difference will cause the cargo owner to switch from rail to sea.

Other reasons for the growth of Sino-European rail transport before the pandemic

In August 2020, *China Global Television Network* presented other reasons besides subsidies for the rapid growth of rail traffic on the China-Europe routes before the pandemic:

- The increased competitiveness of the Chinese economy was accompanied by a rapid increase in exports to European markets.
- China's increasing exports of high-value products require faster delivery than is possible with ocean shipping.
- The Chinese government's "Go West" policy focuses on developing the central and western provinces, from where rail transport to Europe can be cheaper and faster.
- Due to the growing prosperity of the population, more and more Chinese want to consume expensive and high-quality European products.
- The creation of the Eurasian Customs Union, which includes Kazakhstan, Russia and Belarus, enables the free movement of goods and fast and cheap rail connections. [[China Global Television Network, 20 August 2020](#)]

Are the rails between China and Europe greener than the sea?

Environmental sustainability is increasingly a criterion for transport mode choice in intercontinental transport. Logistics managers must therefore ask themselves the question: Is maritime transport more environmentally friendly than rail transport between China and Europe? The answer is not obvious. It

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depends both on the direct CO₂ emissions of ships and trains and on how countries generate electricity for locomotives. One thing is clear: both modes of transport emit far less CO₂ than air travel, with which Sino-European rail also competes.

Moving away from city-to-city trains to hub-and-spoke networks

The transition from a subsidised system for rail transport between China and Europe to a more market-oriented environment will accelerate the gradual replacement of city-to-city trains by hub-and-spoke networks.

Only city-to-city trains are subsidised

Chinese cities and provinces have distributed subsidies for rail transport between China and Europe. A clever aspect of the Chinese government's subsidy system was the requirement that a train leaving a Chinese city must carry containers for a single European city in order to receive a subsidy. Local governments therefore only funded city-to-city trains (also called block trains) between China and Europe.

This rule has political, commercial and operational advantages, but also disadvantages: In rail transport between China and Europe, the block train is only virtual, and a city-to-city train forces a container to travel via the train's destination before continuing to the container's true destination.



Tank containers in Grosskorbetha, Germany, on 19 August 2017. Photo Richard Latten.

Political advantage

One of the impacts of city-to-city trains has been political. In the spirit of the BRI, which includes China-Europe rail, city-to-city trains have allowed the Chinese city or province concerned and the central government to announce and promote explicit links between Chinese and European city pairs. In 2020, for example, China heavily promoted trains carrying masks and other anti-Covid materials

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from a Chinese city to a European city. The city-to-city trains were meant to make people at both ends of the train feel close to each other and have a common destiny that the train would promote.

Commercial advantage

The impact of the city-to-city train is not only political but also commercial. Talking about a block train to a European city has a greater commercial impact than talking more abstractly but precisely about rail service to that city. The term block train suggests that a group of containers travel together from China to Europe and through Europe, and that the containers are tracked and managed together. This can reassure customers.

Operational advantage

A third advantage of a block train is that it can facilitate coordination between the relevant actors in China, Europe and the 1520-mm network in between.

Disadvantage 1: The containers in a block train do not always travel together

In rail transport between China and Europe, the block train is a virtual concept. A container has never made the journey from its origin terminal on the Chinese 1435-mm network to its destination terminal on the European 1435-mm network on the same physical train. This is because it must travel over the 1520-mm network.

Normally, when we think of a container train, we think of a series of flat wagons carrying a group of containers from point A to point B. However, as the 1520-mm network can accommodate trains that are about 50% longer, three trains on the Chinese 1435-mm networks can be combined or separated into two 1520-mm trains.

When they arrive on the European network, the logic of block trains would dictate that these containers be combined again into a single 1435-mm train. But they may not be. And on their journey through Europe, the containers may again change trains before reaching the destination city of the virtual block train. Containers heading east go through this chain in the opposite direction.

In rail freight transport between China and Europe, the block train concept is therefore a metaphor for a container transport service between A and B in which containers actually travel on several trains. Containers leaving a Chinese city together do not necessarily arrive together at their destination in Europe, as they have travelled through the 1520-mm network and then the 1435-mm network in Europe on trains of different lengths and may have changed trains several times.

This creates a dissonance between the theory of the block train - a group of containers travelling together to their destination terminal - and the practice where the containers of the virtual block train may arrive on different physical trains. This dissonance can undermine customer confidence.

Disadvantage 2: All containers in a city-to-city train have the same destination

The term “city-to-city train” means that all containers leaving a Chinese city on the same train are destined for the same European city (or vice versa). This rigidity unnecessarily limits the number of origin-destination relations that China-Europe rail can serve. A container ready to leave a terminal must wait until a whole train of containers is assembled, all bound for the same destination. The fixation on city-to-city trains limits the commercial reach of a Chinese terminal and the frequency of train departures, which much match the flow of containers to specific European destinations on the terminal’s city-to-city trains.

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In addition, *Railfreight.com* reported in March 2021 that faced with pandemic-related capacity constraints, forwarders have searched for additional departure points in China. The current system of city-to-city block trains forces containers to take routes that distance them from the container's true origin and destination. The rigidity of city-to-city trains means that a change of the Chinese origin terminal can also result in a change of the European destination terminal, causing problems on the “last mile” in Europe. For example, goods destined for the Netherlands may have to be picked up in Poland. [Railfreight.com, 2 March 2021]

Opportunities in a more market-oriented environment

In a more market-oriented environment, rail operators and freight forwarders would focus less on city-to-city trains and more on the optimal rail transport of each container from origin to destination via hubs. Such an environment would likely lead to a hub-and-spoke network in which a departing train in China could transport containers for any European city.

As we have seen, current China-Europe-China trains are city-to-city trains for political, commercial and operational reasons. A train from one Chinese city carries containers destined for a single European city (or vice versa):



In the near future, however, city-to-city trains may give way to a hub-and-spoke network in which a train from a Chinese city will carry containers destined for several European cities to a hub:



In Europe, such a hub-and-spoke system has already developed, at least in part. Terminals such as Duisburg, Hamburg and Małaszewicze already serve as hubs. City-to-city trains run from China to these European hubs, which then reload the containers onto intra-European trains bound for the containers' destination terminal.

In China, however, this practice is less developed. So far, Chinese subsidy policies mean that few containers change trains at Chinese hubs. Instead, each city sends its own block trains to specific European cities. City-to-city trains therefore prevent (or at least discourage) the use of hubs in China. Exempt from this ban, secondary Chinese terminals could run trains to Chinese hubs. Several observers have recommended that Sino-European rail services adopt this type of hub-and-spoke operation. From the Chinese hubs, these containers would then travel on intercontinental trains to Europe. Each container would traverse the 1520-mm network and reach its European destination terminal after changing trains at one or more European hubs. (Eastbound, containers would go through the same chain in reverse order).

This means that a container in China could take the next train from its origin terminal regardless of its European destination. Hub-and-spoke operations would thus increase the frequency of departures available for a given container and thus reduce average container journey times.

Proposed reorganisation of hubs

An expert quoted by the *Journal of Commerce* in December 2019 said that China has room for four or five hubs. Given current traffic levels, Xi'an would certainly be one of them. Rail shuttles would

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connect a series of secondary terminals to each hub. The hub would assemble one or more daily trains. Each train could carry containers to any European destination. On the European side, it would be best to sort certain containers by destination at crossings between gauges like Małaszewicze - where the containers have to change trains anyway - instead of moving them in a rigid city-to-city train to Hamburg or Duisburg. This would avoid cases where containers from China arrive in Germany by train and then return to their final destination in Poland by truck. [[Journal of Commerce](#), 30 December 2019]

The shift from city-to-city to hub-and-spoke operations for rail transport between China and Europe will also facilitate the repositioning of empty containers.

The role of information systems in hub-and-spoke operations

As mentioned above, the current practice of grouping containers in a (virtual) block train can facilitate coordination between the actors involved in China, Europe and the 1520-mm network. In hub-and-spoke operations, on the other hand, instead of managing the transport of containers in block trains, operators would use sophisticated information systems to plan and track the transport of each container on a well-defined set of trains - and short-sea vessels or barges on certain routes.

The role of digitalisation

In addition to managing the transport of individual containers in hub-and-spoke networks as described above, press reports have suggested other ways to better digitalise rail transport between China and Europe.

In May 2019, *Railfreight.com* reported that while container handling at the 1435/1520 crossing in Małaszewicze takes only four to five hours, documentation handling may take 24 hours. [[Railfreight.com](#), 15 May 2019]

In November 2020, *Railfreight.com* pointed out that shipping and air transport are already largely digitalised. The rail sector therefore needs to provide equally competitive tools that ease the tasks of all stakeholders. [[Railfreight.com](#), 18 November 2020] In addition to costs and speed, a logistics manager also considers “soft” factors such as uniform customs standards and the minimisation and simplification of administrative procedures when selecting a transport service provider. [[China Global Television Network](#), 26 August 2020] Customs procedures need to be simplified and greater use made of the standard CIM/SMGS consignment note and its digital form. [[Index1520.com](#), 26 November 2020]

According to an expert's estimate in *Railfreight.com* in April 2021, making rail freight between China and Europe as easy to use as sea freight will require at least 10 years of development and international cooperation. Navigation on the open sea may be difficult, but it does not have to deal with congestion at crossings between gauges. [[Railfreight.com](#), 20 April 2021]

The main need of customers: Transparency - real-time and predictive

In rail freight between China and Europe, tracking, information integration, arrival time prediction and data interoperability, i.e. dematerialisation of information between all parties need to be improved.

Some customers have complained that subsidies give Chinese operators little incentive to progressively improve service quality and, in particular, real-time and predictive transparency of shipments. In discussions with this author, several European customers said that the estimated times of arrival (ETAs) provided by rail operators between China and Europe were sometimes poor. According

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to these customers, as the introduction and subsidisation of freight trains between China and Europe largely reflects policy decisions by the Chinese central government rather than a drive to meet customer needs, some platforms have little incentive to improve.



Tank containers in Ratingen-Lintorf, Germany, in April 2016. Photo: Guy Houston.

Customers want reliable and secure door-to-door container tracking. Customers say that the more information a transport solution provides to customers, the more they will use the solution. In addition, some customer segments insist on shipment visibility and will not consider a solution in which this visibility is insufficient.

Forwarders need to focus on informing their customers of possible delays so the customers can properly plan their sales, inventory and downstream logistics. According to customers of China-Europe trains, the Chinese Railways sometimes suspended westbound trains without warning during the pandemic. Logistics service providers under Western control are used to a certain standard of customer information that some Chinese platforms are currently failing to meet. In rail freight transport between China and Europe, reliability and visibility are more important than faster transit.

Development of rail transport between China and Europe during the pandemic

In the first months of the 2020 pandemic, masks and other personal protective equipment (PPE) became a new and highly visible category of goods on trains from China to Europe. Some block trains carried only PPE. China publicised these movements. Large quantities of consumer electronics were also shipped to the West to equip new European home offices. [Lloyd's Loading List, 8 February 2021]. The owners of these products shifted to rail as the pandemic reduced capacity and reliability and increased the prices of air and ocean freight.

In October 2020, prices for rail transport between China and Europe increased, but in some cases not apace with rising sea freight prices. [Deutsche Verkehrs Zeitung, 9 February 2021] In January 2021, the *Journal of Commerce* pointed out that until then, the main argument for rail transport between China and Europe was that rail was faster than sea and much cheaper than air. Against the backdrop of

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the pandemic shipping crisis, rail and sea freight prices have converged. [[Journal of Commerce, 14 January 2021](#)]

In February 2021, *Lloyd's Loading List* reported that unaffordable air freight prices, rising ocean freight prices and the lack of containers available for loading in China were driving up costs and uncertainty over transit times, prompting customers in Asia and Europe to increasingly turn to rail freight. Cargo owners and their logistics service providers were seeking more reliable and stable alternatives to the congestion, cancelled sailings and rising costs of ocean freight that had eroded what was normally a significant price differential between ocean and rail services between Asia and Europe.

However, higher demand for rail led to bottlenecks at crossings between gauges. Pandemic-related restrictions led to longer transit times and higher rail prices. Rail prices between China and Europe roughly doubled in the final months of 2020, driven by strong demand from customers displaced from air and sea transport, as well as capacity and container shortages. However, demand for trains between China and Europe remained strong and reportedly, in October 2020, ocean freight prices between China and Europe sometimes even exceeded rail prices.

Demand has continued to grow in 2021, despite the sharp increase in rail prices for increasingly limited capacity, as well as delays at some 1435/1520 crossings, which have caused backlogs and additional bottlenecks in the supply chain. However, rail transport from Asia to Europe is currently a competitive alternative to sea freight, not least because of the lack of containers that can be loaded in China, which increases the costs and delays of sea freight. Whereas Sino-European rail was formerly a business with very high margins for European logistics providers, the increase in rail prices between China and Europe has made the profitability of rail services between China and Europe rather marginal for freight forwarders. [[Lloyd's Loading List, 4 February 2021](#)]

Also in February 2021, the *Deutsche Verkehrs-Zeitung* reported that freight transport with China had become five times more expensive, regardless of the route. That month, a slot on a container train between China and Western Europe cost \$12,000. The increasing demand for transport had also depleted the market of available containers. Renting a container was now as expensive as buying one before the pandemic-related “boom”. In the meantime, however, the purchase prices for containers had also doubled. The rise in sea and rail prices since the start of the pandemic has made Chinese rail subsidies redundant. [[Deutsche Verkehrs Zeitung, 9 February 2021](#)]

In early March 2021, *Railfreight.com* reported that a huge amount of freight was waiting in China for transport to Europe. Trains between China and Europe were running as frequently as the network would allow, but there were limits. At the same time, many European countries were blocked, so much of the freight was not delivered to the end customer. The result: full Chinese warehouses and a shortage of empty containers.

Despite train delays, customers were still booking places. Their only thought was to get their goods out of China. But the network capacity, the fleet of vehicles and the number of available containers was too small.

The lack of space on ships and trains and the lack of available containers were especially problematic for the owners of low-value products, who couldn't move their goods out of China. They were waiting for prices to fall. Their cargo got stuck. [[Railfreight.com, 2 March 2021](#)]

In April 2021, *Railfreight.com* reported that prices for trains between China and Europe now likely exceeded the Chinese railways' operating costs. In the same month, Chinese Railways reduced its April 2021 train programme by one-sixth from the previous month, possibly due to a lack of capacity. [[Railfreight.com, 21 April 2021](#)]

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The current situation of rail transport between China and Europe in the Covid crisis

The Covid crisis has disrupted global trade and massively increased prices between China and Europe - both by sea and by rail. Simply finding a way to transport a container between China and Europe is now more important than the quality of the service or the price. Subsidies are no longer relevant.

An analysis by the Journal of Commerce

In mid-July 2021, the *Journal of Commerce* published a succinct analysis of the state of China-Europe rail transport in the current environment. Although rail prices have quadrupled since before the pandemic, customers say the appeal of rail between China and Europe - cheaper than air and faster than sea - has been accentuated by the shortage of sea containers, record prices and congestion at European ports.

Currently, sea freight tariffs - at least for China-Europe traffic - are very high, creating a large demand for rail connections between China and Europe. The narrowing of the cost differential between rail and maritime transport is driving this demand. Before the pandemic, the price of rail transport from China to northern Europe was around \$4,000 per 40-foot equivalent unit (FEU) but has quadrupled to \$16,000 to \$18,000 per FEU due to a combination of high demand, limited capacity and container shortages.

Rail vs. ship: reduction in cost difference, increase in transit time difference

The *JOC* article pointed out that while the price difference between rail and maritime was narrowing, the difference in transit time was increasing. Carriers offering rail services between China and Europe boasted transit times of between 18 and 22 days, whereas the published transit time for container transport by sea is around 35 days and schedule reliability on the Asia-North Europe ocean route had fallen to a record 23%.

Better forecasting and planning for rail traffic between China and Europe

However, *JOC* reported, trains and schedules can also vary depending on traffic management, wagon availability, congestion at 1435/1520 interchanges and container space management on a given route. In such a climate of uncertainty, customers who make accurate volume forecasts had the best chance of having their goods loaded on trains.

Customers' former *ad hoc* use of rail had therefore evolved into a more regular and planned practice. Although freight forwarders welcomed this development, it is not without problems. Some customers were starting to commit weekly volumes to trains, which exhausted the available capacity and left no room for *ad hoc* bookings, increasing spot prices. [*Journal of Commerce*, 15 July 2021]

While intercontinental freight was a buyer's market before 2020, the pandemic has transformed it into a seller's market. This new relationship has allowed sellers of rail services between China and Europe to transfer the financial risk of booking capacity to customers.

Transfer of air freight to the rails

As of July 2021, at current prices, rail was the only alternative to the sea route between China and Europe, except for owners of very high-value products who could still think about air travel. According to the *Journal of Commerce*, electronics and high-tech companies had shifted their shipments from air to rail in the previous two years, and this shift has accelerated since the pandemic.

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[Journal of Commerce, 15 July 2021] At the end of July 2021, *The Loadstar* reported that it would cost half a million dollars to transport the equivalent of a 40-foot container by air. [[The Loadstar, 28 July 2021](#)]

Reduction of rail capacity by 30%

In the same article, however, *Loadstar* also reported that the high-demand Sino-European rail service could see a drastic 30% capacity reduction in September, due to congestion and delays at the Kazakh and European 1435/1520 crossings. One freight forwarder indicated that rail prices between China and Europe were around \$18,000 per container in September, depending on the route. [[The Loadstar, 31 August 2021](#)] In early September 2021, *Logística* raised an alarm about the accumulation of containers in Kazakhstan, especially at the 1435/1520 crossing in Khorgos, due to pandemic disruptions and an explosion in volumes. Trains scheduled to depart in August were postponed until September. A 30% capacity reduction was feared for China-Europe block trains. It was expected that space available for containers on the China-Europe rail route would be very limited in September 2021, given the reduced capacity and increased demand. Rail operators had announced general price increases for September, in parallel with price peaks in the ocean freight market. [[Logística, 1 September 2021](#)]

Have subsidies lost their meaning?

All questions about the impact of Chinese subsidies of rail freight to Europe have been swept aside - at least temporarily - by the pandemic. Since the beginning of 2020, the global transport system has been completely thrown out of balance by the non-synchronous closures and openings of various countries' economies and by sudden surges in demand for certain product categories. This has made matching transport capacity to demand much more difficult than in the more stable times before the pandemic. A notable example is the extreme shortage of containers in China, as European and other Western countries cannot unload and return these containers fast enough. The result is capacity bottlenecks and skyrocketing prices for transporting containers by ship or train between China and Europe.



Tank containers in Schulen, Belgium, on 4 April 2019. Photo Johny Brauns.

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It is unclear whether Chinese subsidies for rail transport between China and Europe have survived the current price explosion in air, sea and rail transport. At the moment, the railways certainly don't need them. In early September 2021, *Railfreight.com* reported on the consensus of participants at the Rail Freight Summit Conference that, given the current high prices due to pandemic disruption of global trade and rapid volume growth, any remaining rail subsidies of Sino-European rail are irrelevant. Subsidies in the years leading up to the pandemic only advanced the development of rail transport between China and Europe by about five years compared to what the market would have produced anyway. [[Railfreight.com, 7 September 2021](#)]

Prospects for rail transport between China and Europe

The outlook for China-Europe is twofold: Maintenance of traffic and a possible return to dependence on Chinese subsidies.

Rail will retain much of the traffic it gained during the pandemic

In May 2021, *Hellenic Shipping News* reported that the number of orders for new container ships between January and March this year was 138, already above the 105 ships ordered in the whole of 2020. It takes two to three years to fill such orders. When this capacity finally becomes available, some of the demand that has shifted to rail freight may not return to ships. [[Hellenic Shipping News, 6 May 2021](#)] The pandemic is said to have had a positive impact on logistics, forcing customers to consider rail as an alternative to the sea route between China and Europe.

The pandemic-induced shortage of containers has given transcontinental rail a chance to make its mark in a way that some customers will find hard to ignore once the logistical balance in maritime transport is restored. [[Short-sea Shipping Inland Waterway Promotion Center, downloaded on 18 July 2021](#)]

Before the pandemic, according to one estimate, given the value and transit time required for products flying from China to Europe, 50% of this could be shifted to rail. The rise in air prices in the current crisis may have made such shifts a reality. As with maritime transport, some of the traffic that rail has been able to take over from air between China and Europe will not return.

This could create a virtuous circle: The more TEUs transported on trains between China and Europe, the fuller and more economical the trains, the higher the frequencies and the lower the transit time and its fluctuations. And so even more TEUs will move by rail.

Can Sino-European rail transport survive without subsidies?

It is not clear whether China-Europe rail will need Chinese subsidies again to survive in the coming years. *Railfreight.com* reported a consensus at the Rail Freight Summit in Poland in early September 2021 that the market would continue to support China-Europe rail without subsidies once the effects of the pandemic have subsided. [[Railfreight.com, 7 September 2021](#)]

According to *Railfreight.com*, in the current situation, every slot on a ship or train between China and Europe is immediately booked despite the very high prices. When sea-freight prices return to normal, low-value products and bulk goods will no longer move by rail between China and Europe. But higher-value products, i.e. the goods that are best suited for rail transport, will remain. Rail transport between China and Europe is only suitable for certain customers: those who transport high-value or time-sensitive products and who are therefore willing to spend more money for shorter transport times. [[Railfreight.com, 9 September 2021](#)]

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In any case, transport prices between China and Europe will fall. The world population is being vaccinated and a wave of new ships will arrive by 2023. The global transport system will regain its stability and rail will again compete with Sino-European maritime transport. The focus will again be on price and quality of service - and perhaps on subsidies. Problems caused by subsidies may again come to the fore.

As we have seen, until the pandemic disrupted intercontinental maritime transport and massively increased transport prices worldwide, Chinese subsidies covered about half the cost of Sino-European rail freight. Given that the price of rail transport between China and Europe has increased along with the price of maritime transport, the current situation is unclear. However, the return of the East-West imbalance in rail transport to pre-pandemic levels in the first half of 2021 suggests that the impact of the pandemic is subsidising and that rail and maritime prices could fall to the point where the East-West imbalance in rail transport would again require subsidies

Management of empty containers

Before but also during the pandemic, the management, return and delivery of empty containers has been a problem in Sino-European rail transport.

Before the pandemic, one objective of Chinese subsidies was to kick-start the development of commercially viable rail links between China and Europe. But the path to that viability was not clear. As this report describes, several factors have been hampering rail transport between China and Europe. Although rail traffic has grown dramatically every year since 2016, much of the pre-pandemic growth was bought by Chinese subsidies that kept the price of rail transport well below cost.

Until 2018: subsidies for the transport of empty containers

Chinese subsidy policies also impacted empty containers. There were two main phases. To achieve fast volume growth, the Chinese government even subsidised the transport of empty containers by rail between China and Europe for a time. The *Chinese Business Journal*, overseen by the Chinese Academy of Social Sciences, revealed that as recently as 2018, Chinese cities were subsidising empty container traffic to inflate the growth statistics for Sino-European rail transport. The subsidy policy allowed many containers to travel empty between China and the EU. [[Railfreight.com](#), 1 October 2019]

From 2018 on: ban on empty containers

The Chinese government went to the other extreme in 2018. From now on, only fully loaded trains heading west would be subsidised. A train with 40 full and one empty container would no longer receive a subsidy. [[Railfreight.com](#), 1 October 2019] One operator reported to the author that a container was sometimes loaded with a pallet of bricks to qualify as loaded. However, *Railfreight.com* noted exceptions for special situations such as the return of temperature-controlled containers. [[Railfreight.com](#), 21 August 2019].

In early 2019, the requirement that all of a subsidised train's containers be full delayed entire trains. This affected transit-time reliability, thinned out the service until the 2019 pre-Christmas period and annoyed customers. In April 2021, 95% of the containers on the trains were full. [[Railfreight.com](#), 21 April 2021]

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The market sometimes wants to transport empty containers

The transport of empty containers must be seen in context. In container transport, market participants - regardless of the mode - are sometimes willing to pay to transport of empty containers in order to reposition them. Some containers will therefore always move empty. In August 2019, *Railfreight.com* pointed out that rail transport between China and Europe, like sea transport, requires some market-driven shifting of empty containers, which are themselves a resource. [[Railfreight.com, 21 August 2019](#)]

Between China and Europe, this is especially true for eastbound containers, as more cargo moves westward. But the market may want to move some empty containers westward, such as temperature-controlled containers or containers with racks for transporting autos. Also, as we have seen, some European regions and cities have net eastbound traffic flows. Rail traffic between China and Europe does not escape the general rule of container traffic around the world: The details of trade flows and the management of empty containers can mean that some containers moving from Europe to China - and even from China to Europe - sometimes run empty.

Management of empty eastbound containers

As we have already seen, taking UTLC traffic as a proxy for Sino-European rail freight volumes, 1.66 westbound containers moved from China to Europe for every eastbound container in the first half of 2021. However, some of these containers were likely empty: UTLC reported that about 3.7% of all China-Europe-China containers in transit were empty in 2020. Of this total volume, 3.6% were empty containers eastbound and 0.1% were empty containers westbound.

Given the current East-West imbalance in TEU flows, some containers will have to return to China empty by sea or rail. The following table explains some advantages and disadvantages of both modes.

Options for the transport of empty containers eastbound from Europe to China		
	Sea freight	Rail freight
Advantages	Lower costs, at least before the pandemic.	Free spaces are available on partially empty trains heading east. The container arrives directly at the Chinese rail terminal, from where a truck can bring it to a customer in the region for loading.
Disadvantages	Need to transport containers to a European port and then from a Chinese port to the area of a Chinese rail terminal.	Higher costs for rail transport, at least before the pandemic, including transloading between gauges at both ends of the 1520-mm network.

Before the pandemic, the transport of eastbound containers - whether empty or full - was not subsidised by China. This meant that almost all empty containers arriving loaded in Europe returned empty to China by sea. The rail companies involved in Eurasian rail transport do not have this option for their empty wagons: they must return them east by rail in any case.

In March 2021, *Railfreight.com* reported that the imbalance between eastbound and westbound

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volumes was already one of the main problems by 2020, as empty containers did not easily reach China. By early March 2021, however, even fewer containers were available and prices had jumped. [Railfreight.com, 2 March 2021]

A month later, *Railfreight.com* reported that the demand for empty containers in China is so great that shipping companies seem to prefer them to loaded containers on ships from Europe to China. [Railfreight.com, 4 April 2021] In June 2021, *ORF Steiermark* reported that as a result of the pandemic, China was suffering from a shortage of containers, which were piling up in Europe. [ORF Steiermark, 21 June 2021]. It is not clear whether the current high prices for the lease of containers have prompted some container owners to send empty containers back to China by rail instead of by ship. But *Railfreight.com* reported that Russian Railways ran some special trains for empty containers. [Railfreight.com, 10 August 2020].

Filling eastbound trains and containers

The best way to ensure the profitability of a rail service for container transport is to fill trains with loaded containers in both directions. While the movement of empty containers eastwards in ocean freight is inevitable due to the structural imbalance in physical trade volumes between China and Europe, trains from Europe to China could fill completely were they to siphon off the most valuable and time-sensitive products from ocean freight. However, increasing eastbound rail traffic remains a challenge.



Container train with tanks in Dijkshoek, the Netherlands, on 1 September 2021. Photo Rob Dammers.

Microeconomic potential of eastbound transport

The Chinese middle class has grown by an estimated 4% per year since 2002 and now accounts for 56% of the population. China is now Europe's fastest growing export market. Before the pandemic, many Chinese had travelled and developed a taste for European products. Demand from the Chinese population and businesses for European food, agricultural products, household appliances and high-tech products is increasing. In January 2021, *United World* reported that EU exports to China have

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doubled in the last decade and are growing faster than EU imports from China. [[United World, 2 January 2021](#)]

Benefits of balanced flows

The more trains in the direction of China are filled with loaded containers, the more sustainable the trains will be in both directions, as this will make them less dependent on Chinese subsidies. More eastbound traffic would help finance the eastward return of locomotives, flat wagons and containers, making China-Europe-China rail transport more profitable for operators and cheaper for customers. In a presentation in June 2021, Jet Young at the International Freight Train Advisory Centre at the China Communication and Transport Association confirmed that the imbalance of freight flows between China and Europe makes it difficult to repatriate eastbound wagons. [[Webinaire IBS, 10 June 2021](#)] These wagons have to return empty or make a diversion via Russia, for example, to be loaded with freight for China.

If more high-value European exports move on trains to China, this will increase operators' revenues and reduce the dependence of rail transport between Europe and China on Chinese subsidies. As we have already seen, in their current form these subsidies only apply to city-to-city trains. The removal of subsidies could encourage the development of hub-and-spoke networks allowing more frequent departures to each container's destination. This would help to fill eastbound trains with containers bearing high-value goods, thus promoting the economic sustainability of China-Europe-China rail transport.

Why not just lower the prices eastbound?

Faster rail transport between Europe and China can attract eastbound traffic that now moves by sea. One way to achieve this would be to lower eastbound rail prices. However, were the price of eastbound traffic to fall too far without benefitting from subsidies, it would become uneconomical.

One argument for lower prices is that the cost of flat wagons and locomotives carrying containers westbound is fixed: they must return eastbound whether they carry containers or not. However, the price of moving a container eastbound must at least cover the cost of managing the shipment and handling the container at the point of origin, at the 1435/1520 crossings and other intermediate terminals, and at the container's destination terminal. Lower value products, such as logs, which sometimes move in containers by rail from Europe to China, are difficult to sell at a price that covers these costs. Rail operators therefore need to look for higher-value eastbound products that can bear a higher price in return for rail's shorter transit time.

Regions with high eastbound traffic volumes

The announcement of new rail connections in the online trade press shows that operators are trying to promote and expand rail traffic from Europe to China. These announcements rarely specify the volume of containers involved, but they do give an indication of the potential flows.

Railweb.com reported that in Chongqing, in 2018 slightly more trains arrived from than departed for Europe. [[Railfreight.com, 8 January 2019](#)] In 2019, the GDP of Shandong province ranked third in China. As an industrial region with a high level of production and consumption, its potential for directionally balanced container flows was considered high. [[Railfreight.com, 19 August 2019](#)] In July 2021, *Railfreight.com* reported the first eastbound train from Budapest to Xi'an. Until then, trains had only run from Xi'an to Budapest. [[Railfreight.com, 28 July 2021](#)]

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Products moving eastwards by all transport modes

Press reports describe the products that are transported from Europe to China by air, sea or rail.

The most important European exports to China in 2017 were high-tech machinery and equipment, especially for the construction, energy and solar energy sectors, car parts and accessories, food and beverages such as wine, cosmetics and hygiene products, and fashion items. [[Business and Management Studies](#), 13 June 2017]

In July 2020, the huge Chinese market was expected to stimulate and support the growth of European exports to China in the long term, both for mechanical and electrical products - such as machinery, mechanical equipment, electrical equipment and machinery parts - and for logistics and transport equipment such as aircraft, ships and land vehicles. Strong export potential was also evident for chemicals and a range of raw materials, parts and components, specialised agricultural products and high-value livestock products. [[La Chine au présent](#), 3 July 2020]

With the growing prosperity of the Chinese population, more and more Chinese want to consume expensive and high-quality European products. [[China Global Television Network](#), 26 August 2020] [Index1520.com](#) reported in November 2020 that the Chinese population is becoming more affluent. More consumers want European products, including wine, food and cars. [[Index1520.com](#), 26 November 2020]

Products with high for potential rail towards China

Given the dominance of westbound traffic in Sino-European trade, companies involved in Europe-China rail transport are expected to try to attract high-value products moving eastbound from Europe to China.

Food and agricultural products

The Chinese middle class, including many who visited Europe before the pandemic, is growing and reportedly wants to consume European food. But Russian sanctions blocked the rail transport of food and agricultural products from Europe to China from 2014 to 2019 - and still affect it.

Ban on transit of sanctioned EU food products through Russia

In the context of the Ukraine crisis, Russia initially banned the transport of food by rail from Europe to China. Recently, Russia relented, but now requires containers to be fitted with special electronic seals with tracking devices as they pass through Russia.

Following the crisis in Ukraine, reported [Railfreight.com](#), the EU imposed sanctions on Russia, to which Russia responded in 2014 by banning the transit of food and agricultural products to Russia. The banned food products included beef, pork, fish, wine, beer and dairy products. The ban also affected flowers and bulbs from the Netherlands, another popular import commodity in China. In mid-2019, Russia lifted the ban but kept the sanctions in place in a new form: to pass through Russia, containers with food or agricultural products had to carry an electronic seal equipped with the Russian satellite technology GLONASS. [[Railfreight.com](#), 9 July 2019]

Implementing this procedure has taken time. The first goods to move from Europe's Nordic countries to China under the new electronic seal was frozen salmon in March 2020. In October 2020, the first full container train departed with milk powder and cream. Other pilot shipments included fish, meat

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and other products. [Index1520, 26 October 2020]. The transit of sanctioned products under seal was expected to increase to 100 containers per month by 2021. [Index1520, 1 January 2021]

Customs clearance in Europe for food destined for China?

Another obstacle to eastbound rail freight is the Chinese rule that certain products, especially foodstuffs, may only be cleared through customs in a particular Chinese city. Dutch companies are therefore trying to organise customs clearance for exports to China before they leave the Netherlands. This would allow the products to move directly to their destination in China. [Railfreight.com, 22 June 2021]

Products that require temperature-controlled containers

A promising category of products for transport from Europe to China are those that need to be transported in temperature-controlled containers, commonly known as refrigerated containers or *reefers*. These reefers can typically cool but also heat their interior to keep it within a certain temperature range. The most obvious candidates for transport in reefers are food, agricultural and pharmaceutical products. On the China-Europe routes, these products mainly flow eastwards. Other candidates for reefer movement are certain electronic products - mainly westbound - that must not get too cold. And of course a reefer can also transport any product to the West, rather than returning empty.

In March 2019, *Railfreight.com* pointed out that foodstuffs such as wine, frozen products such as French fries, pizzas, meat and fish, and fruit and vegetables require reefer transport. [Railfreight.com, 20 March 2019]

At the start of 2021, however, China stopped refrigerated shipments from Europe because of fears that the Covid virus could survive during transport. A next wave of shift to rail will happen once the cold chain problems are solved. Pharmaceutical and healthcare companies would then be able to ship products by rail from Europe to China. [Journal of Commerce, 15 July 2021]

According to *Railfreight.com*, China stopped reefer shipments from Europe to China in the first quarter of 2021 because of concerns that the Covid 19 virus could survive in reefers. Previously, in 2020, these concerns were initially focused on frozen salmon from Europe's Nordic countries. Reefer shipments resumed in early April 2021. This resumption of shipments could be due to the gradual vaccination of the Chinese population and their need for pharmaceutical products.

In the same article, *Railfreight.com* reports that some reefers are now equipped with 900-litre fuel tanks so they can cover the entire distance from Europe to China without refuelling. [Railfreight.com, 4 May 2021] However, this fuel must be compatible - for example in terms of its paraffin content - with the much lower temperatures to which it may be exposed during the journey.

There is no indication that the design of China-Europe wagons will soon allow a train's locomotive to power the containers on the flat wagons it is pulling. In Europe, this could change with the migration to digital automatic couplers that also transmit electrical power. The EU is co-financing this change and aiming to complete it by 2030. Ships have an advantage in this area as they ban reefers' diesel generators from running on board but provide electricity for them.

Wood and other agricultural products

Chinese demand for wood products is reportedly high. However, *Holzkurier* reported in August 2020 that Chinese sawmills and wood-processing industries are predominantly located near the coast, as most wood products enter China by sea. More than half of the timber companies have good access to

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ports. [[Holzkurier, 24 August 2020](#)] In addition, customers shipping goods westbound may be reluctant to place their higher-value products in a container whose previous eastbound cargo was unprocessed wood.

A month later, *Holzkurier* reported that Rail Cargo Austria was offering special prices for timber from Europe to China, saying that timber traffic volumes tended to be stable and that this traffic favoured the shift of wagons and containers to the East. The larger and more regular a product flow is, the cheaper it is per unit. This would allow rail prices to compete with maritime prices. [[Holzkurier, 22 September 2020](#)]

Many empty containers travel east from Europe to Russia, but there they are loaded with timber and other agricultural products for China. In October 2020, *Railfreight.com* reported that some Chinese hubs have started to use container backhauls from Europe to China to transport Russian timber. [[Railfreight.com, 23 October 2020](#)] In August 2021, UTLC reported that it uses empty eastbound containers to transport agricultural products from Belarus and Russia via Kazakhstan to China. [[Hellenic Shipping News, 12 August 2021](#)]

Reports on products that can be transported east by rail

Other press reports give indications of trends in the types of products that are or can be transported by rail from Europe to China.

In 2017, strong demand in western China for high-quality European products already had the potential to stimulate interest in faster rail transport. [[International Railway Journal, 17 April 2017](#)]

In February 2019, Dutch bank ING reported that the most important products transported by rail from Europe to China were machinery, car parts, medicines, cosmetics and milk powder. More expensive foodstuffs, such as wine and fish products, were also promising. At the time, Russian sanctions prevented the transit of foodstuffs to the East. [Presentation by ING Economics Department, 28 February 2019]

In May 2019, UTLC said it wanted to expand the range of products shipped from Europe to China to include lower value bulk products, including food and cellulose. [[UTLC website, 20 May 2019](#)]

In March 2020, *Logforum* reported that rail freight traffic from Europe to China consisted of passenger cars and their components, as well as other industrial goods such as engine parts, pumps and electrical components. These industrial goods accounted for 50% of the total freight volume. Other notable products were chemicals and wood by-products (paper and pulp). In addition, German car manufacturers sent about 63,000 CKD (*completely knocked down*) cars a year to China for assembly to avoid high import duties. [[Logforum, 30 March 2020](#)]

In September 2020, Richard Pomfret said that the Europe-China rail was attractive for European car manufacturers supplying parts for their assembly plants in Western China. Examples include Volkswagen, Audi and BMW. [[Richard Pomfret, University of Adelaide, September 2020](#)]

In the same month, Porsche announced that 11 % of all cars destined for China would move by rail. In 2018, 31 % of all Porsches produced went to China. This makes China the most important target country for Porsche. [[Trend, 16 September 2020](#)]

In October 2020, *Railfreight.com* reported the transport of 46 containers from Linz (Austria) to Xi'an in China for onward transport to Qingdao in Shandong province on the east coast. The shipment of garments made of wood fibres came from the Austrian fashion manufacturer Lenzing. From Xi'an, the containers travelled 800 km by truck to their final destination. [[Railfreight.com, 16 October 2020](#)]

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In a presentation on 14 November 2020, THI Logistics reported that the most important products transported by rail from Europe to China were whole vehicles and parts, components for rail and air transport, mechanical equipment and accessories, food (including beer and wine), baby products, foodstuffs, health and beauty products, German kitchen appliances and furniture.

UTLC reported in November 2020 that the dominant products in eastbound Europe-China rail traffic were wood and wood products, fruits and vegetables and other food products, and medical products. [[Railpage, 24 November 2020](#)]

In an online conference the same month, the managing director of logistics company GVT, Roland Verbraak, explained that China was importing high-end cars, beer and wine from Europe by rail. A bonded warehouse in Wuhan mainly distributed French wine.

Also in November 2020, a block train loaded with copper left Serbia for China. [[Index1520.com, 26 November 2020](#)]

In July 2021, the *JOC* reported that among the products transported from Europe to China, there has been a significant increase in the share of rail freight for steel products, cosmetics, milk powder and rubber products. Consumer goods such as milk powder and skin care products are creating a steady demand for rail transport from Europe to China. [[Journal of Commerce, 15 July 2021](#)]

Promoting eastbound rail transport

Since 2019, several initiatives in China have been promoting rail transport from Europe to China:

- In spring 2019, a Wuhan-based logistics company offered Bordeaux wines on an e-commerce platform in China, where Chinese consumers could place their orders and wait for their wines to be shipped to China by train. [[Quotidien du Peuple, 15 April 2019](#)]
- In August 2019, products containing Dutch agricultural and green technologies, such as irrigation and greenhouse systems, were able to travel VAT-free by train to a logistics park in Zhangjiagang, where they could wait for a buyer in or near China. [[Railfreight.com, 13 August 2019](#)]
- At the political level, China's rail representatives called on the EU and European stakeholders to do more to develop eastbound transport from Europe to China to ensure the sustainability of services in both directions. [[yqqlm, 12 November 2020](#)]
- The international dry port in Chengdu has set up a series of pavilions in which products from Europe are displayed and sold, from French wines to German beers and Italian coffee. Most of the goods come by rail. [[Global Times, 17 February 2021](#)]

Products with high bidirectional potential

In order to ensure the long-term viability of rail transport between China and Europe without subsidies, rail operators and freight forwarders are expected to develop services of products with good bidirectional potential.

According to UTLC, the types of products on China-Europe-China trains evolved in the first half of 2021. For a long time, mechanical appliances, computers, electrical appliances and vehicles had dominated. Currently, China-Europe-China rail carries more than 100 different types of goods, and this diversity continues to grow. [[Index1520.com, 2 September 2021](#)]

Against the backdrop of the current global shipping crisis, many products shifted from air and sea

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freight to rail, including automotive, technology, engineering, manufacturing, consumer and chemicals products. Other types of goods that traditionally moved by sea have also shifted to rail simply because it is available in a context of a maritime capacity shortage. [[Journal of Commerce, 15 July 2021](#)]

LCL shipments

Less-than-container-load (LCL) services are more complex than full-container-load (FCL) services. The forwarder, not the customer, must load and unload the container. For LCL rail shipments between China and Europe, the forwarder needs good partners and storage space at both ends of the route. LCL is less affected by train cancellations and delays than FCL services: While the container carrying an FCL shipment needs to find space on a train, an LCL shipment only needs to find space in a container. The demand for door-to-door LCL shipments between any location in China and any location in the EU - or vice versa – is said to be high. The collective value of LCL shipments could amount to a substantial market. LCL could therefore contribute to a sustainable volume of rail traffic between China and Europe, even if Chinese subsidies were to be removed.

E-Commerce

In the years leading up to the pandemic, consumers gradually abandoned brick-and-mortar shops in favour of e-commerce. The pandemic has accelerated this change considerably. With the easing of Covid restrictions, some shopping is returning to brick-and-mortar shops. However, it appears that much of the shift to online shopping will survive the pandemic.

In September 2020, the Swiss Chinese Chamber of Commerce announced that China had drawn up a list of pilot e-commerce centres that will receive tax incentives to support online commerce. Business-to-business or B2B e-commerce is expected to experience a period of strong growth over the next five years as the internet infrastructure for online trade improves. B2B e-commerce platform DHGate.com, whose sales from Chinese suppliers to foreign companies exploded in spring 2020, has sent products by rail to warehouses in Europe. The improved convenience of online ordering from China, pressure from Chinese e-commerce companies and the availability of rail transport from China to Europe are helping to grow China's e-commerce in the West. [[Swiss Chinese Chamber of Commerce, 9 September 2020](#)].

The extent of traffic development in the other direction, i.e. eastbound e-commerce transactions between European sellers and Chinese buyers, is less well known to the public. However, consultants at the WSL Forum reported growing demand for fast-moving consumer goods (FMCG) from European small and medium-sized enterprises (SMEs) to China via e-commerce platforms in November 2019. [[Wald, Schnee und Landschaft \(WSL\) Forum, Poznan, 18 November 2019](#)]

In the summer of 2021, *Index1520.com* reported that the Chinese government attaches great importance to e-commerce [[Index1520.com, 14 June 2021](#)] and the *Journal of Commerce* pointed out that China's focus on e-commerce imports in its 2021 trade policy favoured rail transport from Europe to China. [[Journal of Commerce, 15 July 2021](#)]

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Chemicals and dangerous goods

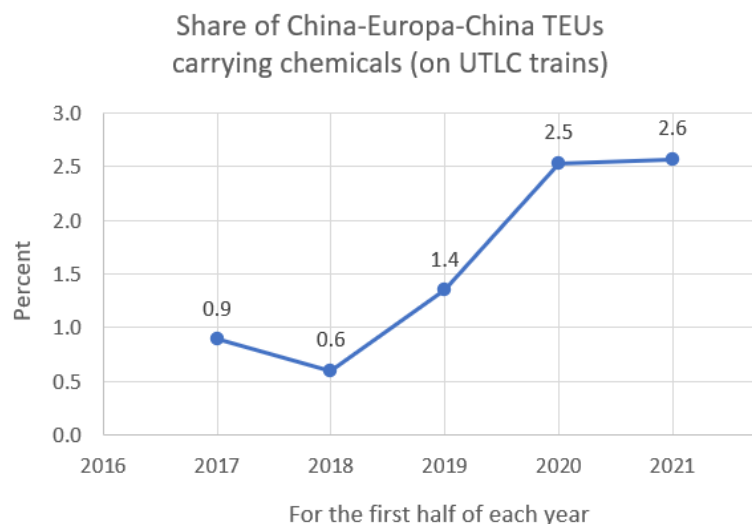
Taken together, chemicals and dangerous goods are a good example of goods with great potential for rail transport between China and Europe. It is true that not all chemicals are dangerous and not all dangerous goods are chemicals. However, many products fall into both categories, so it makes sense to consider them together as a first step.

Eastbound and westbound chemical flows are largely balanced and thus seems to be compatible with China-Europe-China rail traffic. The relatively high value of chemicals means that they can benefit from the shorter transit time of rail between Europe and China compared to sea. The main obstacle to this traffic is perhaps the easiest to remove: Dangerous goods are currently banned on the Chinese Railways.

An article by this author in the German monthly newspaper CHEManager 10/2021 addresses the rail transport of chemicals and dangerous goods from Europe to China and back. Here is an [English translation](#).

Growing interest of chemists in rail transport

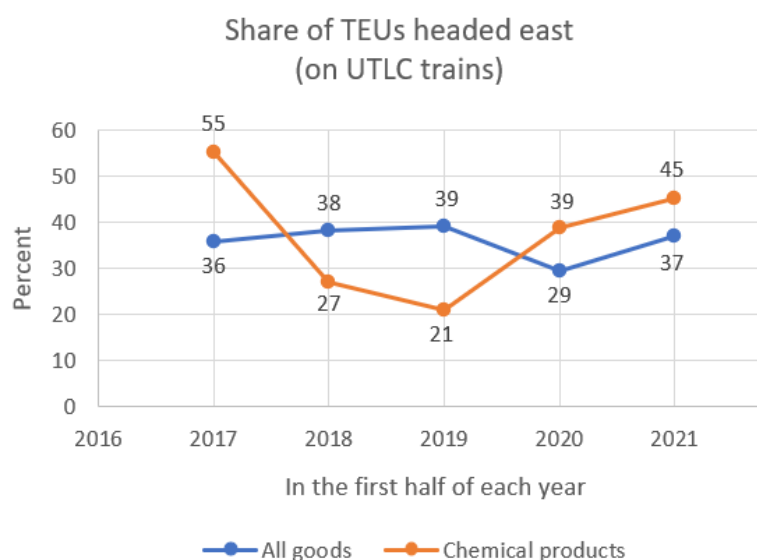
Despite the ban on railings dangerous goods in China, chemical owners seem to be increasingly interested in China-Europe rail transport. Since 2018, the share of TEUs carrying chemicals has risen to 7801 TEUs or 2.6% of total freight on UTLC trains in the first half of 2021.



Stubborn east-west imbalance

Even in the current global supply chain crisis, filling eastbound trains from Europe to China with containers is difficult, as westbound freight flows dominate. Customers heading east may therefore be able to negotiate lower prices. This could be the case for chemicals. Since 2017, the share of eastbound TEUs for all products has been stable at around 38% (except 2020), while the share of eastbound TEUs for chemicals has increased from 21% to 45% since 2019. The following graph shows these trends.

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Ban on the carriage of dangerous goods by rail in China

With only 7801 TEUs on UTLC trains in both directions in the first half of 2021, chemical transport by rail between China and Europe is certainly a niche within the niche occupied by rail transport between China and Europe as a whole. However, a brake on the development of chemical traffic is the the Chinese Railways' current ban on dangerous goods. Indeed, many chemicals that must travel by rail within Europe must travel by truck within China. The less favourable risk analysis for dangerous goods in rail transport in China is perhaps a testament to the greater uncertainty about the consequences of an accident for the railway managers themselves.

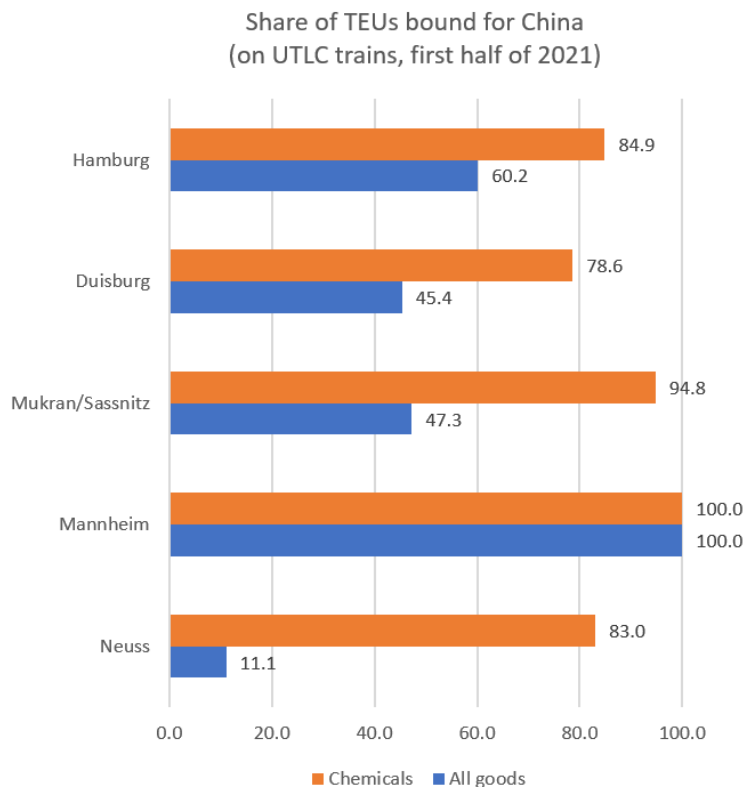
Transport stakeholders in both Europe and China have been trying for years to convince the Chinese Railways to accept dangerous goods. *Railfreight.com* reported in March 2021 that one of the most eagerly awaited breakthroughs for Sino-European rail freight is the lifting of this ban. Many operators involved, such as DB Cargo Eurasia, have expressed hope for such a development. China itself is now reportedly considering allowing dangerous goods by rail. Much lobbying is in progress.

[[Railfreight.com](https://www.railfreight.com/news/industry/2021/03/19/china-ban-on-dangerous-goods-by-rail), 19 March 2021]

Germany's rail transport tends to be eastbound - especially the chemicals

In the first half of 2021, the majority of UTLC rail traffic was westbound. But in the European country with the largest share of this traffic - Germany - most of UTLC's traffic was eastbound. In Germany, the share of eastbound traffic was 54% for all goods and 85% for chemicals. However, this share varied greatly between the German cities. Westbound TEUs dominated in Duisburg and Neuss, while eastbound TEUs dominated in Hamburg. Mannheim's traffic was eastbound only. In all German cities, a high proportion of UTLC TEUs loaded with chemicals were destined for China.

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Understanding these trends and imbalances requires detailed analysis, as an operator like UTLC may only be responsible for part of a container's journey between China and Europe. And not all containers travel on UTLC trains.

BASF's investments in China

One source of pressure - or at least hope - for an early lifting of the ban on dangerous goods by rail in China is the multinational chemical company BASF. *Handelsblatt* reported in 2018 that BASF was continuing to invest in China and expand its network of production sites. In the coastal province of Guangdong, BASF was planning to invest about \$10 billion in a production site. Completion was planned for 2030. [[Handelsblatt, 9 July 2018](#)] But BASF is also investing in Chongqing, far from the Chinese seaports. In March 2020, *LogForum* reported that BASF is planning a hub terminal for Asian shipments in Schwarzheide in eastern Germany to enable more frequent and efficient rail connections to and from Asia. [[LogForum, 30 March 2020](#)] All this could indicate that BASF expects the Chinese Railways to lift its ban on dangerous goods.

Trains with European chemicals to China

In April 2020, the *International Transport Journal* reported that eastbound container trains carrying BASF chemicals had started running between the inland port of Ludwigshafen and Xi'an. The rail connection from Europe promised to be of particular interest to companies in the chemical industry, as they are often located in the Chinese hinterland, far away from the seaports. [[International Transport Journal, 24 April 2020](#)]

In June 2021, *Railfreight.com* pointed out that Hupac was setting up a new transport service for liquid products between Europe and China. The rail service was specifically designed for the chemical industry in Europe and runs as far as the Chinese city of Lanzhou. However, the transport is fraught with difficulties, as forwarders must meet many conditions to transport chemicals, especially in China.

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Before rail movement to China, each shipment must be certified as a “non-dangerous product” and obtain a shipping permit. This can take between four and six weeks. [[Railfreight.com, 29 June 2021](#)]

A westbound train from China to Ludwigshafen in Germany recently attracted attention because (as we have just seen) most chemicals between Germany and China are eastbound. [[Translogistics.net, 16 March 2021](#)] Given China's ban on the transport of dangerous goods by rail, these chemicals are probably not considered dangerous. Isolated trains carrying chemicals are also reported to be running from Spain to China. [[Railfreight.com, 18 June 2021](#)]

Other options for dangerous goods by sea and Russian Railways

Unlike the Chinese Railways, the Russian and also the European railways accept a certain range of dangerous goods. To circumvent the Chinese ban, some dangerous goods from China now move by truck to a Chinese port, by ship to Vladivostok and then by the Trans-Siberian Railway and European railways. However, the route via Vladivostok is relatively long. [[Railfreight.com, 29 June 2021](#)]

Ocean shipping also accepts a range of dangerous goods. However, in view of the current disruptions in global sea freight, some ocean shipping companies have reportedly postponed the carriage of dangerous goods because of the additional administrative burden involved and have given priority to non-dangerous goods. [[The Loadstar, 23 July 2021](#)]

Can lithium batteries get things moving?

Among those pushing China to lift its ban on dangerous goods by rail are the increasingly powerful manufacturers of cars powered by lithium batteries. *Railfreight.com* reported that demand for these batteries runs both eastbound and westbound between China and Europe. [[Railfreight.com, 25 June 2019](#)] Electric bicycles, laptops and household appliances also need such batteries. [[Index1520.com, 15 December 2020](#)]

In articles published in March and April 2021, *Railfreight.com* called the Chinese ban a major obstacle to the transport of electric cars, which can travel by rail in both Europe and Russia. Lifting the ban would allow lithium batteries and electric cars containing them to travel by rail between China and Europe.

So far, the Chinese government has taken a firm stand on the issue. The risks are too high and the stakes too low, the government says.

But the stakes are getting bigger. Cars and their components have always been two of the most important product groups for rail transport between China and Europe. Despite the overall slowdown in the Western European car market due to the pandemic (down 25%, which took it back to 1985 levels), sales of plug-in hybrids were unaffected, rising to 12% of total car sales by 2020. Currently, China produces about 49% of the world's electric vehicles, followed by 27% in Europe, 17% in the US and 7% in Japan and Korea. China supplies both complete electric cars and batteries as a separate item. In addition, more than half of the world's lithium is mined in China. By 2026, 30% of vehicles are expected to be electric, by 2030 54% and by 2040 75%.

The chairman of Geely Holding Group, one of China's largest carmakers, has called on the Chinese government to lift the ban on transporting dangerous goods by rail. Li Shufu, who is also a member of the National People's Congress, has raised the issue at two Congress sessions in 2021. The Chinese government has again pledged to review the restrictions on the transport of dangerous goods by rail.

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Container train with tanks in Angeren, the Netherlands, on 3 August 2018. Photo Sander Brands.

Over the years, many carriers and customers have tried to soften the ban on transporting dangerous goods by rail in China. In 2020, it almost looked like the restrictions on certain types of products would be lifted, but ultimately there was no change in policy. It is not certain that anything will change in 2021, but the ambitions are there. [Railfreight.com, [15 March 2021](#) and [23 April 2021](#)]

Allowing dangerous goods on Chinese rail would likely to trigger a wave of goods shifting to rail. Among others, the fast-growing manufacturers of batteries and the vehicles they contain may opt for China-Europe-China rail solutions. [Journal of Commerce, 15 July 2021]

Eurasian rail terminals

Rail operators in China, Europe and Eurasia are constantly developing new routes and corresponding rail terminals, of which there are four types.

Intermodal transport and the ongoing development of new routes

Rail transport between China and Europe is intermodal transport. Europe also calls it combined transport.² In intermodal transport, containers - or other loading units such as truck trailers - are transported over long distances between terminals by rail (or, where feasible, by barge). In intermodal container transport, a truck generally picks up a container from the customer who loaded it and takes it to an intermodal terminal. The container then moves by train - possibly changing trains or using ships or barges - to its destination terminal, from where a truck takes it to the customer who unloads the container.

To better serve specific regions, shorten transit times, reduce costs, avoid restrictions and reduce risks, rail operators in China, Europe and Eurasia are constantly developing new terminals and routes.

Types of rail terminals in Eurasia

The following rough typology of Sino-European rail terminals should help to provide an overview of Sino-European rail infrastructure.

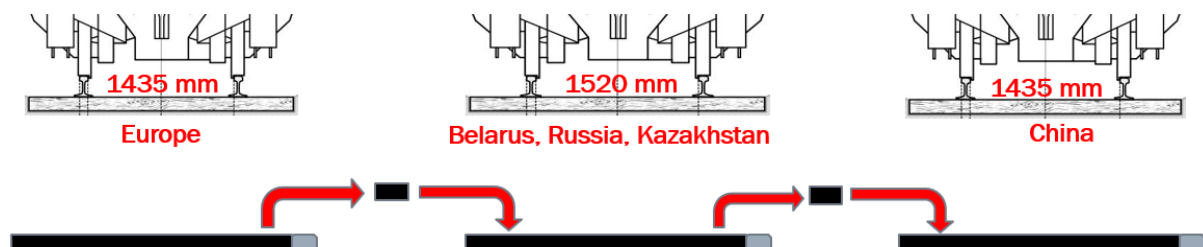
² Sometimes a distinction is made between intermodal and combined transport, but most authors and practitioners seem to use them – for better or worse – as synonyms.

Type of Eurasian rail terminal	Main function when transferring containers (Depending on the location, the terminal may also perform other functions listed here.)
Crossings between gauges	Between trains with different track gauges (e.g. 1435 and 1520 mm)
Hub	Between trains of the same gauge
Seaport	Between trains and short-sea shipping
Simple terminal	Only between trucks and trains

In addition, waterways, where available, can enable the transshipment of containers to/from inland vessels in any of these terminals. The role of waterways is particularly important, for example, in Belgium and the Netherlands and along the Rhine.

Crossings between gauges in Eurasian rail transport

As we have seen, the usual distance between the rails, the so-called gauge, is 1435 mm in China and Europe, but 1520 mm in Finland and the territories of the former Soviet Union. Where the gauges meet, cranes hoist containers between the trains. These crossings between the 1435-mm and 1520 networks have proved to be bottlenecks despite efforts to increase throughput. Congestion at the crossing between Belarus and Poland and the search for more direct routes are currently driving the development of 1435/1520 crossings from Lithuania to Georgia.



(To better illustrate the difference in gauges, it is visually exaggerated here).

Despite efforts to increase capacity to meet growing demand, transfer points have suffered from congestion for years. This congestion and the search for more direct rail routes continue to drive the development of new 1435/1520 interchanges and short sea routes connecting different gauges. As *Railfreight.com* reports, chronic congestion at Brest-Małaszewicze on the Belarus-Poland border, the busiest 1435/1520 interchange in Europe, has forced the industry to look for alternative routes. [[Railfreight.com, 10 September 2021](#)].

Too much dependence on a single 1435/1520 interchange can also be politically problematic. In July 2021, for example, the Belarusian president threatened to ban EU products entering Russia or China via Belarusian territory. [[Railfreight.com, 7 July 2021](#)]

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Crossings between gauges on the Chinese side

This infrastructure enables the transfer of containers from the Chinese 1435-mm rail network to the vast 1520-mm network, but also to the Vietnamese 1000-mm network.

Chinese 1435/1520 interchanges

On the Chinese side, crossings between the 1435-mm and 1520-mm networks are located as follows.

1435-mm network	1520-mm network	
Chinese city	City	Country
Alashankou	Dostyk	Kazakhstan
Khorgas	Altynkol/Korghos	Kazakhstan
Erenhot	Zamyn-Üüd	Mongolia
Manzhouli	Zabaikal'sk	Russia
Suifenhe	Pogranichny	Russia

Chinese 1435/1000 interchanges

Crossings also connect the Chinese 1435-mm network and the Vietnamese 1000-mm (metre-gauge) network. One is located at Yên Viên station in Hanoi.

A first train to Europe left Yên Viên on 20 July 2021, destined for Liège, Belgium, from where the goods would be transported by truck to the Netherlands and France. [[VietNamNet, 5 August 2021](#)] In the first half of 2021, the Chinese Railways reportedly operated 128 cross-border trains between China and Vietnam, an increase of 204.8% year-on-year. [[International Transport Journal, 20 August 2021](#)]



The first container train from Hanoi to Liège, Belgium, leaves Yên Viên station on dual-gauge track (1000 and 1435 mm) on 20 July 2021. Photo VNA reproduced from [VietnamPlus, 3 August 2021](#).

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Crossings between gauges on the European side

The following tables shows the main crossings between the European 1435-mm and the 1520-mm networks. Most of these terminals are near political borders, but some are more or less deep within a country. At the time of writing, in September 2021, some of these 1435/1520 crossings are inactive, and some are much busier than others. However, all have potential.

Crossings at or near political borders

The following 1435/1520 crossings are at or near political borders.

European 1435-mm network		1520-mm network		
City	Country	City	Country	Status of the 1435/1520 crossing in September 2021
Braniewo	Poland	Mamonovo	Russia (Kaliningrad enclave)	In operation
Czeremcha	Poland	<u>Visoko</u> (<u>Vysokaye</u>)	Belarus	Re-opening plans announced
Kuźnica	Poland	Bruzgi	Belarus	Out of service
Siemianówka	Poland	Svislach	Belarus	Out of service
Małaszewicze	Poland	Brest	Belarus	Europe's largest volumes
Medyka	Poland	Mostyska	Ukraine	Re-opening plans announced
Záhony	Hungary	Chop	Ukraine	In operation
Fényeslitke	Hungary	Chop	Ukraine	Under construction
Dobrá / Čierna nad Tisou	Slovakia	Chop	Ukraine	In operation

Crossings within a country

These 1435/1520 crossings are well within a country, more or less far from political borders.

Location of 1435/1520 crossing		
City	Country	Status in September 2021
Kaunas	Lithuania	Operations have just begun
Sławków	Poland	In operation
Košice	Slovakia	Out of service; 1520-mm track to a steel plant
Vienna	Austria	1520-mm track project Košice-Vienna apparently cancelled
Akhalkalaki	Georgia	In operation

Akhalkalaki is a 1435/1520 crossing that is allowing the development of Sino-European routes that run south of Russia. It is located on the BTK line, which connects Baku (Azerbaijan) with Kars (Turkey) via Tbilisi (Georgia). The BTK line is part of the so-called Middle Corridor and was opened

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in 2017 to enable the transport of containers from China via Kazakhstan and the Caspian Sea to Europe, or vice versa.

Eurasian rail hubs

These hubs, which are typically far from the boundaries between the 1435-mm and 1520-mm zones, transfer containers between trains of the same gauge.

Chinese hubs

Only four Chinese cities - Chengdu, Chongqing, Zhengzhou and Xi'an - account for 79 % of the total rail freight traffic between China and Europe. [[Railfreight.com](#), 2 February 2021] China is investing €25 million to help these four cities, as well as Urumqi, become hubs for rail freight in Eurasia. [[Railfreight.com](#), 17 September 2020]

As we have seen, this could allow China to switch from rigid city-to-city trains to a more flexible and efficient hub-and-spoke system. In the city-to-city scheme, all containers on a train leaving a Chinese terminal are destined for a single European city. In a hub-and-spoke operation, on the other hand, secondary terminals supply the hubs with trains that can carry containers for any European destination. This allows a container to begin its rail journey sooner and thus reduces its transit time.

European Hubs

Duisburg and Hamburg remain the leading European hubs for rail transport between China and Europe. However, other hubs and seaports are increasingly sorting containers by European destination and loading them onto corresponding trains or ships. (Conversely, European hubs collect eastbound containers to form trains to China and other Asian countries).

Seaports for the Eurasian railway network

Increasingly, ships are also connecting the 1435-mm and 1520-mm gauges. They connect the intercontinental 1520-mm trains arriving in Kaliningrad, Helsinki and St. Petersburg with the seaports of the 1435-mm networks in the EU and the UK. The intercontinental trains also carry containers to Chinese and Russian ports for shipment to Japan, South Korea, Taiwan and Vietnam. Or the other way around.

European seaports

Within the Eurasian rail network, some seaports offer short-sea routes that provide an intra-European connection with Germany, the UK or the Nordic countries at the beginning or end of a container's Eurasian rail journey. These seaports thus enable short-sea shipping of containers as part of an intercontinental rail service. In rough order from southwest to northeast, the most important seaports for Eurasian rail traffic are Rotterdam, Cuxhaven, Hamburg, Rostock, Sassnitz-Mukran, Kaliningrad, Helsinki and St. Petersburg. The Eurasian volume through Kaliningrad is significant and growing.

Transatlantic too

In August 2021, the ocean shipping company OOCL began transporting containers by rail from Xi'an to Kaliningrad and from there via Bremerhaven to the US East Coast. This new service was a reaction to the pandemic-related congestion of the ports on the US West Coast and the Suez Canal. [[Journal of](#)

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[Commerce, 6 August 2021](#)] The first container left Xi'an on 4 August. [\[Broadway, 20 August 2021\]](#) From Xi'an, the containers travelled by rail through Kazakhstan, Russia and Belarus to Kaliningrad. In Kaliningrad, a short-sea ship moved the containers to Bremerhaven, where they transferred to an OOCL sea connection to the US East Coast. [\[Railfreight.com, 9 August 2021\]](#) Loadstar also reported on the new rail service, but quoted a customer who complained that the service had left several containers “lost in a siding for two weeks”. In contrast, if a container is in a ship off Los Angeles, the customer said, at least we know where it is. [\[The Loadstar, 9 August 2021\]](#)

Asian seaports

The China-Europe rail link is part of a larger series of Eurasian rail links. In addition to the rail connections between China and Europe, the Russian ports in the Far East, Vladivostok and Nakhodka-Vostochny, which is about 100 km south-east of Vladivostok, form another important basis for Eurasian rail services. They can transfer containers from trains that have passed through Russia on the Trans-Siberian Railway to short-sea vessels bound for Japan, South Korea, Taiwan, Vietnam and Singapore. Or the other way around.

Railfreight.com pointed out an advantage of the 1520-mm network, which we have already addressed here: Trains can usually carry about 62 forty-foot containers, compared to only about 41 containers in China. [\[Railfreight.com, 23 April 2021\]](#). Trains are also typically limited to about 41 containers on the European 1435-mm network.

According to recent reports, shipping company container services are increasingly connecting Far Eastern countries with Europe via Vladivostok and the Trans-Siberian Railway. As *Railfreight.com* points out, Kaliningrad's role as the western terminus of this route has increased since 2017. Eurasian traffic at the port of Helsinki-Vuosaari is now also growing. [\[Railfreight.com, 9 July 2021\]](#) Containers move from Kaliningrad and Vuosaari on short-sea ships to ports on Europe's 1435-mm network.

As highlighted in articles in *Railfreight.com* and *IRJ* in August 2021 [\[Railfreight.com, 12 August 2021\]](#) and [International Railway Journal, 18 August 2021](#)], containers originating from a Far East country such as Japan or Korea have two routes to Europe: either via a Chinese port and Sino-European rail, or via a Russian East Coast port such as Vladivostok and the Trans-Siberian Railway. Similarly, containers from the Chinese coastal regions can reach Europe either via Sino-European rail or via a Chinese port, Vladivostok and the Trans-Siberian Railway. Eastbound containers can take any of these routings in reverse.

Simple (road/rail) terminals for Eurasian rail traffic

Virtually all intermodal terminals transfer containers between truck and train. Thus, any intermodal terminal in Europe or Asia can function as a simple terminal for Eurasian container traffic in. Given that the Chinese authorities have so far only subsidised city-to-city trains, Chinese terminals mostly operate as simple terminals. As we have seen, the largest Chinese terminals would play an important hub function in a progressive shift from city-to-city trains to hub-and-spoke operations.

Acknowledgement

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About the author



George Raymond is an independent consultant in rail freight. See www.railweb.ch. Photo Railweb GmbH.

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