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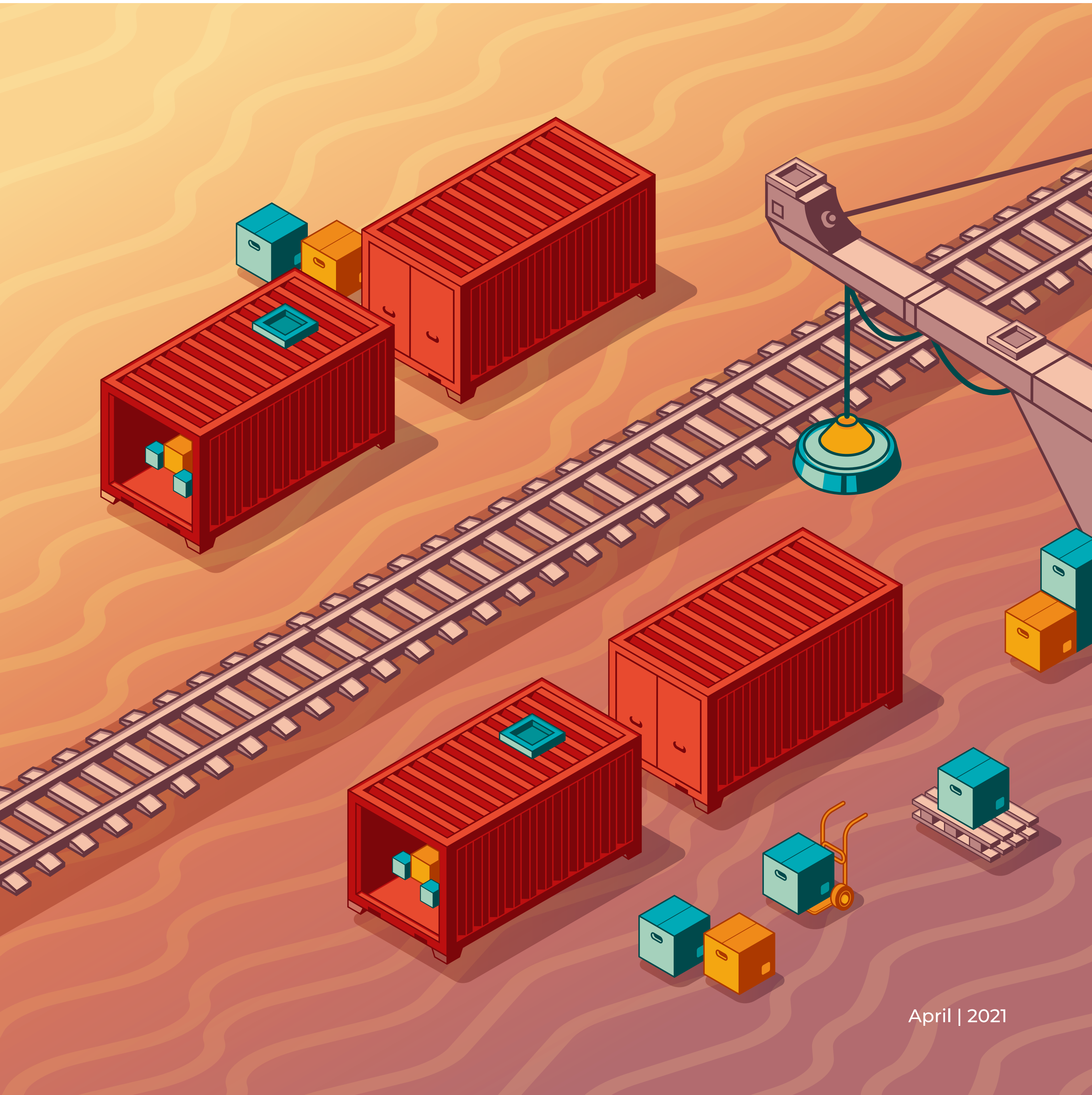
Information and analytical digest

TRADE BETWEEN GERMANY AND CHINA IN 2020: THE STRUCTURE OF GERMAN EXPORTS AND PROSPECTS FOR MODAL SHIFT TO RAIL



April | 2021

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INTRODUCTION

Over the past five years, China has been the main trading partner of Germany, and in 2020 it became the main trading partner of the EU. Trade relations between the states are of particular importance, including due to country and regional specifics, namely both states have an export-oriented economy and are leaders for their regions and the world as a whole. If the German economy is the strongest in Europe, then China is the driver of global economic growth due to the economies of scale. In this part of the study, the focus is on German exports to China.

Germany is the economic locomotive of Europe. The economy of a country with a GDP of 4.47 trillion dollars (53,810 US dollars per capita according to the purchasing power parity, the OECD methodology) is 24.2% of the total GDP of the European Union. The country is characterized by an excess of exports over imports, i.e. the ratio of exports to GDP is 44%, and imports - 38%. Thus, the country's trade surplus in 2020 amounted to USD 195.3 billion. Against the background of the coronacrisis, Germany's GDP decreased by 5%, which is less than in the EU as a whole (-6.2%).

As for China, in 2020, it turned out to be the only major economy in the world that maintained positive growth rates of GDP (+2.3%), although showed a significant decline. China's GDP in 2020 can be estimated at USD 24 trillion (according to the purchasing power parity, the OECD methodology), which is more than the US indicator. However, in dollar terms, China's economy is still smaller than the American one and, according to some estimates, will overtake it in 2028. China's foreign trade is growing in absolute terms, but since 2006 its share of GDP has been decreasing from 64.5% to 35.8% in 2019. This trend is a consequence of the objective reality and Beijing's policy of reorienting the country's economy to domestic demand as a driver of development.

In the transport and logistics context, trade between China and the EU is one of the main global destinations for cargo transportation, and Germany is one of the key transhipment points and the final destination for European and global commodity flows. According to the 2017 BCG Railway Efficiency Index, Germany ranks fourth (6.1 points) after Switzerland, Denmark and Finland, being the leader in the intensity of railway use.

The ties between Germany and China are of particular importance for the development of the Eurasian railway route. The rapid development of transit container rail cargo transportation in the direction of China-Europe-China in 2020 has once again raised the issue of the nomenclature and volumes of cargo that will transfer or continue to transfer to the railway in the context of changes related to both the transformation of the Chinese economy towards domestic consumption and more complex commodities, and the slowdown in economic growth in Europe, primarily in Germany.

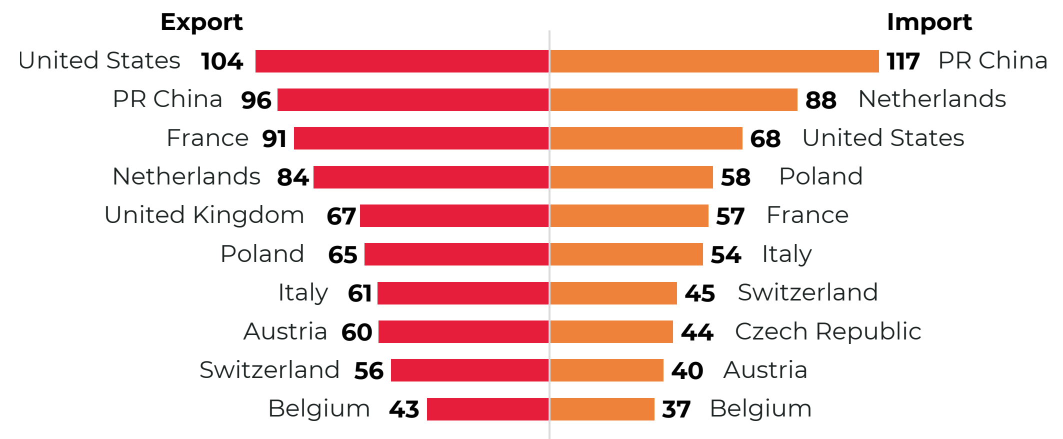
In the previous study, the emphasis was placed on German imports from China. Commodity groups were identified on six HS signs that showed the greatest absolute and relative increase and at the same time gravitated to container transportation by rail. This time, the study focuses on the export of Germany to China, thereby distinguishing the groups that have the greatest potential in terms of switching to shipping by rail.

GENERAL OVERVIEW OF TRADE BETWEEN GERMANY AND CHINA IN 2020

At the end of 2020, the trade turnover between Germany and China amounted to EUR 212.4 billion, that is, about USD 244 billion. At the same time, Germany has a negative balance in trade with China in the amount of USD 23 billion, that is, the largest of all partner countries in absolute terms and uncharacteristic for Germany as an export-oriented country with a positive balance with other partners, such as the United States and European countries.

GERMANYS MAJOR TRADING PARNTERS, 2020

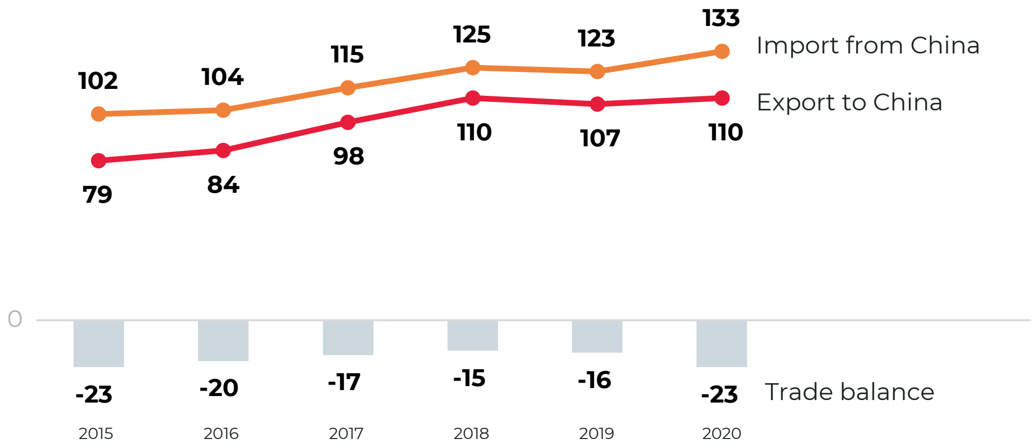
Euro billions



The current situation in 2020 corresponds to the trend of recent years, namely German imports from China have consistently exceeded exports for a long time. Despite the fact that it was in 2020 that the historical maximum of USD 133 billion of imports was reached, almost the same trade balance was observed in 2015, i.e. minus USD 23 billion. It is important to note that in terms of exports, China is the country's second trading partner after the United States, as opposed to imports. At the same time, exports to China exceed exports to other EU countries, including France.

DYNAMICS OF TRADE BETWEEN GERMANY AND CHINA OVER THE PAST 5 YEARS

USD billion



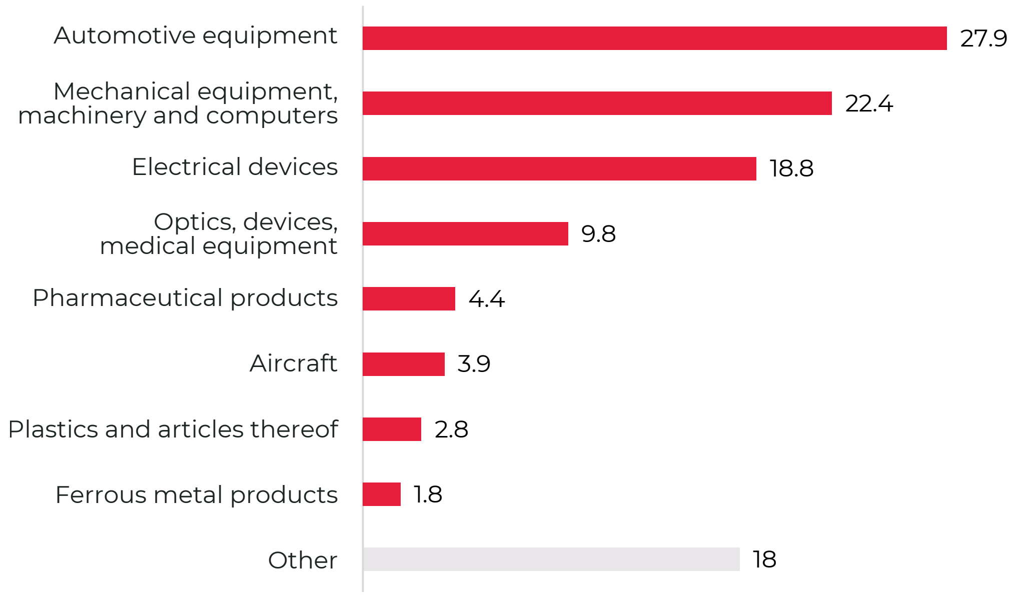
Source: ITC.

Germany's exports to China are represented by 3,108 commodities on six HS signs, which indicates a high degree of exchange intensity and a fairly diversified nomenclature. In value terms, China's exports in 2020 increased by 2.17% to USD 109.8 billion. The first three positions of Germany's exports on two signs (automotive equipment, mechanical equipment, and electrical devices) account for 62% of the country's exports in value terms, that is, about USD 69.1 billion.

The main product of German exports is automotive equipment, which is associated with the industrial specialization of the country and the presence of competitive advantages in this industry. In 2020, the export of motor vehicles in China was mainly cars (USD 16.7 billion) and auto parts (USD 10.5 billion). Despite the fact that the commodity group of the German exports and imports in trade with China correlated, albeit at higher levels of detail, it is the export of vehicles that is a distinctive feature of the range of exports of Germany.

GERMAN EXPORTS IN 2020

USD billion



Source: ITC.

The second main position of exports of Germany in China is a mechanical equipment (USD 22.4 billion). In this group, we can distinguish such commodities as machinery and mechanical appliances of personal use (HS 847989, USD 1.4 billion) and parts of such devices (USD 0.4 billion), transmission equipment (HS 8483, USD 1.8 billion) valves (HS 8481, USD 1.6 billion), liquid pumps (HS 8413, USD 1.2 billion), and parts of internal combustion engines (HS 8409, USD 1.2 billion). The import for this item exceed exports.

The third major position of Germany in China are electrical devices (USD 18.8 billion). Here it is possible to identify such items as the electrical devices in assemblies (HS 8537, USD 3.2 billion), low-voltage electrical distribution equipment (HS 8536, USD 1.8 billion), electronic integrated circuits (HS 8542, USD 1.6 billion), auxiliary electrical equipment for motor vehicles (HS 8512, USD 1.4 billion), etc.

One of the distinctive features of German exports to China is a significant proportion of pharmaceutical products, primarily packaged medicines (HS 3004, USD 3 billion), and immune products and blood (HS 3002, USD 1 billion). Not to mention aircraft, such as aircraft with an unladen weight of more than 15,000 kg (HS 880240, USD 3.2 billion), and parts of aircraft and spacecraft (HS 8803, USD 0.6 billion).

INDUSTRY STRUCTURE AND KEY EXPORTS FROM GERMANY TO CHINA

To select the most promising commodities of potential cargo traffic from Germany to China, UN COMTARDE data on German exports to China in 2019 and 2020 were analysed in quantitative terms, as well as data from Eurostat on the types of transport by which German commodities were exported to China in 2020. The data were compared at the level of six HS signs. For all commodities exported by Germany to China in 2020, absolute (in the number of tons) and relative (as a percentage) import increases by the end of 2020 compared to 2019 were calculated.

When analysing the sectoral structure of German exports to China in 2020 in physical terms (tons), it is necessary to note a lower degree of diversification compared to imports from China. In 2020, Germany's exports to China in physical terms amounted to 12.8 million tons (an increase of 21.9% compared to last year) with imports of 13 million tons. At the same time, 39% of exports in physical terms accounted for wood raw materials (4.98 million tons).

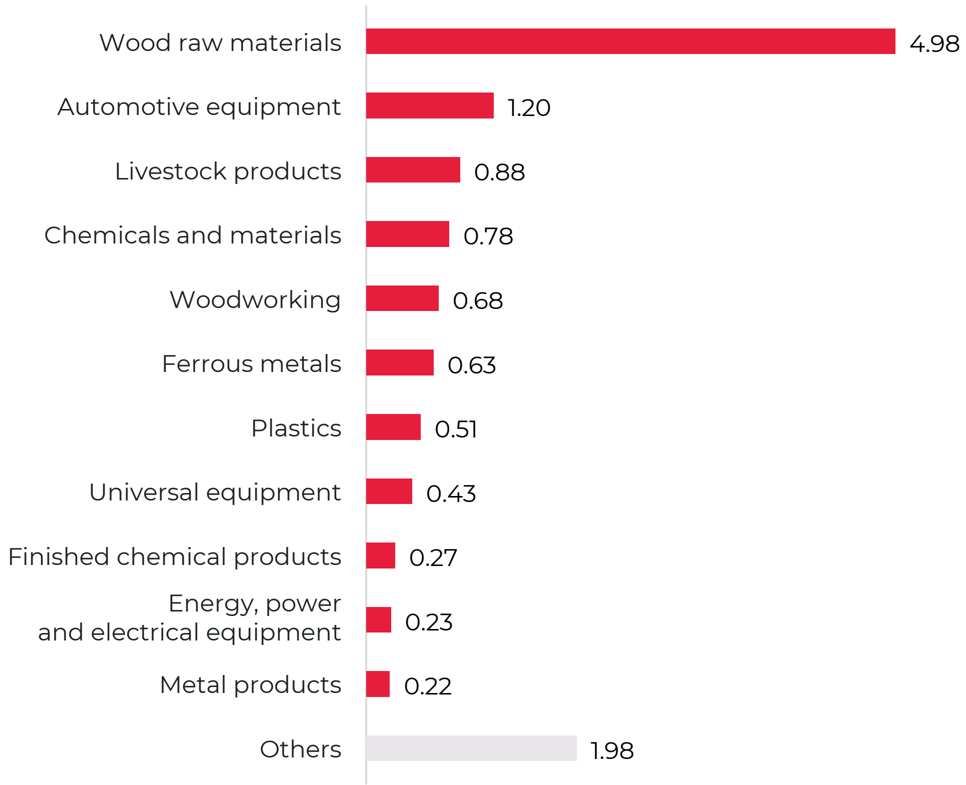
Due to the peculiarities of the product, the lion's share of exports in physical terms was made up of the group "Spruce and fir timber with a diameter of 15 cm" (HS 440323) related to wood raw materials, i.e. 4.6 million tons in 2020, with an increase of 2.3 million tons. It was the increase in this category that ensured the overall increase in exports in physical terms. At the same time, according to Eurostat statistics, this commodity group is not transported by rail. However, according to ERAI data, 840 TEU of this category (about 10,820 tons) were transported along the Eurasian route in 2020.

This is followed by the export of motor vehicles, i.e. 1.2 million tons (9%), of which 51,000 tons were transported along the Eurasian route. The export of livestock products amounted to 0.88 million tons (7%). In this category, it is possible to distinguish such products as:

- fresh milk with a fat content of 1-6% (243,000 tons, +55,000 tons in 2020) with 2,100 tons on the Eurasian route;
- frozen pork (229,000 tons, +10,000 tons in 2020) and frozen offal of swine (166,000 tons, -76,000 tons in 2020), where there is no commodity flow along the route.

GERMANY'S EXPORTS TO CHINA IN 2020

million tons



Source: ITC.

Chemicals and materials, which are in the fourth place in terms of exports of Germany with an indicator of 0.78 million tons, showed a noticeable increase of 100,000 tons in 2020. Such products as tetrachloroethylene (+21,700 tons), octyl alcohol and its isomers (+16,000 tons), magnesium sulphate (+16,400 tons), and other mixed chemical products (+10,600 tons) contributed to the increase. Such substances were not transported along the Eurasian route in 2020.

There is also a significant increase in the export of ferrous metals: 0.6 million tons in total, with an increase of 107,000 tons. Although some commodity items showed relatively small negative dynamics. It is possible to distinguish a number of commodities with accelerated growth in 2020, for example:

- pig iron with less than 0.5% phosphorus content (+33,000 tons), where there is no commodity flow along the route;
- other hot-rolled alloy bars (+18,400 tons), with 230 tons along the route;
- slabs and similar semi-finished products of low-carbon steel (+17,400 tons), where there is no commodity flow along the route;
- large-diameter straight-seam pipes for oil and gas pipelines made by submerged arc welding (+15,500 tons), where there is no commodity flow along the route.

With the exception of the above products, as well as universal equipment, woodworking, and finished chemical products, which showed a moderate increase, most other industries went into negative territory. This is, for example, the production of cellulose (-86,500 tons), non-ferrous metals (-35,300 tons), vessels and watercraft (-57,600 tons), machine tools (-18,300 tons), and non-metallic raw materials (-35,700 tons).

Table 1.

GERMAN EXPORTS TO CHINA BY INDUSTRY IN PHYSICAL TERMS (TONS).

Industry	Total in 2020	Absolute growth for 2020/2019
Wood raw materials	4,983,250	2,138,955
Automotive equipment	1,205,620	8,867
Livestock products	882,674	4,369
Chemicals and materials	788,455	99,776
Woodworking products	684,219	32,644
Ferrous metals	637,143	107,057
Plastics	511,609	27,887
Universal equipment	435,018	18,110
Finished chemical products	275,547	14,315
Unclassified products	235,220	-8,115
Energy, power and electrical equipment	232,713	6,087
Metal products	223,674	5,665
Paper and cardboard	218,396	95,759
Cellulose	189,036	-86,557
Beverages	186,917	-8,961
Non-ferrous metals	159,861	-35,355
Ready-made food products	153,260	478
Vessels and watercraft	135,278	-57,602
Special industry equipment	120,286	-9,858
Recycled fuel	101,514	9,357
Machine tools	52,931	-18,322
Various industrial products	46,961	-186
Instrumentation	45,491	1,756
Non-metallic raw materials	41,692	-35,705
Fertilizers	32,837	4,012
Grain and milling products	29,995	11,499
Railway equipment	25,504	-2,758
Pharmaceuticals	24,319	-1,444
Glass	23,255	834
Textile materials and products	22,959	1,131
Mineral products	21,984	-3,139
Agricultural raw materials	20,069	-4,821
Appliances	16,350	364
Fat and oil products	11,790	9,163
Ceramics	11,708	-7,035
Other equipment and devices	11,574	543

Agricultural machinery	9,712	3,256
Telecommunications equipment	8,838	1,266
Feed	4,924	2,184
Fish and seafood	4,275	-2,923
Electronics	3,684	-809
Animals and plants	3,415	285
Aircraft engineering	2,894	-1,102
Primary fuel	1,366	393
Fruit and vegetable products	1,229	-150
Clothes	1,197	326
Footwear	485	-74
Ores and concentrates	404	-122
Armaments	57	-14
Precious metals and stones	56	-54
Products made of precious metals and stones	35	-9

Source: authors' calculations based on ITC and Eurostat data.

COMMODITY STRUCTURE OF EXPORTS AND PROSPECTS FOR MODAL SHIFT TO RAIL

For a more detailed analysis, 15 main commodity groups were identified on six HS signs, for which the largest exports are noted, as well as the largest increase in German exports to China in physical terms in 2020. As it was mentioned earlier, a large-scale increase in exports was recorded in the industry of production of wood raw materials (HS 44), i.e. spruce and fir timber (4.6 million tons), as well as spruce and fir lumber (0.41 million tons), beech timber (0.25 million tons), and beech lumber (0.11 million tons).

The key factors of a sharp increase in this commodity category were a decrease in demand within Germany due to the pandemic, as well as more competitive purchase prices in China, as a result of which exports were reoriented towards this country. At the same time, the total transportation of this commodity group (HS 44) along the Eurasian route amounted to only 18,040 tons in 2020, which makes this category promising for a modal shift.

Automotive equipment showed a relatively weak increase in 2020, and the export of the group “Passenger cars with a gasoline engine of 1,500-3,000 cc” fell by 70,300 tons. At the same time, 8,320 tons of this commodity passed along the Eurasian route (-43.3%), which correlates with trade statistics. The growth was shown by the group “Body parts and accessories” (HS 870829), thereby reaching the level of 233,000 tons, of which 3,870 tons passed along the Eurasian route (+54.8%).

The potential in terms of food products continues to be preserved. Significant volumes of exports of fresh milk (HS 040120, HS 040110) and pork (HS 020329, HS 020649) are not yet accompanied by an increase in such deliveries by rail. This fact actualizes the issue of the use of electronic seals necessary for the transportation of commodities across the territory of Russia in the context of counter-sanctions. It is also possible to note the negative dynamics of beer exports to China (-7,100 tons) with the positive dynamics of the transition of this category to the railway (+279.62% in 2020). In general, taking into account the long-term growth of consumer demand in China and the attraction of food products to transportation by rail, this category will remain promising for a modal shift.

Table 2.

TOP 15 GERMAN EXPORTS TO CHINA IN PHYSICAL TERMS (TONS).

Item No.	HS code	Product	Total in 2020	Absolute growth by 2019	Relative growth by 2019	ERAI cargo flow	ERAI share
1	440323	Spruce and fir timber with a diameter of 15 cm	4,602,587	2,308,396	101%	10,820	0.2%
2	870323	Passenger cars with a gasoline engine of 1,500-3,000 cc	414,545	-70,375	-15%	8,380	2.0%
3	440712	Spruce and fir lumber	413,734	56,250	16%	1,820	0.4%
4	440393	Beech timber with a diameter from 15 cm and more	249,343	-93,362	-27%	—	0.0%
5	040120	Fresh milk with a fat content of 1-6%	242,752	54,712	29%	2,100	0.9%
6	999999	Unclassified commodities	235,220	-8,115	-3%	—	0.0%
7	870829	Body parts and accessories, except seat belts	233,070	15,318	7%	3,870	1.7%
8	020329	Other frozen pork	228,885	10,281	5%	—	0.0%
9	220300	Beer	169,317	-7,106	-4%	9,950	5.9%
10	020649	Frozen pork offal, except liver	166,555	-76,577	-31%	—	0.0%
11	0470321	Bleached coniferous sulphate cellulose	162,314	-39,197	-19%	2,250	1.4%
12	890190	Cargo vessels, except tankers and refrigerated trucks, cargo and passenger vessels	133,775	-50,642	-27%	—	0.0%
13	870840	Gearboxes and their parts	132,873	15,276	13%	11,330	8.5%
14	040110	Fresh milk with a fat content of up to 1%	117,321	45,236	63%	20	0.0%
15	440792	Beech lumber	113,280	-8,225	-7%	—	0.0%

Source: ITC, Eurostat, ERAI.

The selected 15 leading German exports to China by absolute growth in 2020 indicate growth points for increasing freight traffic by rail in the direction of China-Europe-China. In addition to the above wood raw materials and woodworking, a number of chemical industry products showed a significant increase.

An absolute increase of 74,400 tons (+507%) was shown by the supply of cardboard (testliner of up to 150 g/m2), which was not transported along the Eurasian route in 2020. The same applies to tetrachloroethylene (+21,700 tons, +59%), magnesium sulphate (+16,500 tons, +14.841%), octyl alcohol and its isomers (+16,000 tons, +800%), and ethylene dichloride (+15,500 tons, +300%). At the same time, only ethylene-alpha-olefin copolymers with a specific weight of up to 0.94 passed along the Eurasian route in 2020 in the amount of 4,500 tons.

Nevertheless, in general, the supply of chemical industry commodities via the Eurasian railway route followed foreign trade trends at a faster pace, which does not negate the great prospects for attracting such commodities to the railway as:

- paper and paperboard (HS 48), with deliveries by the Eurasian route in 2020 having showed an increase of 957% to 30,290 tons;
- organic chemistry products (HS 29), with an increase of 906% to 6,890 tons;
- products of inorganic chemistry (HS 28), with an increase of 715% to 10,210 tons;
- plastics and products made from them (HS 39), with an increase of 129% to 41,400 tons.

Passenger cars with a gasoline engine and an electric motor without external recharging (HS 870340) have great long-term prospects, the supply of which increased by 29,400 tons (+97%). Although 4,500 tons of this product passed along the Eurasian route, the decarbonisation agenda and the demand for hybrid cars make this category a potentially significant growth point in the medium term.

A significant increase in physical terms was shown by the products of the ferrous metallurgy. Despite the fact that China is also a supplier, certain commodity sub-items of German exports are in demand on the Chinese market and showed a noticeable increase in absolute figures:

- pig iron with a phosphorus content of less than 0.5%, with an increase of 33,000 tons (+3,575%) and no commodity flow along the Eurasian route;
- other hot-rolled alloy bars, with an increase of 18,500 tons (+24%) and commodity flow on the Eurasian route of 230 tons;
- slabs and similar semi-finished products of low-carbon steel, with an increase of 17,400 tons (+264%) and no commodity flow along the Eurasian route.

In 2020, the supply of ferrous metallurgy products (HS 72) from Germany to China via the Eurasian route amounted to 13,280 tons (+41.3%). Despite the fact that not all commodities in this category tend to be transported by rail, this commodity group has prospects for increasing the share of rail transport.

Table 3.

TOP-15 GERMAN EXPORTS TO CHINA BY ABSOLUTE GROWTH IN PHYSICAL TERMS (TONS).

№	HS code	Product	Total in 2020	Absolute growth by 2019	Relative growth by 2019	ERAI cargo flow	ERAI share
1	440323	Spruce and fir timber with a diameter of 15 cm	4 602 587	2 308 396	101%	10 820	0,2%
2	480524	Testliner up to 150 g/m2	89 056	74 395	507%		0,0%
3	440712	Spruce and fir lumber	413 734	56 250	16%	1 820	0,4%
4	40120	Fresh milk with a fat content of 1-6%	242 752	54 712	29%	2 100	0,9%
5	40110	Fresh milk with a fat content of up to 1%	117 321	45 236	63%	20	0,0%
6	720110	Pig iron with a phosphorus content of less than 0.5%	33 995	33 070	3 575%		0,0%
7	870340	Passenger cars with a gasoline engine and an electric motor without external charging	59 829	29 442	97%	4 500	7,5%
8	440719	Coniferous lumber, except pine, spruce and fir	24 633	24 305	7 410%		0,0%
9	290323	Tetrachloroethylene	58 391	21 702	59%		0,0%
10	722830	Other hot-rolled alloy bars	95 709	18 478	24%	230	0,2%
11	720712	Slabs and similar semi-finished products of low-carbon steel	24 060	17 459	264%		0,0%
12	283321	Magnesium sulphate	16 584	16 473	14 841%		0,0%
13	390140	Ethylene-alpha-olefin copolymers with a specific gravity of up to 0.94	18 469	16 216	720%	590	3,2%
14	290516	Octyl alcohol and its isomers	18 010	16 008	800%		0,0%
15	290315	Ethylene dichloride	21 006	15 751	300%		0,0%

Source: authors' calculations based from ITC, Eurostat and ERAI data.

CONCLUSION

Trade between Germany and China, which are the two economic leaders of their regions, is the most important segment of interregional trade in the direction of China-Europe-China. In 2020, China became the EU's main trading partner, and the commodity turnover between Germany and China amounted to approximately USD 244 billion. German exports are essential for balancing the flow of commodities, given the excess of the country's imports from China over exports.

In value terms, the main commodities of German exports to China are automotive equipment, mechanical equipment and electrical devices, which account for 62% of the country's exports, that is, approximately USD 69.1 billion. This state of affairs is connected with the historical specialization of the country's economy. In addition, a distinctive feature of German exports is a significant share of pharmaceutical products resulting from the developed chemical industry of the country.

To select the most promising commodities of potential cargo traffic from Germany to China in terms of switching to the railway, UN COMTARDE data on German exports to China in 2019 and 2020 were analysed in quantitative terms, as well as data from Eurostat on the types of transport by which German commodities were exported to China in 2020. The data were compared at the level of six HS signs. Further, for a more detailed analysis, 15 main commodity groups were identified on six HS signs, for which the largest export volumes are noted, as well as the largest increase in German exports to China in physical terms in 2020.

According to the analysis, a large-scale increase in exports is observed in the supply of wood raw materials (HS 44), i.e. spruce and fir timber (4.6 million tons), as well as spruce and fir lumber (0.41 million tons), beech timber (0.25 million tons), and beech lumber (0.11 million tons). This is due to the reorientation of this industry to export.

Despite the weak growth in the group as a whole, automotive equipment is promising for the modal shift. The growth was shown by body parts and accessories (HS 870829), thereby reaching the level of 233,000 tons, of which 3,870 tons passed along the Eurasian route (+54.8%). Passenger cars with a gasoline engine and an electric motor without external recharging (HS 870340) have great long-term prospects, the supply of which increased by 29,400 tons (+97%). Although 4,500 tons of this product passed along the Eurasian route, the decarbonisation agenda and the demand for hybrid cars make this category a potentially significant growth point in the medium term.

The potential in terms of food products also continues to be preserved. Significant volumes of exports of fresh milk (HS 040120, HS 040110) and pork (HS 020329, HS 020649) are not yet accompanied by an increase in such deliveries by rail. This fact actualizes the issue of the use of electronic seals necessary for the transportation of commodities across the territory of Russia in the context of counter-sanctions.

A significant increase in physical terms was shown by the products of the ferrous metallurgy. Despite the fact that China is also a supplier, certain commodity sub-items of German exports are in demand on the Chinese market and showed a noticeable increase in absolute figures (pig iron, slabs, etc.).

The analysis shows an increase in the share of railway cargo transportation in certain categories, as well as a significant share of the railway in the transportation of German automotive products to China. However, in general, the share of rail transport continues to remain low for most commodity items of German exports to China.