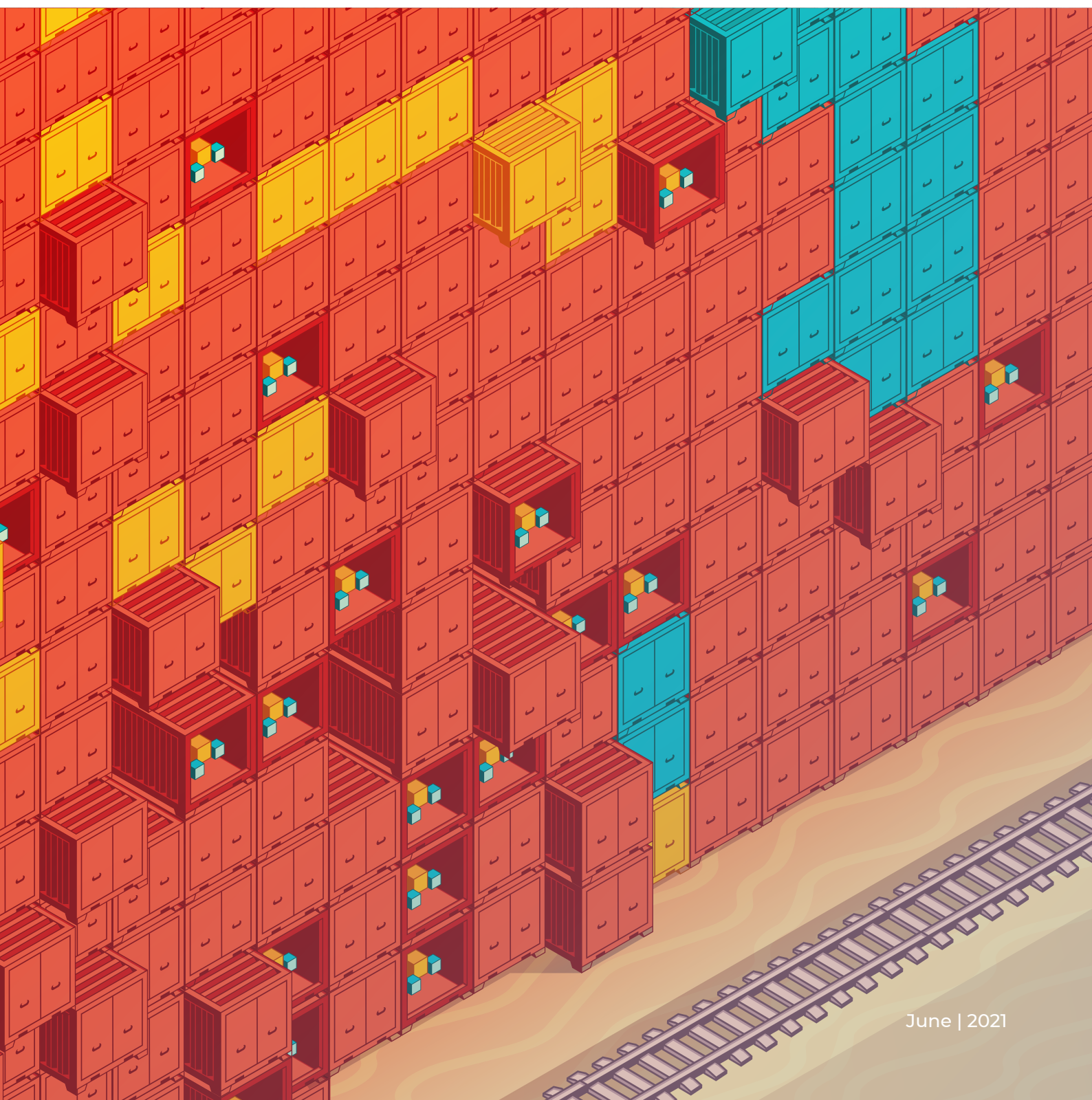


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## SEA AND AIR CARGO TRANSPORTATION: THE END OF THE CRISIS REGIME?

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# INTRODUCTION

For more than a year, the whole world has been living with COVID-19 and related restrictions. The coronacrisis had a huge impact on the transport and logistics industry represented by sea, rail and air cargo transportation. Some of them continue to be in crisis mode, while others have become beneficiaries of the crisis.

Sea cargo transportation in the direction of China-Europe-China has been in a state of crisis since the beginning of the pandemic. If in April 2020 the rate of the WCI Drewry index reflecting the cost of sea freight between East Asia and Europe was USD 1,495 per FEU, then in April 2021 it was already **USD 5,472** (+266%) with an upward trend. Maritime cargo transportation faced disruptions in global value chains, which exacerbated structural market imbalances and led to a cluster of containers in North America and Europe, as well as a sharp increase in transportation rates.

In air transportation in April 2020, a historic drop in volumes was recorded, thereby amounting to more than 90% compared to year-on-year. If we talk about numbers, in the past 2020, the pandemic caused damage to the air transportation industry of the order of **USD 370 billion** of lost income compared to 2019. Although the situation is improving, according to a number of forecasts, the market will not recover to previous levels until the end of 2022.

The beneficiary of the coronacrisis was railway container transportation in the direction of China-Europe-China. If in 2019 333,000 TEU were transported along the Eurasian railway route, then in 2020 this figure has increased already to 546,900 TEU, and in the first half of 2021 it was 352,700 tons, which is more than the indicator for the whole of 2019.

Against the background of the pandemic, the railway has proved to be a reliable, predictable mode of transport. The railway was much less susceptible to coronavirus restrictions, and the rate for rail freight remained stable in the range of USD 2,600-2,700 per FEU.

Nevertheless, mass vaccination and the recovery of transport logistics from the crisis state put on the agenda the issue of the sustainability of restoring air cargo transportation, the speed of returning to the normal level of sea freight rates, and preserving the advantages of the railway in the long term. What will be the transport logistics after the pandemic?

# DEEP SEA: CURRENT STATE AND FUTURE DEVELOPMENT FORECAST

## Maritime logistics in crisis mode

COVID-19 has led to supply chain disruptions, thereby exacerbating structural imbalances in maritime cargo transportation. The reduction in the capacity of the transport infrastructure and the disruption of value chains, which are the basis of global trade and interregional cargo logistics, due to lockdowns and trade restrictions, additional checks at the borders, and disruptions in work led to the transition of the transport and logistics sector to a crisis mode.

The pandemic and related restrictions have been imposed on structural imbalances in the container transport market. For a long time, China has had a permanent trade surplus in trade with the United States and Europe, i.e. USD 316.9 billion with the United States, and EUR 181 billion with the EU by the end of 2020. As a result, containers in which goods are transported were systematically accumulated in North America and Europe, without finding demand for use in the opposite direction. A combination of structural factors and failures due to the coronacrisis led to a radical increase in sea freight rates.

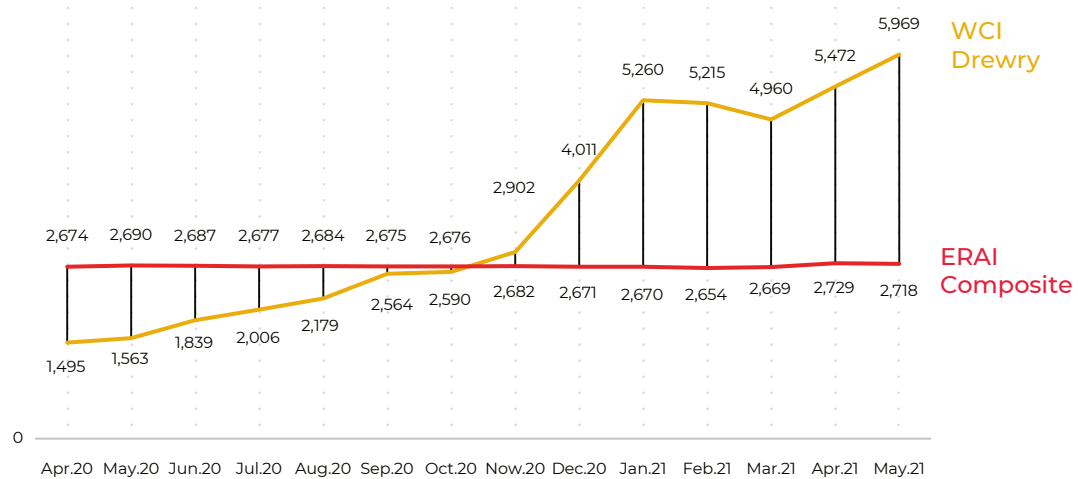
Thus, the COVID-19 outbreak in southern China has seriously affected the functioning of the large Chinese port of Guangzhou, as well as led to disruptions and congestion of cargo. Since Guangzhou is the fifth port in the world by cargo traffic (23 million TEU in 2019), the stability of its operation has an impact on the entire sea cargo transportation market. The same is true for Chinese ports and Asian ports in general, since they are the largest in the world: 7 of the 10 largest ports in the world are located in China. As the situation with the port of Yantian (Guangdong Province) has shown, any delays or restrictions in Chinese ports provoke a crisis of the entire maritime cargo transportation industry.

The spread of the coronavirus began to affect international transport as early as March - April 2020. According to the dynamics of the WCI Drewry index, which reflects the cost of sea freight in the direction of China-Europe-China, since April 2020, a consistent increase in rates for sea container cargo transportation has begun. By October 2020, the rates of sea freight and the rates of rail container transportation on the Eurasian route being the main railway route between China and Europe were equal for the first time. And already in November, the WCI Drewry index overtook the ERAI Composite index: USD 2,902 per FEU against USD 2,682.

Further, the growth of sea rates continued against the background of incessant failures and accumulation of containers in North America and Europe. In January 2021, the cost of sea freight reached USD 5,260 per FEU, after which a decline began, which was perceived by many as a return to normality. Nevertheless, having decreased to USD 4,960 per FEU in March 2021, rates for sea cargo transportation continued to grow, thereby updating the record in May 2021 against the background of the situation in Southern China, i.e. USD 5,969 per FEU.

**DYNAMICS OF THE ERAI COMPOSITE AND WCI DREWRY INDICES**

USD per FEU



Source: ERAI.

At the same time, container rail transportation began to feel an increased load due to the flow of a significant amount of cargo “from the sea to the rails”. The stability of railway rates has become a significant competitive advantage and has stimulated an accelerated modal shift in favour of rail freight transportation in the direction of China-Europe-China. If the growth of rates for sea freight was more than 250%, then the rates of rail transit increased by only 2% during the period under review.

The main increase in the cost of sea freight occurred due to the increase in the cost of cargo transportation in the western direction, that is, from China to Europe. As for the main routes, the largest increase in value according to WCI Drewry was shown by such routes as Shanghai-Rotterdam (+567% year-on-year, USD 12,200), Shanghai-Genoa (+502%, USD 11,700), and Shanghai-Los Angeles (+272%, USD 9,100). At the same time, the cost of freight in the direction Rotterdam-Shanghai was USD 1,600 (+37%), which is in the field of normal values before the start of the pandemic.

**COST OF SEA FREIGHT, USD .**

Route	17-Jun-21	24-Jun-21	1-Jul-21	Weekly change (%)	Annual change(%)
<b>Composite Index</b>	<b>6,957</b>	<b>8 062</b>	<b>8,399</b>	<b>4% ▲</b>	<b>346% ▲</b>
Shanghai - Rotterdam	11,196	11,975	12,203	2% ▲	567% ▲
Rotterdam - Shanghai	1,583	1,649	1,684	2% ▲	37% ▲
Shanghai - Genoa	10,845	11,448	11,774	3% ▲	502% ▲
Shanghai - Los Angeles	6,358	8,548	9,165	7% ▲	272% ▲
Los Angeles - Shanghai	931	1,041	1,284	23% ▲	146% ▲
Shanghai - New York	8,017	11,180	11,719	5% ▲	267% ▲
New York - Rotterdam	1,121	1,155	1,166	1% ▲	129% ▲
Rotterdam - New York	4,607	4,744	5,008	6% ▲	105% ▲

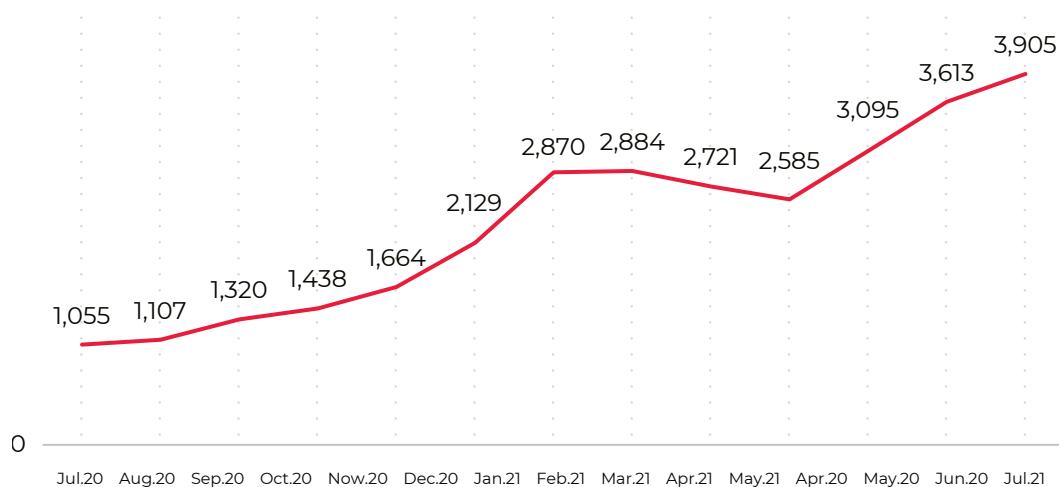
Source: Drewry Supply Chain Advisors

The Shanghai Container Freight Index (SCFI), which reflects the spot rates of sea cargo transportation from China (China's exports) in 13 directions and is updated weekly, also clearly illustrates the development of the crisis in sea cargo transportation. As in 2019, the SCFI index in 2020 remained fairly stable for a long time despite disruptions in the supply of goods. Nevertheless, since July 2020, the cost of supplying Chinese commodities to Europe and the United States has begun to grow, thereby reaching a local peak in February 2021, i.e. USD 2,884 per TEU.

In accordance with the general dynamics, since February, a slight decrease in sea freight rates has begun, which in early April 2021 fell to the level of USD 2,585 per TEU. However, due to disruptions in the schedule of container ships, a general slowdown in container turnover due to anti-coronavirus restrictions and accidents, prices have taken an upward trend. At the beginning of July 2021, the index rate reached USD 3,905 per TEU, and for certain routes it exceeded USD 5,000, which is a historical record.

**SCFI DYNAMICS**

USD/DFE



Source: SCFI.

The reasons for the crisis state of sea cargo transportation between Europe and China were not anti-current restrictions and failures, but structural imbalances exacerbated by the coronacrisis. The imbalance of China's trade with the United States and Europe led to imbalances in commodity flows. China as the "workshop of the world" sent its commodities to the EU and the USA represented mainly by consumer goods, mechanical products, electronics and components. At the same time, the superiority of exports over imports has led to a shortage of empty containers in China.

In 2019, structural imbalances have already manifested themselves in the situation with the accumulation of empty containers in the United States due to the reduced export of soybeans from this country and refrigerated containers in China due to the mass slaughter of pigs due to the plague. At the same time, even then, continental delivery routes began to gain popularity due to the advantage of speed (about six days from border to border), as well as access to containers within the continent, regardless of ocean trade. And events such as the incident with Ever Given in the Suez Canal, the congestion in the port of Hamburg and the like also contribute to the growth of rates and the acquisition of new advantages by the railways in the fight for customers.

## — Rebalancing of the market and sea freight rates

Despite all the new records of cost, the market of sea cargo transportation in the direction of China-Europe-China uses the current moment to increase profits. According to a number of estimates, 2021 will be the most profitable year for the industry, despite disruptions in the supply chains of goods. For the first half of 2021, the main sea carriers earned a record USD 16.2 billion according to Lloyd. At the same time, according to WCI Drewry, by the end of 2021, the pre-tax profit of sea carriers may amount to up to USD 80 billion, which is a record.

The current situation, especially in the FMCG segment, is becoming a challenge for shippers who are suffering losses and are forced to take into account the current market conditions, which are largely beneficial to carriers and dictated by them. Due to the inertia of congestion, consequences of the closure of the Suez Canal or the crisis in the port of Yantian will gradually be felt along the entire supply chain for two to three quarters.

At the same time, anti-Covid restrictions in Chinese ports, according to some estimates, can lead to greater failures than even the closure of the Suez Canal, like the situation with Ever Given. Due to the increased waiting time in South Chinese ports, at some point in time, more than 100 vessels were anchored in the waters near Hong Kong with a capacity of more than 600,000 TEU. The waiting time for vessels on the roadstead can reach 20 days.

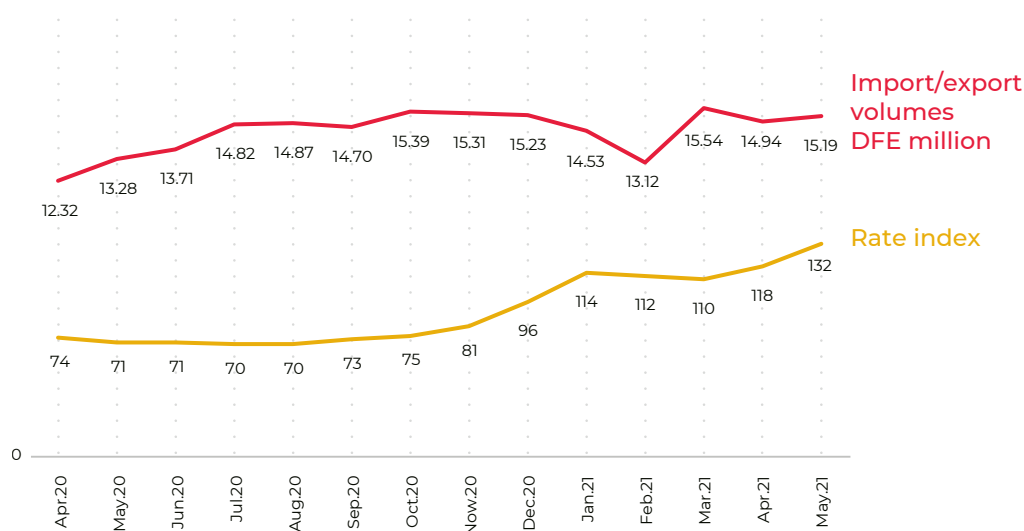


However, in the long term, the preservation of such high rates of sea freight is unlikely. First, vaccination of the population and the recovery of the global economy lead to the normalization of the mode of operation of companies and value chains in the world. The highest and most stable **recovery rates** are shown by the Chinese economy. Following it, the EU economy is gradually returning to its normal state, although it is lagging behind China, i.e. EU GDP growth is expected **at the level of 4.5%** in 2021.

Secondly, the continuing and stable high demand for container transportation against the background of increasing indicators of the cost of sea freight with **growing supply** from carriers allows for concluding that there are no objective prerequisites for maintaining record rates in the long term.

The statistical service Container Trade Statistics (CTS) estimates the global demand for container transportation in May 2021 at 15.19 million TEU. Thus, since April 2020, demand has increased by slightly less than 3 million TEU. At the same time, the CTS sea freight cost index reached a record high of 132 points from the baseline level before the pandemic.

#### GLOBAL DEMAND FOR CONTAINER TRANSPORTATION AND THE DYNAMICS OF CTS SEA FREIGHT COST INDICATOR



Source: Container Trade Statistics (CTS).

In the absence of disruptions and accidents, the effect of congestion in Suez and Southern China will gradually pass through the entire supply chain and will be overcome within two to three quarters. According to WCI Drewry, at the time of writing the review, the share of cancelled voyages is **only 5%**, despite the fact that at the peak of the pandemic in May 2020, **about 55%** of trans-Pacific voyages were cancelled. This indicates a gradual normalization of the situation.

Despite the emerging prerequisites for a return to balance, high rates, apparently, can only decrease, but not return to the pre-pandemic norm due to the resistance of carriers. Sea carriers benefit from the situation due to the lack of alternatives in a number of directions, while the capacity of rail transit to increase volumes is limited by the infrastructure capabilities.



An important factor that will be included in the cost of freight in the future is the agenda of decarbonisation of transport. Within the EU, the issue of including maritime transport in the Emission Trading System (EU ETS) continues to be discussed. Currently, there is no such fuel with zero carbon emissions that could be distributed on a global scale and at the same time be competitive in price in comparison with the currently used fleet fuel oil. Environmental regulation of the industry will obviously increase, similarly to the costs of carriers.

The United Nations International Maritime Organization (IMO) was forced to adopt a strategy for reducing emissions in the industry in 2018. As part of the plan, all new vessels will be subject to mandatory requirements for engine energy efficiency, and from 2019, all vessels will be required to collect fuel consumption data for an accurate assessment of emissions. In addition, since 2020, restrictions have been established on the sulphur content in the fuel used (a maximum of 0.5%) in order to reduce sulphur dioxide emissions into the atmosphere. According to the strategy, by 2050, it is planned to reduce emissions from marine transport by 50% compared to the baseline level of 2008.

Against the background of the current “seller’s market”, when carriers are trying to take advantage of the situation and fix current prices in long-term contracts, alternative routes, primarily rail, are characterized by stable pricing and maintaining the advantage of delivery speed. One of the beneficiaries is the Eurasian railway route. However, against the background of maintaining high rates of sea freight and the congestion of railway transit (the share of empty containers is only 7%) the issue of raising transit rates is becoming more and more clear.

# AIR CARGO: CURRENT STATE AND FUTURE DEVELOPMENT FORECAST

## Historical crisis of air cargo transportation

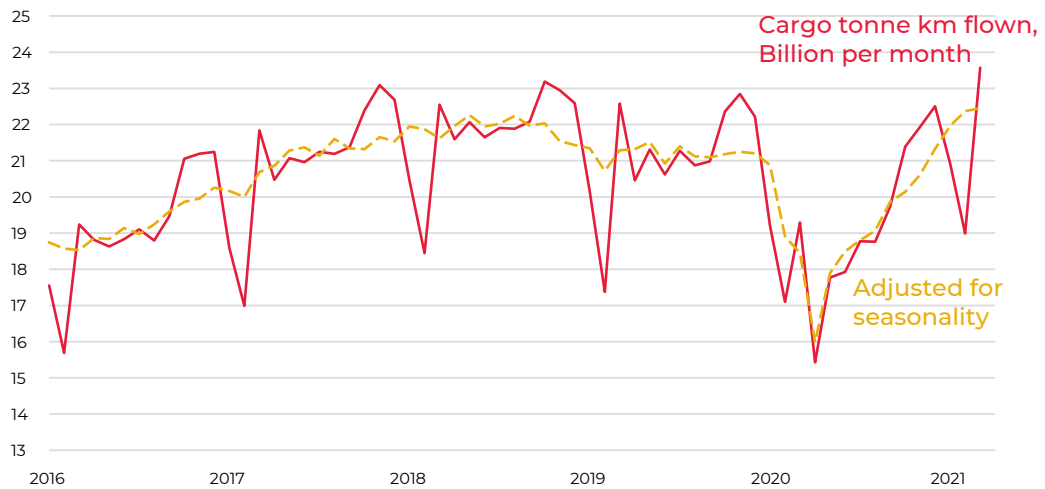
Air transportation has become the type of transport that the pandemic has dealt a direct and immediate blow to. In April - May 2020, air traffic seemed to have stopped. At some point, air traffic decreased by almost **95%**. Before the pandemic, in 2019, about **59%** ton-kilometres of cargo transported by air were transported in the holds of passenger airliners (41% were separate cargo flights). Consequently, the collapse of passenger air traffic led to a drop in the air cargo market.

The past year has become a time of historical crisis of air cargo transportation. If we talk about numbers, in the past 2020, the pandemic caused damage to the air transportation industry of the order of **USD 370 billion** of lost income compared to 2019. As noted, the damage from COVID-19 significantly exceeded the losses of the industry from all other crises, including the attacks of September 11, 2001, as well as the recession of 1991 and the crisis of 2009.

According to the International Air Transport Association (IATA), following the results of the second quarter of 2021, the volume of air cargo transportation expressed in ton-kilometres increased **by 8.4%** compared to the same period of 2019. The spring of 2021 has become a time of market recovery and outstripping growth. The key factor was the revival of the economy and the new economic cycle, which led to an accelerated replenishment of warehouses by manufacturers.

However, the recovery is uneven. The first growth was shown by domestic transportation in China. Air transportation in North America is recovering on the international market. In Europe, growth is still moderate, and in Latin America, there is still stagnation against the background of anti-Covid restrictions. The routes China-USA and Europe-China remain **leaders** of air cargo traffic. In addition to the economic recovery, the market is supported by the growth of the tourist flow, although the business travel segment is still in a crisis state.

## RECORD HIGH FOR AIR CARGO TONNE KM FLOWN IN MARCH



Source: IATA Economics using data from IATA Monthly Statistics

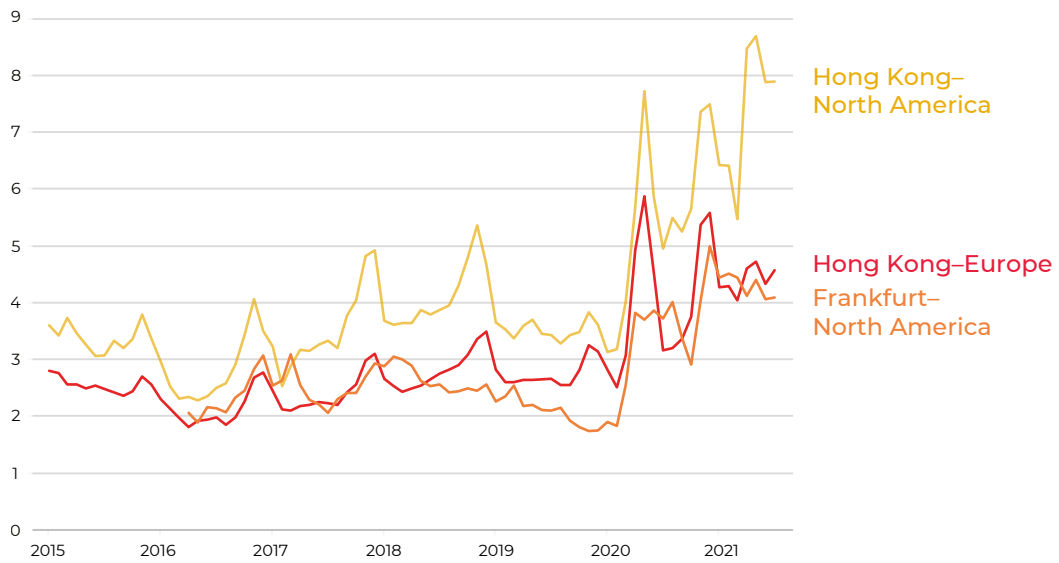
In the first quarter of 2021, despite the growth of transported ton-kilometres, the transportation capacity remained at values noticeably lower than pre-crisis. Thus, the volume of available cargo ton-kilometres (ACTKs) in the industry as a whole is almost 12% less than before the pandemic, in Europe it is almost 16% less with an increase in transportation volumes by 5.6%, and in Asia - by 20% with an increase of 2.4%. The presence of such a gap is a consequence of the reduction of capacity in 2020 and will limit the recovery of cargo transportation in the long term.

The air analogue of the Shanghai Container Transportation Index by Sea is the TAC Index, which reflects the cost of air cargo transportation on the spot market in a number of benchmark directions. As in the sea freight market, air transportation is experiencing a period of turbulence and rising prices, especially on the Hong Kong - North America route.

The cost of air transportation of one kilogram of cargo between Hong Kong and European airports reached a record high in May 2020, i.e. 5.88 US dollar/kg at a normal price of 2-3 US dollar/kg. It was during this period that the maximum drop in air traffic occurred. However, in December 2020, the rate again approached its peak values, thereby stopping at 5.59 US dollars/kg.

According to the results of June 2021, the rates for air cargo transportation between China and Europe are still high having fixed at the level of 4.34 US dollars/kg, which is 63% more than the cost of transporting a kilogram of cargo in 2019.

### BALTIC EXCHANGE AIR FREIGHT INDEX (BAI) POWERED BY TAC DATA

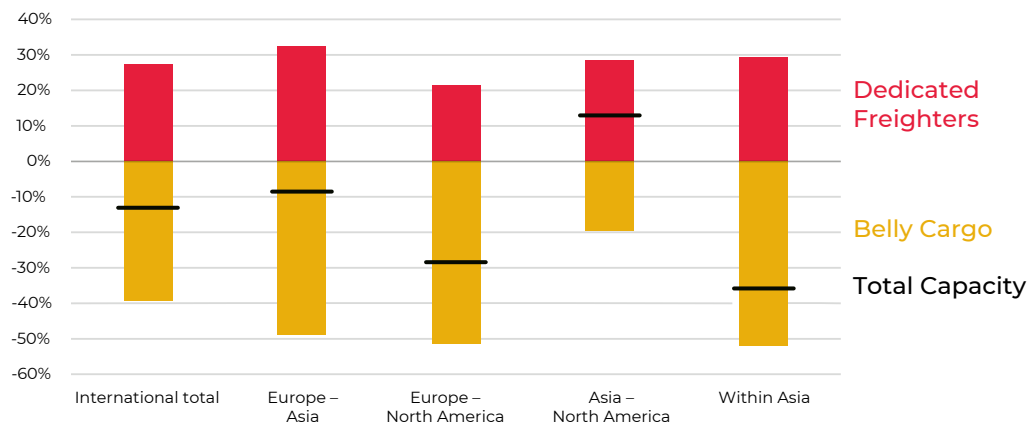


Source: TAC Index.

With the fall in passenger traffic, air carriers sought to “recapture” some of the losses by using airliners for passenger and cargo transportation. Nevertheless, the transportation of goods in the holds of passenger liners, which is the main type of air cargo transportation, is still limited by the pace of recovery of the tourism industry. At the same time, individual cargo flights, although their number has increased, still cannot compensate for the losses and return to the pre-crisis level.

### INTERNATIONAL ACTK, 3M ENDED APR 2021

% ch vs same period in 2019



Source: IATA Monthly Statistics

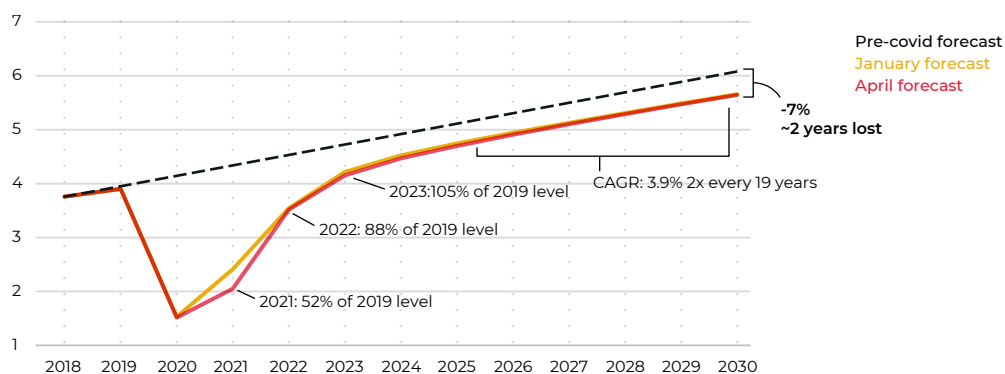
## Will air cargo become a beneficiary of the crisis?

Air cargo transportation, as well as air transport in general were among the industries most affected by COVID-19. However, against the background of the crisis of sea transportation represented by delivery delays, rising rates, and the dominance of sea carriers, air cargo transportation can become one of the beneficiaries of the crisis, similarly to the rail transit transportation.

The trend for the recovery of the industry, which was clearly marked in the first and second quarters of 2021, will continue, and its pace will depend on the success of the fight against coronavirus and, accordingly, the pace of recovery of passenger traffic. In general, the airline industry has lost about two years of growth due to the pandemic. According to the latest IATA forecast, passenger traffic indicators by the end of 2021 will amount to 52% of the level of the pre-pandemic 2019, in 2022 - 88%, and in 2023 - 105%.

### OUR BASELINE VIEW IS A LONG-TERM LOSS OF 2 YEARS GROWTH

Global O-D passengers, billion



Source: IATA Economics using data from Tourism Economic/IATA Air Passenger Forecast, April 2021.

The capacity of air carriers reduced during the pandemic will become a limiter of recovery and growth. Many carriers were forced to reduce their staff, sell their fleet, and refuse new orders for aircraft. This factor will manifest itself in the later stages of recovery as demand and load return.

The decarbonisation agenda is a huge challenge for the entire air transportation industry. Air transportation is considered the least environmentally friendly method of cargo delivery. Direct emissions from the most "green" method of air transportation, i.e. a long-haul cargo liner, range from 250 to 900 g of CO<sub>2</sub> per ton-kilometre.

Initiatives by international industry organizations to move to a more environmentally friendly development of the industry, such as the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), are important steps, similarly to operational improvements and the use of biofuels. Objective technological and economic obstacles hinder the greening of the industry. In addition, the negative impact of air transport is not limited only to CO<sub>2</sub> emissions, since aircraft emit other greenhouse gases.

Despite the crisis, sooner or later air transport, as well as maritime transport will be included in the EU's CO<sub>2</sub> emissions trading system. Already today, as experts note, the regulator is ready to provide assistance to the affected industry only under the condition of further environmental transformation. Certain EU countries introduce restrictions on domestic flights if there is a railway alternative, which puts on the agenda the issue of reallocation of assets in favour of medium-haul and long-haul aircraft and a general focus on trans-regional and transcontinental air transportation. One way or another, shifting the price of emissions to consumers will increase the cost of transporting commodities and transporting passengers by air.

E-commerce is already becoming a supporting factor for air transportation. By 2022, the share of cross-border e-commerce commodities in the total volume of commodities transported by air may amount to 20%. Despite the high cost of air transportation, according to some estimates, about 70% of cross-border e-commerce commodities are delivered by air. At the same time, the railway can become a competitor of air transport in the field of e-commerce commodities in some areas if the lower cost of cargo transportation is taken into account.

According to the consensus forecast, the return of air cargo transportation to pre-pandemic indicators may occur as early as 2022. However, further increase in volumes will be difficult due to the retired capacities. In the long term, the decarbonisation factor, which is included in the costs of companies and the cost of services for shippers, will become increasingly important.

Along with rail transport, air carriers can benefit from the crisis situation with sea carriers. Already now, some shippers, especially on transcontinental routes, choose air transport instead of sea transport. However, the specifics of the product and its attraction to a particular type of transport are important here. It is obvious that the crisis at sea, with the improvement of the epidemiological situation, will accelerate the restoration of air cargo transportation and the return of operating activities and rates to normal. However, the presence of objective long-term constraints raises the question of the growth rate of the industry after the recovery phase.

# CONCLUSION

Maritime cargo transportation faced disruptions in global value chains, which exacerbated structural market imbalances and led to a cluster of containers in North America and Europe, as well as a sharp increase in transportation rates. If in April 2020 the rate of the WCI Drewry index reflecting the cost of sea freight between East Asia and Europe was USD 1,495 per FEU, then in April 2021 it was already USD 5,472 (+266%) with an upward trend. The reasons for the crisis mode of sea cargo transportation between Europe and China were not anti-current restrictions and failures, but structural imbalances exacerbated by the coronacrisis.

The main increase in the cost of sea freight occurred due to the increase in the cost of cargo transportation in the western direction, that is, from China to Europe. As for the main routes, the largest increase in value according to WCI Drewry was shown by such routes as Shanghai-Rotterdam (+567% year-on-year, USD 12,200) and Shanghai-Genoa (+502%, USD 11,700), which is due to the peculiarities of China's trade with its partners, namely a significant surplus. Due to the inertia of congestion, consequences of the closure of the Suez Canal or the crisis in the port of Yantian will gradually be felt along the entire supply chain for two to three quarters.

In the long term, the continuation of high sea freight rates is unlikely due to the acceleration of vaccination rates, the continuing demand for container transportation and the increase in supply from carriers. However, despite the emerging prerequisites for a return to balance, high rates, apparently, can only decrease, but not return to the pre-pandemic norm due to the resistance of carriers. It is also important to monitor carbon regulations that affect both the marine and aviation industries.

The pandemic has caused even greater damage to air transportation, including its cargo segment. If we talk about numbers, in the past 2020, the pandemic caused damage to the air transportation industry of the order of USD 370 billion of lost income compared to 2019. Although the situation is improving, according to a number of forecasts, the market will not recover to previous levels until the end of 2022.

However, the spring of 2021 has become a time of market recovery and outstripping growth. The key factor was the revival of the economy and the new economic cycle, which led to an accelerated replenishment of warehouses by manufacturers. The first growth was shown by domestic transportation in China. Air transportation in North America is recovering on the international market. In Europe, growth is still moderate.

The limited supply will act as a constraint on the growth of air cargo transportation. Thus, the volume of available cargo ton-kilometres (ACTKs) in the industry as a whole is almost 12% less than before the pandemic, in Europe it is almost 16% less with an increase in transportation volumes by 5.6%, and in Asia - by 20% with an increase of 2.4%. According to the results of June 2021, the rates for air cargo transportation between China and Europe are still high having fixed at the level of 4.34 US dollars/kg, which is 63% more than the cost of transporting a kilogram of cargo in 2019.

Against the background of the pandemic, the railway proved to be a reliable, predictable mode of transport, since it turned out to be much less susceptible to coronavirus restrictions, and the rate for rail freight remained stable in the range of USD 2,600-2,700 per FEU.