

FORECAST OF EXPORT OF TRANSPORTATION SERVICES

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The article analyses the current state of Belarusian logistical system. The authors discovered the factors having the greatest influence on the increase (reduction) of transportation services export volume and determined the development trends of Belarusian transport segment. Based on the research results a mathematical model describing adequately the transportation services segment was built, and a forecast of development of such services till 2030 has been made.

Key words: export; transportation services; transport logistics; econometric modeling.

ПРОГНОЗИРОВАНИЕ ЭКСПОРТА ТРАНСПОРТНЫХ УСЛУГ

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Проанализировано текущее состояние белорусской логистической системы. Выявлены факторы, оказывающие наибольшее влияние на рост (снижение) объема экспорта транспортных услуг. Указаны тенденции развития транспортного сектора Беларуси. На основании результатов исследования построена математическая модель, адекватно описывающая сектор транспортных услуг, составлен прогноз их развития до 2030 г.

Ключевые слова: экспорт; транспортные услуги; транспортная логистика; эконометрическое моделирование.

Transportation services occupy an important place in the economy of each country, including Belarus. In transit countries internal logistics and net export of transportation services¹ make a significant contribution to GDP: 14 % in Lithuania, 15 % in Poland, 17 % in Germany, 37 % in Singapore. The transport segment, whose share in the GDP in 2015 amounted to 6 %, plays an important role in the economy of Belarus. It accounts for 6.3 % (280 thousand persons) of the total number of employed in Belarus. The share of the transport complex in the investment in fixed capital is 8 %, and it is 10 % in the state budget income. The segment provides significant currency incoming to the country through the export of transportation services, contributes to foreign trade development and to the national balance of payments.

¹Transportation services export include carriage and related logistics services rendered by a resident transport company for a non-resident, regardless of whether they are carried out outside the country, into the country, throughout its territory or in transit. If a Belarusian transport organization performs services for transportation of imported goods, and the customer is a non-resident, this service is usually included in the cost of the goods and does not belong to the transport services export. If the customer is a resident, this is not, of course, the transport services export either.

Образец цитирования:

Королева А. А., Дутина А. А. Прогнозирование экспорта транспортных услуг // Журн. Белорус. гос. ун-та. Экономика. 2017. № 1. С. 84–89 (на англ.).

For citation:

Koroleva A. A., Dutina A. A. Forecast of export of transportation services. *J. Belarus. State Univ. Econ.* 2017. No. 1. P. 84–89.

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The share of transport services in the total services export is 30 % in Germany, about 50 % in Belarus (61.8 % in 2010, 50.5 % in 2013, 47.6 % in 2014, 44.0 % in 2015, according to UNCTAD). In general, according to UNCTAD, Belarus is ranked number 18 among the world's developing and transitive countries in the volume of export of transport services.

The share of transport costs in the price of goods reaches 10 to 12 % on the average, or, more specifically, ranges from 2–5 % (electronics) to 30–40 % (construction materials). When transporting large machinery or shipping to a distant the place of delivery, transport costs increase up to 100 % of the cost of equipment, and sometimes even exceed it.

Belarus is a transit country for trade between the EU and the EAEC, China and the Black Sea and Baltic Sea countries. The shortest roads connecting the countries of Western Europe, Scandinavia and the Baltic States with the countries of the EAEC and the CIS pass through the territory of Belarus [1]. The dynamics of Belarusian transportation services export growth (increase by an average of 30 % per year, except in 2009 and 2015–2016) confirms the fact that Belarus is a unique transit country for trade between the EU and Russia. In 2014 the volume of transportation services export reached USD 3.72 billion (table 1). For example, the export of cargo-carrying truck services increased during 19 years (from 1995 till 2015) by almost 20 times at a rate of 17 % per year.

Table 1

Belarusian transportation services export, in USD million

Type of service	Year							
	2000	2005	2010	2013	2014	2015	2015 *	2016
<i>Cargo-carrying services export including:</i>	457,5	1133,1	2580,4	3214	3144,1	2451	6860–7080	2403,7
railway cargo-carrying services	138,7	401,5	645,9	918,8	807,2	611,7	1695	585
road cargo-carrying services	114,6	288	618,6	1099	1091,7	854	1373	902,6
air cargo-carrying services	8,7	13,1	19,1	27,6	50,1	42,8	70–74	43,1
sea cargo-carrying services	0	4,7	453,3	233,8	310	224,9	–	210
pipe cargo-carrying services	195,2	425,3	833,6	919,7	866,8	696,6	3720	620,5
Total transport services export	585,1	1341,2	2961,5	3792,4	3719,7	2928		2922,9

Note: 1. * – National export development program for 2011–2015. 2. Source: Balance of Payments of the Republic of Belarus for 2000–2016, the data of the National Bank (www.nbrb.by).

In 2016 Belarusian enterprises exported transportation services worth USD 2.9 billion, and imported such services for an amount of USD 1.3 billion. Transportation services foreign trade surplus in 2016 reached USD 1.6 billion. Belarus is a net exporter of almost all kinds of transportation services. The share of transportation services in the total services export was 42,9 % in 2016, which is a decrease by 4.4 percentage points compared to 2014 due to the EU sanctions and Russian anti-sanctions having reduced trade flows between EU and Russia. Sanctions against Russia and anti-sanctions implemented by Russia did not allow performing the overly optimistic forecast of the National Export Development Program for 2011–2015 (the last column of table 1).

In the structure of cargo-carrying transportation services export the largest specific weight belongs to automobile, pipe and railway transport (fig. 1).

Comparing the structure of exports in 2000 and 2016 shows that the pipeline transportation significantly decreased its share in favour of road, sea and air transport. Moreover, after 2010 automobile transportation services go ahead of the railway ones.

Belarusian freight transportation services export depends directly on turnover between Russia and the EU, and road and railway cargo transportation services export depends on Russian import from the EU (Russian

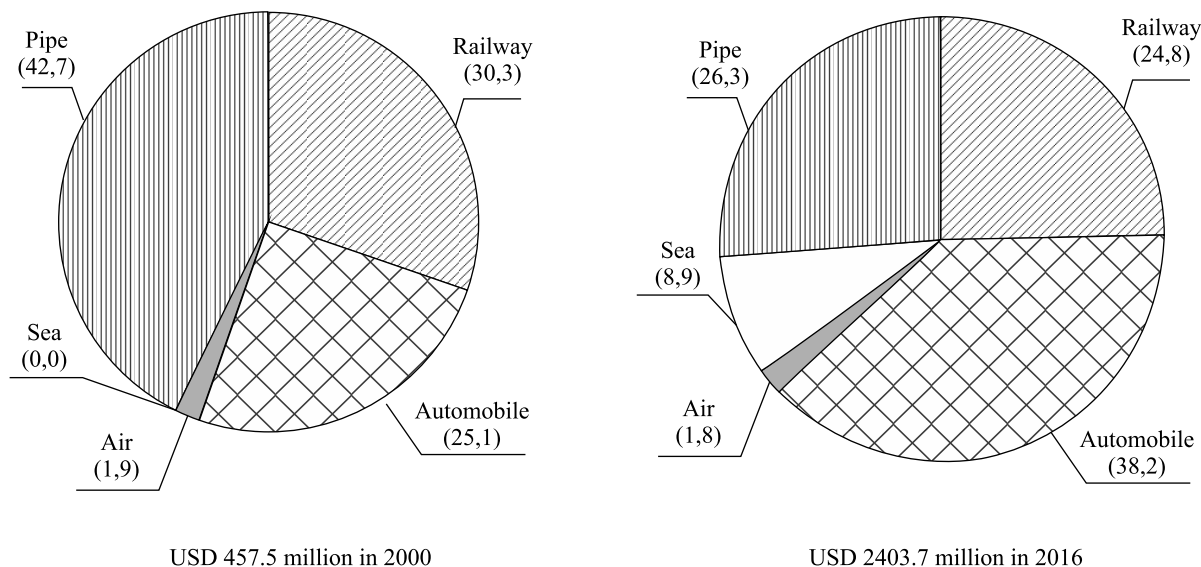


Fig. 1. Change of export structure by kind of transport, %
(authors' analysis based on the data of the Balance of Payments of the Republic of Belarus (2000, 2016))

export to the EU goes mainly by pipes). According to expert estimates, Belarusian share in the transit cargo traffic between Russia and the EU during the crisis of 2008 and in the post-crisis period has increased from 60 to 70 % by reducing the share of the Baltic States and Ukraine. More precisely, from each billion of value of Russian import from the EU Belarusian cargo carriers receive about USD 7–8 million. This figure could be higher. But it should be noted, however, that:

- a) a part of European imports to Russia are increasingly going through Finland, ports in the area of St. Petersburg, Ust-Luga, Primorsk, Vysotsk;
- b) a significant part of the European cargo traffic is serviced by Russian and European carriers [2].

Before 2009 the export of Belarusian cargo-carrying transport (road and railway) services was 0.72 % of Russian import from the EU (Fig. 2 and 3). Starting from 2010, it became also dependent on the significantly increased transit between Kaliningrad and Russia on cargo flows from the EU to Kazakhstan and other Central Asian countries, China, as well as on flows in the direction of Ukraine and the Baltic countries. According to long-term forecasts, a significant increase is expected in cargo traffic from China through Kazakhstan, Russia, and Belarus to the EU. Its reduction due to the development of a branch of the Silk Road, bypassing Russia through Kazakhstan, Georgia, and Azerbaijan, is economically unlikely [3].

The analysis of transportation services export and the turnover between the EU and the EAEC, the EU and China (table 2) shows their mutual correlation, but with very different coefficients.

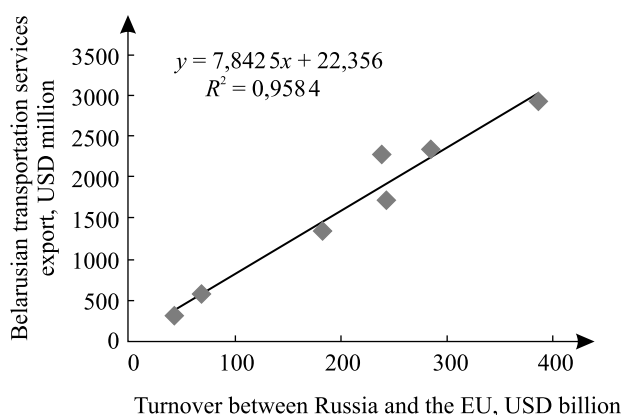


Fig. 2. Dependence of transportation services export of the Republic of Belarus on turnover between Russia and the EU
(authors' analysis based on UNCTAD data, www.unctad.org)

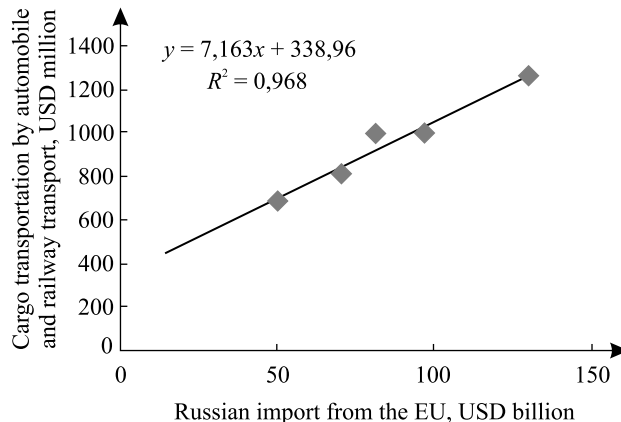


Fig. 3. Dependence of transportation (railway and automobile) services export on Russian import from the EU
(authors' analysis based on UNCTAD data, www.unctad.org)

Table 2

The EU turnover with the EAEU and China, USD billion

Country	Year					
	2000	2005	2006	2007	2008	2009
Belarus	3.9	10.9	14.1	16.8	23	15.8
Russia	67.9	183.1	242	285.4	385.3	239.2
Kazakhstan	14.2	15.9	23.7	27.5	29.1	28.8
Total	86.0	209.9	279.8	329.7	437.4	283.8
China	94.3	277.2	343.5	438	505.3	440.6

Note. According to the UNCTAD data, www.unctad.org).

We shall try to predict the development of transportation services export in 2016–2020 based on data for 2005–2013 (the pre-sanction period is chosen expecting that the sanctions will be lifted sooner or later) using trend extrapolation method. To do so, we shall construct an approximating function that adequately describes the initial statistical series and perform trend analysis, including selection of the trend line. Logical selection of the type of the approximating function on the basis of the initial data shows that the best function of the coefficient of determination is a polynomial trend. The trend line with the lowest approximation error value is shown in fig. 4.

This function has been tested using Chaddock scale, Student's and Fisher's criteria, Spearman coefficient of rank correlation for the absence of autocorrelation and heteroscedasticity. The analysis showed that the power trend adequately and precisely describes the initial statistical series and can be used to predict the volume of transportation services export. Using the model obtained we can predict the increase in the volume of transportation services export from USD 3792.4 million in 2013 up to USD 4874.1 million in 2020, i. e. by 22.2 %. Note that this forecast is close to the one made by the World Bank and predicting the increase in the volume of transportation services by 25 % by the year 2020 (fig. 4).

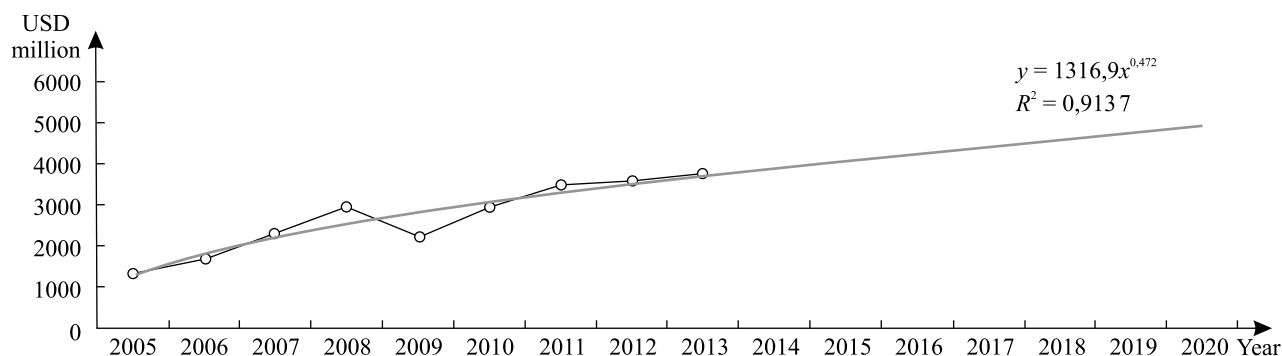


Fig. 4. Belarusian transportation services export dynamics forecast (authors' analysis based on the data of the Balance of Payments of the Republic of Belarus for 2005–2013)

If we use this model till 2030, Belarusian transportation services export will amount to USD 6 billion, which is almost 40 % more than in 2013.

If we use quarterly time series of transportation services export from 1998 to 2013 as historical data, the series will be non-stationary, but the series of first differences of quarterly increase will be stationary, integrated first-order series. In each series we shall distinguish the trend, seasonal and random components, the first two of which were predicted using exponential smoothing according to ARIMA model (Eviews 5.1 package). The results obtained are shown in table 3.

Table 3

Forecast of export of certain types of cargo-carrying transportation services, USD million

Type of transport	Year				
	2015	2015 act.	2020	2025	2030
Railway	1089.2	734	1446.0	1713.9	1981.2
Automobile	1212.2	871	1514.8	2434	2989.7
Pipe	972.2	697	1203.6	1319	1319

Note. Authors' analysis based on the data of the Balance of Payments of the Republic of Belarus for 1998–2013.

In the Republican Program of Logistics System and Transport Potential Development for 2016–2020 (Logistics-2020), as well as in the Strategy of Innovative Development of the Transport Complex of the Republic of Belarus until 2030, adopted by the Ministry of Transport and Communications (hereinafter the Strategy-2030), the growth by half of the volume of transportation services is predicted compared to 2015 (table 4).

Table 4

Indicative figures for export of certain types of cargo-carrying transportation services (minimum/maximum) according to the Strategy-2030

Type of transport	Year		
	2020	2025	2030
Railway	1175/1195	1231/1269	1274/1328
Automobile	1346/1470	1457/1678	1540/1853
Waterborne	1.5/1.7	1.6/1.8	1.7/1.8
Air	361/381	387/424	407/460
<i>Total (without pipe transport)</i>	<i>2883.5/3047.7</i>	<i>3076.6/3372.8</i>	<i>3222.7/3642.8</i>

Note. Ministry of Transport and Communications of the Republic of Belarus (www.mintrans.gov.by).

Transportation by land of the EU and China trade turnover through the territory of the EAEC (currently about USD 0.5 trillion, is predicted to be more than USD 0.7 trillion, and for the countries of the whole Asia-Pacific region it is USD 0.5 trillion more) makes for now less than 1 % of the total turnover between the EU and China, i. e. almost the entire volume of goods is still transported by sea via the Suez Canal. Active actions of EAEC countries aimed at increasing this share is a crucial task. Revenues of EAEC countries from cargo transit from the EU to China are estimated at USD 60 billion.

By analogy with maritime transport the EU – China overland transit market participants began to seek opportunities for organizing overland container lines. Their main advantages are: reduction of transportation time (12–20 days compared to 25–40 days for the water routes), as well as the ability to deliver cargo “door to door” in compliance with the essential safety and quality requirements. It should be noted that in connection with the adoption of plans for Western China development and for the Silk Road Economic Zone super project Chinese logistics specialists have already been active on the development of land transport links between China and Europe (one of the branches of the Silk Road should pass through Belarus).

International experts, including those from the Eurasian Development Bank, predicted a steady increase in shipment between the EU and China beginning from the second decade of the XXI century. Therefore, the main economic interest of the Republic of Belarus in the creation of the EAEC is the development of transit options, i. e. increased transportation services export. This will require within the EAEC:

- harmonization of national legislations in the field of transport;
- development of EAEC transport corridors;
- elimination of non-physical barriers and integration of EAEC transport policy.

The transfer of control from the border between Belarus and Russia and between Russia and Kazakhstan to the external EAEC border has reduced time of completing control operations and decreased logistics costs for the goods going through the territory of the EAEC countries from the EU to Asian states, and vice versa.

Belarus is working closely in the China – EU direction using all modes of transport: railway, air, road. We need to develop the attractiveness of transit, reduce paperwork, switch over to electronic documents. It is necessary to improve the functioning of the checkpoints, both railway and automobile ones. It is necessary for everyone to operate in an integrated manner, all together: people working at the border (transport workers and customs employees) and other bodies performing control functions both at the border and within the country. It is necessary to work out the mechanism of reducing paperwork and unnecessary control functions.

In recent years the volume of cargo transportation in containers on the itineraries Asia – Europe and Europe – Asia significantly increased. Difficulties of passage of container ships through the Suez Canal are inevitable. Experts predict a rise in transshipment of Chinese containers (up to 700 thousand TEU, Kaztrans service forecast) at Dostyk railway station, Kazakhstan. A part of these goods will be distributed on the EAEC territory (in 2010 already shipments from Kazakhstan to Belarus grew by 5.4 times, to USD 404 million), and another part (about 500 thousand TEU) will go to the EU, including through the Republic of Belarus (about 200 thousand TEU). There is a problem of loading the containers on the way back: some offer filling the containers with European goods for Russia, Kazakhstan, and Belarus. In this case, only after unloading in the

Customs Union the containers will go empty to China. The Kazakhskiy vector train, the itinerary of which will be lain from Arys station to Dostyk station, will significantly increase the transportations from Brest (10 000 TEU in 2010)¹.

Russia's intentions to close the China – Kazakhstan – Russia road itinerary under construction onto St. Petersburg may create a certain risk for Belarus. Belarus needs to make some effort in order to ensure that the second branch of this route will go to Kaliningrad. In October 2009, during the first Euro-Asian Transport Forum ASEM, the transport ministers of Belarus, Lithuania and China signed in Vilnius the declaration on the establishment of an East – West overland transit corridor.

The goods exported from the EU countries to China are mainly commodity group 7 industrial products: electrical appliances, machinery and equipment, road vehicles, power generators and equipment, professional scientific equipment. The same products are exported to the European part of CIS, therefore, having a certain storage space, the owners of transport and logistics centers (TLC) and logistics operators can group these two directions in their activities and gain profit from economies of scale.

A wide range of Chinese export of commodity groups 6, 7, 8 to Belarus may contribute to the specialization of Belarusian TLC in this direction, namely, in the maintenance of the following goods: telecommunications and sound-recording devices, office machines and equipment for automatic data processing, electrical devices, machinery and equipment, clothes, shoes, toys, souvenirs.

However, the maintenance of goods going from China to the EU in Belarusian TLC is unlikely. Only the construction of Chinese assembly plants in the Chinese-Belarusian Great Stone Industrial Park is possible.

If the project of creation of the Consolidated Transport and Logistics Company (CTLС) is implemented, it is planned to perform by 2021 the transit of container cargo, primarily in the corridor from China to the EU, in the volume of about 1.1 million containers. As far as Belarus is concerned, by creating CTLС the country plans to increase transit container traffic by 4.5 times. In general, the multiplier effect for Belarus over the forecast period may be about USD 1 billion of GDP growth, and the volume of transportations on the route between China and the EU through Belarus can reach 33 million tons per year.

Thus, to realize the forecasts of “Logistics-2020” and “Strategy-2030” it is necessary to attract additional cargo flows in transport corridors passing through the territory of the country and to make maximum use of the existing opportunities for all modes of transport. The program also provides for a significant development of container transportations within the framework of the “Silk Road Economic Belt” initiative and for the adoption for this purpose of new technologies related to the acceleration of passing container trains in the direction of China – Europe – China throughout the country.

Trend models of transportation services export growth built on data for the years 2005–2013 that are not considering sanctions against Russia showed that export could increase by 40 % (i. e. by 2 % per year) and to reach USD 6 billion by 2030. The aim of the above program is also an increase in transportation services export by 6.3 % per year, which is close to the figure predicted by us. However, the export of Belarusian transportation services depends on the turnover between Russia and the EU, so if the sanctions against Russia continue to persist, the flows between China and Western Europe along the “Silk Road Economic Belt” will not fully replace Russian flows, and the growth will be slightly lower than planned (about 5.5 % per year), which will ensure the achievement by 2020 of transportation services export value of USD 3.8 billion.

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Received by editorial board 16.02.2017.

¹Belarusian railways have 16 container terminals for the processing of heavy 20-foot containers, of which 7 have the ability to process 40-foot containers.