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**ANALYSIS OF RAIL FREIGHT TRAFFIC VOLUMES AS THE MOST  
RELIABLE AND OBJECTIVE INDICATOR OF THE UKRAINE  
ECONOMY CONDITION**

*The article analyzes the changes in the rail freight traffic volumes during 2004 – 2013. We study the relationship between dynamics and microeconomic indicators of railway operational activities in Ukraine. The article examines the changes in the rail freight traffic structure and main range of goods for 2004 – 2013.*

*Analysis of the goods transportation according to the type of transportation clearly shows that in recent years the railroads were steadily losing their turnover share in Ukraine. Unlike the import and export traffic where there is positive dynamics of growth, more than 2 times reduction in the 2013 rail transit traffic to the level of 2007 significantly affects the total amount of freight.*

*Describing the dynamic changes in freight traffic, we are to specify the presence of negative trends worsening transportation for freight tariff classes. Since 2009 the share of the most profitable third class freight turnover has been reducing, which has had a negative impact on the economic development of Ukraine.*

*Keywords: operational activity, the volume of freight traffic, the range of goods, performance of operational activities.*

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### **АНАЛІЗ ОБСЯГІВ ВАНТАЖНИХ ЗАЛІЗНИЧНИХ ПЕРЕВЕЗЕНЬ ЯК НАЙДОСТОВІРНІШОГО І ОБ'ЄКТИВНОГО ІНДИКАТОРА СТАНУ ЕКОНОМІКИ УКРАЇНИ**

*Проаналізовані зміни обсягів вантажних залізничних перевезень протягом 2004 – 2013 рр. Досліджуються питання взаємозв'язку мікроекономічної динаміки і показників експлуатаційної діяльності залізниць України. Розглядаються зміни в структурі залізничних вантажних перевезень та основній номенклатурі вантажів протягом 2004 – 2013 рр.*

*Аналіз структури перевезень вантажів за видами сполучення наочно свідчить, що останніми роками залізниці стабільно втрачають частку вантажообігу в межах України, і якщо по імпорتنих та експортних перевезеннях є позитивна динаміка зростання, то значне скорочення у 2013 р. транзитних перевезень до рівня 2007 р. більше ніж удвічі значно вплинуло на загальний обсяг перевезень вантажів.*

*Характеризуючи динаміку змін перевезень вантажів, слід звернути увагу на наявність негативної тенденції погіршення перевезення за тарифними класами вантажів. Починаючи з 2009 р. частка найдоходніших вантажів третього класу у вантажообігу знижується, що негативно впливає на розвиток економіки України.*

*Ключові слова: експлуатаційна діяльність, обсяг вантажних перевезень, номенклатура вантажів, показники експлуатаційної діяльності.*

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### **АНАЛИЗ ОБЪЕМОВ ГРУЗОВЫХ ЖЕЛЕЗНОДОРОЖНЫХ ПЕРЕВОЗОК КАК НАИБОЛЕЕ ДОСТОВЕРНОГО И ОБЪЕКТИВНОГО ИНДИКАТОРА ЭКОНОМИКИ УКРАИНЫ**

*Проанализированы изменения объемов грузовых железнодорожных перевозок за 2004 – 2013 гг. Исследуются вопросы взаимосвязи микроэкономической дина-*

*мики и показателей эксплуатационной деятельности железных дорог Украины. Рассматриваются изменения в структуре железнодорожных грузовых перевозок и основной номенклатуре грузов за 2004 – 2013 гг.*

*Анализ структуры перевозок грузов по видам сообщения наглядно свидетельствует, что в последние годы железные дороги стабильно теряют долю грузооборота в пределах Украины, и если по импортным и экспортным перевозкам – положительная динамика роста, то значительное сокращение в 2013 г. транзитных перевозок до уровня 2007 г. больше чем в 2 раза значительно повлияло на общий объем перевозок грузов.*

*Характеризуя динамику изменений перевозок грузов, необходимо обратить внимание на наличие негативной тенденции ухудшения перевозки по тарифным классам грузов. Начиная с 2009 г. доля наиболее доходных грузов третьего класса в грузообороте снижается, что негативно отражается на развитии экономики Украины.*

*Ключевые слова: эксплуатационная деятельность, объем грузовых перевозок, номенклатура грузов, показатели эксплуатационной деятельности.*

**Problem definition.** The technical condition of railway transport fixed assets is extremely disastrous, because of the investment funds continuous shortage, limited budget financing and depreciation. Thus, in 2012 and 2013 investment in railway sector fixed assets was only under 14.6 billion UAH and 5.7 billion UAH with a total fixed assets value of 84,5 billion \$. With all necessary volume of annual investment into rail transport sector the process of its fixed assets simple reproduction can be recovered almost in a century. This state of transport of Ukraine has been the result of an inconsistent transport policy held over the last 20 years and economically non-justified investment policy of the Railways in the last 10 years. According to the scientists the transport sector was the main cause of the state railways crisis, increasing its technical and technological gap that hinders the further economic development of the country and its European integration, leading to Ukraine's foreign trade dependence on foreign transport and to the losses in Ukrainian transport competitiveness, accidents growth and environmental stress. All this creates a threat to national and economic security of Ukraine, which requires urgent action on the state level and, first of all, in the railway industry.

It is also important to realize that using the volume of freight traffic as an indicator of the economy state, it is necessary to take into account significant differences between the levels of the industrial production structure and rail freight traffic, which cause differences in the rate of change of the industry total amount and rail freight traffic. According to the scientists in transportation such operational indicator as «quality situation», expressed by concepts of fluctuations in growth and decline, stabilization, growth acceleration, slowdown, recession, etc., the level and dynamics of change of rail freight in the economy of Ukraine, where the share of rail freight turnover exceeds 83% (excluding pipelines), in our opinion, is unparalleled. In this case, all the developed Western European countries don't use such an indicator.

**Recent researches and publications analysis.** Recently, many economists explore theoretical issues and practical aspects of a complex problem solving the task to improve the efficiency of the operation and development of railway transport, among them: Y. Barash [1], V. Lapydus [2], D. Macheret [3], A. Novikova [4], M. Trihynkov [5], L. Mazo [6], N. Tereshyna [7], V. Halaburda [8], I. Belov [9].

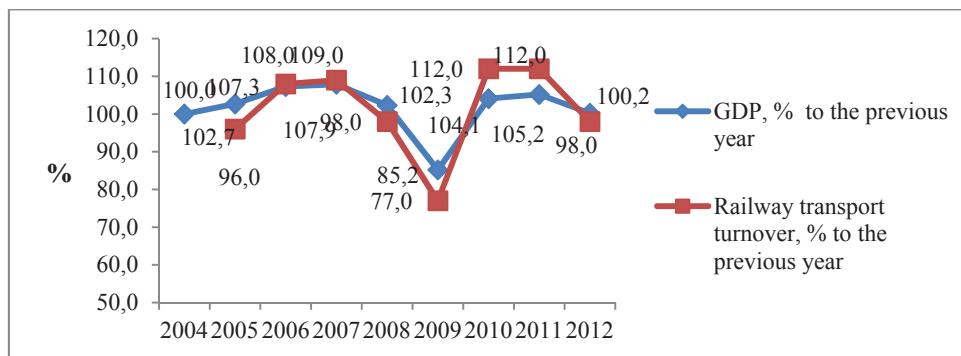
**The aim of this article** is to analyze the volume of rail freight traffic during 2004 – 2013 as the most reliable and objective indicator of the economy state of Ukraine.

**Presentation of main research materials.** Describing the dynamics of changes in the volume of rail freight, it can be stated that the rail transport operational performance can clearly indicate to the formation and growth of negative trends in the real economy sector of Ukraine. In support of this conclusion we can bring figures on the changes of freight and industrial production volumes in the most critical months of 2008 – 2009, i.e. during the strengthening of the global financial crisis.

It must be emphasized that negative effects of the global economic crisis of 2008 – 2009 most strongly influenced the extremely important for railroading economy range of goods such as coal, traffic volume of which in 2009 was reduced by 13 % to the level of 2007, iron ore – reduced by 21%, ferrous metals – reduced by 34%, non-ferrous metals – reduced by 1.5 times, chemicals – reduced by 42%, coke – reduced by 24%. The greatest decrease in the level of these freight types transportation was in export traffic as the export traffic volume of ferrous metals was decreased by 31%.

Our studies suggest that in terms of overcoming the global financial and economic crisis of 2008 – 2009 and the transition to the post-crisis economic development of Ukraine is worthwhile to consider the relationship between dynamics and microeconomic indicators of railways operating in Ukraine in more extended time interval, covering the pre-crisis dynamic growth period, the crisis period and the post-crisis growth period.

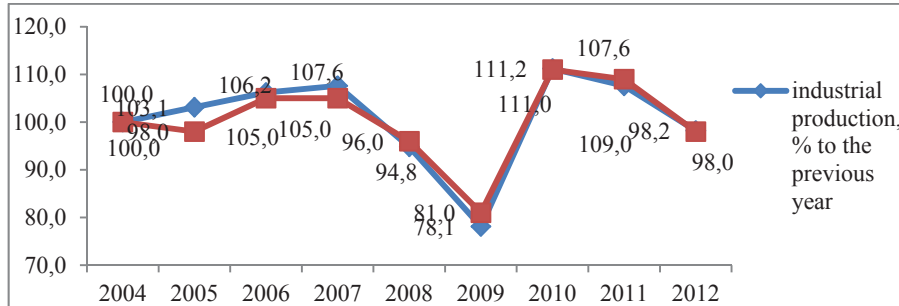
Therefore, we consider two levels of the country's gross domestic product (GDP) changes, industrial production volumes and rail freight traffic. Thus, as can be seen from the figures 1 and 2, before the crisis, and from given volume indices of these indicators, the negative effects of the economic crisis were most strongly manifested in industrial production falling and consequently in a decrease of the cargo loading volumes and railway transport turnover, before the crisis the railway transport turnover dynamics was slightly ahead of GDP growth and to a greater correspondence with the industrial production dynamics.



*Fig. 1. Dynamics of GDP and the volume of rail transport turnover, % to the previous year*

That was true in 2006 and 2007, however in 2008, when with slight decrease to 6.7% in GDP growth the growth in manufacturing sharply slowed by 12.8%, the freight turnover decreased by 11%, and in 2009 the turnover volume decreased significantly even to a greater extent than GDP and industrial production volume, but in 2010 and 2011 post-crisis years its growth was much more dynamic. As the result, during the whole ten year

period under review the freight turnover dynamics was slightly ahead of the GDP growth, including manufacturing, though, since 2012, a steady growth in freight turnover slightly decreased due to reduced transit traffic via Ukraine.



*Fig. 2. Dynamics of industrial output and loading cargo on railways, % to the previous year*

It is also important to realize that if the industrial production volume in the post-crisis Ukraine in 2010 did not reach the level of 2007, and GDP slightly exceeded it, the turnover in 2010 lagged behind 2007 levels by more than 17%, which means that this year it did not even reach the level of 2003, and its level in 2007 was the highest for the period being considered, and, consequently, for the period of independent Ukraine.

Describing the dynamics of change in industrial output and loading of goods by rail transport, we can say that yet during the pre-crisis Ukraine growth there appeared a trend backlog in loading volume to the dynamics of industrial production growth, which is illustrated in Fig. 2. It must be emphasized that this was due to an increase in industrial production share of the finished product, which has a lower transportability, as well as to increased competition from other modes of transport.

One should note that in 2008, when the global financial crisis impact on the Ukrainian economy while GDP growth (102,3%) maintaining the whole year, the volume of cargo loading decreased by 4%, which was due to a quick reaction of the rate «loading transport» on the crisis that emerged later.

In addition, in 2009 the freight volume on rail transport decreased to a greater extent (33%) than the volume of GDP. The level of decline in industrial production was only 22%. This was because the transport sector share fallen most seriously, is significant in the total GDP. As a consequence, one can conclude that by the results of 2014 the volume of cargo load was 21% lower than in 2004, while the industrial production volumes were 2,3% higher. It should be emphasized that in 2010 – 2011 significant traffic increase by 11% and 9% was ensured compared to the industrial production growth in 2011 – by 7.6%. However, this could not lead to the elimination of accumulated imbalances in the dynamics of these indicators. It should be noted that the focus on low load sometimes leads to erroneous conclusions about the actual rail traffic volumes. It also is helpful to note that the volume and intensity of use of railway infrastructure are primarily determined by the actual volume of turnover, which, as shown in Fig. 1, is almost at the maximum level.

In addition, describing the decline dynamics in 2009 of the volume of cargo loading in value of rail transport volumes and GDP, it must be emphasized that the level of decline in cargo traffic had greatly influenced a significant reduction in the volume of transit goods, where they fell by 29% against 23% decrease in Ukraine.

## ЗАЛІЗНИЧНИЙ ТРАНСПОРТ

In summary, we emphasize that a more detailed analysis of the value of the rail freight volume as the most reliable and objective indicator of the Ukraine economy, we need to bring the analysis of changes both in the rail freight structure and in changes on the basic range of goods and, primarily those goods, whose share in total traffic is not less than 8 – 10%.

The structure of traffic on ten-year period, is analyzed, a significant change, as seen from Table 1 for the proportion of main cargo types to the total transportation.

*Table 1. The proportion of main cargo types to the total transportation in all forms of traffic*

Cargo Types Years	Densities, %			
	2004	2007	2009	2013
Coal	27,6	24,5	27,9	26,8
Petroleum and petroleum products	7,1	5,4	6,9	5,2
Iron and manganese ore	16,8	18,1	18,7	19,9
Non-ferrous metals ore	1,0	0,9	1,0	1,2
Ferrous metals	9,2	9,9	8,5	7,6
Non-ferrous metals	0,1	0,0	0,0	0,0
Wood and timber	1,1	1,1	0,9	1,2
Chemical and fertilizers	2,5	3,0	2,8	2,5
Chemicals	2,1	1,9	1,4	1,4
Cars	0,1	0,1	0,0	0,0
Machinery and equipment	0,1	0,1	0,1	0,1
Grain and grinding	2,2	2,2	5,2	5,2
Coke	3,0	2,5	2,4	2,7
Scrap metal	1,7	1,5	1,4	1,1
Mineral building materials	15,1	18,7	13,9	15,6
Cement	1,8	2,2	1,6	1,4
Salt	0,6	0,5	0,6	0,5
Others	7,9	7,4	6,5	7,5

This primarily refers to the types of goods, which in 2013 increased to the level of 2007, such as non-ferrous metals ore, which increase is 33%, grain and grinding – 2,3 times increased. Other types of goods remained their reduction to the 2007 level, although the proportion of such cargo as coal, iron ore, coke were slightly above the 2007. Much worse was the situation with the proportion of such goods as oil and petroleum, steel, chemicals, cement and mineral building materials, whose share in 2013 was much lower than in 2007 (Table. 1).

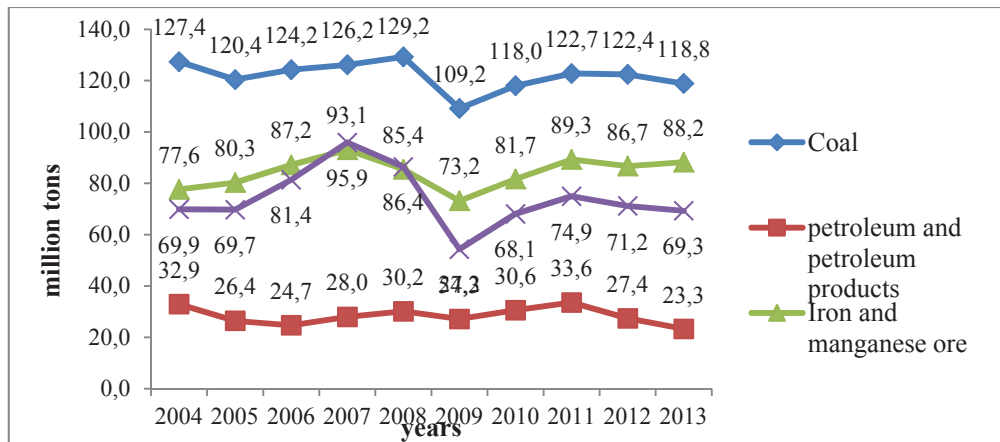
Analysis of the transportation by types shows that traffic in Ukraine compared to 2007 was deteriorated to such goods as oil and oil products, iron ore, ferrous metals, scrap metal, mineral building materials. Thus in 2013 the export freight traffic increased compared to 2007 levels by 33% and import traffic – by 1%.

Changes of the traffic volumes of the main range of goods, whose share in total traffic exceeds 67% in all kinds of transportation for the period of 2004 – 2013 are presented in Fig. 3.

Considering the freight traffic dynamics during the first five pre-crisis years (2004 – 2008) one can note the trend of freight traffic growth in all kinds of transportation. Thus,



in 2008 the total cargo volume increased by 8.1% and amounted to 498,5 million tons, 37,1 million tons more than in 2004.



**Fig. 3. Changes in the traffic volume of the main types of goods in all types of transportation**

Analyzing the range of goods volume, the biggest changes are observed in the main bulk transport, whose share in total traffic is the highest, such as coal (27,6%), petroleum and petroleum products (7,1%), iron and manganese ore (18,1%) and mineral building materials (15,7%). During the described period the traffic volumes of the main types of goods increased as follows: coal – 1.5 million tons, iron and manganese ore – 7,8 million tons, mineral building materials – 16,5 million tons. Since 2008, there was a decrease in freight volumes due to the economic crisis 2008 – 2009. For example, in 2009 it was transported 391,5 million tons of cargo, which is 84,9% of the 2004 level. The largest decrease was seen in the transportation of coal (84,5%) and mineral building materials (62,8%), due to a sharp decline in industry and construction. Since 2010, the rate of decline in freight transport stopped and the increase trend appeared, but the level of 2004 wasn't reached. Thus, the coal transportation in 2013 amounted to 93,3% of 2004, oil and petroleum products – to 70,7%, mineral building materials – to 99,2%. Considering 2013 compared to 2012 freight traffic volume of the main types of goods is: coal – 97,1%, petroleum and petroleum products – 84,9%, mineral building materials – 97,4%, indicating a decline in transportation. The total amount of all types of cargo transportation in 2013 was 443.6 million tons that equaled to 96,1% compared to 2004.

**Conclusion.** Summarizing up the analysis of traffic volumes by type of transportation, it is worth noting that in general the freight rail traffic decreased during 2004 – 2013. In 2013 it was 443,6 million tons, accounting for 96,1% of the 2004 level (461,3 million tons). This trend is observed in almost all types of transportation, except for imports (133,5%) and exports (138%). But the export-import increase did not give the opportunity to reach the pre-crisis levels.

Analysis of the goods transportation according to the type of transportation clearly shows that in recent years the railroads were steadily losing their turnover share in Ukraine. Unlike the import and export traffic where there is positive dynamics of growth, more than 2 times reduction in the 2013 rail transit traffic to the level of 2007 significantly affects the total amount of freight.

Describing the dynamic changes in freight traffic, we are to specify the presence of negative trends worsening transportation for freight tariff classes. Since 2009 the share of the most profitable third class freight turnover was reduced, which has had a negative impact on the economic development of Ukraine.

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