

# “Economic conditions of the functioning and existence of asymmetry in the development of transport services markets of Ukraine”

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## Economic conditions of the functioning and existence of asymmetry in the development of transport services markets of Ukraine

### Abstract

The achievement of the desired level of efficiency in the functioning of the markets of goods and services is possible under the conditions of equilibrium of these processes on the global scale. The paper is focused on the worldwide tendencies in the development of the markets of goods and services, on their disproportional development. The relationship of the received results with the nature of functioning of economic systems and its interaction with the sphere of transport is determined. The article considers the importance of tendencies in the development of the world economic system for Ukraine, the degree of inclusion of transport into the global processes. It identifies the need to consider the asymmetry in the development levels of the markets of goods and transport services on the international and the national scale, assessing the level of deviation from the state of symmetry. It substantiates the necessity in eliminating disproportions depending on the level and type of asymmetries and taking into account the global tendencies.

**Keywords:** transport services, international transport services market, asymmetry evaluation, export and import of goods and services, international integration.

**JEL Classification:** C46, F15, L98.

### Problem statement

The development of transport services markets is carried out under the influence of many factors, the most significant of which are the level of the economy's development in the country and its trade partners, sociodemographic factors, normative legal framework, the level of acceptable ecological burden by the transport and others. These factors form a specific external environment for the development of transportation and, therefore, it is important to follow and evaluate their relation with the mechanisms, which ensure sustainability of different levels of transport systems. The ability of transport firms to be competitive on international markets is supported by the level of their geographical concentration, the level of technical development and technical state of the transport, the state of material resources, the availability of effective logistics and so forth.

While researching the development of the markets of goods, some authors analyze the processes of the movement of goods (Shyrov, 2008; Kirillova, 2011; Kolchikov, 2012). Many scientific works, dedicated to the research of transport services markets published in the Russian or Ukrainian languages, offer approaches to the leveling of negative factors for effective functioning of these markets (Alekseeva, 2008; Kobets, 2005; Mijusov, 2006; Primachev, 2009). A very interesting and complex issue remains the processes of development of international markets of transport services, the problems of achieving their equilibrium. Such approach to transport services markets intends to study the peculiarities of

the related goods markets, the tendencies of their functioning, the level of monopolization and concentration, the character of distribution of the goods flows among the main transport directions, the specifics of using the possibilities provided by this or that type of transport. The specific feature of such approach is a direct practical demand in the studying of transport services markets from the position of their internationalization. At the same time, an increase in the level of openness and interrelation of economic systems on the global scale has definite consequences for all counteragents of these systems. On the whole, effective functioning of counteragents and systems is possible only under the condition of full provision with transport facilities and quality systems for organization of goods flows. It is possible taking into account the peculiarities of product markets, which directly influence the markets of transport services (including the international ones). This paper is devoted to the problems of taking into account these peculiarities.

### Main results of the study

In the recent years, the rates of economic growth in the world have substantially slowed down. The existence of the problems is confirmed not only by the global economic crises, but also by the analysis of the general economic situation. If we address the annual World Economic and Financial Survey prepared by the International Monetary Fund in April 2016, then, we will definitely notice its title – Too Slow for Too Long (Table 1).

In the recent years, the influence of the general macroeconomic factors, which affect the development perspectives of certain countries in different ways, has strengthened. They include: a slow-down of growth in China; a further lowering of prices on goods, especially on oil, with significant redistributive consequences for sectors and countries; the related slowing-down in investments and trade; reduction in the inflows of capital (WEO, 2016).

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Table 1. Some indicators of development of the world economy, percent change to the previous year

Indicator	Value	
	2014	2015
World output	3.4	3.1
Advanced economies	1.8	1.9
Emerging market and developing economies	4.6	4.0
World trade volume (goods and services)	3.5	2.8
Imports- advanced economies	3.5	4.3
Imports - emerging market and developing economies	3.7	0.5
Exports – advanced economies	3.5	3.4
Exports - emerging market and developing economies	3.1	1.7

Source: WEO (2016)

In the period 2012-2014, the growth rate of the world trade of goods fluctuated from 2 to 2.5% and was similar to the growth rate of the world manufacturing. Such indicators are substantially lower than the annual average growth rates in the pre-crisis period of 2003-2007, when they reached 7.2%. In 2014, the volume of the world trade in current prices practically did not change, having risen only by 0.3% because of the falling prices on the basic raw materials. In 2015, there was a growth of 2.8% that is lower than forecasted. The most vivid cause of such state is a geopolitical tension and reduction in the production volumes (for example, in the countries that suffered the most (according to the IMF – Yemen, Libya, Ukraine), the collapse of production led to the reduction of the world GDP by 0.5% in 2014-2015) (TDR, 2015). This situation has a direct impact on the effectiveness of the transport services market. This impact is determined by the system of direct and indirect inter-relations.

Thus, the analysis of the development perspectives of the world economy has showed the existence of several stable tendencies, which influence the system as a whole, and, in turn, having an individual impact on each country. As regards Ukraine, it obviously does not contribute to its integration into the world markets, and the state of its economy is close to critical, which is corroborated by the data of State Statistics Committee shown in Tables 2-5.

Table 2. The main economic characteristics of development in Ukraine

Indicator	Year		
	2013	2014	2015
GDP, billion. UAH.	1522.7	1586.9	1979.5
Consumer prices index, %	100.5	124.9	143.3
Index of prices of industrial producers, %	101.7	131.8	125.4
Index of prices of the sold agricultural products, %	97.1	124.3	154.5
Transportation of cargoes by all types of transport, billion tons	1.8	1.6	1.5
Transportation of passengers by the general transport, billion	6.6	5.9	5.2
Quantity of the permanent population at the end of the year, mln	45.2	42.8	42.6

Source: summarized by the author on the basis of the State Statistics committee of Ukraine (2016).

Table 3. Industrial production in Ukraine according to types of activity (several types)

Indicator	Year		
	2013	2014	2015
Coal, mln. tons	64.4	45.9	29.9
Raw oil, mln. tons	2.2	2.1	1.9
Natural gas, billion m <sup>3</sup>	21.3	20.1	19.8
Iron ore, mln tons	185	184	175
Pig iron and specular cast iron, mln. tons	29.1	24.8	21.9
Ferroalloys, mln. tons	1.1	1.4	1.1
Finished steel of ferrous materials, mln. tons	17.8	14.3	12.1
Energy, billion kWh * a year	194	183	164

Source: summarized by the author on the basis of the State Statistics committee of Ukraine (2016).

Table 4. Indicators of cargo volumes according to the types of transport (% to the previous year)

Indicator	Year		
	2013	2014	2015
Transport	99	90	93
Including:			
1. ground	99	90	93
1.1. railway	97	89	91
1.2. auto	100	92	93
1.3. pipe	98	80	98
2. water	81	102	108
2.1. sea	99	95	117
2.2. river	66	111	100
3. air	81	85	88

Source: summarized by the author on the basis of the State Statistics Committee of Ukraine (2016); Transport and connection of Ukraine in 2014; Transport and connection of Ukraine in 2015.

Table 5. Transportation of cargoes according to the types of transport in Ukraine, mln tons

Indicator	Year		
	2013	2014	2015
Transport	1837	1623	1507
Including:			
1. ground	1831	1617	1501
1.1. railway	444	386	350
1.2. auto	1261	1131	1054
1.3. pipe	126	100	97
2. water	6	6	6
2.1. sea	3	3	3
2.2. river	3	3	3
3. air	0.1	0.1	0.1

Source: summarized by the author on the basis of the State statistics committee of Ukraine (2016); Transport and connection of Ukraine in 2014; Transport and connection of Ukraine in 2015.

Judging by the comparative data, it is important to make decisions, which would make it possible to change the economic situation in Ukraine. It also concerns the development of transportation (Table 6).

Table 6. Export-import indexes of Ukraine

Index	Export			Import		
	2013	2014	2015	2013	2014	2015
Goods, billion US dollars	63320.7	53901.7	38127.1	76986.8	54428.7	37516.4
Services, mln US dollars	14836.3	11520.8	9736.6	7609.0	6373.1	5523.0
Transport services, mln US dollars	8305.8	6101.9	5263.1	1716.4	1376.5	1153.4
Including:						
- sea transport	1123.7	850.9	735.9	195.8	243.6	191.7
- river transport	42.3	46.3	44.5	0.4	1.1	0.6
- air transport	1333.2	1071.3	853.7	643.6	431.0	466.9
- railway transport	1613.8	1098.8	751.2	626.9	431.3	287.0
- auto transport	478.4	459.6	249.1	197.2	189.8	91.8

Source: summarized by the author on the basis of the Transport and connection of Ukraine in 2014; Transport and connection of Ukraine in 2015.

There is definite relationship between the above-mentioned indicators, including those that characterize transport. This dependence should be taken into account considering the product asymmetry on the markets, the need to analyze the influence of asymmetry on the formation and functioning of the transport services markets, as well as the study of the nature and ways to counteract its possible negative consequences.

The degree of the transport system's participation in the formation of economic environment is reflected in the volumes of transport production. A disproportionate distribution of goods flows on the global scale is connected, first of all, with the processes of international division of labor. It gives us the right to consider this asymmetry an objective characteristic of the modern economic system. At the same time, one should remember that what is needed is not the asymmetry of the markets' functioning, but the degree of its manifestation and possibilities of its negative influence on the related fields, including transportation as one of the most overloaded and, consequently, the most vulnerable.

As the main criteria of participation of the transport complex in the economy of a country (region, city) is, first of all, the volumes of transport production, expressed in the tones of transported cargoes or the volumes of the received profits, it is proposed to evaluate the level of asymmetry in the development of transport services markets through their economic results. Disproportions in the development of economic systems of different levels in Ukraine were the subject of research of several authors (Naumenko, 2012; Bozhidarnik, 2005; Grebenkin, 2005; Kobets, 2005; Pshinko, 2011). The understanding of asymmetry and, consequently, the approaches to its evaluation differ (Vakhovich, 2008; Kolochkov, 2012; Khasuna, 2012). From the mathematical point of view, the asymmetry

is understood as a deviation in relation to the mathematical expectation of statistic series. As a basis for its calculation, we use the statistical methods of calculation with the definition of central moment of the third order, while the consequence of calculations is the following: asymmetry coefficient calculation; determination of a relative asymmetry for comparative analysis; calculation of the asymmetry value through its relation to average error. The value of the latter should be considered in the range from 0 to 3, where an indicator bigger than 3 shows the asymmetrical distribution of the sign, and smaller than 3 - indicates an insignificant asymmetry caused by some accidental factors, which can be omitted in this research. Consequently, the closer the value is to 0, the more symmetrical is the sign distribution.

The level of asymmetry's manifestation leads to the understanding of its type. It is proposed to apply the following classification:

- ◆ fluctuating asymmetry, with subtle deviations compared to the average, caused by some accidental factors;
- ◆ directed asymmetry, which suggests the existence of an expressed shift;
- ◆ antisymmetry as an extreme level of manifestation with bimodal distribution around the average.

The above mentioned approach was applied towards the analysis of the level of economic development of countries (71) and the regions of Ukraine (24). As an object of the analysis, we have selected the values of the received profits from importing and exporting goods and services, with the focus on profits from transport services. The data of the table (Table 7) demonstrate a definite level of asymmetry in the distribution of these profits on the international scale and in Ukraine.

Table 7. Analyse results of asymmetry level of researched objects

	Mean square deviation	Asymmetry coefficient	Value of relative asymmetry	Level of importance of the asymmetry
World economy, general income from:				
Goods import	218.2	1.6	0.4	5.3
Goods export	215.7	1.5	0.8	5.0
Services import	60.4	0.6	1.3	2.0
Services export	60.4	1.8	0.9	6.0
Ukraine, general income from:				
Goods import	263.0	1.1	-0.1	2.4
Goods export	223.0	1.1	-3.8	2.4
Services import	27.1	1.1	1.5	2.4
Services export	26.4	1.1	2.1	2.4
Transport services import	5.1	3.7	-0.1	18.5
Transport services export	7.7	1.9	0.1	9.5

Source: summarized by the author on the basis of the State Statistics committee of Ukraine (2016); WEO (2016); TDR (2015).

The indicators of import and export of goods in the world are distributed almost evenly. A small growth of import may be caused by the fact that the delivery of goods is conducted on CIF terms, while the export of goods is done on FOB terms. As for the rest, all indicators testify to the right-hand (“positive”) asymmetry, the economic sense of which is in finding higher values of signs (prevalence of values of the received income on the level higher than average). This fact, along with the high level of asymmetry, proves the general tendency in the formation of trade balance based on the massiveness of the “cheap” goods flows. The situation in Ukraine somewhat differs from the global one. Both import and export of goods have demonstrated a left-side antisymmetry, which means a more frequent presence in the general totality of features, which correspond to higher values of the received profits from the economic activity of the researched areas. That means that the volumes of income and expenditures in the trade of goods are formed, first of all, by their

prices, not their mass. The same tendency is observed in relation to the import and export of transport services, where the left side asymmetry “speaks” of substantial expenditures of the Ukrainian trade balance in this sector (first of all due to unreasonable expenses for providing and receiving services by counteragents on all markets of transport services of Ukraine). This tendency is proved by the indicators of the asymmetry value on the level of 18.5. A sharp asymmetry of the Ukrainian export of transport services confirms the irrationality of formation of cargo flows, the prevalence of “cheap” cargoes in their nomenclature.

The conclusion about the significant difference of the export structure of Ukraine from the world tendencies is also corroborated by the values of indexes of diversification and concentration of exports. For Ukraine, they comprise 0.668 and 0.127, respectively. Below we present a graphic interpretation of the received results (Fig. 1, 2), where N is a normal distribution (for the graphic comparison of the deviation rate).

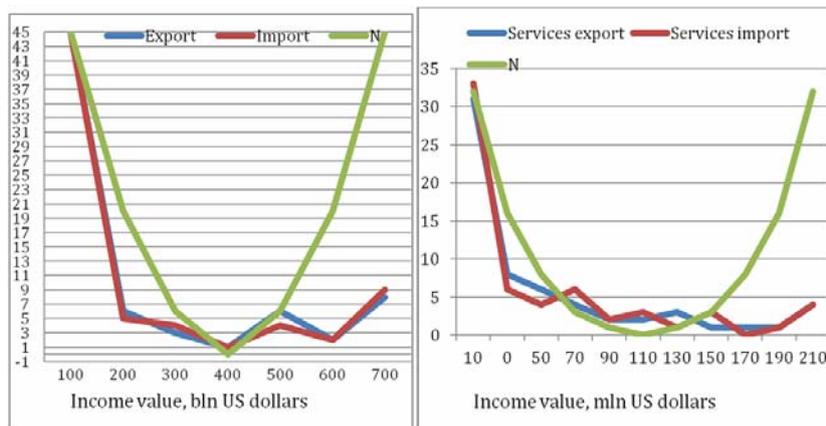


Fig. 1. Indicators of the level of economic processes asymmetry on the international scale

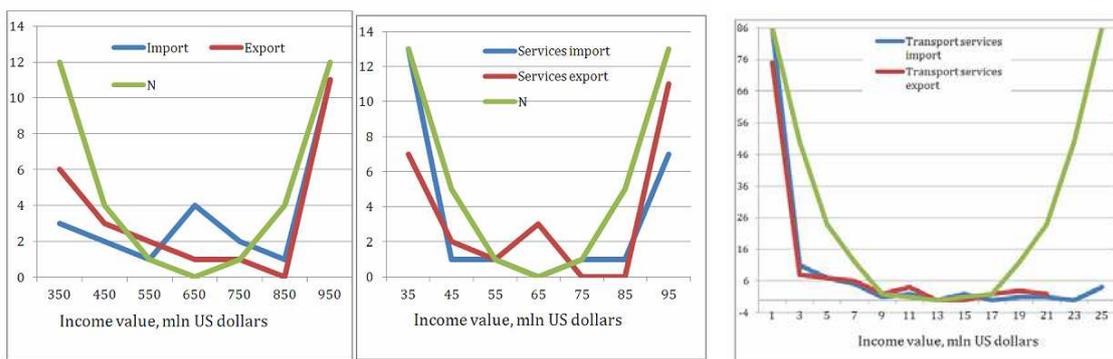


Fig. 2. Indicators of the level of economic processes asymmetry in Ukraine

Practically, all the volume of the Ukrainian export is provided by three groups of goods: ferrous metals and materials made from them (27%), machine building production (13.2%), crops (12.1%). In the recent years, the share of agricultural production in the GDP of Ukraine is constantly growing, from 8% in 2010 till 14% in 2015, at the same time, when the share of industrial production in the recent years has not changed (23-24%).

Table 8 shows the main suppliers of export goods and the volumes of profits. Almost 40% of the Ukrainian export is produced by the Dnepropetrovsk, Donetsk and Zaporozhye regions, almost 10% – by Southern regions of Ukraine. The main export countries: Turkey, Egypt, China, Poland, Italy (about 30%). The share of the Russian Federation has decreased to 18% (practically three times) due to the Eastern regions.

The main problem in the formation of the Ukrainian export is a stable tendency to lower the world prices on

the main groups of the country's products, first of all, on raw materials – ferrous metals and crops.

Table 8. Export volumes of the regions of Ukraine, 2014

Region share in state export, %	Export volumes, mln. US dollars
Donetskaya (42.7), Dnepropetrovskaya (31.6), Zaporozhskaya (12.8), Luganskaya (6.6)	14596.4 (ferrous metals and materials made from them)
Zaporozhskaya (17), Zakarpatskaya (16), Kharkovskaya (9.3), Donetskaya (6.6), Lvovskaya (6.3), Volynskaya (5)	5657.2 (nuclear reactors, boilers, machines, electric machines)
Luganskaya (25.3), Dnepropetrovskaya (19.3), Poltavskaya (8), Donetskaya (6), Kharkovskaya (6.3), Odesskaya (4.6)	1472.1 (means of ground transport, flying machines, floating equipment)
Nickolaevskaya (12), Odesskaya (5.7), Chernigovskaya (3.3), Poltavskaya (3.1)	6544.1(crops)

Source: summarized by the author on the basis of the State Statistics Committee of Ukraine (2016).

Ukraine, which is on the 6 position in the world among the suppliers of crops, according to the International Grain Council, increases its production and already by 2017 plans to export up to 50 mln tons (GMR, 2016).

The delivery of metals on international markets is connected with the range of factors influencing the achievement of a positive net trade balance of Ukraine. The tendencies on raw metals markets are connected with their global oversupply, the fall of demand and prices in China, which is the main consumer of this kind of raw materials in the world, the fall of prices on energy carriers and the growth of the dollar exchange rate. In the absence of unexpected events, which can have critical consequences, in the coming years, there is a high possibility of preservation of this tendency because of the cheap mining by the world largest suppliers of ferrous ore ("Rio-Tinto", Australia and "Vale", Brazil) and low demand in Chins.

Against the reduction of the world industrial production, a relatively small decline of indexes in this sector of Ukraine (in spite of the loss of the biggest Ukrainian industrial centers and a critical political and economic situation in the country), there is a chance of preserving a status quo in relation to the export of machine building products.

Unfortunately, the formation of the foreign trade balance of Ukraine will be happening due to mass cargoes and the prevalence of low prices of exports with the strengthening of the right side asymmetry in the export of both goods and services.

Significant levers of changing the existing tendencies (besides many others) may become the perfection of normative and legislative base and liquidation of bureaucratic barriers for business.

Having studied the structure of cargo flows, which were systematized according to the way of delivery, cargo nomenclature, geography of flows, the size of the received profits/suffered losses, we come to the conclusion about the existence of a stable tendency of reduction in the industrialized exports and practically unchanged ways of their delivery. There are all rea-

sons to have a skeptical attitude to the possibilities of a rapid change of the situation in the nearest future in relation to many factors, which include:

- ◆ lack of the general strategy for the functioning and development of the country's transport complex, which is viable in the contemporary difficult conditions;
- ◆ imperfection of legislative acts on the basis of which the transport complex functions (amendments to the law on the ports of Ukraine, acceptance of Law on the inner water transport, the legislation regulating the work of railway transport, the solution of issues connected with "Open air", implementation of international IMO Conventions, acceptance of Law on abolishment of value added tax with the articles on the use of tax advantages in airplane building and shipbuilding);
- ◆ critical state of infrastructure of all kinds of transport;
- ◆ unpredictable political situation as a cause for stagnation of all processes of the branch's development;
- ◆ low investment activity, etc.

## Conclusions

It should be emphasized that there is an asymmetry that should be considered as antisymmetry of the dynamics of provision of transport services by Ukrainian companies in relation to the development of other branches. The tendency is deepened by the inability to use internal water ways because of the totally destroyed river transport (including the fleet, infrastructure, ground service companies, etc). One should also keep in mind such tendency in the development of the transport complex as a growth in the share of railway transportation based on the lowering of auto cargo flows. The assessment of the level of asymmetry of these processes is aimed not only at a simple statement of the fact about its existence, but also gives an opportunity to unveil the processes, which at first do not appear evident, which makes it possible to correct management decisions and lower undesirable effects.

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