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UKRAINIAN EXPORT AMONG EU COUNTRIES: GEOPOLITICAL PRIORITIES

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УКРАЇНСЬКИЙ ЕКСПОРТ В КРАЇНИ ЄС: ГЕОПОЛІТИЧНІ ПРІОРИТЕТИ

In this paper modern geopolitical trends in international trade between Ukraine and 28 countries of the EU are discussed. Despite recent events, which mostly are political in nature Ukraine has to revise its geopolitical direction in the trade and to choose pathways for the export of goods. The new and most promising partner is the EU. Using a classical gravity model, dependence between Ukrainian export of goods and EU GDP as well as distance between countries is discovered. To provide more detailed and qualitative analysis EU' countries are separated into two groups by income. This allows to identify priorities of Ukrainian export and to find out which of them is preferred in Ukraine. Results are confirmed by the trend analysis.

Статтю присвячено дослідженню сучасних геополітичних напрямків міжнародного потоку то-варів України серед 28 країн ЄС. Зважаючи на останні події, які здебільшого мають політичний характер Україна змушена переглянути свої геополітичні напрямки в торгівлі та обрати перс-пективні шляхи експорту товарів. Новим та найбільш перспективним партнером стає ЄС. Саме тому було досліджено залежність українського експорту товарів від ВВП країн ЄС та дистан-цією, використовуючи класичну гравітаційну модель. Для більш детального та якісного аналізу країни ЄС було розділено на дві групи за рівнем доходу. Такий підхід дозволив визначити пріо-ритетні напрямки українського експорту та з'ясувати, якому з них віддає перевагу Україна. Ре-зультати було перевірено за допомогою аналізу трендів.

Key words: European Union, integration, gravity model, gravity equation, regression analysis.
Ключові слова: Європейський Союз, інтеграція, гравітаційна модель гравітаційне рівняння.

STATEMENT OF THE PROBLEM

Today Ukraine is in a state of uncertainty: due to recent circumstances (war), Ukraine has lost an important strategic partner — Russia. Therefore, Ukrainian exporters are forced to find new trading partners. European Union (hereinafter EU) is a new market with great potential and a large number of consumers. In this process, the government became an active renewal of the agreement with the EU, namely the signing and implementation of the economic Agreement with the EU in 2016. However, EU includes 28 countries that have different economic development and are at different distances from the Ukraine. These factors are important when selecting a trading partner.

OBJECT

Ukrainian export of goods in EU countries.

SUBJECT

Trading relations between Ukraine and EU countries.

THE AIM OF THE PAPER

Explore the priorities of Ukrainian export of goods in the EU countries with above-average income.

Objectives: to analyze the current state of economic relations between Ukraine and the EU; to explore the factors influencing the choice of trade partners among the EU countries by Ukrainian exporters; provide regression analysis based on the variety of factors and select the most significant ones.

METHODOLOGY
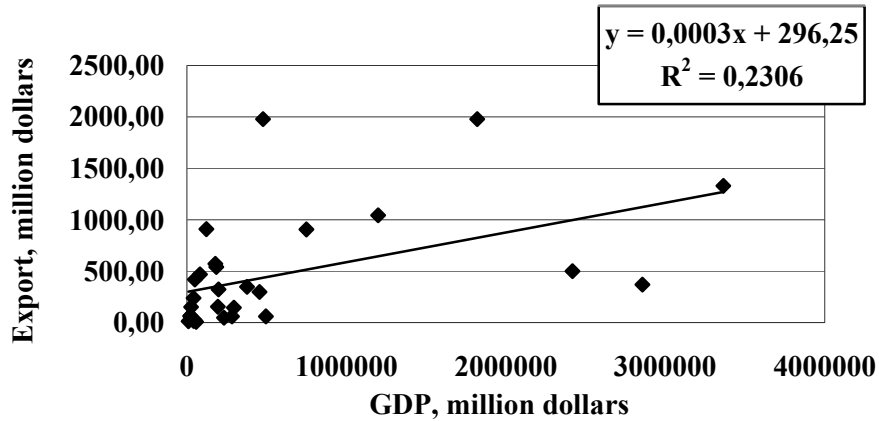
Gravity model, trend analysis, regression analysis..

$$y = 0,0003x + 296,25$$
$$R^2 = 0,2306$$

Figure 1. The dependence of exports and GDP of the second country, millions of dollars

Source: Ukrstat and The World Bank [1; 8].

LITERATURE REVIEW

Trade flows between countries are the object of analysis in many academic papers.

For example, Troyekurov and Pelevin (2014) use gravity model to explore foreign trade flow of the BRICS countries. There were scientists also used the model to demonstrate trade flow between two organizations [9].

Zarzoz and Lehman (2003) applied the gravity trade model to asses Mercosur European Union trade, and trade potential following the agreements reached recently between both trade blocs. To do this they use important determinants of bilateral trade flows as additional variables: infrastructure, disparities in income levels and exchange rates. Kaukin, and Idrisov (2014) analyse Russian import using the gravity model. They test the location of the checkpoints on the state border for significant impact on the volume and routes of Russian imports [3, 10].

Novikova and Tkachuk (2011) examine Ukrainian trade flow of goods to the EU' countries using a lot of dummy-variables: Ukraine GDP, EU countries GDP of; Population of Ukraine and other countries, Distance; Language, Borders with Ukraine [5].

UNSOLVED PARTS OF THE PROBLEM UNDER STUDY

Trade flow includes import and export of goods and services. Services can be delivery without transportation costs. That is why using gravity model for the general trade flow causes unclear results. To provide more correct results and to understand what influences the Ukrainian export (Distance or GDP) only export of goods should be analyzed.

PRESENTATION OF THE BASIC MATERIAL

Russia was the strongest economic partner of Ukraine for a long time. After the recent conflict with Russia, Ukraine was forced to reconsider its geopolitical directions in trade. The most promising partner is EU. It has broad market with consumers and with good purchasing power. Preparation for cooperation between EU and Ukraine has begun in 1991. After this step process has stopped. At the end of 2014 the government in Ukraine has changed. The new government has renewed the process of integration into the EU. In March and June 2014 the political and economic parts of the Agreement have been signed. However in the fall in Brussels at tripartite negotiations of "Ukraine-Russia-EU" implementation of the agreement on creation of the free trade zone Ukraine — the EU to December 31, 2015 has been delayed. Since January 1, 2016, in the mode of "temporary use" provisions have begun to work in the relation of the free trade zone also [4].
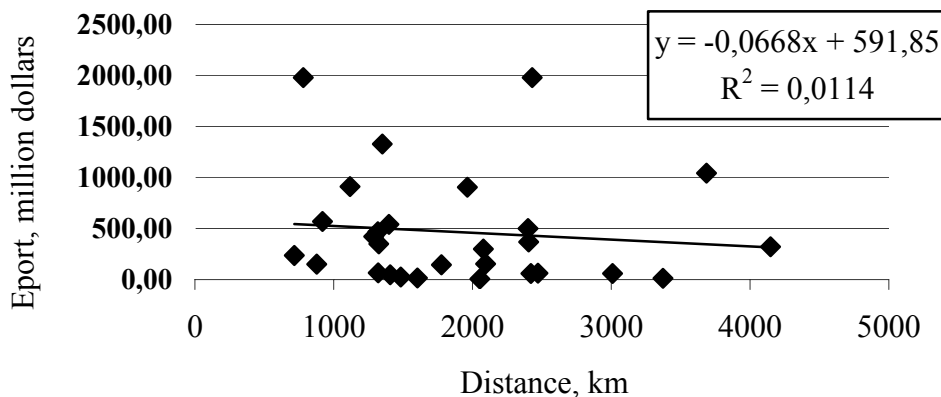

$$y = -0,0668x + 591,85$$
$$R^2 = 0,0114$$

Figure 2. The dependence of exports from the distance between the two countries

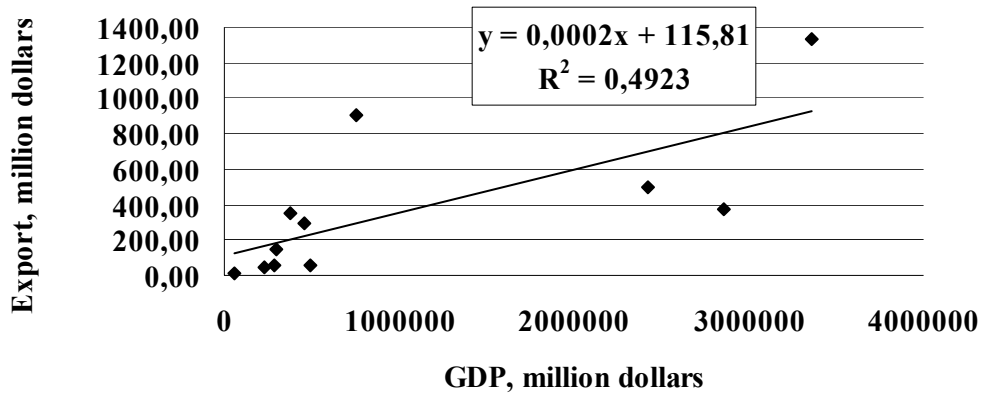Source: Ukrstat and Google Map [1; 2].

Figure 3. The dependence of exports of GDP among countries with above-average income, millions of dollars

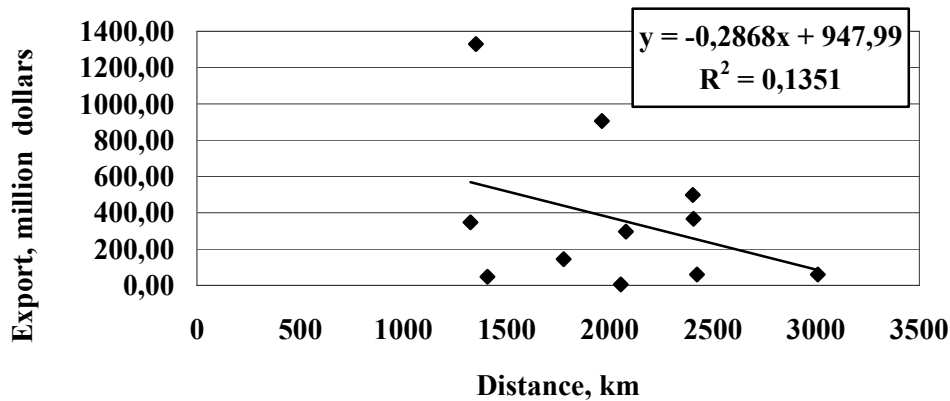Source: Ukrstat and The World Bank [1; 8].

Figure 4. The dependence of exports from the distance between Ukraine and other country among countries with above-average income, millions of dollars

Source: Ukrstat and Google Map [1; 2].

The agreement on free trade provides a number of advantages to the Ukrainian exporters, first of all cancellation/decrease in customs tariff on goods. This fact gives the chance of an entry into rather strongly protected market of EU and to win in comparison with goods of the EU not only in quality, but also in the price. At the same time, free trade zone increases a number of potential purchasing and capable consumers for the Ukrainian production.

Also, access to the European market, with products that meet all the requirements of the EU, which is highly sought after in the world automatically gives the opportunity to enter the markets of third countries [5].

These advantages suggest that the EU is a potentially powerful trade partner for Ukraine with a number of new features. Ukrainian export of goods should focuses on the high-income countries, regardless of distance. To confirm this hypothesis we use the gravity model (see Troyekurov and Pelevin, 2014 for details) [10].

This model is the most successful tool in the analysis of factors, such as: GDP and Distance and it will demonstrate their weighting when selecting trading partners among EU countries.

Novikova and Tkachuk (2011) use a gravity model to analyze trade flows between Ukraine and EU after the agreement in 2014. Using their approach, in this paper we examine private sector trade flow exports of goods of Ukraine [1].

Gravity model is a model describing the social and economic interaction between spatial entities (cities, regions, countries). Nowadays this methodology is widely used to estimate trade flows.

Gravity model is based on the assumption that the volume of bilateral trade flows are directly proportional to the size of the economies (their "masses") and inversely proportional to the distance between them and other trade barriers [10].

Our hypothesis: The export of goods from Ukraine focuses on EU' countries with above-average income.

To test this hypothesis a number of variables for the studying of international trade flows EU-Ukraine are used. Data consist of export of goods instead of total trade flow for the reasons we describe above. The model uses the following variables: GDP of the other country, Ukrainian GDP and Distance between countries. To specify the model the following indicators are used: export of goods from Ukraine to EU countries (the Ukraine's exports), distance from Ukraine to another country ("Distance"), the GDP of the member countries of the EU (the GDP of the second country) and Ukraine's GDP. The data source is the World Bank. To calculate the distance Google maps are used. Exports of goods are used for this model, since the goods in contrast to services require transport costs [3].

The dependence of Ukrainian exports and GDP of the second country is presented in Figure 1.
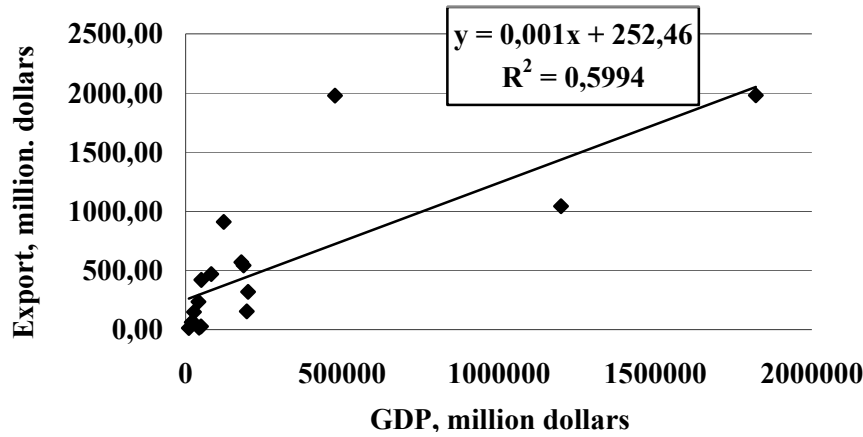
$$y = 0,001x + 252,46$$
$$R^2 = 0,5994$$

Figure 5. The dependence of exports of GDP of the second country, millions of dollars

Source: Ukrstat and The World Bank [1,8].
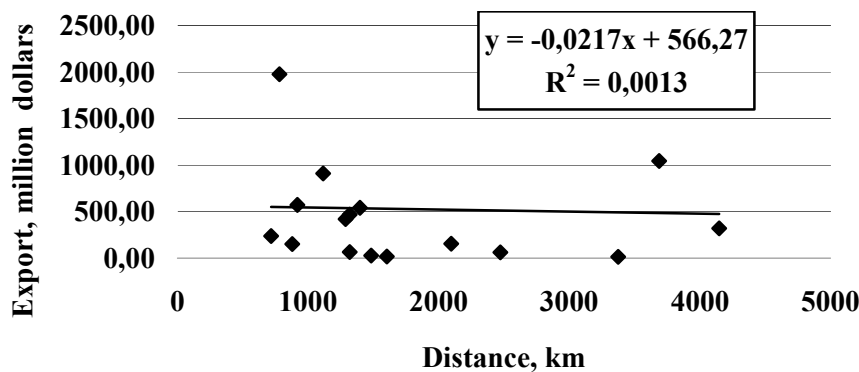

$$y = -0,0217x + 566,27$$
$$R^2 = 0,0013$$

Figure 6. The dependence of exports from the distance between the two countries

Source: The World Bank and Google Map [2,8].

The graph shows a positive correlation between export and GDP of the second country that indicates that the following: the bigger the GDP is, the more Ukraine exports there (see figure 1 for details)).

The relationship between Ukraine's exports and distance between countries is presented in Figure 2.

Figure 2 demonstrates a negative dependence. This means that the more distance between the countries the less is export to them (see figure 2 for details).

EU countries have very different levels of economic development. For this reason, the results are not identical according to the canons of the model. Zarzoz and Lehman (2003) include additional variables such as the difference in income. By analogy, we also incorporate this factor in to the model. As an indicator of the level of income we take GDP per capita. Next, we obtained the average value

of GDP per capita by calculating the arithmetic average among the EU countries. Subsequently, on the basis of this indicator, countries that had a GDP per capita above the average were assigned to the group of "countries with above-average income" and "countries with income below average". Thus, further study will be conducted for each group separately.

We have constructed similar graphs for both groups of countries. Point cloud on the charts was less chaotic and more crowded, which gave us the effectiveness of our distribution.

A direct relationship between GDP and export is saved as a back — between exports and distance (figures 3—6).

In order to determine the degree of influence for the different factors (GDP and distance and the level of

Table 1. Regression statistic general

Regression statistics			
Multiple R		0,733236453	
R-squared		0,537635696	
The normalized R-squared		0,460646552	
Standard error		0,47678531	
Observations		28	
	Coefficients	Standard error	t-statistics
Y-intersection	2,734081407	1,532474614	1,784095725
The Variable X 1	0	0	65535
The Variable X 2	0,702452344	0,136135204	5,159961002
The Variable X 3	-1,281659013	0,471926046	-2,71580478

Table 2. Regression analysis (Countries with above-average income)

	Coefficients	Standard error	t-statistics	P > |t|
Y-intersection	0,837	3,431	0,244	0,813
The Variable X1	0	0	65535	-
The Variable X2	1,082	0,214	5,051	0,001**
The Variable X3	-1,467	0,977	-1,502	0,171

**Strongly Significant Value.

exports) we use regression analysis. Where export was chosen as the dependent variable, and GDP of Ukraine, GDP of other countries and distance as independent variables. Approximation ratio is 0, 53. That means that Ukraine's exports 53 % depends on the chosen factors (table 1).

Variable X 1 — GDP Ukraine 2015;

Variable X 2 — Distance;

Variable X 3 — GDP of other country EU (GDP2);

Y — dependent, = a.

So, as a result of the regression analysis we obtained the following results:

— in case of increase in GDP of the second country by 1 % there is a tendency to increase in export for 0,70%,

— at reduction of a distance from Ukraine to member countries of the European Union for 1% there is a tendency on increases in export by 1,28%.

Next we analyses the results of the regression analysis of the EU countries with the income above average. The

Table 3. Regression analysis (Countries with lower middle income)

	Coefficients	Standard error	t-statistics	P > |t|
Y-intersection	0,827	1,337	0,619	0,546
The Variable X1	0	0	65535	-
The Variable X2	0,943	0,146	6,446	0,037*
The Variable X3	-0,995	0,389	-2,556	0,023*

*Good results.

approximation ratio (R2) is 0, 77. That means that Ukraine's exports to 77% depending on selected factors. Export of Ukraine (Y) in countries with above-average income on 77, 5 % depends on the chosen factors (GDP other country — X3, Distance — X2, GDP of Ukraine X1).

We got the following conclusions (table 2):

— if the GDP of the country is increased by 1 % there is a tendency to increase in exports of 1,08 %;

— with decreasing distance from Ukraine to member countries of the European Union on 1 % there is a tendency for increasing exports of 1,46 %.
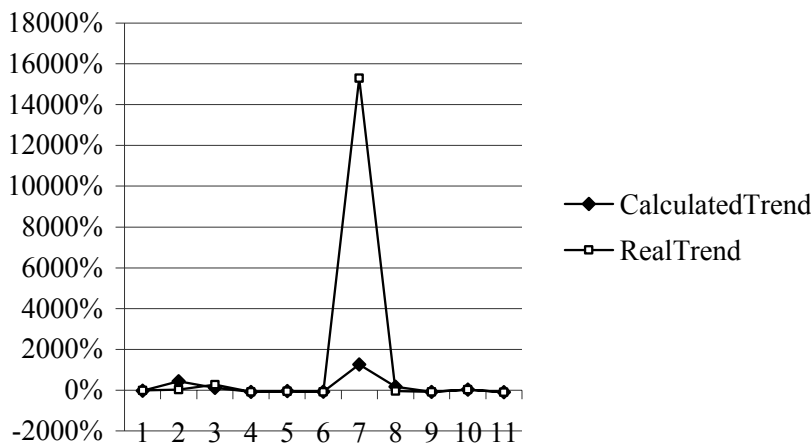

Figure 7. Trend of countries with above-average income, %
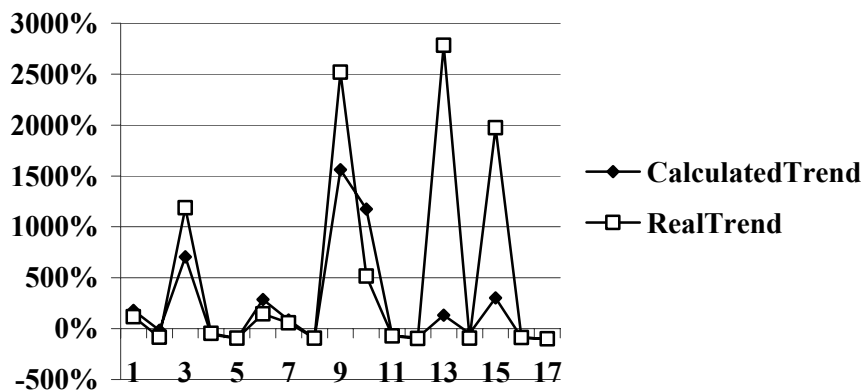
Source: The World Bank.

Figure 8. Trend of countries with country lower middle income, %

Source: The World Bank.

From this we can conclude that the distance has a greater impact on the exports to this group of countries.

The results of the regression analysis of the EU countries with lower middle income show the approximation ratio of 0, 75. That means that Ukraine's export is 75 % dependent on selected factors.

The conclusions are (table 3):

— increase in the GDP of the country by 1 % leads to increase in exports by 0,94 %;

— with decreasing distance from Ukraine to member countries of the European Union on 1 % there is a tendency for increase in exports by 0,99 %.

Based on these results we can conclude that the distance and GDP has approximately the same impact on the exports to this group of countries.

In addition, due to the rate R^2 we can say that Ukraine focuses on EU countries with above-average income.

We also use the trend method. It provides a better understanding and reliability of gravity model and its' results.

To do this we use the following equation:

$$\text{Trade equation flow} = \frac{G \times GDP1 \times GDP2}{\text{Distance}}, \quad (1.1)$$

where G — const;
GDP1 — GDP of Ukraine;
GDP2 — GDP of second country;
Distance — distance between countries.

We considered the rate of exports and considered the trend of the index using this equation:

$$\text{Trend} = \left| \frac{(\text{current} - \text{previous})}{\text{previous}} \right|, \quad (1.2)$$

where current — current indicator of export;
previous — previous indicator of export.

We have also considered the actual level of exports. We compared the trend between EU countries.

So, the trend for EU countries upper middle income countries and lower middle income. From the graphs we can conclude that trend continues, accordingly, the model works (figure 7. Trend of countries with above-average income, %, figure 8. Trend of countries with country lower middle income).

We can say from the graphs that our calculated parameters are the same trend with the real values. So our calculations can be applied in practice.

CONCLUSION

Gravity model, regression analysis and trend analysis of the export of goods of Ukraine provide us with following conclusions. Based on statistical data from the World Bank, we confirmed that the dependence between export and GDP is positive and negative between export and distance.

For countries with above-average income increase in GDP of the country by 1 % causes a tendency to increase in exports of 1, 08 %. Decrease in distance from Ukraine to member countries of the European Union on 1 % causes a tendency for increasing exports of 1,46 %.

For countries with lower middle income increase in the GDP of the country by 1 % forms a tendency to increase in exports by 0,94 %.Decrease in distance from Ukraine to member countries of the European Union on 1% causes a tendency for increase in exports by 0,99 %.

As a conclusion Ukraine is focusing its exports on EU countries with equal income is above average regardless of the distance to this country. Thus, our hypothesis was confirmed. Ukraine tends to export to the countries of the first group (income is higher than average).

Results of trend analysis confirm our hypothesis and show that they can be applied in practice.

We offer the following recommendations for the promotion of Ukrainian exports to the EU:

1) to establish infrastructure and improve the logistics operations;

2) to conclude treaties with the countries-importers of goods;

3) to establish representative offices in the countries of the European Union.

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