

ASSESSMENT OF THE DEPENDENCE OF COUNTRIES ON THE EUROPEAN UNION ON THE CASPIAN REGION IN THE CONDITIONS OF GLOBALIZATION

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Abstract: *the article examines the dependence of the EU countries on the countries of the Caspian region under the influence of globalization. This explains the favorable geographical position of the Caspian region, as well as the geopolitical significance of the natural gas reserves of the Caspian countries. The article in the Eviews-12 software package assessed the impact of natural gas exports from Azerbaijan, Kazakhstan and Turkmenistan to the Caspian countries on the gross domestic product of the European Union countries and determined the predictive validity of the model.*

Keywords: *caspian region, gross domestic product, sub-region, correlation. regression, adequacy, model.*

ОЦЕНКА ЗАВИСИМОСТИ СТРАН ЕВРОПЕЙСКОГО СОЮЗА ОТ КАСПИЙСКОГО РЕГИОНА В УСЛОВИЯХ ГЛОБАЛИЗАЦИИ

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Аннотация: *в статье исследуется зависимость стран Евросоюза от стран Каспийского региона под влиянием глобализации. Здесь объясняется выгодное географическое положение Каспийского региона, а также геополитическое значение запасов природного газа прикаспийских стран. В статье в программном пакете Eviews-12 оценивалось влияние экспорта природного газа Азербайджана, Казахстана и Туркменистана в прикаспийские страны на валовой внутренний продукт стран Европейского союза и определялась прогностическая валидность модели.*

Ключевые слова: *Каспийский регион, валовой внутренний продукт, субрегион, корреляция. регрессия, адекватность, модель.*

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Introduction. The Caspian region is located at an important crossroads of the world's roads, connecting the rich North with the poor South. This is a vast region, which is administered by five states with a population of more than 240 million people [4], with a unique global water basin, and its shelves with hydrocarbon reserves, bioresources, where 90% of the world's sturgeon caviar reserves are concentrated [5]. Its development cannot but be influenced by global processes and changes taking place in the world. Interstate relations between the countries of the region were already built as international ones. The most important geopolitical consequence of the penetration of world globalization processes into the region was the intensification of political and commercial confrontation for control over the vast energy resources of the Caspian region of eight newly independent states of Central Eurasia: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan (Central Asia subregion) and Armenia, Azerbaijan, Georgia (Caucasus subregion). Undoubtedly, the world centers of power represented by the USA, the European Union, China, and other countries of the Asia-Pacific region have become no less influential players in the region. In addition, the huge reserves of oil and natural gas have attracted the attention of the world's main "players" to the region. At present, there is a sharp struggle in the Caspian region both for control over its resources and over the ways of their transportation. This is due to the fact that the development of hydrocarbon resources can not only improve the economic and socio-political situation in the coastal states, but also significantly change the balance of power in the global oil and gas market. These factors determine the strategic direction of development of the situation in the region[5].

Main part. The Caspian countries, which have a large oil and gas potential for export activities, account for 46% of the world's gas reserves[4].The Caspian countries is high compared to other countries: 33.5 trillion m3 in the Islamic Republic of Iran and 32.3 trillion m3 in Russia. Azerbaijan's natural gas potential is 1.1 trillion m3, which is 1.3% of the total natural gas potential of the Caspian countries. According to the schedule, since the bulk of gas

production comes from Iran, Russia and Turkmenistan, it is expected that the volume of gas exports in Azerbaijan and Kazakhstan will decrease in the prospective period. The Caspian region, which has hydrocarbon resources, has always attracted the international world as the center of attention of the countries of the world.

It should be noted that the export of crude oil and natural gas to Azerbaijan, Kazakhstan and Turkmenistan in the Caspian region had a positive impact on the growth of GDP of EU countries. While Azerbaijan and Kazakhstan receive their main energy income from the export of oil, the main source of income for Turkmenistan is the export of natural gas. The recent economic development of the Caspian countries, especially the Republic of Azerbaijan and the Republic of Kazakhstan, allowed them to move from the level of income below the average to the level of countries with the level of income above the average in 2006. The dependence between GDP, which is the main indicator of the level of economic well-being of the EU region, and the income from gas exports of Azerbaijan, Kazakhstan and Turkmenistan in the Caspian region can be assessed using regression analysis. For the purpose of the study, let us designate the volume of gas exports of Azerbaijan, Kazakhstan and Turkmenistan in value terms with X1, X2 and X3 as causal factors, as well as the Gross domestic product of the European Union region with Y as the result of the factor. Using the EViews-12 software package, based on the value of gas exports from Azerbaijan, Kazakhstan and Turkmenistan for 2004-2020 and the statistical data of the European Union region for this period, we obtain the following result.

Table 1. The result of the EViews software package

Dependent Variable: Y				
Method: Least Squares				
Date: 17/08/22 Time:12:59				
Sample (adjusted): 2004 -2020				
Included observations: 17 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
X3	64,3592	52,22725	1,232292	0,0026
X2	538,2469	143,8802	3,740938	0,0485
X1	1777,443	650,091	2,734144	0,017
C	10306767	908889,3	11,33996	0
R-squared	0,627711	Mean dependent var		13311118
Adjusted R-squared	0,541798	S.D. dependent var		2724915
S.E. of regression	1844512	Akaike info criterion		31,89565
Sum squared resid	4.42E+13	Schwarz criterion		32,0917
Log likelihood	-267,113	Hannan-Quinn criter.		31,91514
F-statistic	7,306359	Durbin-Watson stat		1,456035
Prob(F-statistic)	0,004061			

Source: EMIEWS-12 application was developed by the author based on the software package

Based on the results obtained from the EViews application software package, the regression equation will be as follows:

$$Y = 1777.44263768 \cdot X1 + 538.246859357 \cdot X2 + 64.3591995369 \cdot X3 + 10306767.163 \quad R^2 = 0,628$$

$$(t) \quad (2.734) \quad (3.741) \quad (1.232) \quad (11.34) \quad DW=1,456 \quad (1)$$

As can be seen from the regression equation obtained from the software complex Eviews-12, the coefficients of the free term and dependent variables, reflecting causal factors and factor-effect, are greater than their standard errors. This characterizes the statistical significance of the obtained result [3,p.310]. However, to ensure the adequacy of this result, it is necessary to check the statistical significance of the given coefficients.

Critical point of distribution of the student (t-distribution) ($\alpha=0.0005$) will be $t_{0.0005;17} = 3.965$ [3, c. 312]. As you can see, the coefficients of variables X1, X2 and X3 are statistically significant, as $2.734 < 3.965$ and $3.741 < 3.965$, $1.232 < 3.965$.

According to the result of the package of application programs Eviews-12, the coefficient of determination $R^2=0.628$ means that 62.8% of the variance of the corresponding regression equation is explained by the performance indicator, and 28.2% by the influence of other factors [2].

According to the Eviews-12 application program, the change in the natural gas export of the Republic of Azerbaijan, Turkmenistan and Kazakhstan with GDP in the region of the European Union for 2002-2020 is determined by the following schedule.

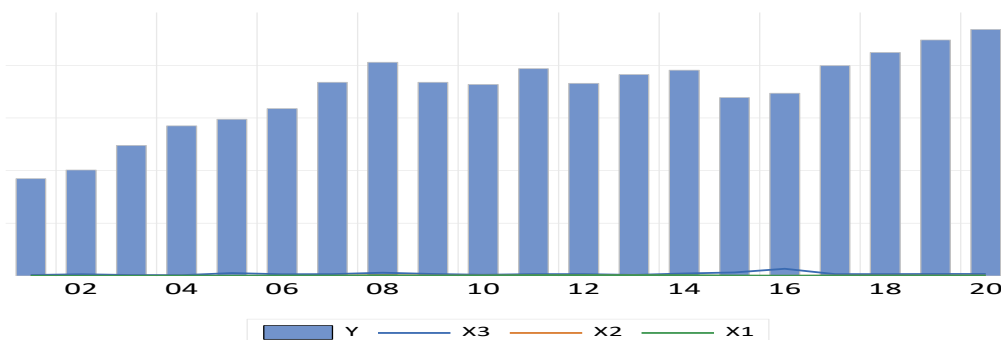


Fig. 1. Changes in the natural gas export of the Republic of Azerbaijan, Turkmenistan and Kazakhstan and the World Economic Forum in the European Union region for 2002-2020.

Source: EViews-12 application was developed by the author based on the software package

Since it is important to check the adequacy of the established model, this adequacy can be defined as one of the traditional methods using the Fisher criterion. F-statistic (Fisher's test) = 7.31

$$F_{\text{table}}(a; m; n - m - 1) = F(0.05; 3; 13) = 3.41$$

When the F-Fisher test is compared with the $F_{\text{table value}}(a; m; n - m - 1)$, it turns out that the F-Fisher test $> F_{\text{table}}$ ($7.31 > 3.41$). This means that the regression equation as a whole is statistically significant, and model (1) is an adequate model.

The autocorrelation result in the model can be determined based on the Durbin -Watson statistics in Table 1 obtained from the EViews-12 application suite. As you can see from the table, DW is 1.456. In this case, the points of the Durbin -Watson crisis for observing 3 explanatory variables $m = 3$ and $n = 17$ up to the significance level $\alpha = 0.05$ will be as follows [3, p. 337].

$$d_l = 0,672, \quad d_u = 1,432$$

$$d_u = 1,432 \leq DW = 1,456 < 4 - d_u = 2,568$$

there is no autocorrelation [2, 3]. This means that the regression equation as a whole is statistically significant, and the constructed model (1) is an adequate model. If we adjust the criterion of the normality of the histogram based on the regression analysis of the dependence of the influence of gas exports to Azerbaijan, Kazakhstan and Turkmenistan in the Caspian region on the GDP of the European Union region for the studied period, we will get the following result.

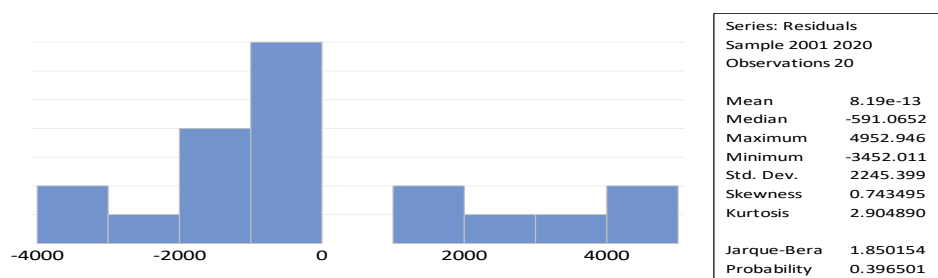


Fig. 2. Criterion normality histogram

Source: Developed on the basis of the EViews-12 software complex.

The regression equation obtained according to the package of application programs EViews-12, annual values and standard errors of GDP of the countries of the European Union, as well as a number of characteristics of using the equation for the purposes of forecasting are presented in the graph below (3).

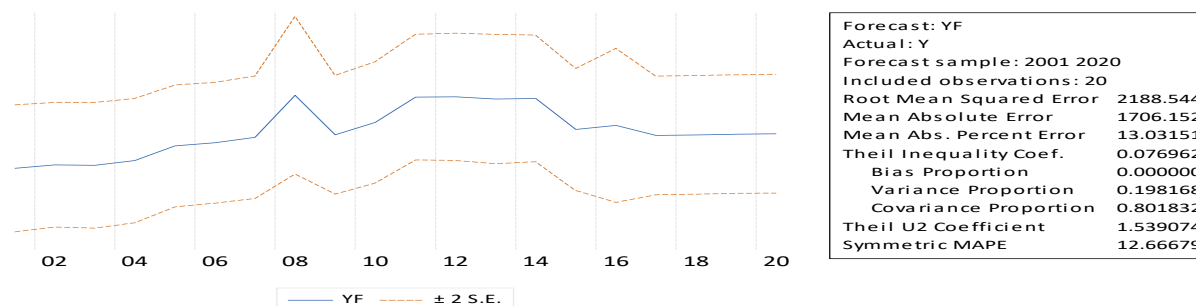


Fig. 3. Characteristics of UDM in the Republic of Azerbaijan for forecasting

Source: Values and standard errors of GDP of EU countries by years and predictive characteristics of the model

As can be seen from the graph, the values of GDP of the EU countries by year, standard errors and characteristics of the model for forecasting determine the prognostic suitability of the model for the prospective period.

In the result of the research for the equation of linear regression (1) shown above, it is possible to determine how much the result factor changes due to the cause factor by calculating the elasticity coefficient. The calculated elasticity coefficients according to the constructed model will be as follows[3, 137].

$$E_{Kazakhstan} = \frac{\alpha \times \bar{x}}{\bar{y}} = \frac{4813,235 \times 64,359}{13311118} = 0,024$$

$$E_{Azerbaijan} = \frac{\alpha \times \bar{x}}{\bar{y}} = \frac{304,6471 \times 538,247}{13311118} = 0,012$$

$$E_{Turkmenistan} = \frac{\alpha \times \bar{x}}{\bar{y}} = \frac{1777,443 \times 1772,294}{13311118} = 0,24$$

The result. As a result of the study, the following results were obtained:

- The Caspian countries, which make up 46% of the world's gas reserves, form the basis of natural gas consumption in the EU countries and play an important role in increasing the GDP of these countries;
- there is a high correlation between the GDP of the EU countries and natural gas exports of the Caspian countries, expressed by the linear regression equation $Y = 1777.443 \cdot X_1 + 538.249 \cdot X_2 + 64.359 \cdot X_3 + 10306767.163$;
- in the research work, tests of the normality of histograms between the GDP of the EU countries and the export of natural gas of the Caspian countries were carried out in the Eviews-12 application software package and the adequacy of the model was tested based on statistical characteristics;
- in a research study in the Eviews-12 application package, the predictive suitability of the model was determined based on annual values, standard errors and model characteristics for forecasting the countries of the European Union. Using the predictive characteristics of the model, it is possible to determine the forecast prices of GDP for the prospective period, taking into account the impact of natural gas consumption in the EU countries on GDP.
- As a result of the study, it was found that a 1% increase in gas exports to the European Union in the Caspian region of the Republic of Azerbaijan leads to an increase in the GDP of the European Union region by 0.024%. An increase in gas exports to the European Union by the Republic of Kazakhstan by 1% leads to an increase in the GDP of the European Union region by 0.012%, and an increase in gas exports to the European Union by the Republic of Turkmenistan by 1% leads to an increase in the GDP of the European Union region by 0.24%.

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