ASSESSMENT OF THE İMPACT OF ECONOMİC GROWTH IN THE PROCESSING INDUSTRY IN AZERBAIJAN
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Abstract: the article examines the influence of commercial products in the processing industry of the Republic of Azerbaijan and investments in fixed assets on economic growth. Using the EVievs software package, a regression equation was established between these indicators and the impact of the industrial sector on GDP was estimated. As a result, it was estimated by the econometric method the ways of constructing the regression equation between the indicators and checking the adequacy of the model.
Keywords: software package. value added, correlation, regression, investment, elasticity coefficient, fixed capital, gross domestic product.

ОЦЕНКА ВЛИЯНИЯ ЭКОНОМИЧЕСКОГО РОСТА ПЕРЕРАБАТЫВАЮЩЕЙ ПРОМЫШЛЕННОСТИ В АЗЕРБАЙДЖАНЕ
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Аннотация: в статье исследуется влияние товарный продукци в перерабатывающей промышленности Азербайджанской Республики и инвестиций в основной капитал на экономический рост. С помощью программного пакета EVievs было установлено уравнение регрессии между этими показателями и оценено влияние промышленного сектора на ВВП. В результате было оценено эконометрическим методом пути построения уравнения регрессии между показателями и проверки адекватности модели.
Ключевые слова: пакет программного обеспечения, добавленная стоимость, корреляция, регрессия, инвестиции, коэффициент эластичности, основной капитал, валовой внутренний продукт.

Introduction. Sustainable, dynamic and stable development of countries in a globalized world economy is based on their well-thought-out strategy for the future. Research shows that the Buffett Ratio, which is the ratio of the capitalization of global companies to GDP, has already reached its highest point. The basis of the strategy of capitalization of enterprises in the world economy is determined by ensuring the financial stability of enterprises operating in each country. The implementation of large-scale energy projects in the socio-economic life of Azerbaijan in recent years has further increased the economic power of our country. The development of the liberal economic system established in the republic ensured the dynamic development of the country's economy, regulating the development of entrepreneurship and creating conditions for increasing the competitiveness of local products. The creation of modern production facilities in the country that meet international standards and the improvement of the production infrastructure have created a transition to a new stage in the development of industry, including processing industry [2, p. 4].

Main part. The added value created by economic activity regulates economic growth in a country and leads to an increase in GDP. Since the economy of Azerbaijan is based on oil and gas production, it is important to assess the impact of the added value of oil refineries on GDP. Economic growth policy is directly related to the increase in the volume of work and services in all sectors of the economy. The development of industry, which occupies a high share in the economy of Azerbaijan, including the processing industry, has laid a solid foundation for the development of all sectors of the economy. The development of the processing industry due to the successful economic reforms carried out in our country has led to an increase in GDP due to an increase in value added through investments in this area. This can be seen more clearly in the diagram below [5].
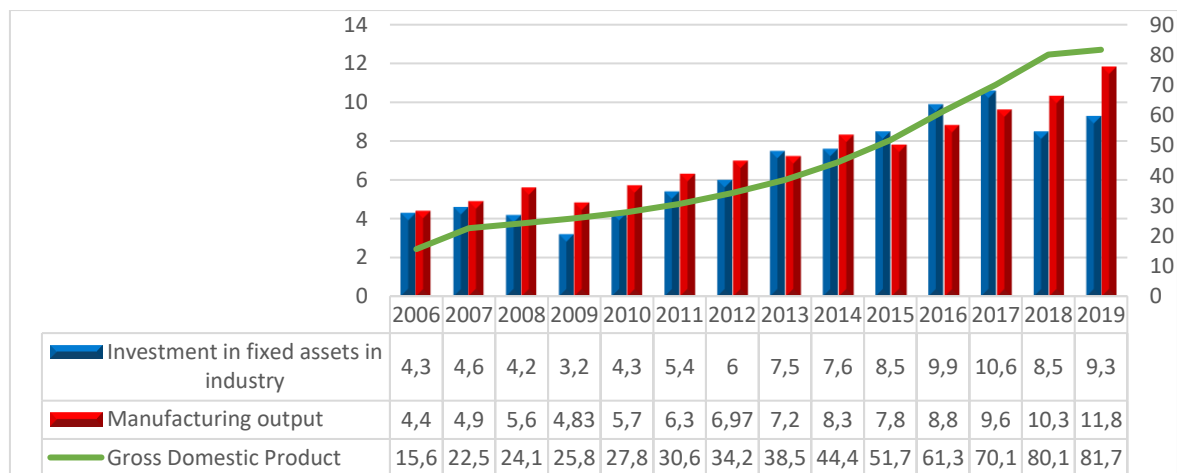
Fig. 1. Income from the manufacturing industry in the Republic of Azerbaijan for 2006-2019, investments in fixed assets and the volume of GDP, billion in manats Source: Compiled by the author based on (5)

As can be seen from the graph, the volume of investments in fixed assets in the industrial sector was observed with an increasing dynamic in 2006-2017, but in subsequent years it decreased and in 2019 amounted to 9.3 billion manat. This is 12.3% or 1.3 billion manat less than in 2017. The increase in investment in fixed assets has led to an increase in value added in the manufacturing industry. As can be seen from Figure 1, production in the manufacturing industry increased over all the periods studied. In this regard, an econometric assessment of the impact of value added on GDP in the manufacturing industry is important. If we use the EViews software package for this purpose, we get the following result based on the data in Figure 1.

Table 1. The result of the EViews software package

Dependent Variable: Y				
Method: Least Squares				
Date: 08/04/21 Time: 13:13				
Sample: 2006 2019				
Included observations: 14				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
X2	8.693609	1.437015	6.049770	0.0001
X1	0.957890	1.321166	0.725034	0.4836
C	-26.61721	5.009948	-5.312871	0.0002
R-squared	0.951877	Mean dependent var	43.45714	
Adjusted R-squared	0.943127	S.D. dependent var	22.05705	
S.E. of regression	5.260177	Akaike info criterion	6.345616	
Sum squared resid	304.3641	Schwarz criterion	6.482557	
Log likelihood	-41.41931	Hannan-Quinn criter.	6.332940	
F-statistic	108.7898	Durbin-Watson stat	1.609784	

	0.00000			
Prob(F-statistic)	0			

Source: Eviews 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:

Estimation Command:
=========================
LS Y X2 X1 C

Estimation Equation:
=========================
Y = C(1)*X2 + C(2)*X1 + C(3)

Substituted Coefficients:
=========================
$$Y = 8.69360942989 * X2 + 0.95789035517 * X1 - 26.6172050653 \qquad (1)$$

According to the Eviews application suite, the covariance between the free variables included in model (1) and the dependent variable will be as follows:

Table 2. Covariance matrix

	X2	X1	Y
X2	4.63381224489796	4.489561224489795	44.5850612244898
X1	4.489561224489795	5.482091836734694	44.28173469387755
Y	44.5850612244898	44.28173469387755	451.7624489795918

Source: Eviews application was developed by the author based on the software package.

Between the variables Y and X as shown in the Eviews application software package   Y = 0.9579 * X1 + 8.6936 * X2 - 26.617 expressed by the model has a high correlation (R^2=0.952). This means that, according to the Chaddock scale, the qualitative characteristic of the strength of dependence is high due to the fact that the quantitative value of the contact density is in the range of 0.7-0.9 [4, p.136].

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. To check the statistical significance of the model (1), which expresses the regression equation as a whole, the F-Fisher test must be compared with the value F_{table} (a; m; n − m − 1) [3, p. 332]. According to Table 1, which reflects the results of the EViews software package,

F-statistic (Fisher's test) = 108.8

If we set the value of table F to EXCEL by the formula F_table (a; m; n-m-1) = Fraspobr,

$$F_{\text{table}} (a; m; n − m − 1) = F(0.05; 2; 11) = 9.4$$

When the F-Fisher test is compared with the $F_{\text{table value}}$(a; m; n − m − 1), it turns out that the F-Fişer test > F_{table} (108,8 > 9.4. 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 Darbon-Watson statistics in Table 1 obtained from the EViews application suite. As you can see from the table, DW is 1.6098. In this case, the points of the Darbon-Watson crisis for observing 2 explanatory variables m = 2 and n = 14 up to the significance level α = 0.05 will be as follows [3, p. 337].

$$d_l = 0,905, \qquad d_u = 1,551$$
$$d_u = 1,551 \le DW = 1,6098 < 4 − d_u = 2,449$$

there is no autocorrelation [4, p.171]. This means that the regression equation as a whole is statistically significant, and the constructed model Y = 0.9579 * X1 + 8.6936 * X2 - 26.617 is an adequate model.

The following graph shows the annual estimates and standard errors of GDP determined by the regression equation obtained from the EViews application suite, as well as a number of characteristics of the use of the equation for forecasting purposes.
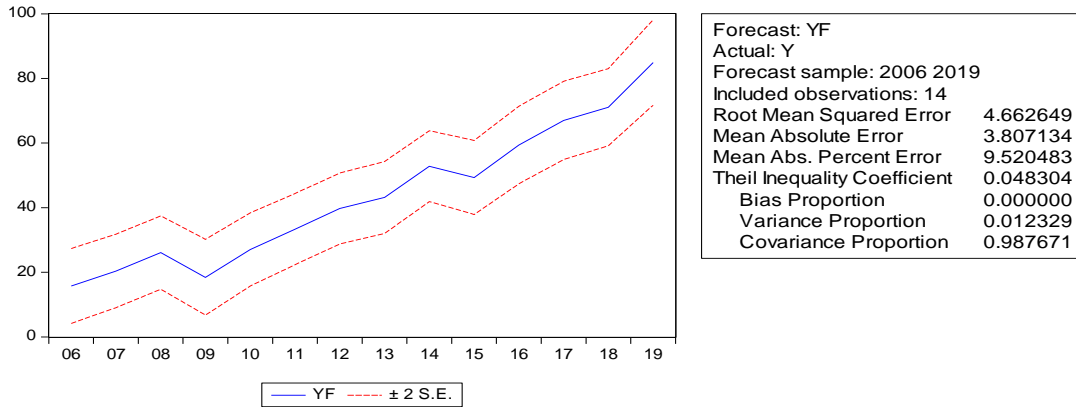
Fig. 2. Characteristics of UDM in the Republic of Azerbaijan for forecasting. Source: EViews application was developed by the author based on the software package

It should be noted that with the help of the graph, it is possible to determine the forecasted prices of GDP in the Republic of Azerbaijan, as well as the income of processing enterprises by year.

As a result of the study, it is possible to determine the percentage change in the outcome factor by calculating the elasticity coefficient, which represents the percentage change in the dependent variable as a result of a 1% increase in the free variables included in the linear regression equation. This ratio is calculated according to the following formula [3, 137].

$$E = \frac{\alpha_i \times \bar{x}_i}{\bar{y}} \qquad (2)$$

Here α_i −are the coefficients of the above contact equation. $\bar{x}_i$ -is the calculated average value of the income of processing enterprises and the volume of investments in fixed assets for the study periods, $\bar{y}$ −is the calculated average value of GDP in the Republic of Azerbaijan for the study periods. The elasticity coefficients calculated on the basis of these indicators for the constructed model will be as follows.

$$E_{for\ investments\ in\ fixed\ asset} = \frac{\alpha_1 \times \overline{x_1}}{\bar{y}} = \frac{0,9579 \times 2709,721}{43,457} = 0,1398$$

$$E_{for\ commodity\ products\ in\ the\ processing\ industry} = \frac{\alpha_4 \times \overline{x_2}}{\bar{y}} = \frac{8,6936 \times 7,3214}{43,457} = 1,465$$

Calculations show that an increase in investment in fixed assets by 1% in the Republic of Azerbaijan leads to an increase in GDP by 0.14%, to an increase in the output of the manufacturing industry by 1%, to an increase in GDP by 1.465%.

The graph of incomes in the manufacturing industry of the Republic of Azerbaijan for 2006-2019, investments in fixed assets and dynamic changes in GDP is as follows.
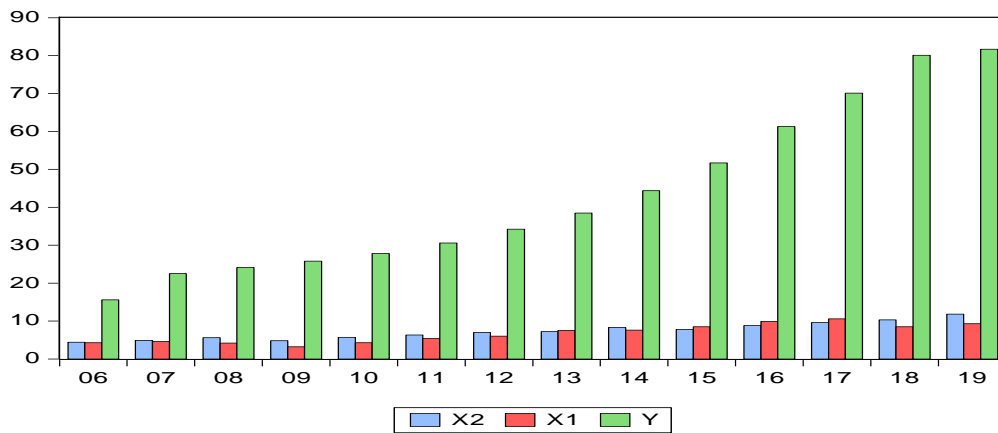

Fig. 3. Income from the manufacturing industry in the Republic of Azerbaijan for 2006-2019, investments in fixed assets and dynamics of changes in GDP

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

According to the EViews software package, the multiplicity correlation coefficient $R^2 = 0.943$ according to Table 1 shows a high correlation between the dependent variable Y, which represents the volume of GDP in the Republic of Azerbaijan, and the free variables (X1 and X2). The fact that R2 = 0.943 means that the corresponding regression equation is explained by 94.3% of the variance results and 5.7% by other factors. A high coefficient of determination indicates that the regression equation is well expressed in the original data and that most of the resulting factor (94.3%) is explained by the factors included in the model.

The dynamics of the fitted and actual values, as well as the residuals between them, according to the regression equation of the established model (1) and the EViews application package, is presented in the graph below.
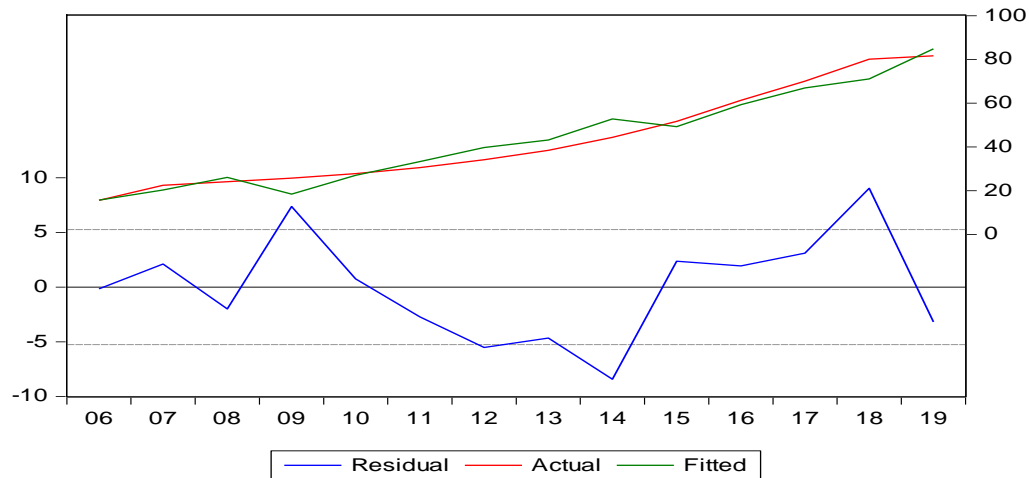

Fig. 4. Dynamics of actual values and residuals obtained by the regression equation

Source: The Eviews application was developed by the author based on the software package.

Thus, the study shows that there is a high correlation between the production of goods in the manufacturing industry in the Republic of Azerbaijan, investment in fixed assets and GDP, and, using the established model 1, GDP revenues in the Republic of Azerbaijan, as well as processing enterprises. It is also possible to determine forecast prices by year.

The result. As a result of assessing the impact of commodity production and investment in fixed assets on GDP in the manufacturing sector of Azerbaijan on the basis of the EViews application package, it was determined that among these indicators the maximum is expressed by the regression equation $Y = 0.9579 * X1 + 8.6936 * X2 - 26.617$ Exists correlation: an increase in production in the manufacturing industry of Azerbaijan by 1%, GDP growth by 1.465% and an increase in investments in fixed assets by 1% lead to an increase in GDP by 0.14%.

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