REPUBLIC OF AZERBAIJAN

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ABSTRACT

of the dissertation for the degree of Doctor of Philosophy

ECONOMETRIC ANALYSIS OF THE IMPACT OF FOREIGN ECONOMIC RELATIONS OF AZERBAIJAN ON MACROECONOMIC DEVELOPMENT

Speciality: 5302.01 - "Econometrics, Economical Statistics

Field of science: Economics

Applicant: **Alikhanli Yegana Seyfal qizi**

BAKU – 2022

The dissertation work was carried out at the "Informatics and technical subjects" department of the Azerbaijan Cooperation University.

Scientific supervisor: Doctor of economic sciences, professor
Taghiyev Murad Ramiz oghlu

Official opponents: Doctor of economic sciences, professor
Taghiyev Namig Faig oghlu

Doctor of philosophy in economics,
Assoc. Professor
Afandiyeva Aytakin Telman qizi

Doctor of philosophy in economics,
Baghirzada Murad Manaf oghlu

Dissertation council FD 1.11 of Supreme Attestation Commission under the President of the Republic of Azerbaijan operating at Azerbaijan State University of Economics.

Chairman of the
Dissertation counci _____

Honored scientist
Doctor of economic scienes, Professor
Yadulla Hamdulla oghlu Hasanli

signature

Scientific secretary of the
Dissertation council: _____

Doctor of philosophy in economics
Rashad Aktiv oghlu Huseynov

signature

Chairman of the
scientific seminar: _____

Doctor of economic sciences, professor
Ramiz Kamal oghlu Isgandarov

signature

GENERAL CHARACTERISTICS

The relevance of the topic and the degree of its elaboration. Ensuring economic development and improving the well-being of the population is of great importance for each country. This goal requires the mobilization of all the country's capabilities, including its natural wealth, human capital and physical capital. However, reality shows that not all countries can develop at the same level, and peoples do not have the same level of well-being. Some countries are richer and their population has a higher standard of living, while some countries are more poorly developed and an important part of their population is in poverty work. The question" why are some countries rich and some poor " has always puzzled scientists, including economistsBack in the early days of the formation of economic science, mercantilists considered it important to bring more precious metals into the country for the country's enrichment. Physiocrats, on the other hand, argued that agriculture was at the heart of the country's wealth, treating land and labor as the main means of production. A.Smith and his followers argued that the wealth of the state was based on a free economy, including free trade. Keynes and his followers noted that confidence in economic growth and economic development is only a mistake, and state intervention in the economy is necessary if necessary. Schumpeter and his followers, on the other hand, favored the role of an innovative approach in economic growth and development. Neo-classics, neo-Keynesians, monetarists, institutionalists, and so on, representatives of various economic schools proposed various models for economic growth and development. Despite the diversity of theories of economic growth and development, each new proposed model can be considered a step forward, enriching the previous one. In this sense, the value given by mercantilists to the role of foreign trade in economic development has always been in the spotlight. Although foreign trade activity is not directly reflected in the neo-Keynesian, neoclassical, Horrod-Domar or Solou-Svan models, which have special confidence among modern theories of economic growth, it is

of interest to study the impact of this activity on economic growth and socio-economic situation. Because over the past 50 years, foreign trade turnover in the world has been developing rapidly, and the foreign trade regime and turnover in countries with high economic growth differ from developing countries. Foreign trade affects economic growth and development through multiplication and accelerator effect. However, this process does not give the same result in all countries. Therefore, a quantitative assessment of the macroeconomic and socio-economic effects of foreign trade is of important scientific and practical importance. The most reliable methodological tool for quantitative assessment is the use of econometric calculations. That is why, in our study, we take as a basis the assessment of the macroeconomic and socio-economic effects of foreign trade by econometric methods.

The problem on which the study is directed is relevant for almost all countries. Because every country is doomed to trade with the world market. No country is capable of producing all the goods and services necessary for it within its borders. On the other hand, not every country can even dream of producing only for itself. Each country has areas in which it has a comparative advantage. Each country seeks to bring to the world market by producing goods and services that cost it less, relying on the means of production with which it is richer. However, it is important for the decision-making process to determine how beneficial such economic relations are for its development. Thus, the foreign trade regime is diverse in different countries. Even the foreign trade regime for each country can be at different levels at different times. Depending on the conjuncture in the world market, the volume of domestic production and other conditions, there is a need for a quantitative assessment of the relationship between these indicators in order to change the foreign trade regime in the necessary direction and stimulate economic growth. Therefore, such problems are studied in almost all countries.

Effects of foreign trade on economic growth Akanni, O.P. , Gemechu, G. Erfani, H.S. Balaguer, M., Lin, F.C. Baldwin, R. Bonelli,

R. Haddad, M., J. De Melo, Weinhold, D., Yean, T. Sjoeholm, F. And on the side of others, it was studied on the example of different countries. Azerbaijani economists have studied this problem from various aspects. The impact of foreign economic relations on economic development on the example of Azerbaijan Z.A.Samedzade, H.B.Rustembeyov, S.S.Kafarov, S.H.Hacıyev, M.A.Ahmedov, A.İ.Bayramov, R.R.Quliyev, M.X.Meybullayev İ.A.Kerimov, M.G.Gulalıyev, D.A.Veliyev, A.S.Shekereliyev, E.M.Hacızade, M.Y.Quliyev, S.H.Purhani, F.A.Qenberov and others studied. Respecting the results of each researcher studying the impact of Azerbaijan's foreign economic relations on economic development, it should be noted that the quantitative assessment of the macroeconomic and socio-economic impact of foreign trade on the socio-economic situation in the country by econometric methods was carried out for the first time.

Object of study – Azerbaijan's foreign trade activity.

Subject of research – The study of the impact of Azerbaijan's foreign trade activities on economic growth and socio-economic development.

Goals and objectives of the study: The aim of the research work is to stimulate economic growth and achieve socio-economic development through Azerbaijan's foreign trade activities.

The tasks set to achieve the set goal consist of:

• Determining the place and main determinants of foreign trade in economic growth and economic development models;

• Comparative study of methods used in various studies to assess the impact of foreign trade on economic growth;

• Comparative study of the methods applied in various studies to assess the socio-economic effects of foreign trade;

• Identification of the main features of the foreign trade activity of Azerbaijan;

• Assessment of the impact of Azerbaijan's foreign trade relations on economic growth;

• Assessment of socio-economic effects of foreign trade in Azerbaijan;

- Forecasting the impact of foreign trade on economic growth in Azerbaijan;
- Forecasting the interaction of foreign trade and foreign direct investment in Azerbaijan
- Forecasting the impact of Azerbaijan's foreign trade relations on employment

Research methods. During the study, econometric assessment methods were widely used. The possible relationship of the determinants of foreign trade, including import, export, trade turnover, trade balance, Foreign Trade Freedom, trade openness with GDP, economic growth and economic growth rates, as well as with some socio-economic indicators, such as employment, poverty, household income and other indicators, has been comparatively analyzed and classified. Cases of using the ARDL model, as well as the Error Correction model were checked in solving these problems. The application of various tests, including the Dickey-Fuller, Phillips-Perron and Darbin-Uatson test, as well as the Granger cause-and-effect test, was considered.

The main provisions brought to defense. The following main provisions are defended in the research work:

- The impact of Azerbaijan's import, export and trade balance on GDP is positive. There is no basis for arguments about the negative impact of any measures to increase the volume of foreign trade in Azerbaijan, especially imports, including liberalization measures, on GDP;

- Dependence of the volume of GDP and its changes on indicators characterizing foreign trade activity, including import, export, trade balance, trade turnover, Trade Freedom and trade openness in Azerbaijan is not a causal relationship. The main reason for this, most likely, is that the main part of the country'S GDP is associated with oil and gas production;

- Changes in the per capita income of households in Azerbaijan are not caused by changes in foreign trade indicators, including import, export, foreign trade balance, foreign trade turnover volumes, as well as Foreign Trade Freedom and openness;

- The one-year change in the level of poverty in Azerbaijan does not have a substantive dependence on one-year changes in the volume of imports, export volumes, trade turnover, trade balance, as well as freedom of foreign trade and openness of foreign trade.

Scientific novelty of the dissertation – the main scientific innovations of the dissertation work can be grouped as follows:

1. studies on the impact of foreign trade on economic growth were comparatively analyzed and the nature of the relationship between these indicators in developed countries and developing countries was determined through panel analysis;

2. studies on the impact of foreign trade on poverty were comparatively analyzed and the relationship between these indicators on different groups of countries classified by income was assessed through panel analysis;

3. Studies on the relationship between employment and foreign trade turnover, Foreign Trade Balance were comparatively analyzed and the dependence of employment on Foreign Trade Indicators in different country groups on income level was assessed through panel analysis;

4. Studies on the dependence of household income on trade turnover, import and export were comparatively analyzed and the dependence of household income on Foreign Trade Indicators in different country groups on income level was assessed using panel analysis;

5. The relationship between indicators characterizing foreign trade activity in Azerbaijan, including import, export, trade turnover, trade balance and economic growth was assessed by Time sequence analysis;

6. Over the past 20 years in Azerbaijan, the relationship between poverty and foreign trade indicators, including trade freedom and trade openness, has been assessed using time sequence analysis;

7. The relationship between employment level and foreign trade balance and foreign trade turnover in Azerbaijan over the past 20 years was assessed by the method of time sequence analysis;

8. The impact of foreign trade on household incomes in Azerbaijan over the past 20 years has been assessed using time sequence analysis.

9. The cause-and-effect relationship between economic growth and foreign trade indicators in Azerbaijan was tested by Granger test;

10. The causality of relations between Azerbaijan's Foreign Trade Indicators and socio-economic indicators was checked by Granger test.

Theoretical and practical significance of the dissertation. The theoretical significance of the dissertation work lies in the improvement of foreign trade relations in order to achieve sustainable economic growth and socio-economic development.

Practical significance of the study - methods and practical recommendations proposed in the dissertation can play an important role in economic growth and socio-economic development in Azerbaijan. The results obtained in the dissertation can be used in the development of state policy on improving the competitiveness of the national economy, as well as in the teaching of the disciplines "world economy", "macroeconomics", "general economic theory", "International Economic Relations".

Approbation of work. The main provisions, theoretical generalizations, practical conclusions and recommendations defined in the dissertation were reported in various scientific journals, Scientific-practical conferences in Baku, International Conference on Mathematical Models & Computational Techniques in Science & Engineering and Proceedings of the second Edition of the International Conference on Innovative Applied Energy in London, 5th European conference on Electrical Engineering and Informatics in Switzerland. A total of 8 articles and 4 conference materials on the results of the dissertation work, of which 4 articles were published in domestic, 4 articles were published in international journals included in the SCOPUS database, 3 were published in the materials of foreign conferences and 1 domestic Conference.

The name of the organization where the dissertation work is performed - Department of "Informatics and Technical Subjects" of Azerbaijan Cooperation University.

The structure and scope of the research work. The dissertation consists of 3 chapters and 9 paragraphs, introduction, conclusion and suggestions. First chapter - 81159 signs; second chapter – 47486 signs; third chapter-37109 signs. The total volume of the dissertation consists of 137 pages and 215 thousand characters. It consists of 53 tables, 29 graphs, conclusions and suggestions, as well as a list of 110 used sources.

Structure of the dissertation

Giriş

I Chapter: Scientific and theoretical bases of study of macroeconomic effects of foreign trade relations

1.1.The essence of foreign trade and its main determinants

1.2. The main determinants of the assessment of the activities of foreign trade

1.3. Assessment of the impact of foreign trade on employment and poverty (stationary check)

II Chapter: econometric assessment of the impact of Azerbaijan's foreign trade relations on macroeconomic development

2.1. Assessment of the current state of foreign trade activity of Azerbaijan

2.2. Assessment of macroeconomic effects of foreign trade activities in Azerbaijan

2.3. Assessment of the stability of foreign trade and domestic production indicators in Azerbaijan (Dickey-Fuller test)

III Chapter: forecasting the impact of Azerbaijan's foreign trade relations on macroeconomic development in short and long term

3.1. Checking the stability of foreign trade and some socio-economic indicators in Azerbaijan

3.2. Analysis of the impact of foreign trade on economic growth of Azerbaijan by Granger test

3.3. Assessment of the impact of foreign trade on some socio-economic indicators in Azerbaijan by Granger test

The result

List of used literature

THE MAIN PROVISIONS PRESENTED FOR DEFENSE

Provision 1: *The impact of Azerbaijan's import, export and trade balance on GDP is positive. There is no basis for arguments about the negative impact of any measures to increase the volume of foreign trade in Azerbaijan, especially imports, including liberalization measures, on GDP*

As the world economic system expands, each country's dependence on the world market and integration processes increases, as well as opportunities to benefit from it. Integration into the world market, the expansion of the volume of foreign trade, as well as its geography, allows the formation of a division of Labor on a global scale and the rational use of factors of production. It is through foreign economic relations that the influence of the division of Labor on factors of production determines the channels of its influence in the function of economic growth. The existence of such channels creates conditions for foreign trade to play an important role in economic growth and improving the well-being of the population. However, it should be borne in mind that the existence of foreign trade relations is not yet sufficient for economic growth. Thus, the direction in which these relations affect economic growth and well-being depends on the economic conjuncture in the country, the specificity of the country's economy, the structure of foreign trade and so on. Therefore, each country tries to increase the positive results of such relations by quantitatively assessing the economic and socio-economic effects of its foreign trade regime and foreign trade activities.

For Azerbaijan, the study of the effects of import on GDP is also of great scientific and practical importance. Thus, the rapid increase in the volume of imports in Azerbaijan over the past 25 years does not affect the value created in the fields of economic activity, especially in the non-oil sector. According to economic theory, as the volume of imports increases, the volume of aggregate demand decreases. This means that the volume of GDP calculated by the cost method also decreases. On the other hand, an increase in the volume of intermediate products in the structure of imported goods stimulates the development

of the economy. The analysis of the structure of imported products of Azerbaijan suggests that the volume of intermediate products is not so much in imports. But the volume of final consumer goods dominates imports. In particular, the excess of imports of food products, automobiles and high-tech products negatively affects the volume of GDP.

However, the increase in the volume of imports of any group of goods may not yet result in a weakening of economic growth. Thus, as a result of reducing the cost of imported goods created in any field of economic activity, a transition from that sector to other sectors may occur.

$$\widehat{GDP}=7.22 - 6068.8 * IMP \qquad (1)$$
$$(0.4203) \quad (2318.47)$$

(1) the regression model reaffirms what we mentioned above. The result shows that the structure of imports for the Azerbaijani economy is such that its increase reduces aggregate demand and the volume of GDP calculated by the cost method.

Extensive studies have been conducted on the dependence of GDP on export volumes. The direct influence and necessity of exports for economic growth is confirmed by most economists, starting with mercantilists.

Although the general trend of the relationship between these two indicators is positive, but for each country its nature and degree of dependence are not universal.

We can express the influence of export volume on GDP in the Azerbaijani economy by such a pair of regression equations

$$GDP_t = a_0 + a_1 * EXP_t + \mu_t$$

then the hypothesis H_0 for the relationship between these two indicators is also denied..

$$\widehat{GDP}=5853.761 + 1.7136 * EXP_t \qquad (2)$$
$$(2915.388) \qquad (0.164853)$$

The positive relationship between both components of foreign trade and the volume of GDP leads to the conclusion that the economic policy pursued by the Azerbaijani state for the last 26 years to expand

its foreign trade activities is correct. Simplification of foreign trade regimes and liberalization of foreign economic activity led to rapid integration of Azerbaijan into the world economic system.

Econometric calculation of the dependence of GDP on trade balance in Azerbaijan also shows that the relationship between these two indicators is strong (R-squared = 0.69).

$$\widehat{GDP} = 11414.66 + 1.974764 * TB \qquad (3)$$
$$(3489.981) \quad (0.27017)$$

Provision 2: *The dependence of the volume of GDP in Azerbaijan and its changes on indicators characterizing foreign trade activity, including import, export, trade balance, trade turnover, Trade Freedom and trade openness, is not a causal relationship. The main reason for this, most likely, is that the main part of the country's GDP is associated with oil and gas production.*

As we mentioned above, the fact that the country has foreign trade relations with the world market or any segment of it does not mean that such relations have a positive impact on economic growth. In some countries, especially countries rich in natural resources, opportunities for diversification in foreign trade activities are weak. In such cases, essential goods and services are usually imported into the country through the proceeds from the sale of exported natural resources. That is, in such a formed foreign trade activity, the effective distribution of the country's production factors is impossible. In the course of quantitative assessment, it turns out that the effects of foreign trade activity on economic growth or well-being are not cause-and-effect substantive.

Azerbaijan is also a country rich in natural resources, and a large number of features inherent in other countries rich in Natural Resources also apply to Azerbaijan. The linear regression method was used to study the impact of Azerbaijan's foreign trade activity on macroeconomic indicators, including economic growth, household income, employment, and poverty. At the same time, indicators of import, export, trade balance, trade turnover, freedom of trade and

openness of trade were used as independent indicators characterizing foreign trade activity.

In accordance with the subject of our study,

$$Y_t = \sum_{j=1}^{m} a_j * X_{t-j} + \sum_{j=1}^{m} b_j * Y_{t-j} + \theta_t \qquad (4)$$

$$X_t = \sum_{j=1}^{m} c_j * X_{t-j} + \sum_{j=1}^{m} d_j * Y_{t-j} + \varepsilon_t \qquad (5)$$

the equivalents are related to the change in the volume of (ΔGDP_t), characterizing foreign trade activities

to study the causal effects, we can write as follows:

$$\begin{cases} \Delta GDP_t = \sum_{j=1}^{m} a_j * \Delta \dot{I}MP_{t-j} + \sum_{j=1}^{m} b_j * \Delta GDP_{t-j} + \theta_t \\ \Delta \dot{I}MP_t = \sum_{j=1}^{m} c_j * \Delta \dot{I}MP_{t-j} + \sum_{j=1}^{m} d_j * \Delta GDP_{t-j} + \varepsilon_t \end{cases} \qquad (6)$$

The calculations show that there is a mean correlation relationship between the indicators of ΔGDP_t and $\Delta \dot{I}MP_t$. However, the presence of such a relationship does not yet confirm the existence of a causal relationship between these indicators. Therefore, we must perform the Granger causality test according to the system. The Granger Test between changes in import and GDP on the basis of 1, 2 and 3-year lag shows that there is no causal relationship in both directions and for Azerbaijan these two indicators do not condition each other. It should be noted that at first glance, the continuous increase in the volume of imports over the past 20 years with an increase in GDP allowed to draw the wrong conclusion that the main reason for the growth of imports in Azerbaijan is the growth of GDP.

The results of the Granger test of the effects of import volume on GDP and in the opposite direction in Azerbaijan in cases where lag=1; 2; 3 are presented in Table 1. It can be seen from the table that neither the volume of imports as a whole acts as the cause of the volume of GDP, nor, on the contrary, the volume of GDP acts as the cause of the volume of imports. As we noted above, the structure of imported goods of Azerbaijan is highly stable, and the absolute price of GDP does not have a significant impact on the structure. Also, since the main weight in GDP is related to crude oil exports and the production of oil products, the relationship of mutual causality is not strong.

Table 1

Results of the Granger test on the impact of import volume on GDP and in the opposite direction in Azerbaijan

	Laq=1			Laq=2			Laq=3		
	F-statistika	p-value	hypothesis	F-statistika	p-value	hypothesis	F-statistika	p-value	hypothesis
$İMP_t \rightarrow GDP_t$	0.33306	0.5706	H_0	0.44084	0.6511	H_0	0.11140	0.9519	H_0
$GDP_t \rightarrow İMP_t$	1.66980	0.2118	H_0	0.64103	0.5398	H_0	1.80567	0.1958	H_0

Note: calculated by the author

The results of the Granger test of the effects of changes in import volume in Azerbaijan on changes in GDP and in the opposite direction in cases where lag=1; 2; 3 are presented in Table 2. It can be seen from the table that a change in the volume of GDP also leads to a change in the volume of imports. That is, as the incomes of the population increase in the country, the volume of imported goods also increases. Feedback, however, is not available. This is also fully consistent with the theory.

Table 2

Results of the Granger test of the effects of changes in import volume in Azerbaijan on changes in GDP and in the opposite direction

	Laq=1			Laq=2			Laq=3		
	F-statistika	p-value	hypothesis	F-statistika	p-value	hypothesis	F-statistika	p-value	hypothesis
$\Delta İMP_t \rightarrow \Delta GDP_t$	0.91569	0.3513	H_0	0.29121	0.7515	H_0	0.30	0.8219	H_0
$\Delta GDP_t \rightarrow \Delta İMP_t$	1.76402	0.2007	H_0	1.17761	0.3349	H_0	3.39	0.0536	H_1

Note: calculated by the author

It allows to replace Granger test for $İMP_t$ və GDP_t. But it is necessary to make sure that the fifth part of the temporary sequence of these indicators is not permanent, even if it is I(0). In addition, nevertheless, the sad situation between these two indicators remains unchanged ($R^2 = 0.86$). F- Test of overall significance $2*10^{-10}$. However, this does not yet mean that there is a cause-and-effect relationship. Calculations show that in cases with laq=1, 2 and 3 for $İMP_t$ and GDP_t the Granger test shows that there is no causal relationship between these two indicators. The results of the Granger test of the effects of export volume on GDP and in the opposite direction in Azerbaijan in cases where Lag=1; 2 and 3 are presented in Table 3

Table 3

Granger test of the effects of export volume on GDP and in the opposite direction in Azerbaijan

	Laq=1			Laq=2			Laq=3		
	F-statistika	p-value	hypothesis	F-statistika	p-value	hypothesis	F-statistika	p-value	hypothesis
EXP_t $\rightarrow GDP_t$	15.8632	0.0008	H_1	4.06821	0.0373	H_1	4.97950	0.0162	H_1
GDP_t $\rightarrow EXP_t$	3.92486	0.0622	H_0	1.87128	0.1861	H_0	2.25703	0.1301	H_0

Note: calculated by the author

$$GDP_t = \sum_{j=1}^{m} a_j * EXP_{t-j} + \sum_{j=1}^{m} b_j * GDP_{t-j} + \theta_t$$
$$EXP_t = \sum_{j=1}^{m} c_j * EXP_{t-j} + \sum_{j=1}^{m} d_j * GDP_{t-j} + \varepsilon_t$$
(7)

Based on this equality, let us try to determine that there is causality in the relationship between changes in GDP volume and changes in export volume. The linear regression relationship between the indicators of export and GDP volumes over the past 23 years is quite strong ($R^2 = 0.95$). F- Test of overall significance $7.35*10^{-15}$. However, in order to prove that such a strong regression relationship is indeed a cause-and-effect relationship, we need to verify that there is Granger causality between these time periods. Hesablamalar göstərir

ki, EXP_t və GDP_t üçün laq=1, 2 və 3 olan hallarda Granger testi bu iki göstərici arasında səbəbiyyət əlaqəsinin olduğunu göstərir. Lakin belə səbəbiyyət əlaqəsi birtərəflidir, daha dəqiq desək, ixrac həcmi ÜDM həcminin səbəbi kimi çıxış edir. Calculations show that in cases with lag=1, 2 and 3 for EXP_t and GDP_t, the Granger test shows that there is a causal relationship between these two indicators. However, such a causal relationship is one-sided, more precisely, export volume acts as the cause of GDP.

The results of the Granger test of the effects of changes in export volume in Azerbaijan on changes in GDP and in the opposite direction in cases where lag=1; 2 and 3 are presented in Table 4:

Table 4

Granger test of the effects of changes in export volume in Azerbaijan on changes in GDP and in the opposite direction

	Laq=1			Laq=2			Laq=3		
	F-statistika	p-value	hypothesis	F-statistika	p-value	hypothesis	F-statistika	p-value	hypothesis
$\Delta EXP_t \rightarrow \Delta GDP_t$	1.80244	0.1961	H_0	0.63672	0.5427	H_0	1.98433	0.1702	H_0
$\Delta GDP_t \rightarrow \Delta EXP_t$	1.09800	0.3086	H_0	0.52091	0.6043	H_0	1.09447	0.3890	H_0

Note: calculated by the author.

The calculations show that there is a high-grade correlation relationship between the ΔGDP_t and ΔEXP_t indicators ($R^2 =0.778252$; F-Test of overall significance $=5.67*10^{-8}$). However, the fact that such a relationship between these indicators is serious does not give grounds to confirm that it is a causal relationship. Therefore, the Granger causality test must be performed. Calculations show that according to the Granger Test between changes in export and GDP on the basis of 1, 2 and 3-year lags, there is no causal relationship in both directions, and for Azerbaijan these two indicators do not condition each other. It should be noted that at first glance, the continuous increase in export volume over the past 20 years with an

increase in GDP allowed to draw the wrong conclusion that the main reason for the growth of exports in Azerbaijan is the growth of GDP. Or, on the contrary, an increase in exports is conditioned by an increase in GDP. However, Granger's test proves that there is no causal relationship between these two indicators, and in cases where lag= 1; 2; 3, the hypothesis H_0 in both directions justifies itself. In contrast to the unilateral causal relationship between export volume and GDP, there is no causal relationship between the changes in these indicators. In other words, changes in Azerbaijan's export volume do not lead to GDP growth. Also, GDP growth does not lead to changes in exports.

In Azerbaijan where lag=1; 2 and 3 the results of the Granger test of the effects of the trade balance on the volume of GDP and in the opposite direction are presented in Table 5:

<div align="right">Table 5</div>

Granger test of the effects of trade balance on GDP and in the opposite direction in Azerbaijan

	Laq=1			Laq=2			Laq=3		
	F-statistika	p-value	hypothesis	F-statistika	p-value	hypothesis	F-statistika	p-value	hypothesis
$TB_t \rightarrow GDP_t$	7.26578	0.0143	H_1	1.65012	0.2231	H_0	1.61385	0.2343	H_0
$GDP_t \rightarrow TB_t$	1.48928	0.2373	H_0	0.61026	0.5554	H_0	0.64370	0.6005	H_0

Note: calculated by the author

The linear regression relationship between the indicators of the trade balance and GDP volumes over the past 23 years is quite strong ($R^2 =0.69$). F- Test of overall significance $7.64*10^{-7}$. However, in order to prove that such a strong regression relationship is indeed a cause-and-effect relationship, we need to verify that there is Granger causality between these time periods. Calculations show that in cases with lag=2 and 3 for TB_t and GDP_t the Granger test shows that there

is no causal relationship between these two indicators. The Granger test shows that in the case of lag=1 there is a causal relationship that is unilateral, that is, directed from the trade balance to the GDP volume. But if we take into account that TB_t and GDP_t are not stationary time sequences, then the real presence of such a connection is at dawn.

The results of the Granger test of the effects of changes in trade balance in Azerbaijan on changes in GDP and in the opposite direction in cases where lag=1; 2 and 3 are presented in Table 6:

Table 6

Granger test of the effects of changes in trade balance in Azerbaijan on changes in GDP and in the opposite direction

	Laq=1			Laq=2			Laq=3		
	F-statistika	p-value	hypothesis	F-statistika	p-value	hypothesis	F-statistika	p-value	hypothesis
$\Delta TB_t \rightarrow \Delta GDP_t$	2.70262	0.1175	H_0	0.93169	0.4155	H_0	1.96283	0.1735	H_0
$\Delta GDP_t \rightarrow \Delta TB_t$	2.20808	0.1546	H_0	1.84837	0.1916	H_0	1.49627	0.2655	H_0

Note: calculated by the author

$$\Delta GDP_t = \sum_{j=1}^{m} a_j * \Delta TB_{t-j} + \sum_{j=1}^{m} b_j * \Delta GDP_{t-j} + \theta_t$$
$$\Delta TB_t = \sum_{j=1}^{m} c_j * \Delta TB_{t-j} + \sum_{j=1}^{m} d_j * \Delta GDP_{t-j} + \varepsilon_t$$

(8)

Calculations show that there is also a high degree of correlation between the ΔGDP_t and ΔTB_t indicators (R^2 =0.646407; F- degree of significance =6.54*10^{-6}). However, the fact that such a relationship between these indicators is serious does not give reason to confirm that it is a causal relationship. Therefore, the Granger causality test must be performed. Calculations show that according to the Granger Test between trade balance and GDP changes based on 1, 2 and 3-year lags, there is no causal relationship in both directions, and for Azerbaijan these two indicators are not mutually exclusive.

The results of the Granger test of the effects of trade turnover on GDP and in the opposite direction in Azerbaijan in cases where lag=1; 2 and 3 are presented in Table 7:

Results of the Granger test of the effects of trade turnover on GDP and in the opposite direction in Azerbaijan

	Laq=1			Laq=2			Laq=3		
	F-statistika	p-value	hypothesis	F-statistika	p-value	hypothesis	F-statistika	p-value	hypothesis
$TT_t \rightarrow GDP_t$	9.93196	0.0053	H_1	2.98759	0.0790	H_0	1.99630	0.1644	H_0
$GDP_t \rightarrow TT_t$	5.07445	0.0363	H_1	1.46365	0.2608	H_0	1.63969	0.2286	H_0

Note: calculated by the author

$$GDP_t = \sum_{j=1}^{m} a_j * TT_{t-j} + \sum_{j=1}^{m} b_j * GDP_{t-j} + \theta_t$$
$$TT_t = \sum_{j=1}^{m} c_j * TT_{t-j} + \sum_{j=1}^{m} d_j * GDP_{t-j} + \varepsilon_t \qquad (9)$$

The linear regression relationship between the indicators of trade turnover and GDP volumes over the past 23 years is quite strong ($R^2 = 0.97$). F-the degree of materiality is $9*10^{-18}$. However, in order to prove that such a strong regression relationship is indeed a cause-and-effect relationship, we need to verify that there is Granger causality between these time periods. Calculations show that the hal Granger test with lag=1 for TT_t və GDP_t shows that there is a bidirectional causal relationship between these two indicators. However, in cases with lag=2 and 3, The Granger test shows that there is no causal relationship between these two indicators in any direction.

Provision 3: *Changes in the per capita income of households in Azerbaijan are not caused by changes in foreign trade indicators, including import, export, foreign trade balance, foreign trade turnover volumes, as well as Foreign Trade Freedom and openness.*

Since oil and gas exports have a significant weight in Azerbaijan's foreign trade activities and revenues are concentrated in the State Oil

Fund and SOCAR, they do not have a direct impact on household income. On the contrary, since the volume of consumption of imported goods in households is high, an important part of household expenses is related to the consumption of such goods. Therefore, the influence of the foreign trade regime and its activities on household incomes is not noticeable. Nevertheless, the quantitative assessment and econometrics of the relationship between these indicators is of great importance.

Of these time orders, only the $\Delta HHRPC_t$ time order is not stationary. The regression dependence of the change in annual per capita income in households ($\Delta HHRPC_t$) on changes in foreign trade indicators is given in Table 8.

Table 8

Regression dependence of changes in annual per capita income in households on indicators of foreign trade

	R^2	F- significance	Standard error	1st coefficient	2nd coefficient
$\Delta \dot{I}MP_t$	0.444186	0.003483	0.044206	-47.2275	0.153055
ΔEXP_t	0.245341	0.043206	0.013155	53.49835	0.029051
ΔTT_t	0.314609	0.019161	0.010566	29.89926	0.027725
ΔTB_t	0.146277	0.129745	0.01646	81.29495	0.026389
ΔFTF_t	0.01442	0.646188	67.88231	66.81144	31.80039
ΔFTO_t	0.009284	0.712963	338.1253	93.13423	-126.772

Note: calculated by the author

Thus, for the regression dependence of one-year changes in annual income per capita in households on one-year changes in the volume of imports, export volumes and trade turnover, the F-significance indicator for a reliability of 95% lies in the permissible inetrval. However, with changes in trade balance, freedom of foreign trade and openness of foreign trade, the F-significance indicator of regression dependence is outside the allowed range.

Calculations show that in the $\Delta \beta_t = \alpha * \beta_{t-1} + \nu_t$ regression equation $\tau = -3.38 < \tau_c = -3.37$ and F-significance indicators =0.00446<0.05. Therefore, $\Delta \dot{I}MP_t$ and $\Delta HHRPC_t$ time series can be considered as co-integrated. Thus, the dependence of ΔIMP_t and

$\Delta HHRPC_t$ is cause-and-effect in nature. To determine the direction of such a cause-effect relationship, i.e. $\Delta \dot{I}MP_t \rightarrow \Delta HHRPC_t$, of such a relationship, or $\Delta HHRPC_t \rightarrow \Delta \dot{I}MP_t$, we can use the Granger test. The Granger test shows that in none of the cases of lag=1; 2; 3 there is neither $\Delta \dot{I}MP_t \rightarrow \Delta HHRPC_t$ directional nor $\Delta HHRPC_t \rightarrow \Delta \dot{I}MP_t$ directional cause-and-effect relationship.

$\tau = -2.42 > \tau_c = -3.37$ and F- significance indicators = 0.029459<0.05 in the $\Delta \gamma_t = \alpha * \gamma_{t-1} + \nu_t$ regression equation. Therefore, the time series ΔEXP_t and $\Delta HHRPC_t$ cannot be considered co-integrated. Thus, $\Delta EXP_t \rightarrow \Delta HHRPC_t$ addiction is not cause-and-effect substantive.

Thus, we can say that changes in the per capita income of households in Azerbaijan are not caused by changes in foreign trade indicators, including import, export, foreign trade balance, foreign trade turnover volumes, as well as Foreign Trade Freedom and openness.

There is a need to check the regression relationship between these indicators by Granger test to find out the causal effects of the main indicators characterizing foreign trade in Azerbaijan, including 1)import; 2) export; 3) foreign trade balance; 4)foreign trade turnover; 5) foreign trade openness; 6) Foreign Trade Freedom on some socio-economic indicators, including poverty level, employment and household income.

Provision 4: *The one-year change in the poverty level in Azerbaijan does not have a causal dependence on one-year changes in import volume, export volume, trade turnover, trade balance, as well as freedom of foreign trade and openness of foreign trade.*

There is no co-integration between the time Order of import, export, trade balance, trade turnover, Foreign Trade Freedom and foreign trade openness, which characterizes the level of poverty. Therefore, it can be argued that despite the fact that there is a strong correlation relationship between 1) $\dot{I}MP_t \rightarrow POV_t$; 2) $EXP_t \rightarrow POV_t$; 3) $TB_t \rightarrow POV_t$; 4) $TT_t \rightarrow POV_t$; 5) $FTF_t \rightarrow POV_t$ indicators, this relationship is not "real" and there are no cause-and-effect relationships between

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these indicators. In other words, the H_0 hypothesis about the absence of cause-effect relations between these indicators justifies itself.

Since $\Delta \dot{I}MP_t$, ΔEXP_t, ΔTB_t, ΔTT_t, ΔFTF_t and ΔFTO_t time series are stationary at degree I(1), but not stationary at degree ΔPOV_t, we propose the following hypotheses to test their co-integration: taking into account the above results, let us perform co-integration tests on the basis of the following hypotheses to determine the extent to which the relationship between the changes in the indicators we have considered above is:

1) ΔPOV_t and $\Delta \dot{I}MP_t$ time series are not co-integrable, i.e. the H_0 hypothesis justifies itself;
2) ΔPOV_t and ΔEXP_t time series are not co-integrable, i.e. the H_0 hypothesis justifies itself;
3) ΔPOV_t and ΔTB_t time series are not co-integrable, i.e. the H_0 hypothesis justifies itself;
4) ΔPOV_t and ΔTT_t z time series are not co-integrable, i.e. the H_0 hypothesis justifies itself;
5) ΔPOV_t and ΔFTF_t time series are not co-integrable, i.e. the H_0 hypothesis justifies itself;
6) ΔPOV_t and ΔFTO_t time series are not co-integrable, i.e. the H_0 hypothesis justifies itself;

Of these time rows, only ΔPOV time row is not stasionar. But between him and other time rows, with the exception of the (ΔFTO_t time row) there is a serious demand (Table 9).

Table 9
The change in the level of poverty Regression dependence on changes in (ΔPOV_t)foreign trade indicators

	R^2	F- significance	Standard error	1st coefficient	2nd coefficient	
$\Delta \dot{I}MP_t$	0.12453	0.164726	0.000361	-2.09951	-0.00053	
ΔEXP_t	0.208847	0.065152	8.76E-05	-2.34535	-0.00017	
ΔTT_t	0.21262	0.06247	7.36E-05	-2.24502	-0.00015	
ΔTB_t	0.186274	0.083654	0.000105	-2.49646	-0.00019	
ΔFTF_t	0.000533	0.929917	0.444538	-2.54961	-0.03976	
ΔFTO_t	0.017615	0.611593	2.189565	-2.58115	-1.13555	

Note: calculated by the author

It can be seen from Table 9 that the F-significant indicator for a 95% reliability for the regression dependence of one-year changes in the level of poverty on one-year changes in import volume, export volume, trade turnover, trade balance, as well as freedom of foreign trade and openness of foreign trade is not in the permissible inetrval. Therefore, there is no causal dependence between these indicators.

CONCLUSION and SUGGESTIONS

In the course of the study, various evaluation models were used to assess the effects of foreign trade on economic growth and economic development. Also, a comparison of the methods used in various studies was carried out to assess the impact of foreign trade on economic growth. The main features of Azerbaijan's foreign trade activities were determined by comparing the methods used in various studies to assess the socio-economic effects of foreign trade and the impact of Azerbaijan's foreign trade relations on economic growth and some socio-economic indicators were assessed.

The main results obtained during the study can be grouped as follows:
1. The impact of Azerbaijan's import, export and trade balance on GDP is positive. There is no basis for arguments about the negative impact of any measures to increase the volume of foreign trade in Azerbaijan, especially imports, including liberalization measures, on GDP;

2. The dependence of the volume of GDP in Azerbaijan and its changes on indicators characterizing foreign trade activity, including import, export, trade balance, trade turnover, Trade Freedom and trade openness, is not a causal relationship. The main reason for this, most likely, is that the main part of the country's GDP is associated with oil and gas production.

3. Changes in the per capita income of households in Azerbaijan are not caused by changes in foreign trade indicators, including import, export, foreign trade balance, foreign trade turnover volumes, as well as Foreign Trade Freedom and openness.

4. The one-year change in the poverty level in Azerbaijan is not within the acceptable inetrval indicator of 95% reliability for regression dependence on one-year changes in import, export volume, trade turnover, trade balance, as well as freedom of foreign trade and openness of foreign trade. Therefore, there is no causal dependence between these indicators.

5. The economy of Azerbaijan is fully dependent on the import of some goods, for example, cars, and therefore any event accompanied by a change in the income of the population, for example, Covid-19, immediately affects the volume of imports and prices.

Taking into account the scientific results obtained during the study, we can make the following suggestions for decision makers:

1. Given the positive impact of Azerbaijan's import, export and trade balance on GDP, further liberalization of the foreign trade regime will further enhance foreign trade activity. in particular, there is a need to reduce tariffs on imports of non-manufactured or partially manufactured goods in Azerbaijan.

2. Since the dependence of the volume of GDP and its changes on indicators characterizing foreign trade activity, including import, export, trade balance, trade turnover, Trade Freedom and trade openness in Azerbaijan, no negative impact on economic growth is expected during the implementation of this activity. Therefore, when implementing the foreign trade policy, it is necessary to pursue not the goals of ensuring economic growth, but the goals of increasing the income of consumers. In this case, the demand for imported goods will

increase. The increase in demand will strengthen both domestic production and foreign economic activity;

3. The fact that foreign trade indicators have not been affected by the annual per capita income of households and the poverty level in Azerbaijan shows once again that there is a need to industrialize the foreign trade regime and reduce tariffs.

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The defense will be held *on "28" October 2022* at FD 1.11. Dissertation council of Supreme Attestation Commission under the President of the Republic of Azerbaijan operating at Azerbaijan State University of Economics.

Address: AZ 1001, Baku, Istiglaliyat street 6

The dissertation is accessible at the Azerbaijan State University of Economics Library.

Electron versions of dissertation and its abstract are available on the official website of the Azerbaijan State University of Economics.

Abstract was sent to the required addresses on *"27" September 2022.*