Measuring the impact of foreign trade liberalization on economic growth in Algeria using the ARDL autoregressive model during the period 1980-2021

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Abstract: *This study aims to measure the impact of foreign trade liberalization on economic growth in Algeria, through an econometric study in which we used the methodology of self-regression of distributed time gaps applied to annual time series for both the trade openness index, which expresses the independent variable foreign trade liberalization and the dependent variable Economic growth rate from the year 1980 To 2021, with regard to the data on which the study is based, we obtainedit from the World Bank and the National Bureau of Statistics.*

The study concluded that more open economies are growing faster than more closed economies. The standard study also found a long-term equilibrium relationship between the trade openness index, which expresses the liberalization of foreign trade and the rate of economic growth in Algeria, and this means that the liberalization of foreign trade in Algeria and openness to the outside world raise the rate of economic growth in the long run.

Keywords:foreign *trade liberalization, exports, imports, economic growth, ARDL models.*

JEL Classification *: C13; C12; F12; C22; F43.*

الملخص: *تهدف هذه الدراسة إلى قياس اثر تحرير التجارة الخارجية على النمو الاقتصادي في الجزائر، وذلك من خلال دراسة قياسية استخدمنا فيها منهجية الانحدار الذاتي للفجوات الزمنية الموزعة طبقت على سلاسل زمنية سنوية لكل من مؤشر الانفتاح التجاري والذي يعبر عن المتغير المستقل تحرير التجارة الخارجية و المتغير التابع معدل النمو الاقتصادي من سنة 1980 إلى 2021، وفيما يتعلق بالبيانات التي بنيت عليها الدراسة فقد تحصلنا عليها من البنك الدولي والديوان الوطني للإحصائيات .وقد خلصت الدراسة إلى ان الاقتصاديات الأكثر انفتاحا تنمو أسرع ما الاقتصاديات الأكثر انغلاقا. كما توصلت الدراسة القياسية إلى وجود علاقة توازنية طويلة الأجل بين مؤشر الانفتاح التجاري الذي يعبر عن تحرير التجارة الخارجية و معدل النمو الاقتصادي في الجزائر ، وهذا يعني أن تحرير التجارة الخارجية في الجزائر و الانفتاح على العالم الخارجي يرفع من معدل النمو الاقتصادي في المدى البعيد.*

الكلمات المفتاحية : *تحرير التجارة الخارجية، الصادرات، الواردات، النمو الاقتصادي، نماذجARDL.*

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1.Introduction:

The relationship between foreign trade liberalization and economic growth is an important topic in the international economy and a long-standing point of contention among intellectuals and economists .It is not easy to show the links between foreign trade liberalization and economic growth, and there is no doubt that this field is rich in the literature of economic thought, in addition to various models of economic growth and theories of foreign trade, several empirical and statistical studies have been conducted to try to reject or support the cause of free trade. We find that there is a stream of studies that have proven that increasing the openness of the economy to international trade would achieve high rates of income Economic growth, while the other current has rejected these results because the effects of foreign trade are overestimated or are not measured correctly.

Among the main determinants that exert an impact on economic growth rates, the policy of foreign trade liberalization has received a very important attention in the theoretical literature and applied studies. This approach seems logical. There are strong andvalid reasons to believe that more open economies grow faster than more closed economies. This is given the experiences of leading countries such as Southeast Asian countries. Algeria, like various developing countries, hassince its independence pursued a number of procedures and measures in order to regulate its foreign trade sector in accordance with its economic objectives, starting with the stage of administrative control, then the stage of monopoly, and finally the stage of trade liberalization, which coincided with the political and economic openness it adopted at the end of the eighties and the beginning of the nineties of the last century.

Based on the above, the main features of the problem emerge, which can be formulated as follows:

What is the impact of foreign trade liberalization on economic growth rates in Algeria during the period 1980-2021?

- **Hypotheses:**To answer the main question raised above, we have proposed a number of main hypotheses that we will test their validity on the ground:
  - More open economies grow faster than more closed economies;
  - The higher the index of openness to the outside world, the higher the growth rate in Algeria;
  - There is a long-term relationship between foreign trade liberalization and economic growth in Algeria;
- **The importance of the study:** The policy of liberalization of foreign trade is of great importance in most economies of countries, especially developing ones, such as Algeria, which aspires to penetrate international markets and integrate into the global trading system by giving great importance to international trade by lifting and liberalizing restrictions on this sector. The importance of this study lies in trying to show the effects caused by the policy of foreign trade liberalization on economic growth in Algeria during the study period, based on linear autoregressive models with distributed time deceleration (ARDL).
- **Objectives of the study:** The objectives of this study are the following points:
  - Analyze the relationship between trade liberalization policy and economic growth in Algeria;

- Kadir is a powerful econometric model that explains the relationship between trade liberalization policy and economic growth in Algeria;
- Study the effects of oil price fluctuations on economic growth in Algeria;

- **Study Methodology:** In our study, we will rely on the quantitative approach using standard and statistical tools aimed at measuring the impact of foreign trade liberalization on economic growth using Eviews 12 program in the short and long terms according to the ARDL model
- **Divisions of the study:** In order to answer the main question and verify the hypothesis of the study and take note of all aspects of our research, we have divided this study into four axes as follows:
  - **The first axis:** the nature of foreign trade;
  - **The second axis:** foreign trade liberalization policy and objectives;
  - **The third axis:** advantages and obstacles to foreign trade liberalization;
  - **Fourth axis:** An econometric study of the impact of trade liberalization policy on economic growth in Algeria;
- **Previous studies:** Showing the links between trade liberalization and economic growth is not easy at all, as it is certain that this field of studies is important and rich in the economic literature, in addition to various theories and study models, a number of empirical and statistical studies have been used to support or reject the issue of free trade, starting with the study of Michaely 1977 and Balassa 1978 . The most common of which tested the hypothesis that trade exerts an effect on growth based on linear standard models derived from the neoclassical production function revealed a positive relationship between the two variables.

Robert J Barro's study entitled Economic Growth in Cross Section of Countries This study aims to search for the determinants of economic growth through the declines of 100 countries as an attempt to find out the damage to the determinants of economic growth common to the sample countries and has concluded that there are many variables with a significant impact on economic growth rates in the long term, such as the percentage of investment and levels of education.

- Frankel & Romer's study in 1991, using several criteria to measure trade openness as an attempt to analyze the impact of trade openness on economic growth, concluded that increasing the ratio of foreign trade to GDP by 1% would increase national income to 5%, in addition to a positive relationship between trade openness and economic growth.
- Sachs and Warner study in 199 entitled Natural Resource Abundance and Economic Growth to show trade openness as one of the main determinants of economic growth This study used the growth accounting approach where economic openness was calculated by average levels of tariff and non-tariff barriers, black market premiums, state monopoly of major exports and other information The results of the study showed that open economies grow at a rate ranging from 2% to 3 % faster than in closed economies.
- The Wacziarg and Welchstudy in 2003, which described how countries that liberalized their trade systems during the period 1980-1998 benefited on average with a growth rate of 1.5% per year compared to the pre-liberalization period.
- Madsen's 2009 study , which showed that the diffusive effect across the import channel exerted a positive effect on economic growth using annual pannel data for 16

OECD countries during the period 1870-2006 and to verify whether trade openness exerted an impact on the growth of total factor productivity and per capita income. An important contribution is to test the hypothesis proposed by the internal growth model that openness affects growth through the import of knowledge produced in other countries, where the study provided evidence to support the existence of positive effects of the spread of knowledge through the import channel on economic growth during all study periods.

- Another study Sadet Amini et al in 2012 through models of autoregressive with distributed deceleration during the period 1961-2006 on the Iranian economy, the results of the study led to a long-term equilibrium relationship with a positive and significant effect between both economic growth and trade openness, while the impact of trade openness on the balance of payments is not significant.
- Nowbutsing study in 2014 using a sample of 15 countries during the period 1997-2011 to measure the impact of trade openness on economic growth, three indicators of trade openness were used, namely the index of exports to GDP, imports to GDP, total exports and imports to GDP, and using the method of fully corrected least squares, the study found a positive and significant impact of trade openness indicators on economic growth in these countries.

2.The first axis: the nature of foreign trade:

Foreign trade exchange is of great importance in international economic relations, as the world cannot be imagined without trade exchange in our time, as no country, no matter how advanced it is, can reduce its economy from the rest of the world. In the past, it is noted that trade was one of the causes of wars between countries, unlike the present time, which has become one of the reasons for international rapprochement, as it allows at the present time for these countries to consume more than what they produce from their own resources in addition to expanding distribution outlets to sell their production (Lasary 2005, 12) Researchers have worked hard to develop several definitions of foreign trade, including:

A number of economic researchers in the field of international economics believe that the concept of foreign trade refers to the framework and classical understanding of the phenomenon of international exchange, which was focused on looking at acceptable explanations that determine the structure and nature of commodity exports and imports (زايري 2006، 13)

Trade transactions between countries under what is known as visible and invisible exports and imports in their three forms (goods, individuals and capital) that arise between individuals residing in different political units or between governments and economic organizations residing in different political units. (جميل محمد 2014، 217).Foreign trade is a branch of economics that is concerned with the study of economic transactions taking place across national borders. (جوادي 2017، 5)

In summary, foreign trade can be defined as a branch of economics that is concerned with the way national and overlapping economies deal in order to allocate limited resources to the growing human needs through trade exchange that takes place in its three forms, represented in the movement of goods, services, capital, individuals and expertise from units within the borders of the state to the rest of the world.

3.The second axis: Foreign trade liberalization policy and its objectives:

Foreign trade plays an important role in the lives of peoples, hence it was necessary to have policies that frame and direct them, as each country in the field of foreign trade is characterized by a certain type of trade policies, which vary according to economic conditions, the nature of the economy and the political and economic orientations of the state, and it should be noted that these policies vary from one country to another and each of the tools, objectives and size is certain.

Trade policies are defined as a set of regulations and actions taken by the state to regulate the foreign trade sector, and each policy is characterized by certain tools that help it achieve its objectives; (يسرى احمد و ايمان 2007، 153)

It should be noted that there are a number of trade policies governing international trade exchanges, and through our research we will try to shed light only on the policy of liberalization of foreign trade as a mechanism to promote economic growth.

3.1.Foreign Trade Liberalization Policy:

The first to call for the policy of freedom of foreign trade are the pioneers of naturalism that emerged in France led by **François Kenny** (1694-1774), which is based on the principle of non-interference of the state in economic activity as the interests of individuals are not incompatible with each other and do not conflict with the interests of society, and they expressed the idea through their famous phrase "**Let it work, let it pass**" They also considered that free competition is enough to achieve the rewarding price "**Bon Prix"** It is a price that achieves a reasonable profit for sellers, and is considered reasonable for consumers (Ben Deeb, Abdul Rashid, 2002-2003), and (بن ديب،عبدالرشيد 2002-2003)**"The Wealth of Nations",** David Ricardo and John Stuart Mill, and the policy of liberalization of foreign trade depends on the principle of free movement of means of production to and from outside the state within the framework of what is known as foreign trade, and not to impose restrictions and obstacles on it (Ali Al-Sous, 2012, p. 130) (علي الصوص 2012، 130) Among the most prominent definitions on foreign trade liberalization are the following:

- ✓ It is a set of measures and measures aimed at transforming the foreign trade system into a neutral direction, in the sense of non-preferential state intervention in the direction of imports or exports, a process that takes a long time (عبدالمجيد 2006، 209)
- ✓ Non-interference of the state, governments and decision-makers in the exchange, trade and movement of goods and services between different countries by eliminating all barriers, fees and restrictions imposed on trade, whether internal or external, while allowing free competition to prevail in production and exchange, and this is what enables individuals to export and import what they desire from the pursuit and services without the intervention of the parties

The advantages of the policy of free foreign trade are summarized as follows (حسن جابر 2012، 51)

- ✓ Reducing the prices of goods and services through competition among their producers as well as eliminating duties and taxes that benefit domestic and foreign consumers;
- ✓ The expansion of the sphere of specialization and the division of labour, resulting in an improvement in the quality of goods and the living standards of peoples;
- ✓ Achieving the optimal distribution of the productive and economic resources of the State;

- ✓ Production of goods in the most efficient and cost-effective manner and the elimination of monopoly;

3.2. Arguments of supporters of the policy of trade liberalization: There is no doubt that achieving economic welfare is the desired goal of any policy, whether economic or commercial, and supporters of the policy of free foreign trade rely on several arguments to defend their views, including:

- ✓ Freedom of foreign trade is one of the factors that contribute to economic expansion and stimulate sustainable economic growth that raises profits and encourages savings and investment, one of the arguments of Adam Smith and Ricardo is that the gains of exchange come only through free exchange;
- ✓ Trade liberalization helps generate foreign exchange and attract foreign capital and experts, whose supply is scarce in LDCs;
- ✓ Freedom of exchange pushes countries to specialize in the production of goods in which they are characterized by comparative advantage, and specialization helps to increase the division of labor and thus increase the volume of goods produced and increase the number of markets;
- ✓ Free trade allows States to obtain products in greater quantities than they can produce themselves (Duglas 1996, 87)
- ✓ Trade liberalization is a means of peace in the world and a powerful factor for development, providing goods necessary for production and subsistence in developing countries and encouraging good dealings between nations (Paul et Mauric 2003, 6)
- ✓ The policy of restricting foreign trade leads to a decrease in income as a result of the orientation of factors of production towards sectors that do not enjoy high productivity, which leads to a decrease in the real incomes of individuals due to their having to buy local goods at different prices;
- ✓ Trade liberalization leads to export maximization within the framework of a production-for-export strategy, thus achieving external balance to a much better degree than protectionism (عبد المطلب 2003، 131-132)
- ✓ The expansion of markets leads to full competition, which leads to the improvement of means of production and access to a fair price, as the protection policy paves the way for the formation of the cartel, which has harmful effects in terms of price control and product quality (عبدالجابر 2010، 18)
- ✓ The possibility of the consumer defending himself from the monopoly of the producer by importing goods from abroad, so that the policy of trade liberalization can eliminate monopoly at home (الناشد 1977، 244)
- ✓ Protection leads to the impoverishment of others, as global customs duties call for weakening international trade in general, as reducing imports leads to a decrease in exports. Countries will not be able to export surplus production on a continuous basis unless they import surplus production from the outside world (احمد حشيش 2000، 228)

4.Thethird axis: Procedures and conditions of foreign trade liberalization policy and its obstacles

Before any country embarks on liberalizing its foreign trade, it must provide several conditions and procedures that guarantee the success of this policy

4.1. Procedures for implementing commercial liberalization (غرزي 2018، 132)

- ✓ Establishing advisory institutions to support exports and work to solve the problems they face through a well-defined strategy for the development of exports in addition to removing all regulatory, administrative and legal obstacles, so that these institutions accompany the goods exported from the producing enterprises to their final markets;
- ✓ Gradually removing customs benefits as well as supporting national institutions in order to enable them to increase their competitiveness and viability and adapt after full openness to foreign goods;
- ✓ Establishing funds to support and finance exports, encouraging exporting enterprises, as well as stimulating sectors in which they have a comparative advantage that enables them to export, thus allowing the State to specialize and increase the gains from international integration;
- ✓ Expanding infrastructure bases, training and qualifying the labour force because of their role in enhancing the competitiveness of the economy and absorbing technological capabilities and rapid changes in the global economy;

4.2.Conditions for the success of trade liberalization policy: Based on the experiences of successful countries in the policy of foreign trade liberalization, we can derive a number of conditions that must be met in order to ensure the success of trade liberalization, the most important of which are:

- ✓ The soundness of macroeconomic policies and the floating of the labor exchange rate in order to give them real value that reflects reality;
- ✓ changing the pattern of state intervention in foreign trade;
- ✓ There is no conflict between foreign trade liberalization policy and other policies within the country – such as those related to investment and prices;
- ✓ Changing the price regime by phasing out subsidies for consumer goods;
- ✓ Simplifying export and import procedures by reducing the number of documents required from exporters and importers and facilitating transit procedures;
- ✓ Provide a global environment that encourages further trade liberalization, in which countries adhere to liberalization (عبدالمجيد، 2006، 251)
- ✓ Increasing exports before the start of tariff reduction measures in conjunction with the exchange rate devaluation, in order to achieve early gains from the liberalization process by increasing exports, production and employment (عبدالمجيد، 2006، 251)
- ✓ Participation in international exhibitions and contact with foreign dealers for the international marketing of domestic products;

4.3.Disadvantages of foreign trade liberalization policy: Despite the multiplicity of benefits that can be reaped through the foreign trade liberalization policy, with the increasing crises that have ravaged the economies of many countries, several negative effects have been revealed to us that intensify on developing countries, especially the most prominent of them:

- ✓ The narrowing of the market in developing countries because industrial production is still unable to penetrate markets, and the competition imposed by foreign companies will increase the narrowness of domestic markets and thus increase the rates of idle capacity in these markets;
- ✓ Eliminate emerging industries that are unable to cope with strong competition in global markets and thus high levels of unemployment in developing countries;

- ✓ Strengthening the position of monopolists and eliminating small competitors in the market (فاروق غنيم 2004، 4)
  - ✓ Imposing pressure and laws on local enterprises and how they face foreign competition;
  - ✓ Foreign trade liberalization allows banks and financial institutions to establish branches, especially in the developing world, which affects the economic policies of the State (قويدري 2002، 22)
  - ✓ The dominance of the major industrialized countries in the world economy (علي ابراهيم 2003، 12)

5.Fourth axis: An Econometric Study of the Impact of Foreign Trade Liberalization Policy on Economic Growth in Algeria during the Period 19 80-202 1

For the purpose of studying the impact of foreign trade liberalization on economic growth in Algeria, we used annual data during the period 1980-20 21, and in line with recent trends in time series analysis we used the distributed time-gap autoregression model (ARDL).

5.1.Time Series Data Stability Test (Stationary Test): The unit root test aims to examine the properties of time series for all economic and social variables, ensure their stillness, and determine the rank of integration of each variable separately, and to test the stillness of time series for the variables of the model under study, we will use the Dickey and Fuller test (ADF) This extended Dickey and Fuller test (ADF) test is based on the following hypothesis test (Obben, 1998, pp. 109-121) :

: H_0 The unit root is in the series, i.e. the time series is unstable,

: H_1 There is no unit root in the series, i.e. the time series is stable,

This test is performed for the original time series at the level first, and if it does not stabilize at the level, the first and second differences are taken, and so on until it settles, and the null hypothesis that there is a unit root problem is rejected (Gujarati, 2003, p. 19), if the absolute value calculated for the ADF test is greater than the absolute values of the critical value at the significance level of 0.05, and if the p-value is less than 0.05, and the ADF test is referred to as The regression equation is done in three formulas (fixed limit or fixed limit and direction or without fixed limit and direction) (Lafi Al-Naif and Al-Hunaiti, 2018, page 26), as shown in the following table:

Table 01: Stability tests usingADF test at a significant level of 5%

Variable	Prototype	Original Series Level		First–class series of spreads 1st difference	
		ADF	t–Statistic	ADF	t–Statistic
OP	III/None	1.962813	–0.298366	–1.968430	–4.489850
	II/trend and intercept	–3.710482	–1.260743	–3.791172	–4.040816
	I/ intercept	–3.052169	–1.602212	–3.098896	–4.287859
GDP	III/None	–1.960171	–1.331724	–1.961409	–4.427686
	II/trend and intercept	–3.673616	–1.927566	–3.690814	–4.302835
	I/ intercept	–3.029970	–1.329742	–3.040391	–4.321639

Source: Prepared by researchers based on EViews.10

After testing using EViews.10 we found that the time series of the Algeria's GDP openness index are not stable in origin, because the ADF test statistic is insignificant, in this case we enter the differences of degree one, and after processing the original series by the method of first-order differences, it was found that the two series (DPP and DBC)) are stable in the first differences because they have the stable condition that the absolute values of the test statistics be greater than the corresponding critical values in the three models of the extended Dickey-Fuller tests, and this proves that the two series of public expenditure and oil prices are complementary of the first order, which means that they have the same degree of integration, which indicates a long-term relationship.

5.2.Test Bound: In this case there are two hypotheses, the null hypothesis H0, which indicates that there is no long-term relationship going from the interpreted variable to the dependent variable, if the calculated F is less than I1Bound and the hypothesis of the H1alternative indicates the existence of a long-term relationship going from the interpreted variable to the dependent variable if the calculated F is greater than the I1Bound term and we compare F-statistic calculated with I1Bound.

Table 02: Test Bound Estimation Results

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GDP)
Selected Model: ARDL(1, 4)
Case 2: Restricted Constant and No Trend
Date: 04/14/23 Time: 00:13
Sample: 1980 2021
Included observations: 38

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-161.1006	182.6246	-0.882141	0.3845
GDP(-1)*	0.044718	0.026567	1.683203	0.1024
OP(-1)	0.947431	2.126712	0.445491	0.6591
D(OP)	18.83136	4.666219	4.035678	0.0003
D(OP(-1))	12.43482	4.735870	2.625667	0.0133
D(OP(-2))	5.161620	4.535667	1.138007	0.2638
D(OP(-3))	12.08289	4.389041	2.752967	0.0098

* p-value incompatible with t-Bounds distribution.

Levels Equation
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
OP	21.18664	45.37376	-0.466936	0.6438
C	3602.565	2955.299	1.219019	0.2320

EC = GDP - (-21.1866*OP + 3602.5646)

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)

			Asymptotic: n=1000	
F-statistic	6.328470	10%	3.02	3.51
K	1	5%	3.62	4.16
		2.5%	4.18	4.79
		1%	4.94	5.58
			Finite Sample: n=40	
Actual Sample Size	38			
		10%	3.21	3.73
		5%	3.937	4.523
		1%	5.593	6.333
			Finite Sample: n=35	
		10%	3.223	3.757
		5%	3.957	4.53
		1%	5.763	6.48

Source: Prepared by researchers using EViews.10

From the table we can see that: 6. 32 = F-statistic calculated greater than the statistic 4.16 = test Bound at a significant level of 5% In this case, we reject the null hypothesis and accept the alternative hypothesis, which means a long-term relationship that goes from the explained variable (foreign trade liberalization) to the dependent variable (GDP).

5.3.Regression of cointegration according to the ARDL model: We conduct a cointegration test to investigate the existence of a equilibrium relationship in the long run, and the nature of the equilibrium relationship, and this includes that the relationship between them is complementary, as the two variables are considered to be complementary, that is, they go over time in an ascending random manner, and the existence of cointegration requires the existence of at least one integral vector between the variables in theARDL test. The Autoregressive Distributed Lag Model, ARDL emerged as the best alternative because it does not require the estimated variables to have the same rank as the integration as the co-integration is tested using ARDL through the "Bound Test" method developed by Pesaran et Shin in 2001 where autoregressive models are incorporated Autoregressive Model, AR(p) and distributed deceleration models Distributed Lag Model. In this methodology, the time series is a function of slowing down its values and the values of current explanatory variables and slowing them down by one or more intervals (Pesaran, Smith, & Shin, 2001, pp. 289-326). The ARDL method has many advantages from the traditional methods used for cointegration testing (Narayan, 2005, p. 258); it can be applied regardless of whether the variables under study are integrated of order I (0)). Or an integral of the rank one correct (1)I or an integral of different degrees, that is, it can be applied when the rank of integration is unknown or not uniform for all the variables under study, and its use helps to estimate the components of the long- and short-term (relationships) together at the same time in one equation instead of two separate equations as shown in the following table:

Table 03: ARDL Model Estimation Results

Dependent Variable: GDP
Method: ARDL
Date: 04/14/23 Time: 00:25
Sample (adjusted): 1984 2021
Included observations: 38 after adjustments

Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): OP
Fixed regressors: C
Number of models evalulated: 20
Selected Model: ARDL(1, 4)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GDP(-1)	1.044718	0.026567	39.32332	0.0000
OP	18.83136	4.666219	4.035678	0.0003
OP(-1)	-5.449106	6.912649	-0.788280	0.4365
OP(-2)	-7.273199	7.061378	-1.029997	0.3110
OP(-3)	6.921266	6.578285	1.052138	0.3009
OP(-4)	-12.08289	4.389041	-2.752967	0.0098
C	-161.1006	182.6246	-0.882141	0.3845

R-squared	0.982892	Mean dependent var	3515.527
Adjusted R-squared	0.979581	S.D. dependent var	470.8239
S.E. of regression	67.27899	Akaike info criterion	11.42040
Sum squared resid	140320.3	Schwarz criterion	11.72206
Log likelihood	-209.9875	Hannan-Quinn criter.	11.52772
F-statistic	296.8344	Durbin-Watson stat	2.008895
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

Source: Prepared by researchers using EViews.10

The results of the statistical tests of the regression equation shown in the table indicate the high quality of the model estimated by the coefficient of determination that R^2 = 0.9 8) and show that the model explains9-8% of the changes in GDP in Algeria, and the results indicate that the relationship between the dependent variable and the interpreted variable is not false and significant, since:

Prob(F-statistic) at the significance level is well below 1%.

5.4.Using the methodology of the error correction factor (error limit factor): In practice, we are not interested in the results of the estimate in the previous table, what interests us is the folds of this estimate, which is the error correction factor using ARDL Cointegrating And Long Run Form and the results are shown in the following table:

Table 04: Results of Estimating the Error Correction Coefficient Methodology

ARDL Error Correction Regression
Dependent Variable: D(GDP)
Selected Model: ARDL(1, 4)
Case 2: Restricted Constant and No Trend
Date: 04/14/23 Time: 00:28
Sample: 1980 2021
Included observations: 38

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(OP)	18.83136	4.375104	4.304207	0.0002

D(OP(-1))	12.43482	4.260330	2.918746	0.0065
D(OP(-2))	5.161620	4.322171	1.194219	0.2415
D(OP(-3))	12.08289	4.071143	2.967935	0.0057
CointEq(-1)*	-0.04471	0.009947	4.495584	0.0001

R-squared	0.550035	Mean dependent var	14.76193
Adjusted R-squared	0.495493	S.D. dependent var	91.80574
S.E. of regression	65.20837	Akaike info criterion	11.31513
Sum squared resid	140320.3	Schwarz criterion	11.53060
Log likelihood	-209.9875	Hannan-Quinn criter.	11.39180
Durbin-Watson stat	2.008895		

* p-value incompatible with t-Bounds distribution.

F-Bounds Test Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	6.328470	10%	3.02	3.51
K	1	5%	3.62	4.16
		2.5%	4.18	4.79
		1%	4.94	5.58

Source: Prepared by researchers using EViews.10

In this test, two conditions must be met, namely that CointEq (-1) is with a negative and significant sign, where we note from the results of the table that CointEq(-1) The error correction factor is equal to: -0.044 and with a negative and significant sign because prob = 0.0005 is less than 0.05, and from it the two conditions are met, and the long-term cointegration equation represented in the non-dependent GDP and the variable interpreted the trade openness index are as follows:

$$BC = +3602.56 + 21.18*OP \ldots\ldots\ldots\ldots 01$$

As for the index of openness with a positive sign, which means that the higher the index of openness to the outside world, the GDP in Algeria will rise, and this reflects the validity of the hypothesis, as well as that 00 Prob = 00 less than 5% means a parameter or ability of the index of openness has statistical significance, so there is a long-term equilibrium positive relationship between the liberalization of foreign trade and GDP That is, whenever the index of openness with the outside world rises by one unit, the GDP will rise by 0.044 billion dinars, and this explains the validity of the hypothesis, and it is noted that the value of the coefficient of determinationR^2 = 0.9 8 This indicates that the variable explaining trade openness (OP) is explained by 98% for the changes that occur in the dependent variable GDP Load (GDP) and 2% is the amount of error or other variables not included in the model or the inaccuracy of statistical data.

5.5. Autocorrelation test between errors using (LM Test).

Table (05): Results of estimating the autocorrelation test between errors using (LM Test).

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.063151	Prob. F(2,13)	0.9391
Obs*R-squared	0.182819	Prob. Chi-Square(2)	0.9126

Source: Prepared by researchers using EViews.10

Since =0.9391(Prob.F(2,13), which is a high value and greater than 5%, we accept the null hypothesis and reject the alternative hypothesis, i.e. there is no sequential self-correlation between errors, as errors are independent of each other.

5.6.Breusch-Pagan-Godfrey Test heterogeneity of error variances

Table 06: Results of Estimating the Heterogeneity Test for Error Variances

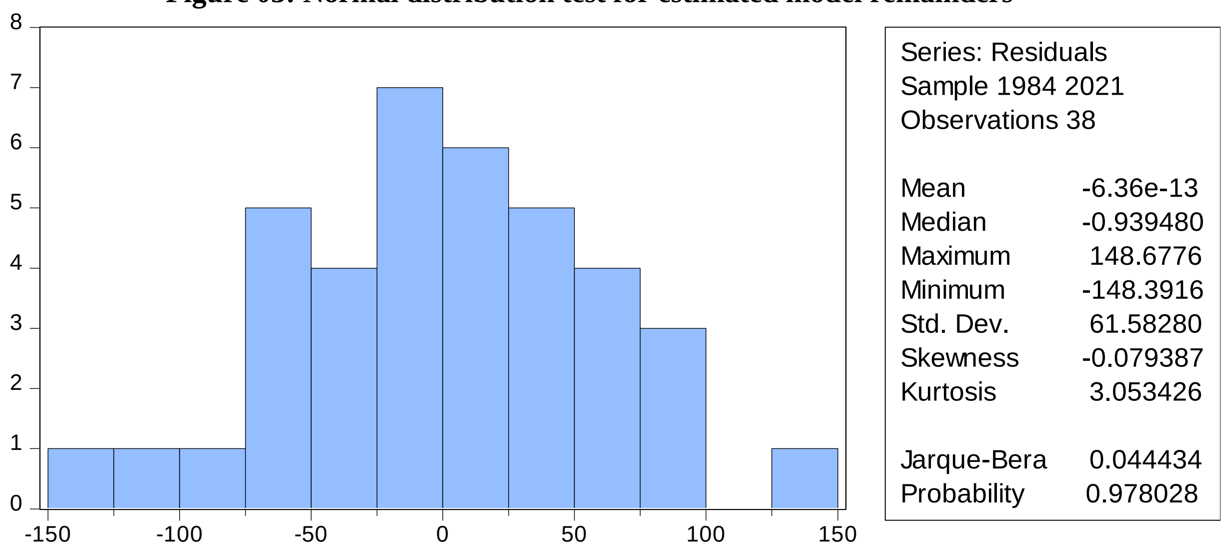
Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.745240	Prob. F(3,15)	0.5417
Obs*R-squared	2.464572	Prob. Chi-Square(3)	0.4817
Scaled explained SS	1.205138	Prob. Chi-Square(3)	0.7518

Source: Prepared by researchers using EViews.10

From the table above, it is clear that the probability of testing for heterogeneity of error variances Prob.F (3,15) is equal to 0.7937 and is agreater than5%, and therefore we reject the alternative hypothesis H_1 and accept the null hypothesis $_0H$, which means that the estimated model is free from the heterogeneity problem, i.e. the remainder has homogeneous variance and the differences between their variances are not significant.

5.7.Normal distribution test of Jarque-Bera model remainders:

Figure 03: Normal distribution test for estimated model remainders



Source: Prepared by the researcher using EViews.10

We can see from the normal distribution test diagram of the Jarque-Bera model that the p-value of the Jarque-Bera statistic (Prob = 0.678671) is greater than 05% if: the residual follows the normal distribution.

Since the remainder of the estimated model is identical (with the same variance and independent of each other) and follows the normal distribution, we can rely on this modelto explain the impact of foreign trade liberalization on Algeria's GDP, which means that the estimated model is valid for interpretation after passing both the statistical tests of its parameters, the tests (first-degree tests) and the standard tests for the remainders (second-order tests).

6. conclusion:

There is no doubt that the policy of liberalization of foreign trade is among the most policies that most countries have resorted to in recent times and is one of the most important pillars on which countries rely in order to achieve economic growth, which is the liberalization of trade from the restrictions imposed on them to facilitate their movement, and we have tried through this research paper to build a standard model, in which we used the autoregressive model of distributed time gaps ARDL, in order to study the impact of foreign trade liberalization on GDP in Algeria during the period 1980-2021, and at the conclusion of this study, the hypotheses were tested and we concluded the following results:

- ✓ The foreign trade sector represents the backbone of the economy as an indicator of the competitiveness and productivity of a country in the international market and has a significant impact on economic activity
- ✓ Foreign trade has a significant impact on the economic aspects of countries through its contribution to achieving economic growth through the optimal utilization of available resources and expanding the size of markets to exchange countries' products, as it has a major role in the transfer of ideas, modern technology and advanced production methods
- ✓ In the long run, the liberalization of foreign trade affects the GDP in Algeria, that is, the higher the index of trade openness with the outside world, the value of oil exports increases, which leads to an increase in GDP, while its impact in the short term on the GDP in Algeria was direct and moral, which explains that the liberalization of foreign trade is affected , which confirms the validity of the first hypothesis;

✓ The results of the standard study concluded that there is a long-term equilibrium relationship between the trade openness index and GDP in Algeria, which means that foreign trade liberalization has a long-term impact on GDP in Algeria, which confirms the validity of the second hypothesis.

The results of this study seem more realistic, especially as they fit with economic theory, as GDP in most countries is affected by the liberalization of foreign trade and when opening up to the outside world.

7.Propositions:

From the findings we propose some of the following recommendations:

- ✓ Keeping pace with the positive integration into the global economy by engaging in international and regional trade agreements and directing foreign trade towards the African continent.
- ✓ Continue to strive for the liberalization of foreign trade by taking the necessary measures to liberalize and activate foreign trade in a way that serves the national economy and maintains its position in the global economy.
- ✓ Stimulate and encourage small and medium-sized enterprises in the field of international trade by providing medium opportunities to carry out export operations and global competition.
- ✓ The need to invest in alternative energies because there is a possibility of their success in Algeria and export abroad.

8.Bibliography

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