

Impact of Bilateral Trade between Algeria and Tunisia on Algeria's Economic Growth (2002-2021)

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Abstract:

The aim of this study is to measure the impact of intra-trade between Algeria and Tunisia through the preferential agreement on economic growth in Algeria during the period (2002-2021) using the Autoregressive Distributed Lag (ARDL) methodology to estimate the relationship between the independent variables (intra-trade, inflation, government spending, and political stability) and the dependent variable (Gross Domestic Product). The study found that there is no long-term equilibrium relationship between Gross Domestic Product and intra-trade, but there is a positive effect on economic growth in the short term, meaning that intra-trade does not contribute to supporting Algeria's economic growth during the study period. Therefore, Algeria should make more effort to achieve support for intra-trade between it and Tunisia

Keywords : Intra-trade ,Gross Domestic Product ,Economic growth , Inflation rate , Government spending , Political stability, ARDL model.

Jel Classification: F14, F32 , F43 , E31, H50.

1. Introduction:

Economic cooperation between Algeria and Tunisia is not a new matter, as this cooperation began a long time ago based on the historical relations between the two countries. In 2008, a preferential trade agreement was officially signed between the two countries, under which a free trade area was established, but this agreement was not ratified until 2010. According to this agreement, several products are exempted from customs duties upon entering Algerian or Tunisian territory. This agreement came into effect in March 2014. This agreement also includes more important trade privileges for the two countries than the privileges of the free trade agreement signed within the framework of the Greater Arab Free Trade Area. Based on the assessment made by the Tunisian-Algerian Joint Committee for Trade Partnership, it is expected that this bilateral agreement will develop into a free trade agreement, which will contribute to strengthening economic integration between the two countries. Intra-trade between Algeria and Tunisia is considered a major driver of economic growth and development in both countries. It is a major source of income and contributes significantly to achieving economic growth rates and improving the standard of living. In this context, this study discusses the role of inter-trade between Algeria and Tunisia in supporting economic growth in Algeria, and thus attempts to answer the following problem:

To what extent does inter-trade between Algeria and Tunisia contribute to supporting economic growth in Algeria?

1.2 Study objectives: This study seeks to achieve the following objectives:

- Identify the Algerian-Tunisian preferential agreement and its most important legal texts.
- Analyze the reality of inter-trade between Algeria and Tunisia during the study period.
- Evaluate the impact of inter-trade on economic growth in Algeria during the period under study.

1.3 Study methodology: To answer the study problem and to test the validity of the proposed hypotheses, we will use the descriptive analytical approach in the theoretical aspect in order to cover the research topic and collect, analyze and

interpret some data and information related to it and the standard approach to study the impact of inter-trade on economic growth in Algeria using the ARDL model.

2. The reality of inter-trade between Algeria and Tunisia:

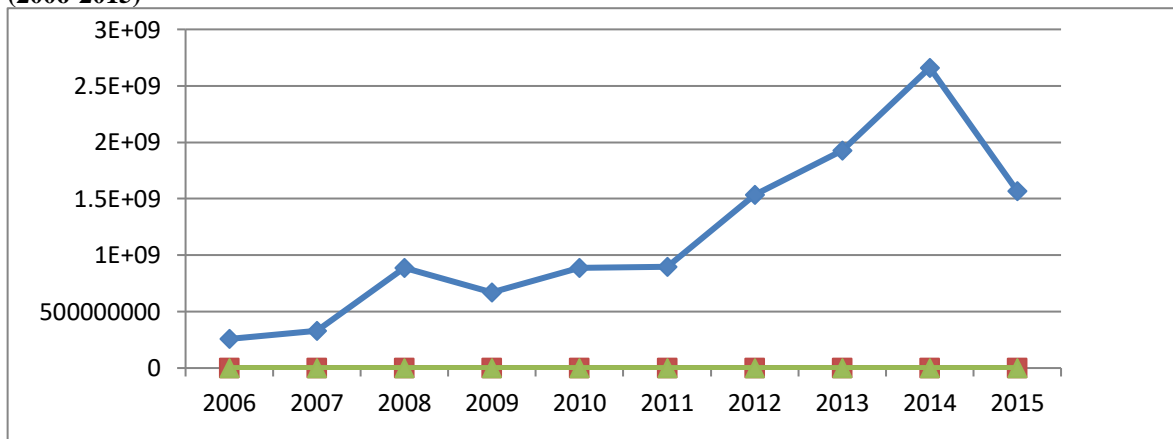
In this part of the study, we will try to analyze the volume of trade exchange between the two contracting parties, and to know the role of the preferential agreement in increasing the volume of Algerian exports to Tunisia, we will study the total value of Algeria's exports to Tunisia for all types of materials combined without detail, and the following table and figure show the value of exports throughout the study period, i.e. (2006-2015)

Table No. (01):The following table shows the total value of Algerian exports to the Tunisian Republic during the study period (2006-2015)

years	Total value of Algerian exports in Tunisian dinars
2006	257875031
2007	331099835
2008	887479011
2009	672446949
2010	885593476
2011	896081570
2012	1534146840
2013	1924996837
2014	2660368327
2015	1566973103

Prepared by the researchers: Based on data from Tunisia’s statistics 2016

Figure No. (01): Shows the total value of Algerian exports to the Republic of Tunisia during the study period (2006-2015)



Prepared by the researchers: Based on data from Tunisia’s statistics 2016

From the previous figure, it is clear that Algerian exports are increasing from 2006 to 2008, then they decrease slightly in 2009, and then they continue to increase until they reach about 2660368327 Tunisian dinars in 2014, then they decline in 2015 to reach about 1566973103 Tunisian dinars.

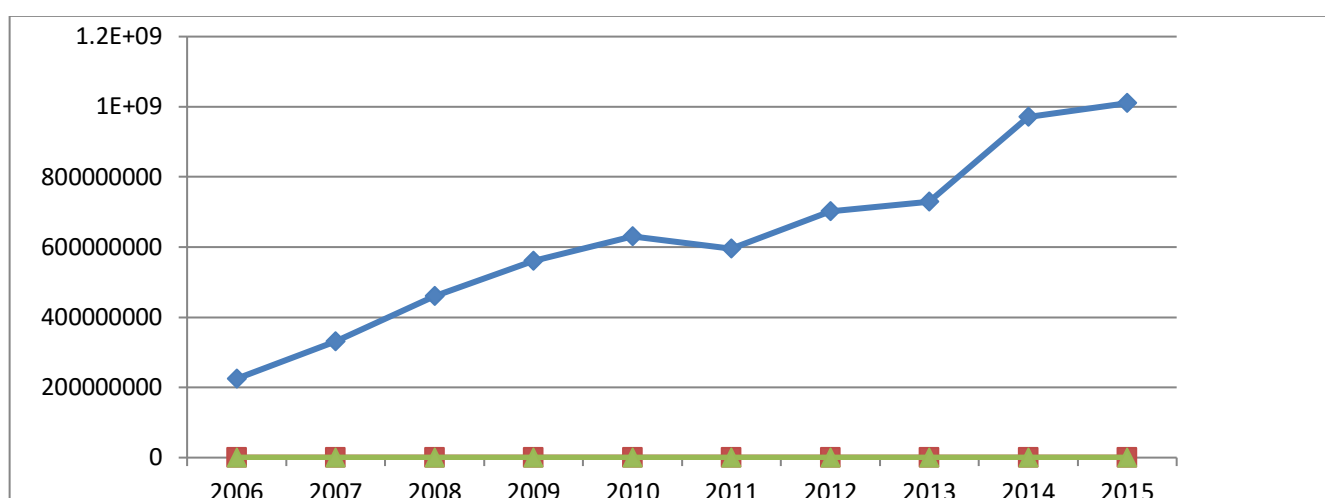
It is also clear from the previous graph that the preferential agreement has a major role in increasing the volume of Algerian exports, given that this agreement entered into force on March 1, 2014, where Algeria achieved a trade surplus in the first year of the preferential trade agreement between it and Tunisia, due to oil exports, which were estimated at \$2.1 billion. The first evaluation of the preferential trade agreement between Algeria and Tunisia showed a trade surplus in favor of the Algerian side, but it showed a significant deficit in terms of exchanges outside of hydrocarbons, according to what was learned from the National Agency for the Promotion of Foreign Trade. The value of trade exchanges between Algeria and Tunisia was estimated at about \$2.1 billion in 2014 (National Agency for the Promotion of Foreign Trade, n.d.). Second: Studying the volume of Tunisian exports to Algeria

Where the volume of Tunisian exports directed to Algeria will be presented for a group of exported goods, so that we summarize them in the following table and figure:

Table No. (02): Shows the total value of Algerian exports to the Tunisian Republic during the study period (2006-2015) Unit in Tunisian dinars

2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	years
1010186174	970699922	728862235	701982890	595528933	631039907	560217653	460897296	330501798	224828309	Total exports

Source: (Tunisia Statistics, 2016)



The previous figure shows the development of the volume of Tunisian exports to Algeria, where a growing increase in Tunisian exports is observed from 2006 to 2015. The previous graph also clearly shows the major role played by the preferential agreement in increasing the volume of Tunisian exports, and it also proves that the volume of trade exchange between Algeria and Tunisia is increasing, especially after the preferential agreement entered into force on March 1, 2014.

3. Standard modeling of the impact of inter-trade on economic growth in Algeria:

This section will explain the impact of inter-trade, government spending, inflation, and political stability on economic growth in Algeria.

Section One: Building the study model and testing the stability of variables

Several independent variables will be selected, including inter-trade between Algeria and Tunisia, which can have a significant impact on economic growth in Algeria. To achieve this goal, we follow the model (Nurjannah & al, 2023)

The equation that was relied upon can be stated in the following formula: $GROWTH = f(INTRA, GC, INF, STAB)$

And the linear form is as follows: $GROWTH = \alpha + \beta_1 INTRA + \beta_2 GC + \beta_3 INF + \beta_4 STAB + \epsilon_t$

Where: GROWTH: GDP growth; INTRA: inter-trade between Algeria and Tunisia; GC: general government final consumption expenditures; INF: inflation; STAB: political stability and absence of violence/terrorism; $\alpha, \beta_1, \beta_2, \beta_3, \beta_4$, model parameters; ϵ_t random error.

Study of the stability of time series:

The ARDL model will be relied upon in this study, and before estimating the model, some necessary tests must be conducted to ensure the validity of using the time series, by testing the stability of the time series of the study variables using the augmented Dickey-Fuller test (Dickey & Augmented-Dickey Fuller, 1979)

The following table shows the results of the unit root test for the study variables:

Variable	ADF						result
	level			first			
	Without a constant	With a constant and general trend	With a constant and general trend	Without a constant	Without a constant and general direction	Without a constant and general direction	
GROWTH	- 3.029585	- 4.656092	- 2.892270	---	---	---	(0)I
INTRA	-4.194341	-1.301202	-0.065620	-2.321295	-7.065915	-2.798128	(1)I
GC	-1.170853	-1.508078	0.030317	-2.886395	-2.716784	-2.981124	(1)I
INF	-3.839493	-4.305864	-2.630412	---	---	---)0(I
STAB	-2.150016	-2.537986	-1.379625	-4.416906	-4.426658	-4.210353	(1)I

Source: Prepared by the researchers based on the outputs of the Eviews 12 program.

The table shows the application of the advanced Dickey-Fuller test for time series, and the results indicate that the dependent variable (economic growth in Algeria) is stable at the level, while the independent variable series are stable at the first difference, except for the inflation rate, the results showed that it is stable at the level, which means that the ARDL model can be applied to study the relationship between inter-trade and economic growth in Algeria.

2.1 Testing the model, determining lag periods, and testing joint integration using the ARDL methodology:

The method of testing the limits approach will be used.

First - Testing the autoregressive model with lag time gaps ARDL:

The following table shows the test of the ARDL model for Algeria

Dependent Variable: GROWTH

Method: ARDL

Date: 01/09/24 Time: 10: 49

Sample (adjusted): 2004 2021

Included observations: 18 after adjustments

Maximum dependent lags: 2 (Automatic selection)

Model selection method: Akaike info criterion (AIC)

Dynamic regressors (2 lags, automatic): INTRA GC INF STAB

Fixed regressors: C

Number of models evaluated: 162

Selected Model: ARDL(2, 2, 2, 2)

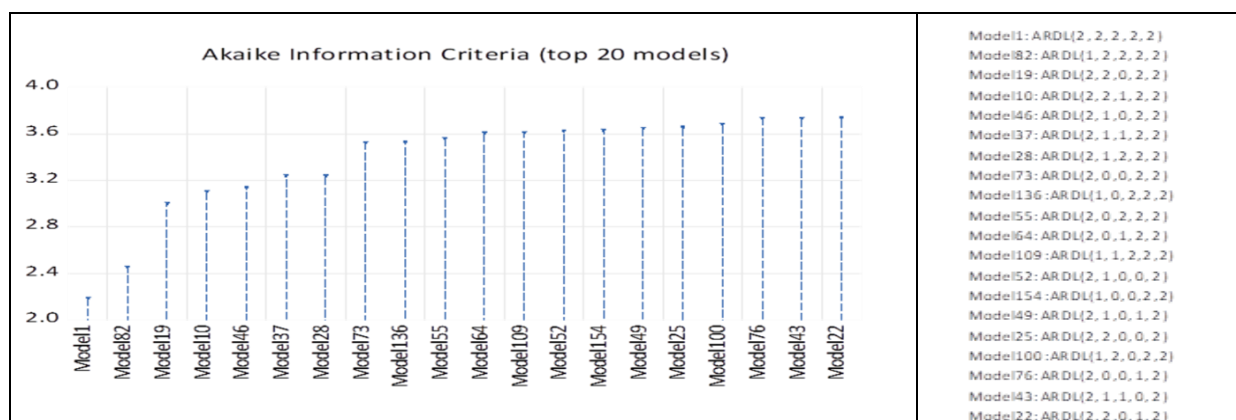
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GROWTH(-1)	-0.495873	0.208237	-2.381297	0.0975
GROWTH(-2)	0.529205	0.450525	1.174641	0.3249
INTRA	8.480820	2.712715	3.126322	0.0522
INTRA(-1)	2.014155	2.417937	0.833005	0.4660
INTRA(-2)	-8.411681	3.273242	-2.569831	0.0825
GC	-0.435777	0.282415	-1.543041	0.2205
GC(-1)	0.700329	0.370391	1.890782	0.1550
GC(-2)	-0.654090	0.282074	-2.318859	0.1032
INF	-0.089943	0.074040	-1.214785	0.3113
INF(-1)	-0.162004	0.050075	-3.235246	0.0480
INF(-2)	-0.240908	0.060672	-3.970673	0.0286
STAB	11.53343	2.552232	4.518960	0.0203
STAB(-1)	9.289697	2.298316	4.041959	0.0273
STAB(-2)	15.01578	3.272341	4.588698	0.0194
C	-11.99340	3.686208	-3.253587	0.0474
R-squared	0.979612	Mean dependent var		0.663264
Adjusted R-squared	0.884468	S.D. dependent var		2.263167
S.E. of regression	0.769249	Akaike info criterion		2.188103
Sum squared resid	1.775232	Schwarz criterion		2.930080
Log likelihood	-4.692928	Hannan-Quinn criter.		2.290412
F-statistic	10.29613	Durbin-Watson stat		2.333676
Prob(F-statistic)	0.039665			

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

Source: Prepared by the researcher based on the outputs of the Eviews 12 program.

The table shows us that the ARDL model automatically determines the degrees of time lag for the variables, as the degree of time lag for the dependent variable (GROWTH) was 2 degrees of time lag, while the explanatory variables (INTRA, GC, INF, STAB) also have 2 degrees of time lag. The results of the (Adjusted R-squared) showed that the explanatory variables explained (88%) of the changes that occurred in the dependent variable (GROWTH), and that (12%) are due to external factors. As for the (F-statistic) test at a probability level of Prob(0.039665). Less than (0.05), it indicates the overall significance of the model from a statistical point of view, and the D-W statistics indicate that it reached its peak of (2.333676), which explains that the model is free from the problem of autocorrelation.

Second: Determining the optimal slowdown periods: The following figure shows the optimal slowdown results according to Akaike’s criterion for the model for Algeria:



Source: Prepared by the researcher based on the outputs of the Eviews 12 program.

It is clear from the previous figure that the optimal deceleration periods are 2, so the optimal model is:

The following table shows the degrees of time deceleration for the model:

Model Selection Criteria Table

Dependent Variable: GROWTH

Date: 01/08/24 Time: 08: 50

Sample: 2002 2021

Included observations: 18

Model	LogL	AIC*	BIC	HQ	Adj. R-sq	Specification
1	-4.692928	2.188103	2.930080	2.290412	0.884468	ARDL(2, 2, 2, 2, 2)

The results of the boundary test indicate that the calculated Fisher statistic F-statistic = 12.25890 is greater than the critical values of the maximum at the significance level of 10%, 5%, 2.5% and 1%, which makes us reject the null hypothesis and accept the alternative hypothesis that there is a joint integration relationship between the study variables "there is an equilibrium relationship in the long run."

2.2 Estimating the relationships between the variables in the long and short run

Based on the previous results, from the stability of the time series at the level and first degree, and the existence of a long-term relationship between the study variables, we can continue to estimate the model, by obtaining the estimates of the long-term parameters, and the following table shows these results:

Levels Equation					
Case 2: Restricted Constant and No Trend					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
INTRA	2.155129	4.496332	0.479308	0.6645	
GC	-0.402971	0.188809	-2.134276	0.1225	
INF	-0.509850	0.157411	-3.238983	0.0479	
STAB	17.85466	6.177708	2.890175	0.0630	
C	-12.40695	7.956886	-1.559272	0.2168	
EC = GROWTH - (2.1551*INTRA -0.4030*GC -0.5099*INF +17.8547*STAB - 12.4070)					

Source: Prepared by the researcher based on the outputs of the Eviews 12 program. The following table also shows the results of the short-term estimation of the ARDL model:

ARDL Error Correction Regression

Dependent Variable: D(GROWTH)

Selected Model: ARDL(2, 2, 2, 2, 2)

Case 2: Restricted Constant and No Trend

Date: 01/08/24 Time: 08: 53

Sample: 2002 2021

Included observations: 18

ECM Regression

Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GROWTH(-1))	-0.529205	0.078765	-6.718773	0.0067
D(INTRA)	8.480820	0.921635	9.201925	0.0027
D(INTRA(-1))	8.411681	0.821433	10.24026	0.0020
D(GC)	-0.435777	0.091100	-4.783497	0.0174
D(GC(-1))	0.654090	0.091753	7.128794	0.0057
D(INF)	-0.089943	0.016340	-5.504369	0.0118

D(INF(-1))	0.240908	0.019160	12.57371	0.0011
D(STAB)	11.53343	0.840146	13.72789	0.0008
D(STAB(-1))	15.01578	1.376802	10.90628	0.0016
CointEq(-1)*	-0.966668	0.069023	-14.00508	0.0008
R-squared	0.987935	Mean dependent var		-0.225443
Adjusted R-squared	0.974361	S.D. dependent var		2.941940
S.E. of regression	0.471067	Akaike info criterion		1.632548
Sum squared resid	1.775232	Schwarz criterion		2.127199
Log likelihood	-4.692928	Hannan-Quinn criter.		1.700753
Durbin-Watson stat	2.333676			

* p-value incompatible with t-Bounds distribution.

Source: Prepared by the researcher based on the outputs of the Eviews 12 program

2.3 Model stability tests

We will detect the stability of the model by conducting a test to detect the presence of an autocorrelation problem between the estimation residuals, and testing the absence of any structural changes in one of the time series.

First - Detecting the presence of an autocorrelation problem between the estimation residuals:

The following table shows the results of the test for the presence of autocorrelation between the residuals (LM)

Breusch-Godfrey Serial Correlation LM Test:

Null hypothesis: No serial correlation at up to 2 lags

F-statistic	23.17032	Prob. F(2*1)	0.1453
Obs*R-squared	17.61978	Prob. Chi-Square(2)	0.0001

Source: Prepared by the researchers based on the outputs of Eviews 12 program.

The results of the (LM Test) indicate that the P-Value of the Fisher statistic is equal to 0.1453, which is greater than 0.05, meaning that the null hypothesis (no autocorrelation between the residuals) can be accepted, and thus the alternative hypothesis (the presence of autocorrelation) can be rejected. Accordingly, the model chosen to study the long-term and short-term relationship is considered acceptable from this aspect.

As for the second test, which is related to testing the problem of non-constancy of variance, the results of the model were shown in the following table:

Heteroskedasticity Test: Breusch-Pagan-Godfrey

Null hypothesis: Homoskedasticity

F-statistic	0.806789	Prob. F(14*3)	0.6673
Obs*R-squared	14.22247	Prob. Chi-Square(14)	0.4333
Scaled explained SS	0.210303	Prob. Chi-Square(14)	1.0000

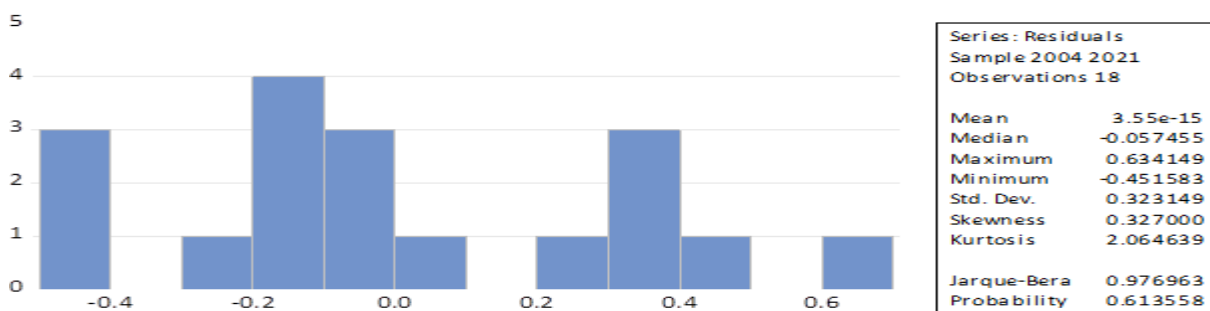
Source: Prepared by the researcher based on the outputs of the Eviews 12 program.

The results of the table show that the P-Value of the Fisher statistic is equal to 0.6673, which is greater than 0.05, which means accepting the null hypothesis that states: the variance is not constant, and we reject the alternative hypothesis.

Second - Testing the normal distribution of the residuals:

As indicated here, the condition of the normal distribution of the residuals resulting from the model estimation, using the Jarque-Bera test, it was found that the result of the probability value is greater than 0.05, and the value of JB = 0.976963, which was less than $\chi^2_{0.05}(2) = 5.99$, proves that the series of residuals of the model follows the normal distribution, and the figure below illustrates this.

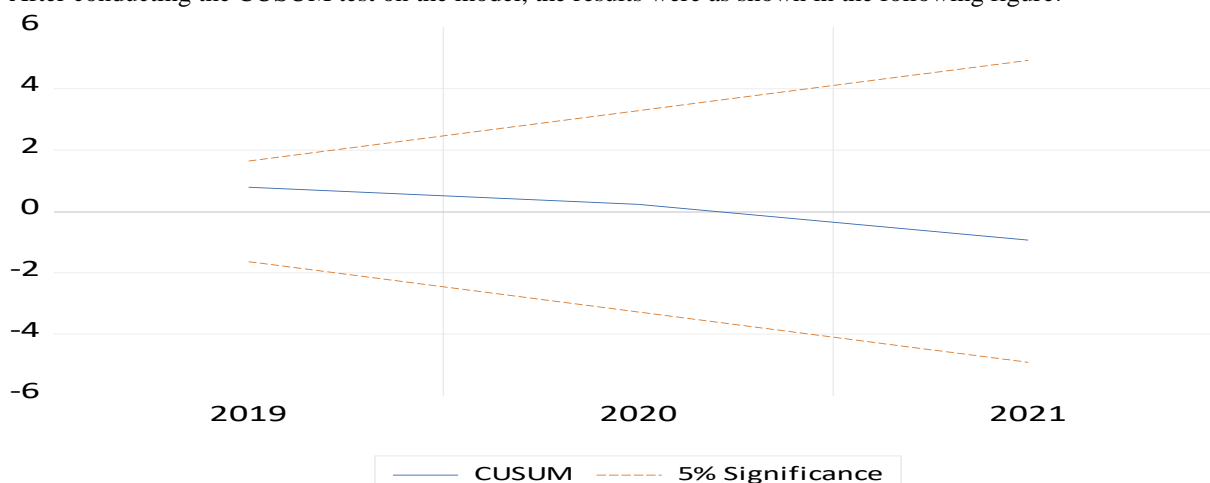
A figure showing the test of the normal distribution of the series of residuals of the model



Source: Prepared by the researcher based on the outputs of the Eviews 12 program.

Third - Model stability test:

After conducting the CUSUM test on the model, the results were as shown in the following figure:



Source: Prepared by the researcher based on the outputs of the Eviews 12 program.

From the graph, we notice the test of the cumulative sum of recurring residuals (CUSUM) for this model, as it crosses a linear mean within the boundaries of the critical region, indicating a type of stability in the model at a significance level of 5%; the same thing applies to the test of the cumulative sum of recurring residuals (CUSUM of Squares); and it is clear from these two tests that there is stability and consistency in the model between the long-term results and the short-term results, which means that it is possible to continue analyzing the model.

3. Analysis and study of the results

the results of the statistical and economic analysis extracted from them can be presented as follows:

There is no significant relationship in the long term between inter-trade and economic growth in Algeria, due to the severe fluctuation resulting from the Algerian economy's connection to the hydrocarbons sector. Exports from this sector have witnessed high rates, reaching about 96% of total Algerian exports (Bouskhan and Hakimi, 2021), which are mainly directed to the European Union countries. This strong connection to the hydrocarbons sector makes economic growth in Algeria vulnerable to fluctuations and challenges resulting from fluctuations in oil and gas prices, in addition to the presence of structural restrictions and other obstacles, such as the clear lack of infrastructure and weak competitiveness, which prevents achieving maximum benefit from inter-trade in the long term.

There is a direct significant relationship in the short term between inter-trade and economic growth in Algeria, as increasing inter-trade between Algeria and Tunisia by 1% will lead to an increase in economic growth in Algeria by 8.480820% in the short term, which is consistent with economic theory, which indicates a positive relationship between inter-trade and economic growth in the short term, and this positive effect results in increasing external demand for Algerian products, which enhances economic growth. - There is no significant relationship in the long term between public consumer spending in Algeria and its economic growth, which is consistent with the results of some previous

applied studies and with the expectations of economic theory, which considers this type of spending to be unproductive, and the reason for this may be due to the high volume of public consumer spending and the imbalance in its structure, as the largest proportion of it is directed towards wages, compensation and transfers, which are unproductive expenses, in addition to the external influences that affect the Algerian economy as a rentier economy that depends to a large extent on hydrocarbons (Ayati and Ben Azza, 2018). - While in the short term there was a joint integration relationship between the two variables, which is consistent with the Keynesian theory, as there was a negative elasticity of government spending, meaning that the latter has an inverse effect, as an increase in this variable by 1% will lead to a decrease in economic growth by 0.435777%, which is consistent with the neoclassical theory, and according to this theory, increasing government spending leads to a negative effect on economic growth, and this theory also indicates that increasing public spending can lead to a deficit in the general budget, which means that the government will need to increase borrowing to finance excess spending, and thus there will be pressure on the credit market and higher interest rates, which reduces investment in the private sector. In general, excessive government spending and its financing through high levels of borrowing are considered harmful to economic growth, as it crowds out private investment and leads to a reduction in investment in this sector, and thus increasing public spending leads to the replacement of public goods with private goods, which leads to a decrease in private spending on education, health, transportation and other goods and services. (Suleiman & Aamer, 2006)

There is an inverse moral relationship in the long and short term between the inflation rate in Algeria and its economic growth, as a 1% increase in the inflation rate will lead to a decrease in economic growth by 0.509850% in the long term and 0.089943% in the short term, which is consistent with the study of (Khan and Sanhaji, 2001). This means that the impact of the high inflation rate on economic performance lies in increasing the general price levels, which leads to a decline in the purchasing power of the currency and the loss of its function as a store of value. As a result, there is a decline in local demand, which in turn leads to a contraction in local production and the loss of business owners due to the accumulation of goods and the rise in production costs. In addition, the high inflation rate can cause a decline in the ability of locally produced goods and services to compete in foreign markets, which causes a decline in the country's exports. All of these factors work together to restrict economic activity and narrow the scope of economic growth. (Shaloufi and Azawi, 2017)

There is a significant positive relationship in the long and short term between political stability in Algeria and its economic growth, as political stability will lead to an increase in economic growth by 17.85466% in the long term and 11.53343% in the short term, as political stability can play an important role in determining economic growth and sources of capital accumulation (Younis, Lin, & Sharahili, 2008), and it also positively affects the economy through multiple mechanisms. For example, political stability can lead to increased confidence in investment as investors feel safe and stable in a stable political environment, and political stability can also contribute to improving the business environment and reducing economic risks, which enhances private sector growth, stimulates innovation and strengthens the economy in general (Si Djilali and Mokhtari, 2020). As for the error correction limit parameter $\text{CoinEp}(-1)$, it appeared negative at a significance level of 1% with a value of 0.966668, which confirms the accuracy and validity of the equilibrium relationship in the long term.

4. Conclusion:

Strengthening the Algerian-Tunisian economic position in the regional and international economic environment requires steps to improve the legal framework for Tunisian-Algerian cooperation, because this serves the path of intertwining interests, and is a protective shield against the challenges posed, whether at the regional or international level, which will have a positive reality for businessmen and financial and service institutions in the two countries, and will also give impetus to bilateral trade exchanges and contribute to creating a new dynamic between economic operators to develop relations of cooperation and partnership, at a stage in which economic and human relations between Tunisia and Algeria are witnessing a remarkable development. This study aims to highlight the impact of inter-trade between Algeria and Tunisia on economic growth in Algeria, by studying and analyzing the impact of independent variables (inter-trade, inflation, general government final consumption expenditures, political stability, and the absence of violence and terrorism) on the dependent variable, which is economic growth, represented by the growth of the gross domestic product. This study also showed that there is a statistically insignificant relationship between inter-trade and economic growth in the long term, due to the fact that the rate of inter-trade exchange is very low, which is a figure much lower than the figures recorded in other regional blocs, and that the economies of the two countries are reciprocal with the

outside world, as the largest part of Algeria's foreign trade is with the European Union, in addition to the weak diversity of the economies of the two countries.

- Based on the previous results, the study recommends the following:
- •Strengthening the legal and institutional structure necessary for the success of the trade exchange path between the two countries.
- •Accelerating the launch of a "free trade zone" between Algeria and Tunisia, and establishing a monetary unit to facilitate trade exchanges.
- •Establishing joint investments, whether in the economic or agricultural fields, between Algeria and Tunisia.
- Officials of the two countries should strengthen and develop bilateral agreements in the field of inter-trade, especially within the framework of the preferential agreement

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