

Algeria's Foreign Trade and Economic Growth –Econometric Study-

التجارة الخارجية والنمو الاقتصادي في الجزائر.

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Temouchent (Algeria) feyza.simohammed@univ-temouchent.edu.dz**Received:** 08/02/2025**Accepted:** 27/03/2025**Published:** 31/03/2025**Abstract:**

Through this paper we examined and analysed the impact of foreign trade on Algeria's economic growth. Foreign trade is the cornerstone of the economy and plays an active role in economic activity, as well as an indicator of the measurement of the productive and competitive capacity of countries in the international market because it is linked to the available productive potential, reflecting an appropriate trade policy with economic policy is essential for success. Economic development by focusing on appropriate and effective mechanisms and tools through which the desired goals can be achieved (VECM) to determine the role that foreign trade plays in economic growth for the period 2022-1992. The results of the standard study showed a long-term relationship between study variables such as FDI and real exchange rate, which in turn is important in foreign exchanges (IRF) and (VD) derived from VECM models that shocks in GDP are explained more by fluctuations in the real exchange rate than by shocks to Algeria's foreign trade and investment ratio. The Granger causation test conducted showed that D (REER) has a one-way causal relationship with GDP, which is causal to foreign trade

Keywords: Economic Growth, Foreign Trade, VECM, GCT.**JEL Classification Codes:** C5, F1, O4.**ملخص:**

سنحاول من خلال هذه الورقة البحثية تحليل تأثير التجارة الخارجية على النمو الاقتصادي الجزائري، فالتجارة الخارجية تعتبر حجر الزاوية في الاقتصاد فهي تؤدي دورا نشطا في النشاط الاقتصادي، فضلا عن كونها مؤشرا على قياس القدرة الإنتاجية والتنافسية للبلدان في السوق الدولية لأنها مرتبطة بالإمكانيات الإنتاجية المتاحة مما يعكس أن وجود سياسة تجارية ملائمة أمر أساسي للنجاح الاقتصادي، من خلال نموذج VECM الذي سيتجه الى التركيز على الآليات والأدوات المناسبة والفعالة التي تحقق الأهداف المرجوة لتحديد الدور الذي تؤديه التجارة الخارجية في النمو الاقتصادي للفترة 2022-1992. أظهرت نتائج الدراسة القياسية وجود علاقة طويلة الأجل بين متغيرات الدراسة المتمثلة في الاستثمار الأجنبي المباشر وسعر الصرف الحقيقي كونها مهمة في البورصات الأجنبية (IRF) و (VD) وبسبب التقلبات في سعر صرف الريال تبين وجود تأثير كبير على الناتج المحلي الإجمالي أقل منه في التجارة الخارجية ونسبة الاستثمار في الجزائر، كما أظهر اختبار السببية Granger وجود علاقة سببية أحادية الاتجاه مع الناتج المحلي الإجمالي.

كلمات مفتاحية: النمو الاقتصادي، التجارة الخارجية، VECM، GCT.**تصنيفات JEL:** O4، F1، C5

INTRODUCTION:

Foreign trade refers to the exchange of goods and services between states or regions, assisted via exporting and importing processes. A country would benefit from possessing a varied array of products, encompassing both domestically produced and imported goods. (Dosi, Enrica Virgillito, & Yu, 2023). Certainly, the benefit of trade theory has witnessed a parabola in the previous hundred years. The Worldwide Trade Organisation (WTO) and the International Monetary Fund (IMF) have supported free trade, highlighting the advantages of trading within industries and gaining experience through exporting. But the financial crisis of 2008 put a stop to that.

The rapid development of Algeria's market economy has led to significant import and export trade growth, which has had a notable impact on the local economic situation. Furthermore, the expansion of import and export trade has resulted in substantial financial benefits for trade targets and has made investing internationally through cross-border channels easier. To confirm the effect of international commerce on Algeria's economy, with a youthful population and an oil-exporting economy, Algeria faces the same challenge as other MENA nations: how to diversify their economies to increase employment opportunities. A new Hydrocarbon Law, a new Investment Law, a new Money and Credit Law, and a partial relaxation of foreign ownership of domestic enterprises are all measures made by the government since 2020 to increase investment from abroad and within the country. Changes to the business climate, such as the privatisation of state-owned companies and public banks, as well as reductions in imports and increases in non-hydrocarbon exports, have been emphasised as developmental priorities in the 2021 Government Action Plan, which has also prioritised the shift to a private sector-led growth and employment creation model. an argumentation data analysis using econometric models is required.

Purpose of study

When it comes to making Algeria's economy more efficient and effective in global markets and more competitive, one of the most essential foundations of development is the country's foreign trade.

Algeria aims to overcome the stifling crisis in which the national economy still suffers through liberalising foreign trade. It should be noted that the national economy and the foreign trade sector have undergone much research. Nevertheless, several standard studies have shown the connection between exports and economic growth. This study investigates the influence that international commerce has had on the expansion of the Algerian economy.

This paper aims to assess and quantify the effect of foreign trade in Algeria using data from 1990 to 2023. It seeks to answer whether foreign trade affects GDP development in Algeria.

Methodology of the study:

This study uses quantitative research to examine the impact of international commerce on Algeria's GDP. The Empirical Analysis section Includes Unit root tests, Johansen's cointegration test, the GC test, the IRS, VD, and other tests using the vector error correction (VECM) model, with suggestions on how the results should be used in the final section.

Review Of Literature

(Kircicek & Ozparlak, 2023): The focus of this paper is to analyse the impact of foreign trade on both immediate and distant economic expansion and the export, import and growth impacts of the G-20 countries over the past 25 years. The growth and development of national economies depend on the importance of these variables. An econometric study based on joint integration tests examined the long-term relationship between variables. Furthermore, the Walt test was employed to investigate the partnership in the near term. GC Tests are used to look at how the factors affected each other and how they caused each other. The growth of both exports and imports can help long-term economic growth. Also, in the short term, there is a causality link that goes both ways: exports cause economic growth and imports cause economic growth. So, there are a lot of different things that affect the link between economic growth and trade with other countries. However, you can see how important trade with other countries is for the short- and long-term economies.

(NANGABO HESBON, 2009) : Analyses the link between exports and other factors affecting GDP over a twenty-two-year period to determine the effects of trading abroad on the development of the Kenyan economy. In addition, the impact of imports on GDP growth has been investigated. Investments from the public and private sectors, government spending, and imports and exports involving foreign aid are all examined in terms of GDP using a linear model in the study. The findings revealed that real GDP rises with increasing real exports. Furthermore, there was discovered to be a favourable and statistically substantial correlation between GDP and government expenditure as well as foreign aid; public investments had a negative and statistically significant correlation with GDP, and private investments had a negative and statistically insignificant correlation with GDP. The investigation found Improve Export-Led Growth Strategy credibility. A core idea is that exports stimulate domestic demand and the economy.

(Yeboah, Chibale Chibalamula, Atiso, & Amankwaa-Opoku, 2023) : Using World Bank data from 1990–2020, A study was conducted to assess the effect of export and import commerce on GDP growth. U R tests, J C tests, VECM, and a G C test were all the econometric methods used to ensure the reliability of the findings. The report indicates that imports and exports help Ghana's economy grow, and it suggests that the government should continue to promote local businesses to make many products for the country's internal market and international trade.

(AFONSO, 2001): This paper analyses research since Adam Smith about the effects of commercial and technological aspects of international commerce on productive factors' physical accumulation and quality. This paper notes that the theories of economic growth and international commerce, throughout the 'traditional ages', were two inseparable areas of economics. During this period, it was considered that international trade positively influenced economic growth. Subsequently, these two economic theories were somewhat autonomous during the neoclassical period. As a result, the significance of international trade was overlooked regarding economic progress, particularly until the 1960s. The advent of endogenous growth models has recently resulted in the re-convergence of both theories. The modelling frameworks introduced by the new models, along with recent advancements in

international trade theory, have enhanced our comprehension Of the link between economic development and international trade.

(GUISAN & EXPOSITO, 2008)The purpose of this essay is to examine the Philippines' economic development status from 1990 to 2006, paying special attention to intersectoral relationships and the function of international commerce. An analysis of the growth of real value added in agriculture, manufacturing, industry, and services illustrates that industrialisation and foreign commerce significantly and positively influence economic development, as evidenced by a conventional financial model. The research concluded that the Philippines needs to improve its manufacturing sector to increase real per capita income and eradicate poverty. The results from data analysis and the assessment of econometric models highlight the essential significance of a strong strategy in promoting the growth of diverse supply-side sectors. This results from its direct and indirect advantages, especially considering the constrained domestic savings capability. Consequently, prioritising social conditions—economic elements such as human capital, social capital, infrastructure, and others—is crucial for improving domestic and foreign investment and cooperation.

1- Empirical Results and Conclusion

Four factors are considered to identify and assess the causal link. Gross Domestic Product (GDP) is the dependent and independent variables. We estimate the equation of the following model for foreign trade (F_trade) between 1990 and 2023 in terms of both real effective exchange rate (REER) and FDI, encompassing a sample of 34 years.

$$GDP = C(1)*F_TRADE + C(2)*REER + C(3)*FDI + C(4)$$

GDP Gross Domestic Product

F_TRADE foreign trade

REER Reel effective exchange rate

FDI foreign direct investment

1-1 Unit roots test:

We will first use the (ADF) and (PP) tests to ensure that our variables are stationary. The findings are displayed in Table 1 below.

Table1: unit roots test

variables	Aug Dikk Fl TEST		Phili-Peron TEST	
	level	first st différen	level	first st différen
GDP	0.8079	0.0081	0.8179	0.0082
F_TRADE	0.4780	0.0009	0.4580	0.0010
REER	0.7829	0.0008	0.8829	0.0009
FDI	0.4225	0.0006	0.4525	0.0007
(* signifc at 1 %, ** signifc at 5 %, **** signifc at 10 %)				

Source : EvIEWS 12 is used by the author to compute

According to Table 1, the ADF and PP tests indicated that each variable was integrated on the first difference after being different once. Suggesting that they be integrated at I (1).

1-2 Cointegration Analysis

Table2: Cointeg test

Sample (adjusted): 1992 2022				
Include obs: 30 after adjusts.				
Series: GDP F_TRADE REER FDI				
In the first difference, the lag interval is present:): 1 to 1				
Unrestri Cointeg Rank Test (Trace)				
Hypothesised		Trace	0.05	
No. of CE(s)	Eigen-value	Statistic	Critical Value	Probab.**
None *	0.817551	64.22428	47.85613	0.0007
At most 1	0.420996	21.69213	29.79707	0.3159
At most 2	0.259671	8.030997	15.49471	0.4621
At most 3	0.020369	0.514477	3.841466	0.4732
At 0.05 level, the trace test shows 1 cointeg equation (s).				
*signifies that the hypothesis has been rejected at the 0.05 level				
Unrest Coint Rank Test (Max Eigenvalue)				
Hypothes		Max-Eigen	0.05	
No. of CE(s)	Eigen-value	Statistic	Critic Val	Probab. **
None *	0.817551	42.53214	27.58434	0.0003
At mst 1	0.420996	13.66114	21.13162	0.3935
At mst 2	0.259671	7.516520	14.26460	0.4300
At mst 3	0.020369	0.514477	3.841466	0.4732
The Max-eigen-value test demonstrates that 1 coint equation(s) has a level of 0.05.				
*signifies that the hypoThesis has been rejected at the 0.05 level				

Source : Eviews 12 is used by the author to compute

The trace statistic and maximum eigenvalue statistic show that only one equation cointegrates at the five per cent significance level. Consequently, the variables reflect a long-term equilibrium relationship and possess a co-integrating vector. The error correction model may now be estimated, as all variables are cointegrated and integrated at the initial difference.

1-2 Long-run model

The baseline empirical model to be The VECM being evaluated has three (3) endogenous variables, as we previously mentioned: F_TRADE, REER, and FDI. Table 3 presents the estimated long-run relationships incorporating restrictions, as the weak homogeneity results suggested.

Table 3 : VECM Estimation

V E C Estimts				
Sampl (adjusted): 1992 2022				
Includ observats: 30 afters adjusts				
Stand errors in () & t-statistics in []				
Cointegrating Eq:	CointEq1			
GDP(-1)	1.000000			
FDI(-1)	18716736			

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	(9679132)			
	[1.93372]			
F_TRADE(-1)	1.23E+09			
	(3.2E+08)			
	[3.83321]			
REER(-1)	-3.77E+08			
	(2.5E+08)			
	[-1.53086]			
C	-3.13E+10			
Error Correction:	D(GDP)	D(FDI)	D(F_TRADE)	D(REER)
CointEq1	-0.221574	-4.94E-10	-1.17E-10	2.17E-10
	(0.09624)	(4.0E-09)	(4.9E-11)	(7.0E-11)
	[-2.30238]	[-0.12384]	[-2.41192]	[3.08930]
D(GDP(-1))	-0.404263	4.69E-10	7.00E-11	-8.75E-11
	(0.24165)	(3.5E-09)	(4.2E-11)	(6.1E-11)
	[-1.67292]	[0.13528]	[1.65979]	[-1.43108]
D(FDI(-1))	-176139.9	-0.122591	-0.001344	-0.001126
	(8388863)	(0.12047)	(0.00146)	(0.00212)
	[-0.02100]	[-1.01756]	[-0.91810]	[-0.53007]
D(F_TRADE(-1))	-1.64E+08	19.32266	0.088993	0.166237
	(1.2E+09)	(17.8017)	(0.21632)	(0.31380)
	[-0.13228]	[1.08544]	[0.41139]	[0.52976]
D(REER(-1))	-1.40E+09	-3.163152	0.215989	-0.170664
	(8.1E+08)	(11.5700)	(0.14059)	(0.20395)
	[-1.73678]	[-0.27339]	[1.53626]	[-0.83680]
C	-92257615	-2.663003	0.040032	-0.043177
	(1.5E+08)	(2.15213)	(0.02615)	(0.03794)
	[-0.61564]	[-1.23738]	[1.53077]	[-1.13814]
R.squared	0.262650	0.079992	0.302293	0.341212
Adj.R-squared	0.102357	-0.120010	0.150617	0.197997
Sum sq. resids	1.03E+19	2121.080	0.313202	0.659065
S.E. equation	6.69E+08	9.603171	0.116694	0.169278
F-statistic	1.638557	0.399957	1.993022	2.382516

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Log likelihood	-627.0920	-103.3888	24.50973	13.72210
Akaike AIC	43.66152	7.544055	-1.276533	-0.532559
Schwarz SC	43.94440	7.826944	-0.993644	-0.249670
Mean dependent	-40274622	-1.391475	0.039805	-0.023748
S.D. dependent	7.06E+08	9.074105	0.126618	0.189022

Source : Eviews 12 is used by the author to compute

Table 3's Error Correction Model result aligns with our expectations, displaying a negative and significant coefficient of the VECMt (-1). The error correction term, or the adjustment rate towards the long-term equilibrium state, is 22.15%, according to its value of -0.221574. This suggests that the next period will see a correction of roughly 22.15% of the divergence caused by the equilibrium error in the previous year. It is apparent that the adjustment speed for long runs is medium.

This negative effect continues in the long term. With an R-squared value of 0.2626, we can see that the model provides a fair fit; the explanatory factors account for more than 26.26 per cent of the variance in gross domestic product. Despite removing the impact of insignificant estimators, the adjusted R-squared value of 0.1023 suggests that the model remains weakly effective.

1-2-1 Residual Diagnostics:

Serial Correlation LM Test:

The Autocorrelation and Breusch-Godfrey correlation LM tests are used to test serial correlation, as demonstrated in Table 3. These results show that the probability chi-square value is greater than 0.05 and that the Q-statistics are insignificant at all delays, therefore accepting the null hypothesis (no autocorrelation).

Table 4 : Serial correlation LM test

VEC Residu Serial Correlation LM Tests		
Null Hypothesis: absence of serial correlation at lag order h		
Sample (adjusted): 1990 2023		
Includ observats: 30 after adjustments		
Lags	LM-Stat	Prob
1	15.84303	0.4640
Probs from chi-square with 16 df.		

Source : Eviews 12 is used by the author to compute

Heteroskedasticity Test:

As indicated in Table 4, the heteroskedasticity test is employed to ascertain whether or not error terms are constant. The null hypothesis is affirmed because the variance of error terms is not constant, and the f-statistic is insignificant.

Table 5 : Heteroskedasticity test

Cross terms are not included in VEC Residual Heteroskedasticity Tests (only levels and squares)			
Sample: 1990 2023			

Included observations: 30					
Joint test:					
Chi-squared	diferrence	Probab.			
101.7757	100	0.4318			

Source: Eviews 12 is used by the author to compute

1-2-2 Dydynamic equations :

Finally, we describe the dynamics (or results under equilibrium conditions) to summarise our findings.

Causality test:

The Granger causality test could then be checked and presented in Table 6.

Table 6: Causality test

VEC Granger Causality/Block Exogeneity Wald Tests			
Sample: 1990 2023			
Included observations: 30			
Depend variable: D(GDP)			
Excluded	Chi-squared	dif	Probab.
D(FDI)	0.000441	1	0.9832
D(F_TRADE)	0.017499	1	0.8948
D(REER)	3.016409	1	0.0824
All	3.493044	3	0.3217
Depend variable: D(FDI)			
Excluded	Chi-sq	df	Prob.
D(GDP)	0.018301	1	0.8924
D(F_TRADE)	1.178177	1	0.2777
D(REER)	0.074743	1	0.7846
All	1.242246	3	0.7429
Depend variable: D(F_TRADE)			
Excluded	Chi-sq	df	Prob.
D(GDP)	2.754907	1	0.0970
D(FDI)	0.842906	1	0.3586
D(REER)	2.360089	1	0.1245
All	5.749646	3	0.1244
Depend variable: D(REER)			
Excluded	Chi-sq	df	Prob.
D(GDP)	2.048003	1	0.1524
D(FDI)	0.280977	1	0.5961
D(F_TRADE)	0.280646	1	0.5963
All	2.213936	3	0.5292

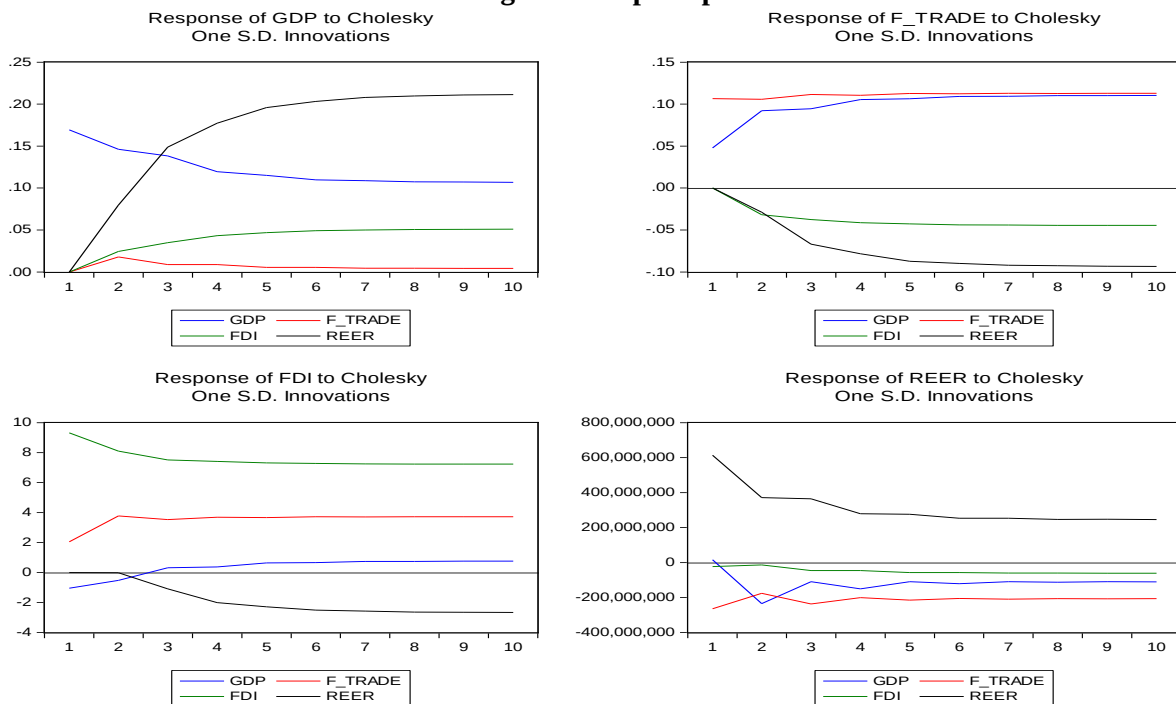
Source: Eviews 12 is used by the author to compute

Table 6 confirms that the causality between REER and GDP is one-way. On the other hand, GC runs from GDP to F_TRADE at a 10% level.

2- Impulse Responses

Using the (IRF), one can analyse the response of one variable to a random shock in another variable while keeping the original data units and estimating uncertainty. The results are presented here. According to the results, the impulse responses of GDP to a standard innovation shock to independent variables were always positive during the study. Regarding the impulse reaction to F_TRADE, it was seen that 0.017 per cent was transferred to GDP on the second horizon. This means that in the 2end horizon, a unit rise in F_TRADE resulted in an increase of GDP by 0.017 per cent. From then until the conclusion of the prediction horizon, this reaction varied between 0.0042% and 0.088%.

Figure 1: Imp Resp



Source : Eviews 12 is used by the author to compute

- Variance Decomposition

VD is the technique for decomposing the variation of endogenous variables into components that represent shocks to the VECM, as opposed to IRF, which monitors the impact of a shock to one endogenous variable on the other variables within the VECM.

Table 7 : Impulse Responses

VD of GDP :					
Period	S.E.	GDP	F_TRADE	FDI	REER
1	0.169278	100.0000	0.000000	0.000000	0.000000
2	0.239346	87.33365	0.555547	1.039650	11.07116
3	0.316006	69.26311	0.397712	1.812739	28.52644
4	0.384057	56.57647	0.322030	2.495832	40.60566
5	0.448746	48.02647	0.250453	2.916346	48.80673
6	0.507119	42.29927	0.207308	3.221222	54.27220
7	0.561032	38.31985	0.175678	3.425699	58.07877
8	0.610605	35.44490	0.153646	3.577679	60.82377

9	0.656798	33.29719	0.136924	3.689719	62.87617
10	0.700032	31.64001	0.124185	3.777044	64.45876

Source : Eviews 12 is used by the author to compute

The Variance Decomposition (VD) analysis for GDP shows that the ration of F_TRADE shocks can explain 55.55 % of the infrastructure forecast error. After the second period, the contribution of F_TRADE decreases to 12.41% until the end of the study. Still, the ratio of other independent variables (REER, FDI) increases after the first horizon up to 64.45 and 3.77% in the 10th period.

Conclusion

Algeria has made significant progress in developing foreign trade through scaling growth, structural upgrading, and market expansion as it transitions from a planned economy to a market economy over the past few years. Algeria's foreign trade strategy has undergone numerous regulatory revisions. After the restrictions of the 1960s and 1970s, it transitioned to a trade liberalisation strategy emphasising high-quality development. In this paper, we have sought to explore recent theoretical and empirical developments in the analysis of the impact of foreign trade on economic growth in Algeria. An increase in all variables, including F_TRADE growth, positively affects the flow of GDP. According to the paper, foreign trade is a significant factor in Algeria's gross domestic product growth. The study proposes that the government implement effective macroeconomic policies that enhance the country's trade significance and facilitate domestic local industries' production of goods for export.

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