

Econometric study to calculate the impact of the annual rate of import growth on the rate of economic growth in Algeria 1990-2021.

دراسة قياسية لحساب تأثير المعدل السنوي لنمو الواردات على معدل النمو الاقتصادي في الجزائر 1990-2021

Une étude économétrique de l'impact du taux de croissance des importations sur le taux de croissance économique en Algérie - 1990-2021

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ملخص:

تهدف الدراسة لتوضيح تأثير الارتفاع المتزايد للاستيراد على النمو الاقتصادي، حيث أن تزايد معدل الاستيراد سنويا وتنوع الواردات الجزائرية وارتفاع قيمتها رفع من معدل اختراق الواردات للاقتصاد، وجعله منكشفا تجاريا، و ساهم في تراجع معدل نمو الناتج المحلي الخام، وقمنا بدراسة قياسية باستعمال نموذج ARDL لتقدير العلاقة السببية التأثيرية بين متغيري معدل النمو السنوي للواردات ومعدل النمو السنوي للناتج المحلي الخام، و توصلت الدراسة لوجود تأثير موجب و لن ضعيف للاستيراد على معدل نمو الناتج المحلي الخام للاقتصاد الجزائري، خاصة إذا علمنا ان البنية الهيكلية للواردات الجزائرية تتشكل من 60% سلع استهلاكية غذائية و غير غذائية و مدخلات انتاج و سلع وسيطة، و لا تشكل السلع الاستثمارية التي تعكس قدرة الاقتصاد على الإنتاج و تمثل تراكم لرأس المال الثابت سوى 40 % .

الكلمات المفتاحية: المعدل السنوي للاستيراد؛ معدل نمو الناتج المحلي الخام؛ تنوع الواردات؛ النمو الاقتصادي؛ الواردات.

Abstract:

The study aims to clarify the negative impact of the increasing rise of Algerian imports on economic growth, the annual increasing rate of imports, and their diversity nature and rising values, has raised the import penetration rate into the economy, this has rendered it trade-exposed and contributed to a decline in the gross domestic product (GDP) growth rate, Using the ARDL model to estimate the causal relationship between the annual growth rates of imports and the annual growth rate of gross domestic product (GDP), the study found a weak impact of imports on the GDP growth rate for the Algerian economy. Notably, 60% of Algerian imports comprise food, non-food consumer goods, and production inputs and intermediate goods, lacking substantial investment goods crucial for reflecting economic productivity and fixed capital accumulation, which only constitutes 40%.

Keywords: Annual import rate; Gross Domestic Product (GDP) growth rate; Import diversity; Economic growth; Imports.

Résumé :

L'étude vise à clarifier l'impact croissant des importations sur la croissance économique. La croissance annuelle du taux d'importation, la diversification des importations algériennes et leur augmentation de valeur ont augmenté le taux de pénétration des importations dans l'économie, la rendant commercialement exposée et contribuant à la baisse du taux de croissance du produit intérieur brut. Une étude économétrique utilisant le modèle ARDL a été menée pour estimer la relation causale entre les taux de croissance annuels des importations et du PIB. Les résultats révèlent un impact faible des importations sur le taux de croissance du PIB en Algérie, notamment du fait que 60% de la structure des importations algériennes se compose de biens de consommation alimentaires et non alimentaires, d'intrants de production et de biens intermédiaires. Les biens d'investissement, reflétant la capacité de l'économie à produire et de l'accumulation de capital fixe, ne représentent que 40%.

Mots clés : Taux d'importation annuel ; Taux de croissance du Produit Intérieur Brut (PIB) ; Diversité des importations ; Croissance économique ; Importations.

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Introduction:

The investigation into the issue of economic growth is considered one of the current concerns occupying the minds of economic policymakers and many economists. The theories of economic growth focus on explaining and clarifying the factors that determine and influence the growth rates of countries, as well as interpreting the reasons for growth or decline. The explanation of why developing countries rely on foreign trade to achieve economic growth is a matter worthy of examination to justify the reasons for the slowdown in growth in developing economies. However in reality, most economic literature concentrates on studying the reciprocal impact relationship between exports and the growth of Gross Domestic Product (GDP), while studies addressing the impact of imports on achieving a significant economic growth rate are relatively scarce.

In reality, the significance of foreign trade is dominant in the economic structure of third-world countries, especially given the weakness of the industrial production apparatus capable of meeting economic requirements. These countries also rely on global markets to export natural resource products. Consequently, there appears to be a strong relationship between export and import revenues and gross domestic product (GDP). This explains the various impacts of an open trade policy on the achieved growth in these economies.

While many economists and policymakers have praised trade liberalization as a successful policy for developing international trade and achieving economic growth, the extent of its impact on economic development varies between advanced and developing countries, manifesting in different ways. The issue of the impact of foreign trade on the growth rates of third-world economies remains a subject open for discussion.

In the case of the Algerian economy, it has adopted an open trade policy since the 1990s following the adoption of a market economy model. This has rendered the national economy trade-exposed, compounded by a high rate of import penetration as a percentage of gross domestic product. This has had a negative impact on the trajectory of economic growth, especially in the face of declining oil prices and the inflation of the import bill. Consumer goods have accounted for the largest share of Algeria's import structure, contributing to a significant annual growth rate in import values.

From this standpoint, we pose the following problem

1-Problem Statement: In light of the foregoing, we will attempt to diagnose the impact of Algeria's foreign trade policy on economic growth. In this context, we present the following problem statement:

To what extent does the annual growth rate of imports affect the economic growth rate in Algeria?

Based on the main question, we pose the following sub-questions:

1-How have the values of Algerian imports affected the rate of import penetration and trade exposure of the national economy?

2-How has the annual growth rate of Algerian imports affected the economic growth rate in Algeria?

2-Research Hypotheses: Our study is built on the following hypotheses:

1-At a significance level of 0.05, we reject the presence of an effect between the variable of

gross domestic product (GDP) growth and the annual increase in the value of imports during 2-the study period from 1990 to 2021.

2-At a significance level of 0.05, there is an effect between the variable of gross domestic Product (GDP) growth and the annual increase in the value of imports during the study period from 1990 to 2021.

3-Study Objective: The study aims to analyze the presence and direction of the mutual relationship between imports and economic growth, considering the diversity of Algerian imports, considering the diversity of Algerian imports, including investment goods, raw materials, production inputs, and consumer goods, especially food items that constitute the largest share of total imports The research seeks to present an empirical test for causality between the economic growth rate and the import growth rate and provide a quantitative measure for the negative impact of this causal relationship.

4-Importance of the Study: The study focuses on clarifying the weak relationship of imports in achieving a high growth rate, the acquisition of capital goods and production inputs with low values and percentages reflects the weakness in accumulating invested capital and utilizing intermediate goods and raw materials to increase production and enhance productivity. This has resulted in a lack of growth in gross domestic product.

5-Methodological Division: We structured the study into three main axes, in the first part, we addressed the economic importance of imports in the development of foreign trade. In the second part, we presented economists' justifications and perspectives on the positive and negative impact of imports on boosting economic growth, as well as achieving economic development manifested in the continuous increase in gross domestic product (GDP). In the third axis, we conducted a standard study to measure the extent of the influence of the annual growth rate of imports in achieving economic growth since Algeria's adoption of liberalization and trade openness, followed by a return to restrictive and protective trade policies during the period 1990-2021.

6-Previous Economic Literature: The economic literature has explored the causal relationship between liberal trade policies and protection, examining the impact of import liberalization or restriction on achieving growth in developing economies, including the Algerian economy, In this context, we will endeavor to present some national and foreign studies on the subject:

- A study by researcher Tassabt Abdurrahman, titled "The Impact of Imports on Economic Growth: A Standardized Study of the Algerian Case (1991-2010)," aimed to analyze the influence of imports on economic growth. The researcher examined a time series that links the values of the structural composition of imports as an explanatory variable and the values of gross domestic product (GDP) as a dependent variable. The study found a positive impact of the increase in the total value of imports on the increase in gross domestic product, especially when the imported goods are capital goods. (Tassabet, 2014, pp.117-124)

- A study by researcher Majdi Ijdid Ramadan Masoud, titled "Quantitative Measurement of the Impact of Imports on Economic Growth in Libya: A Standardized Study During the Period 1980-2012," aimed to analyze the relationship between total imports and economic growth in Libya using standardized methods, including stationarity tests, cointegration methodology, and causality tests. The study concluded the presence of a statistically significant causal relationship between the volume

of total imports and the gross domestic product over the long term, confirming that imports are a fundamental factor for economic growth in Libya. (Majdi Ijdid, 2022, pp.72-93)

-A study by researcher Ahmet Uğur involved an empirical quantitative analysis to diagnose and analyze the relationship between imports and economic growth in Turkey. The researcher detailed the structural composition of imports and then utilized a Multivariate VAR analysis to determine this relationship. The empirical results revealed a bidirectional relationship between Gross Domestic Product (GDP) and the imports of capital goods and raw materials. Meanwhile, a unidirectional relationship was found between GDP and the imports of consumer goods and other goods. (Uğur, 2008, pp.54-74)

- A study by the researchers: Khalid Usman and Usman Bashir, The study examined the causal relationship between imports and economic growth in China, India, and the Group of Seven (G7) economies using BC Granger causality analysis in the frequency domain. The study aimed to determine the causal relationship between the variables under study in the short-term (transitory) and long-term (permanent) periods. The results confirmed a bidirectional causal link between imports and economic growth. The researchers concluded that the impact of imports on economic growth in most economies depends on both the long-term and short-term perspectives. Therefore, macroeconomic policy should analyze the causality dynamics between imports and economic growth consistently throughout the year when planning trade openness policies. (Usman, 2022, pp.1-7)

- A study by the researchers: Zergoune Mohamed and Okba Abdellaou and Nawal Ben Amara, The study focused on analyzing the role of imports in achieving growth for the Algerian economy during the period 1970-2016, using the cointegration regression distribution model. The researcher affirmed that total imports explain economic growth in Algeria in both the short and long term. However, achieving economic diversification and developing the manufacturing sector are necessary to maintain stable economic growth in Algeria. (Zergoune, 2018, pp.7-10)

1- The Economic Significance of Imports in Developing Foreign Trade:

The economic importance of foreign trade is increasing for both advanced and developing countries, encompassing both imports and exports. This vital sector is a fundamental indicator of the production and competitive capacity of an economy, serving as a crucial link between various global economies. Foreign trade can be viewed as that type of activity focused on tangible commodity flows, representing tangible material production, both in terms of exports and imports. Additionally, it encompasses a mass of intangible service flows, including international transport services in all its forms, international insurance services, international travel and tourism movements, international banking services, intellectual property rights transfers, as well as technology transfer. (Assayed, 2009, p.8)

In this context, exports are considered a mechanism for increasing national income, acquiring foreign currency, and disposing of the surplus of production, based on the principle of comparative advantage as introduced by the economist Adam Smith. This makes any economy that opens up to other economies capable of achieving profits. Meanwhile, imports contribute to covering the deficit experienced by some economies in supplying both food and non-food consumer goods. Imports also serve as a model for acquiring equipment, machinery, investment goods, and production inputs, including raw materials, intermediate goods, and semi-manufactured goods. Therefore, imports increase the value of the national supply of goods alongside gross domestic product, contributing to achieving economic development. (Abu Jamea 2016, pp.1848-1876)

2-The Positive and Negative Impact of Imports on Boosting Economic Growth and Achieving Economic Development:

Economists' opinions have varied regarding the importance of imports for developing economies. Some argue that their impact is minimal on economic growth and may even be negative for economies where consumer goods constitute the majority of imports. On the other hand, there are those who affirm their positive impact on economic growth, especially when there is a transfer of technological advancements and the importation of investment goods from more advanced countries.

Raul Prebisch's study emphasizes that importing capital goods helps developing countries expand investment and build a production base capable of substituting imports for consumer goods. This is especially significant if these consumer goods carry a considerable value and pose a burden on the trade balance. In his analysis, Prebisch affirms that the continued export of raw materials by developing countries and their importation of manufactured goods is due to the incapacity of local industries to deal with foreign production. This is coupled with the challenges of weak domestic markets and competition from mature industries in advanced manufacturing countries. (Deubel 2008, P 486)‘

In the same context, a study by Rivera-Batiz and Romer affirmed that 85% of machinery, equipment, and transportation tools in developing economies are imported from manufacturing countries, and they have an impact on achieving economic growth. The rise in economic activity contributes to the creation and elevation of incomes, thereby increasing the level of consumption demand. This makes a specific economy reliant on capital imports to augment the supply of consumer goods. In this regard, there is a direct relationship between economic growth and imports. (Rivera-Batiz, 1991, pp971-1001)

A study by Mahmoodzadeh and Mohseni, analyzing the impact of imported technology on Iranian economic growth, indicated that both in the short and long term, the influence of imports on economic growth is evident. The researchers affirm that importing appropriate technology is the foundation of industrial and social development, leading to a transition from traditional production to industrial production and progressing through stages of economic development. (Mahmoodzadeh, 2006, pp.103-130)

In the context of the study titled "The Impact of Imports on Iranian Economic Growth," Tehranchian examined the influence of investment, intermediate, and consumer imports on economic growth. Despite the continuous increase in importing these three groups of goods, the study emphasized the need to reduce consumer goods imports and focus solely on intermediate and investment goods that contribute to the growth of domestic output. Through his research, Tehranchian affirmed the diminishing and negative impact of importing consumer goods on economic growth. (Tehranchian, 2006, p.1387)

The study by Esfahani clarified that for economies relying on export-oriented industries, imports play a central role in meeting the remaining needs for goods, confirming the principle of specialization. (Esfahani, 1991, pp.93-116)

According to Grossman and Helpman, the policy of openness and encouragement of imports for developing economies, especially for capital goods, will have a positive impact on technological development and, consequently, on economic growth. This is because their production becomes more efficient, and their productivity increases. Economies that are more open tend to grow at a faster rate than protectionist economies. Additionally, economies with a weak growth rate will be influenced by imports, given the diversity of their imports and the shortcomings in industry and production specialization, especially if they specialize in rentier natural resources. The researchers in the same

study emphasize that a state that protects itself can stimulate its self-sustaining growth. This is possible when the government intervenes and encourages local investment based on the comparative advantages of the country. (Grossman, 1991)

Ezzalat asserts that economic growth is achieved through a continuous increase in the production capacity of an economy in the production of goods and services. This results in an increase in the average real individual income, meaning purchasing power and its improvement. Adopting the replacement of imports with local manufacturing has the potential to increase production and drive economic growth. (Ezzat 2002, pp.20-30)

El-Houfi believes that economic growth reflects the increase in the Gross Domestic Product for all economic sectors. It is the sum of the increases, meaning the value added achieved by all these sectors, which is realized through local manufacturing. (El Houfi 2021, p 2).

In a study by Balassa, there is a connection between trade and economic growth, discussing alternative development strategies available to a country. These strategies should be emulated from the experiences of newly industrialized countries, with a focus on two model cases of the industrialization process: South Korea and Brazil. They relied on strategies of self-reliant industrial development (internal), involving the gradual development of a small local industry. The process involved substituting imports with domestic production for consumer goods, using the revenues from raw materials for these countries from exporting countries to acquire capital goods and technology. This, in turn, led to an increase in the production of alternative consumer goods, allowing for the re-launch of economic growth. (Bela 1965, p p 99-123)

In a study by Poirine on the model for evaluating local demand based on creating local supply relying on importing foreign capital goods, the researcher argues that the increasing local demand fuels national supply. This allows for the recovery of the domestic market through national supply by substituting imports, especially consumer goods. Over time, it reduces the average propensity for imports, positively impacting the growth of the gross domestic product (GDP). (Poirine 1996).

Economists affirm that there is a positive relationship between economic development and the growth of imports, particularly when there is positive growth in total imports. Since the structural composition of imports consists of homogeneous categories, including raw materials, primary materials, intermediate goods, all falling under production inputs, the second category encompasses final consumer goods, both food and non-food items. The third and last category represents capital goods. The growth rate of imports for these categories varies. If the growth rate of imported capital goods is high and positive, its impact on the economic growth rate is higher. The same applies to production inputs. However, for the category of imports related to consumer goods, the higher and more positive the growth rate, the weaker its impact on the economic growth rate. Therefore, the inclination of the growth rate for one of these categories, if predominant, becomes the primary influencer on the growth rate for the concerned economy. (Nassau, 1967, pp.129-135)

3-The empirical study on the impact of the annual growth rate of imports on the economic growth rate using the ARDL (1, 0) model.

To achieve the study's objective, the Auto-Regressive Distributed Lag (ARDL) model for Distributed Lag Gaps will be adopted.

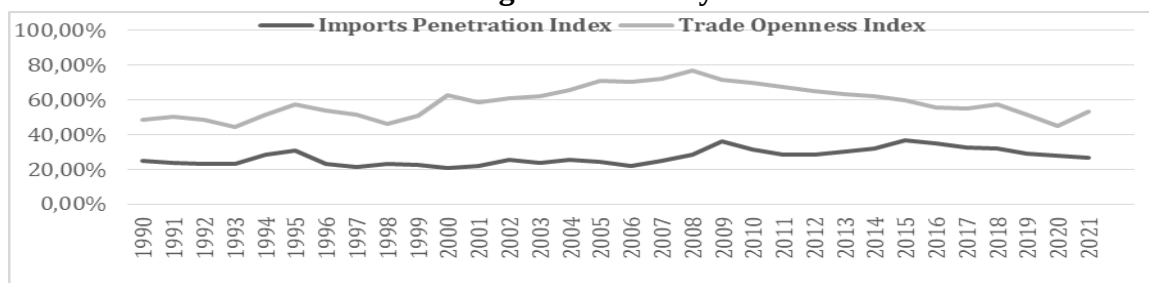
3-1. Numbers and facts about trade liberalization policy in Algeria:

Algeria's foreign trade, like other economic variables, has been influenced by various developments in the national economy, transitioning from the centrally planned socialist era to a phase of moving towards a free-market economy and openness to the global economy. Since the 1990, Algeria has adopted a trade liberalization policy. This radical change was characterized by the decline of the industrial sector and the government relinquishing many economic institutions, leading to a significant expansion of the import sector, the branch of manufacturing industries, which accounted for 18% of the Gross Domestic Product in 1982, only represented 6% in 2004 and 5% by 2014. This percentage has remained constant until today. Consequently, this sector has become incapable of meeting national needs. (Ahmed 2001, pp185-205)

Where the import bill benefited from oil revenues and recorded staggering figures since the crisis in 2014. The highest value reached 6,552 billion Algerian dinars in 2018 and 6,170 billion Algerian dinars in 2017. This opened the door to transferring massive amounts of hard currency to various countries. Thus, the policy of trade liberalization and openness did not strongly impact the trajectory of economic development. (Sheref, 29-30 November 2016, PP.7-9)

Before delving into the standard model, we wanted to clarify the evolution of the penetration rate of imports and the trade openness rate for the Algerian economy since abandoning the restrictions and monopolies on foreign trade and adopting the trade openness model, as illustrated in the following figure:

Graph-1-: Evolution of the imports penetration index and trade openness for the Algerian economy.



Source: prepared by the researcher based on data from the General Directorate of Customs

The Imports Penetration Index indicates the percentage of imports in the gross domestic product (GDP), and when the percentage exceeds 20%, it signifies the importance of imports in meeting the local demand and, consequently, the economy's reliance on imports. The trade openness ratio represents the value of foreign trade (imports + exports) as a proportion of the total GDP, reflecting the significance of international trade in an economy. When the ratio exceeds 50%, it indicates a higher degree of correlation between the growth rate of the GDP and changes in foreign trade, highlighting increased susceptibility and exposure of the economy to external changes and influences. (Foreign Trade Bulletin for the Arab Region 2019, PPXII-XIII)

Clearly evident from the preceding figure is that the penetration rate exceeds 20%, reflecting a significant reliance of the national economy on imports to meet its diverse needs. This is further affirmed by the trade openness ratio, which, in turn, records values exceeding 50%, solidifying the

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considerable trade openness of the national economy. The subsequent figure illustrates the substantial diversity in national imports since Algeria's liberation of foreign trade in 1990. However, the pertinent question arises: despite the evident presence of foreign imports in the national economy, has their impact on economic growth been positive and robust? Through the following figure, we will attempt to examine imports based on their three categories:

Graph-2:- Structural Composition of Different Categories of Algerian Imports.



Source: prepared by the researcher based on data from the General Directorate of Customs

It is notable that consumer goods (both food and non-food) occupy the top position in total, Imports, with an average import share of 36.81% over the study period. Following closely are capital goods, accounting for an average of 34.10%, and production inputs with an average of 29.08%. This leads us to anticipate that the importation of consumer goods has not had a positive impact on the growth rate of our national economy. Meanwhile, the importation of capital goods and production inputs has positively influenced the growth rate, as supported by the subsequent table illustrating the evolution of the Growth Rate of Imports for the Three Categories during the study period.

Table -1-: Evolution of the growth rate of imports for the three categories

The growth rate of capital goods imports	The growth rate of production inputs imports	The growth rate of consumer goods imports	years	The growth rate of capital goods imports	The growth rate of production inputs imports	The growth rate of consumer goods imports	years
0.14	19.20	1.75	2006	-	-	-	1990
0.65	45.39	49.71	2007	33.81-	3.81-	19.11-	1991
52.85	37.10	39.35	2008	0	5.46	22.08	1992
15.87	0.73-	15.50-	2009	5.05	4.84	3.91	1993
4.85	4.60	0.95-	2010	-6.14	0.86	21.17	1994
1.98	9.42	44.43	2011	21	16.36	10.23	1995
-16.15	3.29	10.72	2012	2.85	26.93-	19.20-	1996
21	-0.16	9.25	2013	-6.82	8.39-	0.030-	1997
17.63	1.30	2.70	2014	10.83	8.79	5.88	1998
-9.58	-9.37	-15.68	2015	4.05	9.13-	3.87-	1999
-1029	-8.50	-7.95	2016	-4.19	1.94	2.84	2000
-8.22	-0.75	2.34	2017	13.86	12.52	0.030	2001
16.74	-3.86	-9.52	2018	27.33	22.26	13.83	2002
-19.89	-1.42	-5.26	2019	11.22	20.28	8.99	2003
-31.45	-18.65	-4.66	2020	43.82	25.73	33.49	2004
0.43	0.40	21.09	2021	17.78	9.75	4.69	2005

Source: by the researcher based on statistics from the National Customs Office of Algeria.

Through the values, it is clear that the growth rate of consumer goods imports has experienced stability, while the rate of capital goods and production inputs imports has been fluctuating. This leads us to anticipate that capital goods and production inputs have had a positive but weak impact on economic growth in Algeria.

3-2. Standard Study:

In light of this context, we wanted to analyze and measure the direction and strength of the causal relationship between the annual growth rate of total imports and economic growth. We represented the annual growth rate of imports with the symbol **TIMP** as an independent explanatory variable, and the economic growth rate with the symbol **GDPR** as a dependent variable. The standard model to be estimated is represented by the following equation: **GDPR = f (TIMP)**, the mathematical formula for the model is as follows:

GDPR = α + β TIMP + ε , where ε represents the random error, and α and β are the parameters of the model to be estimated.

1- Study Sample: Through this study, we will utilize annual data for Algeria spanning the period from 1990 to 2021. The data for the variables under investigation were collected from the annual economic and monetary reports of the Bank of Algeria, the statistical bulletins of the National Office of Statistics, the following table illustrates the evolution of the annual growth rate values for imports and the annual growth rate of gross domestic product (GDP):

Table -2 -: the evolution of the annual growth rate values for imports and the annual growth rate of gross domestic product (GDP)

ANNE	Economic growth rate : GDPR%	IMPORTS : million US dollars.	Annual growth rate of imports : TIMP%	ANNE	Economic growth rate : GDPR%	IMPORTS : million US dollars.	Annual growth rate of imports : TIMP%
1990	0,8	139,1	-	2006	1,7	1863,5	2.367612
1991	1,2-	198,4	42.631201	2007	3,4	2326,1	24.824255
1992	1,6	244,5	23.235887	2008	2	3170,8	36.314002
1993	2,2-	269,1	10.06135	2009	1,7	3 583,8	13.025104
1994	0,2	424,5	57.748049	2010	3,6	3 768	5.139796
1995	3,8	616,1	45.135453	2011	2,9	4184,9	11.064225
1996	3,7	596,7	-3.148839	2012	3,4	4622	10.444694
1997	1,1	594,7	-0.335177	2013	2,8	5061,1	9.500216
1998	6,2	656,1	10.324533	2014	3,8	5500,1	8.674004
1999	3,2	737,6	12.421887	2015	3,7	6104	10.9798
2000	3,8	857,2	16.214751	2016	3,2	6139,4	0.579948
2001	3	930,7	8.574428	2017	1,3	6170,5	0.506564
2002	5,6	1159,2	24.551413	2018	1,1	6552	6.182643

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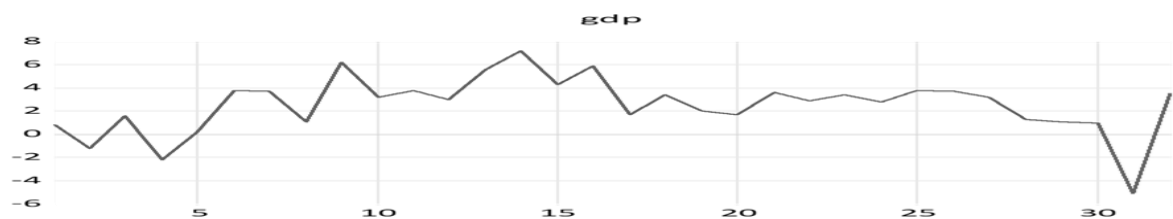
2003	7,2	1254	8.178054	2019	1	5964,6	- 8.965201
2004	4,3	1577,1	25.76555	2020	5,1-	5146,6	-13.714247
2005	5,9	1820,4	15.42705	2021	3,5	5854,2	13.748883

Source: prepared by the researcher based on data from the annual economic and monetary reports of the Bank of Algeria, the statistical bulletins of the National Office of Statistics

2- Description of Study Variables:

1-Dependent Variable in the Study: Gross Domestic Product (GDP) was utilized as the dependent variable in the study. It is represented by the acronym GDP, and the trend of the indicator can be presented as follows:

Graph-3-: Evolution of Gross Domestic Product (GDP)

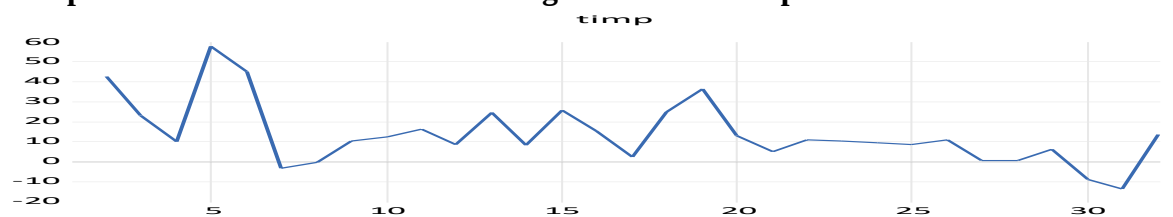


Source: Statistical outputs from Eviews 10 program.

From the figure above, we observe that the Gross Domestic Product (GDP) variable has exhibited significant fluctuations throughout the study period. Consequently, the series does not show a general trend, but rather it contains a random or constant component.

2-Independent Variable in the Study: The annual growth rate of imports, represented by the acronym TIMP, was adopted as the independent variable. The trend of the indicator can be presented as follows:

Graph-4-: The evolution of the annual growth rate of imports.



Source: Statistical outputs from Eviews 10 program.

3-Descriptive Statistics for the Study Variable: These can be included through the following table:

Table- 3-: Descriptive Statistics for Descriptive Variables.

Mean	13.78896	2.587097
Median	10.44469	3.200000
Maximum	57.74805	7.200000
Minimum	-13.71425	-5.100000
Std. Dev.	15.56253	2.463026
Skewness	0.972224	-0.955898
Kurtosis	3.969102	4.795189

Source: Statistical outputs from Eviews 10 program.

3- The Appropriate Standard Model for the Study:

Before determining the parameters of the study model, it is necessary to assess the stability of the time series.

1-Time Series Stability Study: Various tests are employed to detect the stability of time series. However, the Dickey-Fuller Expanded Test is the most commonly used. The test results are presented in the following table:

A-Stability Study of the Gross Domestic Product Growth Rate Variable: As observed in the above figure, the growth rate of gross domestic product does not exhibit a general trend and has a constant component. Therefore, the suitable model for it is the intercept model. After computing the stability results at the level, the model for the indicated results is obtained as shown in the following table:

Table-4:- GDP Stability Test Models

Decision	First Difference	At Level	Stability Level
I(1)	intercept	intercept	Appropriate Model
	-2.963972	-2.963972	Critical Value at 5%
	-9.436061	-2.117669	DF GDP
	0.00	0.2395	Significance Level

Source: Statistical outputs from Eviews 10 program.

The appropriate stability model for the variable indicates that the tabulated value is greater than the computed value in the intercept model at the level, indicating non-stationarity of the series at the level in this model. This is further confirmed by the non-significance of the test in the estimated model at 0.2395, which is greater than 0.05. As for the intercept model with first differences, we observe that the tabulated value is less than the computed value, affirming the stationarity of the series with first differences in the intercept model. This is further supported by the test significance level of 0.00, which is less than 0.05.

B-Stability Study of the Annual Growth Rate of Imports Indicator: From the previous figure of

The independent variable in the study, it is evident that it corresponds to the intercept model. The results have been summarized in the following table:

Table -5:- Stability Test Models for TIMP

Decision	At Level	Stability Level
I(0)	intercept	Appropriate Model
	-2.963972	Critical Value at 5%
	-4.076999	DF TIMP
	0.0037	Significance Level

Source: Statistical outputs from Eviews 10 program.

From the previous table displaying the appropriate model for the stability study, it is evident that the tabulated value is less than the computed value in the intercept model at the level. This indicates the stationarity of the series at the level. Further confirmation is provided by the significance of the unit root test in the intercept model, reaching a value of 0.0037, which is less than 0.05.

2-Lag Periods for Study Variables: Lag periods for the study variables can be included through the following table:

Table -6-: Lag Periods for the Annual Economic Growth Rate Variable (GDP)

VAR Lag Order Selection Criteria
Endogenous variables: GDP
Exogenous variables: C
Date: 10/01/23 Time: 16:48
Sample: 1990 2021
Included observations: 28

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-62.31204	NA*	5.389441	4.522288	4.569867*	4.536834*
1	-61.26555	1.943467	5.372722*	4.518968*	4.614126	4.548059
2	-60.66242	1.077022	5.530424	4.547316	4.690052	4.590952
3	-60.58400	0.134439	5.913474	4.613143	4.803458	4.671324
4	-60.11708	0.767088	6.154682	4.651220	4.889113	4.723946

Source: Statistical outputs from Eviews 10 program.

From the table, we observe that the lag period for Gross Domestic Product yielded different test results. However, the AIC test is considered the best, and therefore, we will follow its decision. Consequently, the lag period for the variable is determined to be 1. As for the annual growth rate of imports, we have summarized its lag period in the following table:

Table- 7-: Lag Periods for the Annual Growth Rate of Imports Variable (TIMP)

VAR Lag Order Selection Criteria
Endogenous variables: TIMP
Exogenous variables: C
Date: 11/25/23 Time: 19:19
Sample: 1 32
Included observations: 27

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-106.3491	NA	166.3248	7.951785	7.999779	7.966057
1	-103.7314	4.847613	147.5770	7.831955	7.927943	7.860497
2	-101.5601	3.860006*	135.4009	7.745196	7.889177*	7.788009
3	-99.96232	2.722208	129.7011*	7.700913*	7.892889	7.757997*
4	-99.94569	0.027096	139.7984	7.773755	8.013725	7.845111

Source: Statistical outputs from Eviews 10 program.

From the table, we observe that the lag period for the annual growth rate of imports variable, according to the AIC test, as well as the HQ and FPE tests, is determined to be 3.

3-Estimating the ARDL Model between the Variables: Based on the preceding tables, it becomes evident that the variables exhibit stability at different degrees. The first variable, representing the growth of Gross Domestic Product, stabilizes after first differencing, while the variable for the annual growth rate of imports stabilizes at the level. Therefore, the Autoregressive Distributed Lag (ARDL) method can be adopted.

A- Error Correction Term Results for the Model: Before estimating the model, we present the results of the error correction term, which is considered a fundamental condition for accepting or rejecting the model.

Table- 8-: Results of the Error Correction Term for the Model

Dependent Variable: D(GDP)				
Method: ARDL				
Date: 11/25/23 Time: 20:39				
Sample: 1991 2021				
Included observations: 31				
Dependent lags: 1 (Automatic)				
Automatic-lag linear regressors (1 max. lags): TIMP D_1993 D_1998				
D_2003 D_2020				
Deterministics: Restricted constant and no trend (Case 2)				
Model selection method: Akaike info criterion (AIC)				
Number of models evaluated: 32				
Selected model: ARDL(1,0,1,0,0,1)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
COINTEQ*	-0.666405	0.101829	-6.544358	0.0000
D(D_1993)	-4.484160	0.959892	-4.671526	0.0001
D(D_2020)	-6.798249	0.940089	-7.231499	0.0000
R-squared	0.804578	Mean dependent var		0.087097
Adjusted R-squared	0.790619	S.D. dependent var		2.893757
S.E. of regression	1.324129	Akaike info criterion		3.491152
Sum squared resid	49.09287	Schwarz criterion		3.629925
Log likelihood	-51.11286	Hannan-Quinn criter.		3.536389
F-statistic	57.63989	Durbin-Watson stat		1.979787
Prob(F-statistic)	0.000000			

* p-values are incompatible with t-Bounds distribution.

Source: Statistical outputs from Eviews 10 program.

From the table, it is observed that the error correction term achieved a negative value of -0.666405 with a significant level of 0.000, confirming its statistical significance. Therefore, it can be asserted that there is a long-term relationship between the variables, with 66% of errors being corrected in the short term. Consequently, it can be stated that complete or full correction and a return to the equilibrium state occur after one year and eight months.

B- Results of the Bounds Test: Before presenting the Impulse Response Model between the variables, it is necessary to conduct the Bounds Test to confirm the significance of the proposed model. The results can be displayed in the following table:

Table-9-: Bounds Test or Model Significance

Null hypothesis: No levels relationship	
Number of cointegrating variables: 5	
Trend type: Rest. constant (Case 2)	
Sample size: 31	
Test Statistic	Value
F-statistic	4.807294

= Bounds Critical Values

Sample Size	10%		5%		1%	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
30	2.407	3.517	2.910	4.193	4.134	5.761
35	2.331	3.417	2.804	4.013	3.900	5.419
Asymptotic	2.080	3.000	2.390	3.360	3.060	4.150

* I(0) and I(1) are respectively the stationary and non-stationary bounds.

Source: Statistical outputs from Eviews 10 program.

The table above indicates that the Fisher test value of 4.807294 has exceeded the critical values at the 5% significance level in the sample of 35, which is the closest to the study sample. This confirms the rejection of the null hypothesis and the acceptance of the alternative hypothesis, acknowledging that the independent variable explains the dependent variable in the proposed model. Consequently, the long-term relationship equation can be estimated through the following table:

C-Estimation of the Regression Model using the ARDL Model: The model can be presented through the following table:

Table -10-: Estimation of the ARDL Regression Model

Econometric study to calculate the impact of the annual rate of import growth on the rate of economic growth in Algeria 1990-2021.

Dependent Variable: GDP Method: ARDL Date: 11/25/23 Time: 20:50 Sample: 1991 2021 Included observations: 31 Dependent lags: 1 (Automatic) Automatic lag linear regressors (1 max. lags): TIMP D_1993 D_1998 D_2003 D_2020 Deterministics: Restricted constant and no trend (Case 2) Model selection method: Akaike info criterion (AIC) Number of models evaluated: 32 Selected model: ARDL(1,0,1,0,0,1)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GDP(-1)	0.333595	0.169717	1.965598	0.0621
TIMP	0.016225	0.022984	0.705916	0.0487
D_1993	-4.484160	1.547823	-2.897076	0.0084
D_1993(-1)	-1.590208	1.916866	-0.829587	0.4157
D_1998	4.078367	1.563797	2.607990	0.0161
D_2003	3.612017	1.581191	2.284365	0.0324
D_2020	-6.798249	1.715757	-3.962245	0.0007
D_2020(-1)	3.391095	2.053832	1.651106	0.1129
C	1.587165	0.729674	2.175170	0.0406
R-squared	0.730251	Mean dependent var	2.587097	
Adjusted R-squared	0.632161	S.D. dependent var	2.463026	
S.E. of regression	1.493819	Akaike info criterion	3.878249	
Sum squared resid	49.09287	Schwarz criterion	4.294568	
Log likelihood	-51.11286	Hannan-Quinn criter.	4.013958	
F-statistic	7.444675	Durbin-Watson stat	1.979787	
Prob(F-statistic)	0.000086			

Source: Statistical outputs from Eviews 10 program.

From the table, we observe that the Student test value of 0.7059 has achieved a significance level of 0.0487, which is less than the significance level of 0.05. This confirms the presence of an effect at the level for the annual growth rate of imports on the Gross Domestic Product (GDP) during the proposed study period. Therefore, it can be said that 73.02% of the variations in GDP are attributable to changes in the annual growth rate of imports. The selected model between the variables is ARDL (1,0), as for the regression equation, it can be presented in the following table:

Table-11-: Linear Regression Model between Variables

Deterministics: Rest. constant (Case 2)	
CE = GDP(-1) - (0.024347*TIMP - 9.115126*D_1993(-1) + 6.119950 *D_1998 + 5.420150*D_2003 - 5.112736*D_2020(-1) + 2.381682)	

Variable *	Coefficient	Std. Error	t-Statistic	Prob.
TIMP	0.024347	0.036568	0.665791	0.0116
D_1993(-1)	-9.115126	3.695141	-2.466787	0.0208
D_1998	6.119950	3.090507	1.980241	0.0588
D_2003	5.420150	2.419543	2.240154	0.0342
D_2020(-1)	-5.112736	3.740479	-1.366867	0.1838
C	2.381682	0.698539	3.409517	0.0022

Source: Statistical outputs from Eviews 10 program.

From the table, it is evident that there is a significant effect due to reaching a significance level value of 0.0116, which is less than 0.05, for the variable of the annual growth rate of imports on Gross Domestic Product. Therefore, it can be said that a one-unit change in the independent variable, the annual growth rate of imports, leads to a 2.4% increase in Gross Domestic Product. This indicates a positive and direct relationship between the variables, confirming that the regression equation reflects a positive impact of imports on economic growth. Thus, we affirm the positive impact of importing capital goods and production inputs on the GDP growth rate.

However, the relationship between the variables was found to be very weak. This result can be interpreted by considering that the annual growth rate of imports of investment goods and production inputs was fluctuating, while imports of consumer goods experienced growth and continuous stability in their import levels. Consequently, imports of consumer goods are considered less statistically significant in achieving economic growth in Algeria. On the contrary, we affirm that the statistical significance lies in the importation of investment goods, indicating its impact on the economic growth rate.

4-Tests for Detecting Standardized Residuals Problems Associated with the Model:

1-Detecting Autocorrelation Problem of Errors: The results of the test detecting autocorrelation in the model can be presented in the following table:

Table – 12:- Autocorrelation of Errors

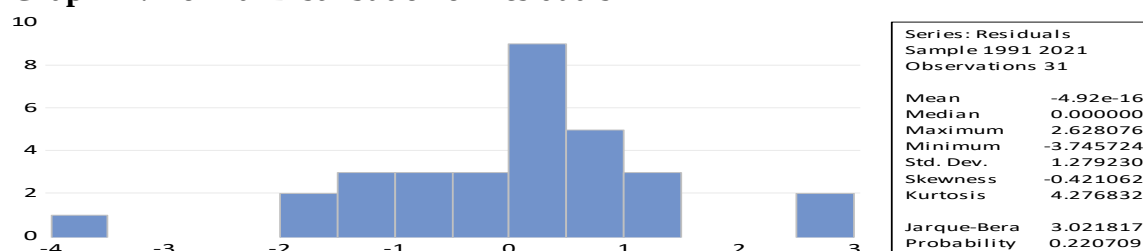
Breusch-Godfrey Serial Correlation LM Test: Null hypothesis: No serial correlation at up to 2 lags			
F-statistic	0.481589	Prob. F(2,20)	0.6248
Obs*R-squared	1.424332	Prob. Chi-Square(2)	0.4906

Source: Statistical outputs from Eviews 10 program.

We observe that the results of the Breusch-Godfrey LM test for the probability level of the chi-square test achieved a value of 0.4906, which is greater than the significance level adopted in the study (0.05). This confirms the absence of an autocorrelation problem in the model. Additionally, the Fisher significance level of 0.6248 further supports this conclusion.

2- The normal distribution of residuals can be presented through the residuals as follows:

Graph-4:- Normal Distribution of Residuals



Source: Statistical outputs from Eviews 10 program.

Through the table and the graph, it is evident that the residuals follow a normal distribution due to the achieved test significance level value of 0.22, which is greater than 0.05. This confirms the acceptance of the null hypothesis, indicating that the residuals of the proposed model follow a normal distribution.

3- The stability of variance of residuals: can be presented through the results of heteroscedasticity as follows:

Table -13:- Heteroscedasticity Stability

Breusch-Godfrey Serial Correlation LM Test: Null hypothesis: No serial correlation at up to 2 lags			
F-statistic	0.481589	Prob. F(2,20)	0.6248
Obs*R-squared	1.424332	Prob. Chi-Square(2)	0.4906

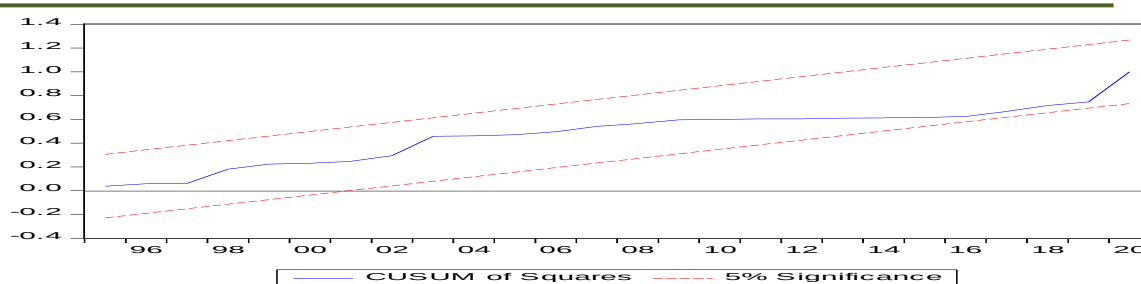
Source: Statistical outputs from Eviews 10 program.

We observe that the model does not suffer from heteroscedasticity issues because the p-value for the chi-square test is estimated at 0.4906, which is greater than 5%. This confirms the stability of the variance of residuals. Additionally, the non-significance of the Fisher test with a value of 0.624 further supports the conclusion.

4- The results of the stationarity of the estimates: The results of the stationarity of the estimates over time can be presented through the following figure:

Graph-5:- Stationarity of Estimates

Econometric study to calculate the impact of the annual rate of import growth on the rate of economic growth in Algeria 1990-2021.



Source: Statistical outputs from Eviews 10 program.

Through the figure, we observe that the estimates fall within the confidence intervals both below and above, confirming that the estimates are stable over time. By examining the results of the tests related to the model's measurement problems, we can conclude that the presented model is good and suitable for the study. This is due to its lack of exposure to any measurement problems, and thus, the estimated relationships are accurate and reflect the changes in the independent variable and its impact on the dependent variable in the long run.

It can be affirmed that in the long run and in the context of the continuous efforts to replace imports of consumer goods and production inputs, the continuous annual increase in imports of capital goods can have a strong positive impact on increasing the growth rate of gross domestic product (GDP). This reflects a robust economic growth rate in Algeria in the future.

4-Results and discussion of the research

Through the standard study of the impact of the annual growth rate of imports on the economic growth rate in Algeria, we have reached a set of results, which can be summarized as follows:

- The growth rate of Algerian imports has witnessed clear development, both during the liberalization period since 1990 and after the government returned to adopting the quota and preference system to restrict imports since 2008.
- The national economy relies on imports, as reflected by the values of the import penetration index, which exceeded 20%. The trade exposure index also recorded high values exceeding 50%, making our national economy vulnerable to the impact of international market crises.
- Algerian imports are diverse, with consumer goods occupying the first position, followed by production inputs in the second position, and finally industrial equipment in the last position.
- The trend of the import rate of consumer goods, both food and non-food, is increasing. The noticeable fluctuations in the growth rate of imports of investment goods and production inputs have made the impact of imports on economic growth weak.

Conclusion:

The impact of imports on economic growth varies depending on the structure of these imports, the positive and strong correlation between imports and the continuous increase in the economic growth rate is associated with the continuous increase in the import of intermediate and capital goods. Thus, trade openness to international markets has a positive impact. However, for the Algerian economy, reliance on importing consumer goods at high and increasing proportions annually, at the expense of imports of capital goods and production inputs, confirms the weak relationship between

the annual import growth rate and the economic growth rate. The standard study confirmed this at a significance level of 0.05. However, in the long term, the study emphasizes the existence of a positive and strong impact of imports on economic growth in Algeria, provided that the national economy seeks to reduce the import of consumer goods and shift towards increasing the import of investment goods that reflect the accumulation of fixed capital and increased production capacity.

Therefore, we propose a set of suggestions, including:

- The necessity of adopting an industrialization model to replace imports of food and non-food items, as well as production inputs, with local products.
- Encouraging and supporting small and medium-sized enterprises, which are considered engines of production, to contribute to reducing imports and raising the economic growth rate.
- Implementing facilitative measures to encourage the import of capital goods, which are considered drivers of investment and increased local production.

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