

The impact of foreign direct investment on economic growth in Algeria for the period between 1970-2022

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Abstract :

This study sought to measure the impact of foreign direct investment (FDI) on economic growth in Algeria over the period 1970–2022, by selecting FDI inflows and the trade balance as independent variables and examining their effects on real GDP per capita as an indicator of economic growth. The study also discussed the findings of various research works conducted by international institutions on foreign direct investment. Given the abundance of studies on FDI, the originality of this research lies in the use of the trade balance as a control variable, with the aim of assessing the extent to which these two variables affect economic growth in Algeria. The results indicate that foreign direct investment does not exert a statistically significant effect on economic growth in Algeria in the long run, while its short-run effect is positive but very weak. Moreover, the speed of adjustment suggests that deviations from the long-run equilibrium relationship between foreign direct investment and economic growth require approximately 13 years to return to equilibrium. **Keywords** : Gross Domestic Product, Economic Growth, Trade Balance, Foreign Direct Investment.

Jel Classification Codes : F21, F10, O47, E01

1. INTRODUCTION

Foreign direct investment (FDI) is viewed in economic theory as a key driver of economic growth through technology transfer, productivity improvement, and labor market development. It helps diversify external financing sources and supports structural transformation in developing economies, prompting countries to improve their investment climate. Algeria, like other developing countries, seeks sustainable growth and external balance, especially after the 2014 oil price collapse and the COVID-19 shock. These challenges highlighted the need to reduce oil dependence and diversify the economy through effective macroeconomic policies. Within this framework, FDI represents a viable tool for building a diversified economy, provided a competitive and attractive business environment is ensured.

1.1 Research Problem:

Based on the above, the main research problem of this study can be formulated as follows:

What is the nature and magnitude of the impact of foreign direct investment on economic growth in Algeria during the period 1970–2022?

To address this problem, the following sub-questions are posed:

- Is there a long-run relationship between foreign direct investment inflows and economic growth?
- Is there a long-run relationship between the trade balance and economic growth?
- Do foreign direct investment and the trade balance have a positive effect on economic growth?

1.2 Research Hypotheses:

- There is a long-run relationship between foreign direct investment and economic growth.
- Foreign direct investment affects economic growth in Algeria.
- There is a long-run relationship between the trade balance and economic growth.
- Foreign direct investment and the trade balance have a positive effect on growth in both the short and long run.

1.3 Objectives of the Study:

- To identify the theoretical foundations of the relationship between foreign direct investment and economic growth;
- To examine the nature of foreign investments in Algeria;
- To analyze the reality and trends of economic policies in Algeria during the study period;
- To evaluate and determine the impact of foreign direct investment and the trade balance on economic growth in Algeria.

1.4 Methodology:

- An econometric approach using data for the period 1970–2022;
- The ARDL model to analyze long-run and short-run relationships, with an ECM test;
- Variables: GDP per capita (dependent), foreign direct investment and the trade balance (independent).

1.5 Previous Studies:

There are numerous previous studies that have addressed the relationship between foreign direct investment and economic growth, both in Arabic and foreign literature. Some of these studies are reviewed as follows:

- Mohamed Ismail and Jamal Qassem Hassan (2023), *Trends of Foreign Direct Investment in Arab Countries in the Aftermath of the COVID-19 Pandemic*, an Arab Monetary Fund working paper, which examined the evolution of FDI during the pandemic and the measures adopted to stimulate it in Arab countries, including Algeria, such as reducing the import bill by about 6% of GDP and prioritizing investment in agriculture to ensure food security.
- Sahli Jamila and Mujahid Sayed Ahmed (2021), *Foreign Direct Investment and Its Impact on Economic Growth in Algeria: An Econometric Study for the Period 2000–2019*, published in the Journal of Economics and Environment, which used the ARDL approach and found a long-run equilibrium relationship and a unidirectional causal relationship from FDI to economic growth.
- Miloud Wael and Khaira Tali (2022), *The Impact of Foreign Direct Investment on Economic Growth in Maghreb Countries (1990–2017)*, published in the Journal of Maaref, using panel data analysis, and finding a positive long-run effect of FDI on growth, alongside positive effects of physical and human capital accumulation.
- Imen Mohamed Sghaier and Zouheir Abida (2013), *Foreign Direct Investment, Financial Development and Economic Growth: Empirical*

Evidence from North African Countries, Journal of International and Global Economic Studies, which employed the GMM method for Algeria, Tunisia, Morocco, and Egypt (1980–2011) and found a positive effect of FDI and financial development on growth.

– M. Nureldin Hussain (1999), *The Balance-of-Payments Constraint and Growth Rate Differences among African and East Asian Economies*, which applied the Harrod–Thirlwall framework and showed stronger growth effects in Asian countries compared to African countries due to export performance and trade structure.

Despite the diversity of these studies and their shared focus on foreign direct investment, this study differs by incorporating FDI inflows alongside the trade balance as a control variable to examine their impact on economic growth in Algeria.

2. The Theoretical Framework of the Relationship between Foreign Direct Investment and Economic Growth:

Foreign direct investment and economic growth have long been among the most widely examined economic indicators due to their crucial importance for national economies. Consequently, economists and scholars have extensively theorized these concepts through various theories and empirical studies that clarify their definitions, interrelationship, and resulting effects.

2.1. Concept of Foreign Direct Investment and Economic Growth:

– Foreign Direct Investment:

Foreign direct investment is defined as a long-term investment undertaken by a foreign investor with the aim of acquiring a lasting and significant interest in an economic entity within a host country, thereby allowing effective participation in management and decision-making. (Moosa, 2020, p. 20)

This type of investment is not limited to capital flows; it also involves the transfer of technology, managerial expertise, organizational knowledge, and modern production methods, making it one of the most important mechanisms for integration into the global economy. (OECD, 2020, p. 18) Recent literature emphasizes that foreign direct investment constitutes a key element in enhancing the competitiveness of developing economies, (UNCTAD, 2023, p. 22) provided that an appropriate institutional and financial environment exists, along with a sufficient level of human capital

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capable of absorbing the associated technological and knowledge spillovers.
(Alfaro, 2021, p. 50)

2.2 Concept of Economic Growth:

Economic growth refers to a sustained increase in real gross domestic product or real GDP per capita over the long run, reflecting an improvement in an economy's productive capacity. (Acemoglu, 2020, p. 30) This concept is not confined to quantitative expansion of output but also encompasses productivity improvements, human capital accumulation, and technological progress. (Barro, R. J & Sala-i-Martin, X, 2023, p. 101)

Modern growth theories stress that sustainable economic performance depends on the interaction of several factors, including investment, economic openness, institutional quality, and innovation, with economic growth regarded as a fundamental prerequisite for achieving comprehensive economic development. (Todaro, M. P & Smith, S. C, 2020, p. 150)

2.3 The Relationship between Foreign Direct Investment and Economic Growth:

Recent studies indicate that the relationship between foreign direct investment and economic growth is nonlinear and conditional, as FDI can exert a strong positive effect on growth when appropriate economic and institutional conditions are in place.X (Aghion, P & Howitt, P, 2021, p. 70)

The main transmission channels include: (Alfaro, L & Chauvin, J, 2020, p. 12)

- Technology transfer and improvements in total factor productivity
- Capital formation and the reduction of the savings gap
- Enhancement of labor skills
- Promotion of competition and innovation
- Support for exports and integration into global value chains

However, the absence of developed financial markets, weak institutions, or limited human capital may constrain or even weaken the impact of foreign direct investment on economic growth. (Iamsiraroj, S, 2020, p. 5)

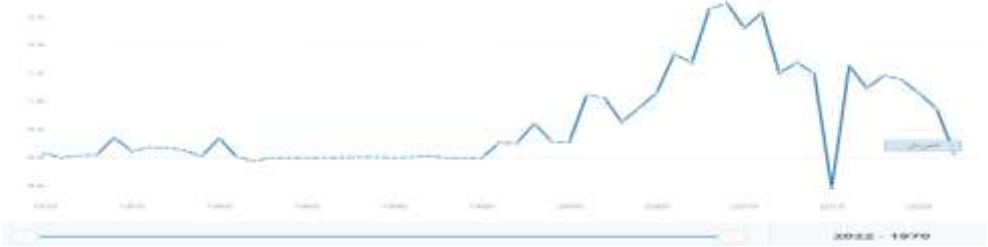
3. Analysis of the Evolution of Foreign Direct Investment and Economic Growth in Algeria

This section analyzes the study variables over the specified period from 1970 to 2022.

3.1. Study and Analysis of Foreign Direct Investment in Algeria

Statistics for the period **1970–2022** are presented to illustrate the flows of foreign direct investment (FDI) into Algeria. These flows are analyzed in light of the prevailing economic conditions and outcomes, while highlighting the shortcomings and the factors that have hindered their development.

Figure 1: Evolution of Foreign Direct Investment Flows in Algeria (1970–2022)



Source: World Bank, <https://data.albankaldawli.org>

Figure 2: Evolution of GDP per Capita in Algeria (1960–2022)



Source: World Bank, <https://data.albankaldawli.org>

Figures **01** and **02** illustrate the evolution of foreign direct investment and GDP per capita over the period **1970–2022**, as shown above. It can be observed that the development of FDI during **1970–1998** was characterized by stagnation due to the economic conditions prevailing at that time. Subsequently, a relatively positive trend emerged in the early 2000s, driven by improvements in the security situation and the gradual recovery of oil prices. However, a significant decline has been observed since **2013**, which may be attributed to the investment climate and the political conditions during that period.

Conversely, several key periods can be identified in the evolution of GDP per capita from **1960 to 2022**, as follows:

- **(1960–1976):** This period recorded the lowest values, reflecting the aftermath of colonialism and the transition toward state-building and institutional development. It was also marked by the nationalization of public enterprises.
- **(1990–1998):** This period likewise experienced low values due to the consequences of declining oil prices, coupled with the onset of

the political crisis. These factors adversely affected the performance of various economic sectors and the attraction of foreign investment, as foreign investors were deterred by security and political instability. This led to weak national production and exchange rate deterioration, which negatively impacted economic growth.

- **(2002–2015):** A noticeable increase in GDP per capita is observed during this period, attributable to the implementation of development programs through projects and five-year plans. These initiatives primarily focused on supporting small and medium-sized enterprises, improving the investment climate, and increasing the value of foreign investments. Such investments were directed toward local development programs and infrastructure support, benefiting from high oil prices, with the aim of promoting economic growth and contributing to economic development.
- **(2015–2022):** This period is characterized by fluctuations and a relative decline in GDP per capita, mainly due to the collapse of oil prices since 2014, reflecting the rentier nature of the Algerian economy. This was compounded by political circumstances and the emergence of the **COVID-19 pandemic**, which adversely affected FDI inflows. However, starting in 2021, a gradual recovery and increase in economic growth can be observed, driven by political and health stability, alongside profound changes in the general orientation of the Algerian economy.

2.3. Commentary on Statistics and Reports Issued by International Institutions and Organizations

2.3.1. Arab Monetary Fund

Statistics from a research paper issued by the **Arab Monetary Fund (AMF) in 2023** present the distribution of investment projects across Arab countries and highlight the most important investment projects by sector. This study focuses on the **COVID-19 pandemic period**, with the aim of assessing its impact on Arab economies and examining the preventive measures adopted to mitigate its effects, particularly with regard to stimulating foreign direct investment.

Table 1: Distribution of Investment Projects in Arab Countries

Country	2000	2005	2010	2015	2019	2020	1970–2020
Jordan	913	1,984	1,689	1,600	730	726	34,396
United	-506	10,90	8,797	8,551	17,875	19,88	179,616

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Arab Emirates		0				4	
Bahrain	364	1,049	156	65	1,501	1,007	27,395
Tunisia	779	783	1,513	1,003	845	652	31,743
Algeria	280	1,145	2,301	-585	1,382	1,125	33,081
Saudi Arabia	183	12,097	29,233	8,141	4,562	5,486	263,541
Sudan	392	1,617	2,064	1,728	825	717	29,471
Iraq	0	515	1,396	-7,574	-3,076	-2,896	-28,983
Oman	832	1,538	1,243	3,255	3,420	4,093	35,425
Palestine	62	47	206	103	132	52	3,489
Qatar	252	2,500	4,670	1,071	-2,813	-2,434	28,861
Kuwait	16	234	1,305	311	104	-319	12,922
Lebanon	993	3,321	3,708	2,159	2,055	—	58,874
Egypt	1,235	5,376	6,386	6,925	9,010	5,852	132,589
Morocco	422	1,654	1,574	3,255	1,720	1,763	53,365
Mauritania	40,096	812	131	502	885	979	9,974
Arab Countries (Total)	5,928	46,914	69,984	30,624	39,012	36,936	934,650
Africa	14,752	17,748	57,460	59,700	114,162	90,562	1,078,036
Turkey	982	10,031	9,085	18,976	9,290	7,880	238,990
World	1,356,613	947,706	1,396,203	2,065,238	1,530,228	998,891	33,198,843

Source: Arab Monetary Fund

The data on **foreign direct investment (FDI) flows during 2000–2020** highlight a clear structural disparity among Arab countries in terms of size and stability, reflecting differences in economic openness and the quality of institutional environments. Major flows were concentrated in a limited number of economies characterized by large markets or attractive regulatory frameworks, while the remaining countries experienced sharp volatility and high sensitivity to external shocks. This pattern indicates that

the impact of FDI on economic growth remains conditional on the host economy’s capacity to absorb technological spillovers and strengthen domestic production linkages. Moreover, comparison with Africa and the world reveals the limited integration of Arab economies into global value chains, despite the availability of basic fundamentals.

With regard to **Algeria**, the data reveal a volatile trajectory of FDI inflows, with periods of decline reflecting weak legislative stability and the concentration of investments in the hydrocarbons sector. Accordingly, maximizing the developmental impact of foreign investment in Algeria requires diversifying the productive base, improving the business climate, and strengthening human capital.

Table 2: Major Investment Projects in Arab Countries by Sector

2019 (Million USD)	2020 (Million USD)	
Chemicals	7,613	8,215
Extractive Projects (Coal, Oil and Gas)	7,266	6,789
Renewable Energy	8,975	3,540
Telecommunications	1,679	2,916
Information & Communications Technologies (ICT) & Internet Infrastructure	1,376	1,890
Financial Services	1,779	1,441
Food and Beverages	1,554	1,386
Business Services	2,448	1,292
Hotels and Tourism Sector	6,207	1,116
Total Investment Projects	60,208	33,935

Source: Arab Monetary Fund (adapted)

This table presents the most important investment projects in Arab countries by sector. Investments declined across most sectors, except for telecommunications, internet-related activities, and chemicals, which increased by approximately **73.7%**, **37.4%**, and **7.9%**, respectively, in **2020**. In contrast, investment values in extractive industries and renewable energy decreased by about **6.6%** and **61%**, respectively, during the same year. This trend reflects the economic conditions prevailing during the **COVID-19 pandemic**, which affected all Arab countries, except for certain strategic-sector investments that remained relatively stable.

2.3.2. Arab Investment and Export Credit Guarantee Corporation

An annual report issued in **2023** focuses on monitoring major political, economic, social, and regulatory changes affecting the investment climate in Arab countries, while providing data and information on new projects and investment flows.

Table 3: Global Ranking of Arab Countries in Key Economic Indicators (2022)

Arab Ranking (2022)	Country	Real GDP Growth (%)	Nominal GDP (USD bn)	Nominal GDP, PPP (USD bn)	GDP per Capita (USD)	GDP per Capita, PPP (Intl. \$)	Inflation (Avg. Consumer Prices) (%)	Investment as % of GDP (%)	Population (Millions)	Unemployment Rate (%)
1	Saudi Arabia	16	17	17	36	22	6	50	42	103
2	UAE	27	30	34	16	6	36	72	89	30
3	Kuwait	20	57	66	26	35	24	139	121	31
4	Qatar	85	54	62	5	4	37	—	136	1
5	Iraq	21	49	46	102	115	38	38	35	154
6	Oman	83	66	76	45	48	13	100	122	26
7	Bahrain	87	94	99	41	25	21	34	148	10
7	Algeria	120	56	43	111	122	30	30	33	149
9	Libya	191	95	85	99	78	32	164	105	176
10	Egypt	36	32	118	97	107	146	13	13	131

Source: Annual Report 2022, Arab Investment and Export Credit Guarantee Corporation (adapted)

The 2022 Arab rankings reveal strong economic disparities across Arab countries. Gulf economies lead due to high growth, strong output, and high per capita income, supported by investment and non-oil sector expansion. Small oil-exporting countries show high purchasing power but face inflation and labor market imbalances. Highly populated economies suffer from weak investment, high unemployment, and inflation, reducing economic welfare despite large output. Algeria has a sizable economy and moderate income levels, but low

investment efficiency, high unemployment, and inflation constrain sustainable and inclusive growth

Table 4: Major Investing Companies in Arab Countries in 2022

Company	Capex Rank	Capex (US\$ bn)	Project Rank	Projects	Jobs Created	Investment Profile
Eni SpA	2	13	5	5	4,382	Capital- & job-intensive
TotalEnergies	7	9	—	—	3,361	Capital-intensive, moderate jobs
Masdar	3	11	—	—	3,290	Capital-intensive (renewables)
Fortescue FFI	6	10	—	—	3,000	Green capital-intensive
AMEA Power	9	7	3	6	—	Medium capex, high project spread
Regus (IWG)	—	—	1	9	—	Project-intensive, low capex
Stellantis	—	—	—	—	4,000	Manufacturing & job-intensive
Kronberg & Schubert	—	—	—	—	3,500	Labor-intensive manufacturing
Hutchison Port Holdings	—	—	—	—	3,188	Infrastructure & logistics
Alpine Group	—	—	—	—	3,163	Industrial, labor-absorbing

Source: Annual Report 2022, Arab Investment and Export Credit Guarantee Corporation

This table presents the leading investing companies in Arab countries in **2022**, classified according to **capital expenditure**, **number of projects**, and **jobs created**, as shown above. The data indicate that the **Indian ACME Group**, operating in the **chemical industries sector**, ranked first in terms of investment cost. The **Swiss International Workplace Group (Regus)** ranked first in terms of the number of projects; it operates in the **real estate sector** and specializes in providing physical and virtual workplaces for companies. Finally, the **Eni SpA Group**, operating in the **oil and gas sector**, ranked first in terms of the number of newly created jobs.

Table 5: Distribution of New Foreign Direct Investment Projects in Arab Countries in 2022

Rank	Country	No. of	No. of	Jobs	Avg.	Capex	Avg.
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		Projects	Companies	Created	Jobs / Project	(US\$ m)	Capex / Project (US\$ m)
1	UAE	923	890	38,871	42	10,837	12
2	Saudi Arabia	217	201	20,249	93	13,249	61
3	Egypt	148	130	61,063	413	106,996	723
4	Qatar	135	133	13,972	103	29,779	221
5	Morocco	71	64	21,074	297	15,308	216
6	Oman	35	35	8,071	231	9,795	280
7	Bahrain	24	21	2,743	114	2,199	92
8	Tunisia	13	12	1,706	131	402	31
9	Iraq	10	7	2,960	296	1,039	104
10	Jordan	10	9	820	82	377	38
11	Kuwait	6	6	777	130	555	92
12	Lebanon	5	5	91	18	12	2
13	Libya	5	5	2,240	448	6,362	1,272
14	Algeria	4	4	1,908	477	136	34
15	Palestine	3	3	100	33	25	8
16	Djibouti	2	2	154	77	2,469	1,235
17	Sudan	2	2	91	46	174	87
18	Yemen	2	2	113	57	358	179
19	Mauritania	1	1	16	16	55	55
20	Somalia	1	1	70	70	109	109
Total / Avg.	—	1,617	1,418	177,089	110	200,232	124

Source: Annual Report 2022, Arab Investment and Export Credit Guarantee Corporation

The **2022 data** reveal a concentration of new foreign direct investment (FDI) projects in a limited number of Arab economies. The **United Arab Emirates** leads in terms of the number of projects and investing companies, reflecting the attractiveness of its business environment and the high density of service-oriented investments.

In contrast, **Egypt and Qatar** outperform other countries in terms of capital intensity and job creation, indicating the dominance of industrial and infrastructure investments with high developmental impact. The disparity between the number of projects and the average number of jobs or capital

expenditure (Capex) per project highlights differences in investment models, with some countries emphasizing quantity, while others prioritize quality and scale.

With regard to **Algeria**, despite the limited number of projects, the high average number of jobs per project indicates a labor-intensive investment pattern with relatively low capital intensity. This underscores the need to enhance the attractiveness of large-scale projects and to increase the capital intensity of productive investments in order to strengthen their developmental impact.

4. Econometric Study of the Impact of Foreign Direct Investment on Economic Growth in Algeria for the Period 1970–2022

In order to build an econometric model, annual statistics for the study variables were collected for the period **1970–2022**, expressed in **US dollars**. The selected variables are as follows:

- **Foreign Direct Investment (Inv):** net inflows;
- **Trade Balance (Trade):** used as a control variable;
- **GDP per capita (PPP):** as an indicator of economic growth.

We adopt the **ARDL methodology**, also known as the **Bounds Test for Cointegration**, introduced by **Pesaran (1999)**. ARDL stands for **Autoregressive Distributed Lag**, which allows the examination of both long-run and short-run cointegrating relationships between the dependent and independent variables. This approach is based on a regression equation in which the dependent variable is regressed on its own lagged values, meaning that past periods influence the current value.

To apply this methodology, the following conditions must be satisfied:

- Variables must be stationary at the same level, i.e., stationary at level **I(0)** or stationary and integrated of order **I(1)**;
- One variable may be stationary and integrated of order **I(1)**, while another is stationary at level **I(0)**.

The steps of this methodology are as follows:

- Testing the stationarity of time series;

- Testing for cointegration using the **Bounds Test**;
- Estimating the long-run equilibrium relationship;
- Estimating the short-run equilibrium relationship (Error Correction Model);
- **5. Diagnostic tests:**
 - ✓ Test for serial correlation of errors: **LM Test (Breusch–Godfrey Serial Correlation Test)**;
 - ✓ Test for heteroskedasticity: **ARCH Test**;
 - ✓ Stability test of the **ARDL model**.

4.1. Study of Variable Stationarity

The use of non-stationary time series in econometric models leads to spurious results that distort the study's findings. Therefore, stationarity is examined using statistical tests, most notably the Augmented Dickey–Fuller (ADF) test, which is discussed below.

Augmented Dickey–Fuller (ADF) Test

In earlier models, the simple Dickey–Fuller test was valid only for first-order autoregressive models and ignored the possibility of error correlation. Consequently, **Dickey and Fuller (1981)** extended and improved this test to overcome these shortcomings. The test is based on the hypothesis **H₁:** $|\lambda| < 1$, and estimation using **Ordinary Least Squares (OLS)**, according to the following models:

$$\Delta Y_t = \lambda Y_{t-1} + \sum_{i=1}^p \varphi_i \Delta Y_{t-1} + \varepsilon_t \dots \dots \dots (1)$$

$$\Delta Y_t = \lambda Y_{t-1} + \sum_{i=1}^p \varphi_i \Delta Y_{t-1} + C + \varepsilon_t \dots \dots \dots (2)$$

$$\Delta Y_t = \lambda Y_{t-1} + \sum_{i=1}^p \varphi_i \Delta Y_{t-1} + C + bt + \varepsilon_t \dots \dots (3)$$

This test is conducted in the same manner as the simple Dickey–Fuller (DF) test, where **p** represents the lag length, determined by minimizing

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 information criteria such as **Akaike (AC)** and **Hannan–Quinn (HQ)** (Fuller, 1981, pp. 1057–1072).

The results of the **ADF unit root tests** show that the variables **Inv** and **PPP** are stationary at first difference and integrated of the same order **I(1)**, while the **Trade** variable is stationary at level **I(0)**, as shown in **Table 6**.

4.2. Cointegration Test Using the Bounds Test

After satisfying the conditions for applying the **ARDL methodology** through stationarity testing, the **Bounds Test** is used to examine cointegration, i.e., the existence of a long-run equilibrium relationship among the study variables. **Pesaran, Shin, and Smith** provided two sets of critical values, assuming that all variables are **I(0)** in the lower bound and **I(1)** in the upper bound.

The test relies on the **F-statistic**, which is compared to the Bounds critical values. The null hypothesis assumes **no long-run equilibrium relationship**, while the alternative hypothesis assumes **the existence of a long-run equilibrium relationship**, as follows:

- If the calculated **F-statistic** is greater than the upper bound critical value, the hypothesis of cointegration is accepted;
- If the calculated **F-statistic** is lower than the lower bound critical value, the hypothesis of no cointegration is accepted;
- The test is inconclusive if the calculated **F-statistic** falls between the lower and upper bounds (Mert, 2019, p. 39).

Based on the results reported in **Table 7**, the calculated statistic is **F_stat = 3.451959**, which is greater than the critical value provided by **Pesaran** at the **10% significance level**. Therefore, we accept the alternative hypothesis **H₁**, concluding that there is cointegration and a long-run equilibrium relationship between foreign direct investment and economic growth.

4.3. Estimation of the Long-Run Equilibrium Relationship

After confirming the existence of cointegration among the study variables using the **Bounds Test**, the long-run model is estimated according to the following equation:

$$PPP = (2.03INV - 06E) + (2.03TRADE - 08E) + 1609.8$$

$$(*0.0053)$$

$$(0.3659)$$

$$(*0.0096)$$

As shown above, the **foreign direct investment variable** is statistically significant, unlike the **trade balance** variable. This indicates that foreign direct investment affects economic growth in the long run. A one-unit increase in foreign direct investment leads to an increase in economic growth by **2.03E-06**.

The weak impact of foreign direct investment can be explained by the nature of investments in Algeria and their sensitivity to the investment climate, which requires a comprehensive set of economic, political, and legislative incentives. In addition, the Algerian economy relies heavily on a single resource—**oil revenues**—with limited economic diversification. This dependence affects public revenues and the trade balance positively or negatively depending on global oil price fluctuations.

4.4. Estimation of the Short-Run Relationship (Error Correction Model)

After estimating the Error Correction Model (ECM), it is necessary to verify that the error correction coefficient is **negative and statistically significant** in order to be acceptable both statistically and economically. Based on the results reported in **Table 8**, the short-run relationship is estimated as follo

$$D(PPP) = -0.076489617228*(0.223451874786*PPP(-3) + 4.01288043238e-08*TRADE)$$

$$(0.0004)$$

$$(*0.0081)$$

$$(*0.0000)$$

The error correction coefficient is negative and statistically significant, with a value of **ET₋₁ = -0.0764896**, indicating acceptance both statistically and economically. This coefficient represents the speed at which the economy adjusts back to equilibrium following shocks, i.e., the speed of correction from short-run disequilibrium toward long-run equilibrium. The adjustment speed is approximately **7%**, which is relatively weak.

Furthermore, foreign direct investment does not exhibit any significant short-run effect, unlike the trade balance, which has a positive effect on economic growth in the short run. A one-unit increase in the trade balance leads to an increase in economic growth by **4.01288043238e-08**. This

reflects the volatility and instability of Algeria's trade balance due to its heavy dependence on oil exports amid global oil price fluctuations.

4.5. Diagnostic Tests

4.5.1. Test for Serial Correlation of Errors

According to the **Breusch–Godfrey test** for serial correlation, which relies on the **F-statistic**, the results shown in **Table 9** indicate that the probability value is greater than the significance level:

Prob(F) = 0.3637 > 0.05.

Thus, the null hypothesis of **no serial correlation** is accepted.

4.5.2. Test for Heteroskedasticity

Using the **Breusch–Godfrey test** for heteroskedasticity, based on the **F-statistic**, the results reported in **Table 10** show that:

Prob(F) = 0.8609 > 0.05.

Accordingly, the null hypothesis of **homoskedasticity (constant variance of errors)** is accepted.

4.5.3. Stability Test of the ARDL Model

To ensure the stability of the **ARDL model**, there should be no structural changes over time. This is examined using:

- **CUSUM** (Cumulative Sum of Residuals);
- **CUSUM of Squares.**

As shown in **Figures 3 and 4**, the cumulative sum of residuals and the cumulative sum of squared residuals lie within the critical bounds at the **5% significance level**. This confirms the stability of the variables in both the short and long run and indicates the absence of structural breaks over time. Therefore, the **ARDL model is structurally stable**.

This test is conducted in the same manner as the simple Dickey–Fuller (DF) test, where **p** represents the lag length, determined by minimizing information criteria such as **Akaike (AC)** and **Hannan–Quinn (HQ)** (Fuller, 1981, pp. 1057–1072).

The results of the **ADF unit root tests** show that the variables **Inv** and **PPP** are stationary at first difference and integrated of the same order **I(1)**, while the **Trade** variable is stationary at level **I(0)**, as shown in **Table 6**.

5. Conclusion:

Our study has shown that the impact of foreign direct investment (FDI) on economic growth in Algeria between 1970 and 2022 remained **limited and uneven**, due to the concentration of investments in the hydrocarbons sector, weak productive linkages, regulatory instability, low economic diversification, and limited technology transfer. Econometric models (ARDL) confirmed that the **long-run relationship** between FDI and growth is weak, while the trade balance has a **marginal short-run effect** on growth, reflecting the rent-based nature of the economy and constraints of the productive apparatus.

Based on these findings, the study recommends:

- Diversifying sectors receiving investment and increasing productive investments outside the oil sector.
- Improving the investment climate by simplifying procedures, combating corruption, and implementing good governance.
- Developing human capital to enhance productivity and efficiency.
- Promoting exports and liberalizing foreign trade to reduce dependence on oil and domestic demand.
- Reforming the financial and fiscal systems to support investment and stimulate growth.
- Activating economic diplomacy and joining economic blocs to attract sustainable foreign investment.
- Providing guarantees and incentives to foreign companies to ensure political and economic stability.

Achieving a **positive and sustainable impact** of FDI on Algerian growth depends on implementing comprehensive reforms that develop the national economy and strengthen its integration into the global economy.

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7. Appendices :

Table 6: ADF Stationarity Tests

Variable	At level constant Linear		At first differences constant Linear	
	ADF	The decision	ADF	The decision
PPP	0.25	Non-stationary	0.71	Stationary
Trade	0.56	Non-stationary	-	Stationary
Inv	0.11	Non-stationary	0.49	Stationary
Variable	At level constant		At first differences constant	
	ADF	The decision	ADF	The decision
PPP	0.07	Non-stationary	0.22	Stationary
Trade	0.47	Non-stationary	-	Stationary
Inv	0.25	Non-stationary	0.90	Stationary
Variable	At level none		At first differences none	
	ADF	The decision	ADF	The decision
PPP	0.83	Non-stationary	0.00*	Stationary
Trade	0.02*	stationary	-	Stationary
Inv	0.21	Non-stationary	0.00*	Stationary

Source: Prepared by the researchers using EViews 12.

Table 7: Cointegration Test Using the Bounds Test (BOUNDED TEST)

The impact of foreign direct investment on economic growth in Algeria for the period between 1970-2022

berriche rabah, rahmoun mohamed said

ARDL Long Run Form and Bounds Test
Dependent Variable: D(PGDP)
Selected Model: ARDL(4, 0, 1)
Case 2: Restricted Constant and No Trend
Date: 10/29/23 Time: 15:20
Sample: 1970 2022
Included observations: 49

Conditional Error Correction Regression				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	123.1330	78.54721	1.567539	0.1247
PPG(-1)*	0.975499	0.032830	2.969588	0.0048
INV**	1.55E-07	5.97E-09	2.611409	0.0115
TR(-1)	5.84E-08	8.32E-09	1.057108	0.2780
D(PPG(-1))	0.135437	0.119241	1.135522	0.2626
D(PPG(-2))	0.009301	0.088938	0.054232	0.8254
D(PPG(-3))	0.232763	0.093316	2.484230	0.0167
D(TRADE)	4.01E-09	4.05E-09	9.627100	0.0000

- p-value incompatible with t-Bounds distribution.
*- Variable interpreted as $Z = Z(-1) + D(Z)$.

Levels Equation
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
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Table 8: Error Correction Model (ECM)
Source: Prepared by the researchers using EViews 12

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PPG(-1))	0.135437	0.085861	1.577387	0.1224
D(PPG(-2))	0.009301	0.085566	0.109553	0.9140
D(PPG(-3))	0.232763	0.083884	2.782321	0.0081
D(TRADE)	4.01E-09	4.20E-09	9.367090	0.0000
Constant(-1)*	-0.078480	0.019870	-3.849437	0.0004

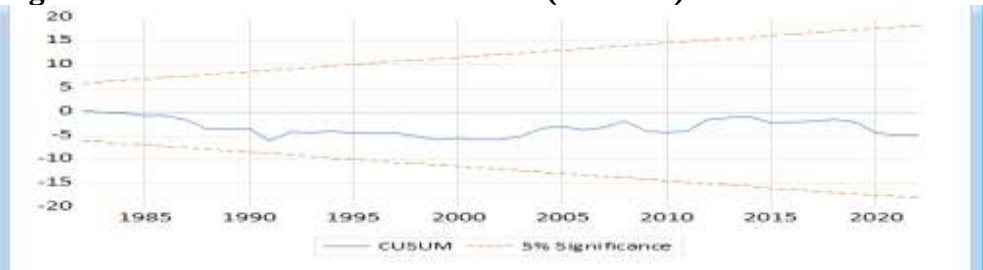
R-squared: 0.754772 Mean dependent var: 78.20438
Adjusted R-squared: 0.732479 S.D. dependent var: 414.0050
S.E. of regression: 214.4343 Akaike info criterion: 13.87033
Sum squared resid: 2923997 Schwarz criterion: 13.86347
Log likelihood: -329.9288 Hannan-Quinn criter.: 13.74367
Durbin-Watson stat: 1.829500

- p-value incompatible with t-Bounds distribution.

F-Bounds Test

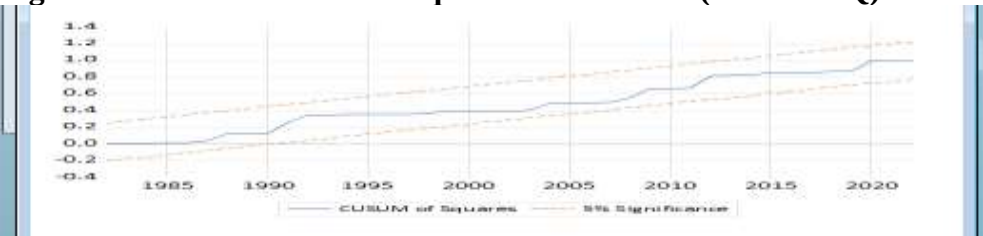
Null Hypothesis: No levels relationship				
Test Statistic	Value	Signif.	(0)	(1)
F-statistic	3.451959	10%	2.63	3.35
K	2	5%	3.1	3.87
		2.5%	3.55	4.39
		1%	4.13	5

Figure 3: Cumulative Sum of Residuals (CUSUM)



Source: Prepared by the researchers using EViews 12

Figure 4: Cumulative Sum of Squares of Residuals (CUSUMSQ)



Source: Prepared by the researchers using EViews 12