The Impact of Foreign Direct Investment on Economic Development in Algeria: An econometric study during the period (1990 – 2021)

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Abstract:
*The interest attached by researchers in the Foreign Direct Investment has increased since the last century, because of its role in supporting the economies of the different developed and developing countries without exceptions. In this context, this study aimed at measuring the impact of the Foreign Direct Investment on the Economic Development in Algeria during the period between 1990 - 2021. To achieve this goal, the Vector Autoregressive model (**VAR**) was used, based on two variables which are the Gross Domestic Product, and the flows of the Foreign Direct Investment. The study had concluded that Foreign Direct Investment doesn't affect the Economic Development in Algeria.*
Key words: *Foreign Direct Investment, Economic Development, Gross Domestic Product, Vector Autoregressive model.*
Jel Codes Classification*: F21, O1, O47, O55.*

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أثر الاستثمار الأجنبي المباشر على التنمية الاقتصادية في الجزائر: دراسة قياسية خلال الفترة (1990-2021)

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ملخص:

لقد تزايد اهتمام الباحثين بالاستثمار الأجنبي المباشر منذ القرن الماضي، وذلك لدوره في دعم اقتصاديات مختلف دول العالم المتقدمة والنامية دون استثناء. وفي هذا السياق، هدفت هذه الدراسة إلى قياس أثر الاستثمار الأجنبي المباشر على التنمية الاقتصادية في الجزائر خلال الفترة 1990-2021. ولتحقيق هذا الهدف تم استخدام تقنية أشعة الانحدار الذاتي (VAR)، بالاعتماد على متغيرين وهما الناتج المحلي الإجمالي وتدفقات الاستثمار الأجنبي المباشر. وقد خلصت الدراسة إلى نتيجة مفادها أن الاستثمار الأجنبي المباشر لا يؤثر على التنمية الاقتصادية في الجزائر.

الكلمات المفاتيح: الاستثمار الأجنبي المباشر، التنمية الاقتصادية، الناتج المحلي الإجمالي، تقنية أشعة الانحدار الذاتي.

التصنيف JEL: F21، O1، O47، O55.

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Introduction:

The different aspects related to FDI have been explored and evaluated long time ago. Nevertheless, in the past the determinants and impacts related to FDI were explained theoretically without giving empirical evidence. As time passed econometric models equations and indices were used to find out the empirical results (Kurtishi-Kastrati, 2013, p. 56) .There are many empirical papers on researching the different effects of FDI. However, the variables identified vary from one to another (Minh & others, 2020, p. 174) .

The flow of Foreign Direct Investment and its continuation towards developing countries depends on manydeterminants, including what is essential, such as political and economic stability, macroeconomic indicatorsand the extent of their impact on the decision concerning foreign investment, in addition to economicpolicies adopted by the host country for investment and the independence of the judicial system. Moreover,there are some other complementary determinants, including the size of the market and the rate of itsgrowth in addition to the availability of qualified human resources and the strength of the communicationsbase. Therefore, these developing countries have improved their investment climate and cleansed theirbusiness environment in order to obtain the largest amount of foreign direct investment flows (Khechiba & Djedidi, 2020, p. 2) .

Algeria, like all developing countries, has worked to improve its investment climate by providing a legal and regulatory framework for this foreign financial resource, as well as working to improve the performance ofits economy byimproving macroeconomic indicators and attempting to make it more stable and at acceptable levels, all within the context of a national policy aimed at achieving progress and economic openness to the rest of the world. This is in order to win the advantages that FDI offers, especially the increase in economic developmentindicators.

Based on the above, the problematic of the study revolves around the following question:

What is the impact of Foreign Direct Investment on Economic Development in Algeria?

Objective of the study:

The objective of this study is to measure the impact of FDI on economic development in Algeria during 1990-2020 using the Vector Autoregressive model (VAR), and to determine the relationship between Foreign Direct Investment and Economic Development in Algeria.

Significance of Study:

- The study tends to explore how can FDI boost economic development.

- Highlight the central role of foreigndirect investment in the world.

- Trying to find an alternative that would allow Algeria to increase the financial resources out of energy sector.

Hypotheses:

- Algeria has undertaken many reforms for the purpose attracting foreign direct investment, but they have yet to achieve the looked-for results.
- Algeria is characterized by its strategic location and diversity in its wealth; more to the point, it has shown to be of an important focal point for multinational companies.
- In light of the impartiality and credibility of the provided statistical data, we presuppose that a comprehensive and accurate description can be provided for the relationship between the two variables.

Study Methodology:

We rely on the descriptive and analytical approach regarding the theoretical concepts of foreign direct investment and economic development, supported by an econometric study to determine the extent of their correlation and impact.

I- The Literature Review:

There are a number of studies that have explained the relationship between the inflows of foreign direct investment and economic development. Most of them confirmed that FDI is often seen as an important catalyst for economic development.

Nikolaos Papageorgiadis and others, The Effect of European Intellectual Property Institutions on Chinese Outward Foreign Direct Investment, This study examines the role of the strength of the Intellectual Property (IP) institutions of 23 European countries in attracting Chinese Outward Foreign Direct Investment (OFDI) during the time period 2003-2015. Following a Dynamic Panel Data Analysis methodology, they found that the strength of IP institutions has a positive effect in attracting higher levels of OFDI from China (Papageorgiadis & others, 2019).

Amna Muhammad Gudaro and others, Impact of Foreign Direct Investment on Economic Growth: A Case Study of Pakistan, This paper aimed to analyze the effect of FDI in Pakistan for the period from 1981 to 2010. The study tried to link between Gross Domestic Product (GDP) on one part and Foreign Direct Investment FDI and Inflation on the other part. While GDP is considered as a dependent variable, FDI and Inflation are considered independent variables. Consequently, the results showed that the model has a positive and significant association of GDP and FDI. Yet, a negative and significant relationship is attested between GDP and inflation (Gudaro & others, 2012).

Mehdi Behname, **Foreign Direct Investment and Economic Growth: Evidence from Southern Asia**, The paper aimed to investigate the influence of Foreign Direct Investment (FDI) on Economic Growth in Southern Asia for the period 1977-2009, using the IM, Pesaran and Shin (2003) unit root test and Hausman (1978) test. The study came to the conclusion that Foreign Direct Investment (FDI) has positive and significant effect on Economic Growth and variables such as human capital, economic infrastructure and capital formation have positive effect on Gross Domestic Product (GDP). But, population, technology gap and inflation have negative effect on the economic growth (Behname, 2012.).

Sarumi Adewumi,The Impact of FDI on Growth in Developing Countries_An African Experience, This paper examined the contribution of Foreign Direct Investment to Economic Growth in Africa using Graphical and Regression Analysis Data for the entire continent and data for eleven countries within the continent were used for the empirical analysis. The time series data is from 1970-2003. It was discovered that the contribution of FDI to growth is estimated to be positive in most of the countries but not significant (Sarumi, 2006).

Samir Cherakrak and WahibaGaham, Foreign Direct Investment and Economic Growth In Algeria -An application of The Autoregressive Distributed Lag Model (ARDL), This study aimed to analyze the Impact of Foreign Direct Investment on Economic Growth in Algeria, over the period 1990-2018, using (ARDL), developed by Pesaran& al (2001), The study showed that in the short and long run, FDI has a significant negative effect on growth in Algeria. This means that Foreign Direct Investment has had a negative effect on the economic growth of Algeria (Cherakrak & Gaham, 2020).

Nepal Ramsharan, Foreign Direct Investment: Political and Economic Risks,The objective of this paper was to find out the risks that a home and host country can face in terms of political and economic system. The study concluded that the change in political and economic environment of host country also makes changes on home country and the business has to be suffered and vice versa. Since the FDI is key to economic growth and prosperity every country wants to welcome it. But due to lack of proper matching between the goal of host and home country they have to face lot of challenges (Nepal, 2019).

ZohraKhechiba and RaoudaDjedidi ,Study of the Asymmetric Effects of the Determinants of Foreign Direct Investment in Algeria Using the Method of Nonlinear Autoregressive Distributed Lag (NARDL) during the Period (1970-2018), This study aimed to show the most important determinants of Foreign Direct Investment in Algeria

aswell as the standard modeling that links to their relationship during the period (1970-2018). Eviews Economic Measurement Programwas used to estimate the model and reveal the existence of a common integration between Foreign DirectInvestment and its main determinants according to the method of Nonlinear Autoregressive Distributed Lag(NARDL).The results of the tests concluded that there is a long-term balance relationship as well as an asymmetrybetween the size and determinants of Foreign Direct Investment inflows, which are inflation, exchange rate,economic growth rate, population census, and external debt stocks in Algeria during the studied period (Khechiba & Djedidi, 2020).

II- The reality of Foreign Direct Investment in Algeria:

The arrival of foreign direct investment to any country depends on the availability of an attractive investment climate. Like any other country, the Algerian government has sought to promote this investment through enactment of a number of laws that contain a host of fiscal incentives as an attempt to create this favourable environment and attract foreign direct investment (Zaaich & Bouzida, 2018, p. 185).

II-1- FDI in Algeria and Rule 49/51:

The Algerian government has taken in consideration the issue of FDI sinceindependence, through a series of successive laws that were compatible with thenature of the stage and the economic situation (Bensghir, 2010, p. 34).

Often the Algerian government has imposed measures to foreign investment, foremost of which is the adoption ofthe famous rule 49/51, which means that the Algerian partner or partners - whether public or private - must own 51% ofthe investment assets to be established in Algeria by Foreigners, with the necessity of the commitment of foreigncompanies that want to invest in Algeria to establish a partnership with local investors, as a kind of preserving nationalsovereignty and protecting the national economy, as Algeria regards this rule as a sovereign and legal right that it has theright to impose and exercise its economic sovereignty within its geographical framework. However, according to a recentstudy by the World Bank that affected 99 countries, it found that Algeria is the only country in the world that applies thistype of legislation (Tebani & Semsoum, 2021, p. 14).

The following table summarizes the legal texts by which the rule 49/51was adopted or repealed in Algeria:

Table n° 1: Rule 49/51 through various legal texts

Title	Legal text	Rule 49-51	Notes
Investment law 1963	Law 63-277 of July 26, 1963 containing the Investment Law (Official Gazette 53).	Not available	–A law specifically directed at foreign capitals. –Freedom of foreign investment in order to participate in building and constructing the national economy, while giving them guarantees. –In fact, it was not implemented due to nationalizations.
Investment law 1966	Law 66-284 of September 15, 1966 containing the Investment Law (Official Gazette 80).	Dedicated the base.	–Giving priority to local investment. –Determine the field of investment intervention in two economic sectors (industry and tourism). –Mixed companies with contributions from state capital. –Provision of the possibility of nationalization. –Disputes are subject to the Algerian

			courts and law.
Mixed economy companies law 1982	Law 82-13 of August 28,1982 containing the Mixed economy companies law (Official Gazette 35).	Dedicated the base.	−Mixed economy companies. −A reservation from foreign investment. −Provision of the possibility of insurance.
Investment law 1986	Law 86-13 of August 19,1986 which amends and completes Law 82-13 (Official Gazette 35).	Dedicated the base.	−New ways of running mixed companies in a stimulating and flexible way. −Reducing control over mixed economy companies.
Money and credit law 1990	Law 90-10 of April 14, 1990 containing The Money and Credit Law (Official Gazette 39).	Cancel the partnership clause.	Freedom to transfer capital. The text for the first time on the international guarantees contained in international agreements ratified by Algeria.
Investment law 1993	Legislative Decree of October 05,1993 containing the Investment Law (Official Gazette 64).	Cancel the partnership clause.	−Freedom of investment + guarantees. −The possibility of recourse to international courts in the event of disputes. −APSI establishment, support and follow-up of the Investment Promotion Agency.
Investment law 2001	Law 01-03of August 20, 2001 containing the Investment Law (Official Gazette 47).	Cancel the partnership clause.	−Increase tax and customs incentives. −The establishment of the National Council for Investment, CNI. −Establishing the National Agency for Investment Development. ANDI. −Establishing the only window at the decentralized level.
Complementary Finance Law 2009	Law 09-01of July 22, 2009 containing the Complementary Finance Law 2009 (Official Gazette 44).	Dedicated the base.	− Establishing the right of pre-emption, this gives the government the right to acquire shares of foreign companies active in the local market, when making any decision to suspend their activities.
Investment law 2016	Law 16-09of August 05, 2016 containing the Investment Law.	Dedicated the base.	− Preserving the right of pre-emption for the state.
Finance Law 2020	Law 19-14of December 11, 2019 containing the Finance Law 2020 (Official Gazette 81).	Abolish the rule.	− With the exception of some strategic sectors (such as hydrocarbons, mines and military industries).

Source : Tebani Amel, SemsoumAicha, **Assessing Foreign Direct Investment in Algeria: From the Implications of Rule 51/49 to the Impact of the Coronavirus pandemic**, Journal of Economic Growth and Entrepreneurship, Vol. 4, No. 6, University of Adrar, Algeria, 2021, p 15.

The above table showed us the unstable of the enactment on foreign investment in Algeria and also we noticed that the rule 49/51 was pull out of from the investment law and included in the finance law starting from 2009 and this proceeding doesn't give a share in the stability of investing and doesn't give reassure signals of foreign investors and does not give service a picture, Algeria in international record the contrary, suggests doubt and uncertainty.

The first important change to the 49/51 rule was initiated under the FL 2020, which loosened the application of the 49/51 rule. The FL 2020 provided that the 49/51 rule shall only apply to "production and service activities which are strategic for the national economy". Accordingly, the FL 2020 has transformed the 49/51 rule from a general rule to a rule of exception by means of limiting its application to strategicsectors.

Pursuant to the Supplemental Finance Law for 2020 (promulgated on June 4 2020, the SFL 2020) and to the Finance Law for 2021 (promulgated on December 31 2020, the FL 2021), sectors which remain subject to the 49/51 rule include importation for resale without transformation and the following strategic sectors mining, energy, defense, transport infrastructure, and pharmacy.

II-2- The evolution of FDI flows during the period (1990-2021):

Several natural advantages are characterizing Algeria, as it has a surface assessed to 2,381,741 km^2. As for location, it is situated in the centre of Maghreb in the northwest of the African continent. Moreover, it is bordered by the Mediterranean Sea in the north, it extends south to the depths of the desert, from which Algeria owns more than 2,000,000 km^2; likewise, it has sea coasts extending over 1200 km. more to the point, thanks to the gigantic natural resources and the huge tourism potentials possessed by Algeria, this latter constitutes a natural area for attracting foreign direct investment. Nonetheless, the economic policies and the management of such resources have not been sufficient to attain an effective economic framework, the fact of which made Algeria struggle in lots of problems and thus compelling it to opening up the field for foreign direct investment. In virtue of which, the figure hereunder shows the evolution of the flow of foreign direct investment incoming to Algeria during the period extending from 1990 to 2021.

Figure n°1: Foreign Direct investment net inflows (BoP, current US$) -Algeria

Source: The World Bank https://www.worldbank.org/en
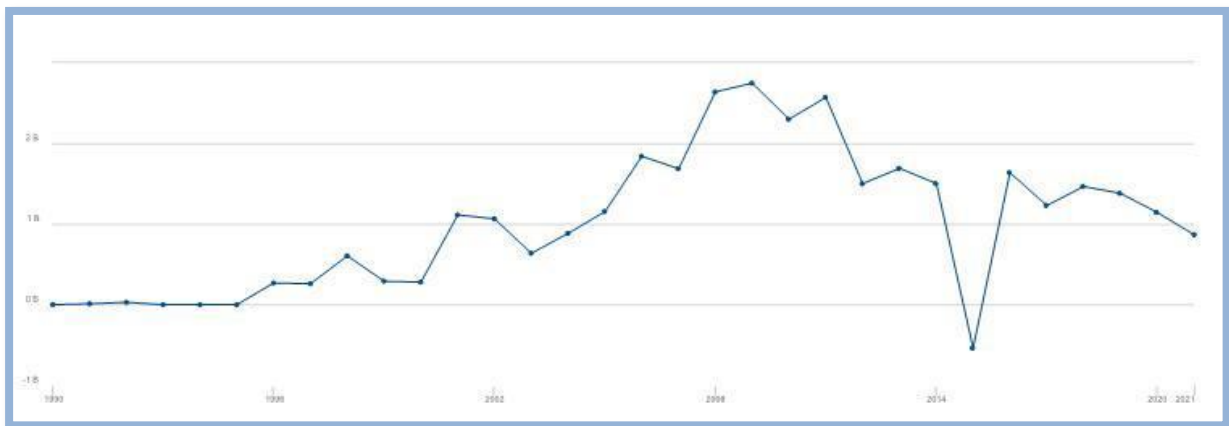
In fact, foreign direct investment inflows have increased during the years of 2001 and 2002 compared to the period extending from 1990 to 2000, whereat they recorded 1,2 billion dollars, hence ranking third in Africa, seeing that this rise coincided with the issuance of Law No.03/01 alongside the incentives and guarantees included therein both for foreign and local investors. However, with regards to the year 2002, it recorded around 1,1 billion dollars, which is due to the sale of the mobile phone license to the Egyptian company Orascom on 21st

July 2001, along with the privatization of the Steel Industries Company to the Indian company ISPAT.

Besides, during 2003, foreign direct investment inflows to Algeria decreased, whereat they reached 0.2 billion dollars. However, such decline is due to the decrease in foreign projects in the energy sector, which is considered the first sector in attracting foreign investments; although this decline, foreign investment flows have known an increase after 2003, due to the sale of the firth license for the Kuwaiti company, the fact of which confirms the weak effect of tax incentives in attracting foreign direct investment, for the reason that most of the tax incentives are granted by the Ordinance No. 03/01. As consequence, they set a record throughout the course of the reforms undertaken by the Algerian State, whereat they reached the amount of 2, 75 billion dollars in 2009.

Nevertheless, foreign direct investment flows fell to 1,5 billion dollars during 2012, seeing that this issue is due to the imposition of the foreign investment rule 51/49 (measures of the Supplementary Finance Law of 2009), which stipulate that the national investor has the right to obtain at least 50% in any project with a foreign partner. Likewise, the documentary credit was alike imposed as the only means of payment, in addition to the inability for the foreign investor to recover his/its capital except after twenty-five years of activity along with the abolition of the foreign investor's right to purchase real estate. Above and beyond, the flow of foreign direct investment to Algeria continued to fluctuate year after year, whereat a significant decline was recorded in the value of foreign direct investments in Algeria in 2015 (the oil crisis), as they attained the amount of (-0,5) billion dollars, compared to 1,6 billion dollars in 2016, and continued declining until reaching 869,17 billion dollars in 2021 due to the health crisis and the repercussions thereof on the worldwide economy.

Having said that, it has shown to be clear that the impact of the energy and hydrocarbon sector affects wholly the volume and value of the foreign direct investments in Algeria, thus making Algeria at all times a secondary destination for foreign investments, in addition to administrative bureaucracy and lack of clarity in terms of legislation and laws.

II-3- Algeria's potential attracting FDI :

Foreign direct investment (FDI) inflows to Algeria tend to be below the country's potential considering its substantial natural resources, strong macroeconomic indicators and favourable demographic factors. This is amongst others due to a challenging business environment, new investment laws introduced by the complementary finance bill for 2009 and the existing tax regime (Africa gearing up, Price water house Coopers (PWC).

The following table summarizes Algeria'spotential attracting FDI:

Table n° 2: Algeria's potential attracting FDI

Source	Prospects
Business environment	Algeria has set forth restrictive regulations for foreign investors. Specifically, for businesses created after August 2009, foreign companies are obliged to have a local partner for 51% of their investment in Algeria and a 30% local partner in their import companies.
Labour	Algeria has a large labour force and enjoys high levels of human development. It also performs quite well in terms of healthcare indicators, with Algerians having high life expectancy and low prevalence of HIV/Aids.
Natural gas	The supply of natural gas is reliable,Butgetting a connection to the grid takes 134 days onaverage.
Electricity	Although Algeria is heavily reliant on fossil fuels for power generation, the Government recently unveiled plans to

		develop the country's renewable energy industry and has aims to produce 5% of the country's electricity needs from solar energy by 2017. vii In particular, the country will expand its solar power capabilities by investing in the Desertec project, eventually also exporting electricity to Europe.
Logistics		According to the latest Logistics Performance Index (LPI), Algeria has improved its overall ranking from 140th in 2007, to 130th in 2010 and 117th in 2018.
Transport infrastructure	**Air transport**	Airports and air transport are on the Government's agenda for further expansion projects.
	Rail	A future rail line will connect Africa's northern coast and link Tunisia to Morocco.
	Roads	Road corridor priorities could change in the future from east-west to north-south
	Ports	Algeria's economy depends on its congested Mediterranean ports (Arzew, Skikda, Algiers).

Source: **prepared by the student based on PWC Reports** https://pwcalgerie.pwc.fr/

III- The econometric study of the impact of FDI on Economic Development in Algeria during the period (1990-2021)

For identification purpose of the nature of the relationship between foreign direct investment and economic development in Algeria, since its orientation towards a market economy and openness to foreign markets in the early nineties during the period (1990 - 2021), we adopted a Vector Autoregressive (VAR) model.

III- 1- Presentation of variables:
This study was carried out based on annual data for the two variables hereunder:

- Gross Domestic Product (**GDP**): We will adopt this variable as a representative indicator of economic development;

- Net inflows of foreign direct investments as a percentage of the gross domestic product (**FDI**): It represents the sum of equity capital, reinvested earnings and other long-term and short-term capitals; besides, it is considered as the predominant source of capital inflows.

III- 2- Study of the stability of time series:

In order to be acquainted with the nature and properties of the series, it has shown mandatory for us to undertake a graph analysis, and then carry out the Dickey-Fuller tests in order to substantiate the results. Further, this latter has alike shown to be applied for the aim of determining the nature of the instability of the series; thus, in the event that we find it unstable, as being of (DS) type, we shall apply the differences d once in order to make it stable anew; however, should it be of the (TS) type, then we will remove the effect of the general trend.

a- **Analysis of graphs**: In order to know the nature and characteristics of the two series, it is necessary to analyse their two graphs

Figure n°2: Development of GDP and FDI Series during the period of (1990 - 2021)
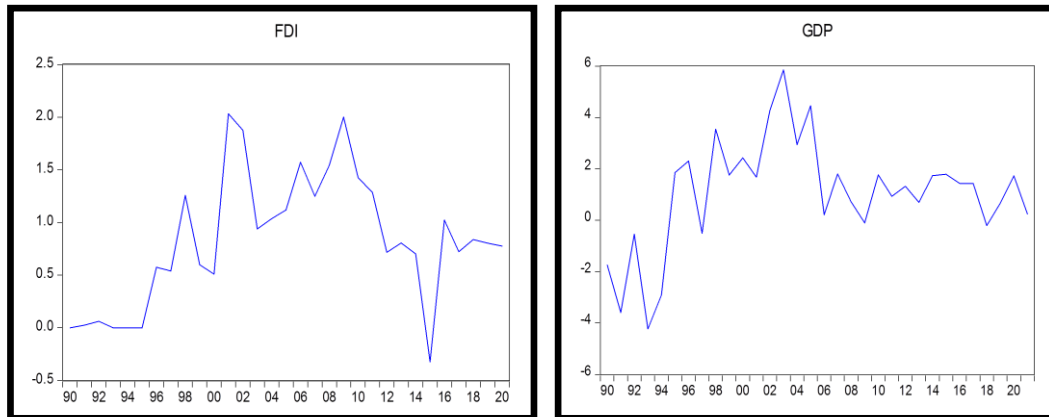
In virtue of which, the instability of the two series was shown to be clear from the graphic representation thereof, Besides, in order to make certain of the instability of the two series, we will apply the Dickey-Fuller test.

b- **Unit root test on the two time series:**

when using temporal data, it is essential that they maintain a constant distribution over time. This concept of stationarity must be checked for both series in order to avoid false regressions for results likely to be significant, when they are not. If a series is non-stationary, the difference can be converted to a stationary series. In order to examine the presence of unit root, the augmented Dickey-Fuller (ADF) is used to test:

$$H_0: There\ is\ a\ unit\ root, \emptyset = 1\ against\ H_1 : Absence\ of\ unit\ root, \emptyset < 1$$

We obtain the following results (Table n° 2). Faced with the lack of stationarity of the two time series at the level, we must pass to the stationarity test in first difference.

Table n° 3: Stationarity test results on GDP and FDI series

Variable		Augmented Dickey-Fuller Test in the Level			Augmented Dickey-Fuller Test in first difference		
		Trend and intercept	intercept	none	Trend and intercept	intercept	none
GDP	$ADF_{calculated}$	-3.0909	-2.6350	-1.8950	-9.0143	-8.9068	-9.0043
	$ADF_{Tabulated}(5\%)$	-3.5628	-2.9639	-1.9524	-3.5683	-2.9639	-1.9524
FDI	$ADF_{calculated}$	-3.0225	-1.3443	-1.2315	-7.4833	-7.6275	-7.7149
	$ADF_{Tabulated}(5\%)$	-3.5628	-2.9604	-1.9520	-3.5683	-2.9639	-1.9524

The results of the unit root test show that the two series became stationarity after the first differention, so they are integrated of the same order 1, for that it is interesting to seek a possible relation of co-integration between them.

III- 3- Test of johansen's Cointegration Relation:

Since the two series have the same stationarity order (the two series are integrated with order 1), so there is a possibility of a co-integration relationship (the return to long-term equilibrium). We will apply the test of the trace and the maximum eigenvalue of Johansen

(1991) the existence of a possible relation of co-integration, but before that we determine the number of optimal delay of the system (VAR) with series in raw state.

Table n° 4: Determination of the degree of delay of the (VAR) system

VAR Lag Order Selection Criteria
Endogenous variables: GDP FDI
Exogenous variables: C
Date: 03/21/23   Time: 13:54
Sample: 1990 2021
Included observations: 30

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-90.12180	NA	1.593207	6.141454	6.234867	6.171337
1	-78.97652	20.06151*	0.990732*	5.665101*	5.945341*	5.754752*
2	-75.08174	6.491288	1.002643	5.672116	6.139182	5.821535

Source: Eviews 10 outputs

We have retained the number of delays which minimizes the information criteria, is (p=1).

For the reason that the studied data failed to show any general significant trends, we shall have the choice to conduct tests with the hypothesis that (We will adopt the first hypothesis in our study):
- The absence of the general trend component in (VAR), along with the absence of the constant and the general trend component in the cointegration relationship.
- The absence of the general trend component in (VAR), along with the presence of the constant with the absence of the general trend component in the cointegration relationship.

a- Trace test :
The trace test consists in testing the existence of a co-integration between the two series, the test results are shown in the following table:

Table n° 5: Results of the Trace test

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.251491	11.56177	15.49471	0.1792
At most 1	0.091281	2.871586	3.841466	0.0902

Trace test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Eviews 10 outputs

In the light of the tabulated impact test results, we accept the null hypothesis "there is no cointegration relationship between the two studied variables" at a significant level of 05%.

b- Results of the maximum eigenvalue test:
The test results are shown in the following table:

Table n° 6: Results of the maximum eigenvalue test

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.251491	8.690181	14.26460	0.3128
At most 1	0.091281	2.871586	3.841466	0.0902

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Eviews 10 outputs

The results of the tabulated maximum eigenvalue test lead also to the same decision, whereat we accept the hypothesis of the total absence of cointegration relationships.

In virtue of which, we have concluded that there is no cointegration relationship in the long term between the two studied variables.

III- 4- Determination and Assessment of the Model:

In the light of the cointegration results, through which we concluded that there exists no cointegration relationship between the two variables, the appropriate model for assessment has shown to be the VAR model for variables in the form of differences.

Besides, after determination of the appropriate degree of delay, which was one year (Vide Table (4)), we will assess the VAR (1) model. In virtue of which, the assessment results gave the following:

$$DGDP = 0.2208 - 0.4745 DGDP(-1) - 0.0234 DFDI(-1) \quad R^2 = 0.23 \quad F = 4.06$$

$$(0.3451) \qquad (0.1674) \qquad (0.5390)$$

$$DFDI = 0.0327 - 0.0168 DGDP(-1) - 0.4115 DFDI(-1) \quad R^2 = 0.14 \quad F = 2.20$$

$$(0.1254) \qquad (0.0608) \qquad (-2.1017)$$

Based on the results, it has become clear for us that there is no relationship between the two variables.

Further, it should be noted that the instability of the VAR(1) model will lead to inaccurate results; as consequence, we will make sure that the model assessed above attains this characteristic.

Table n° 7: Results of the model stability test VAR(1)

Roots of Characteristic Polynomial
Endogenous variables: DGDP DFDI
Exogenous variables: C
Lag specification: 1 1
Date: 03/21/23   Time: 14:03

Root	Modulus
-0.480347	0.480347
-0.405805	0.405805

Source: Eviews 10 outputs

According to the figure, it has shown to be clear that all the inverse roots of the polynomial accompanying the autoregressive part are of a value less than the accurate one, so that they all fall within the unit circle; as consequence, the assessed VAR(1) model fulfils the stability condition, the fact of which confirms the validity thereof.

III- 5- Dynamics of the VAR(1) model:

After having estimatd the VAR(1) model, we are interested in the study of its dynamics in order to give an economic sense to the different results found through the detection of causality between the two variables, the analysis of shocks and the decomposition of the variance of the forecast error.

a- causality study:

we are going to use the notion of causality developed by Granger (1969) which will allow us to have an additional idea. According to Granger, a variable X causes a variable Y and only if the past and present values of X make it possible to better predict the values of the variable Y. In other words, a variable X causes a variable Y if knowledge of the past and present values of X better expresses the forecast of Y. We test the null hypothesis of non-causality between the two variables at the significance level which is equal to 5%.

Upon conducting the causality test – according to the concept of Granger – between the two variables, we came to conclude the results shown in the table hereinafter:

Table n° 7: Results of the causality test

VAR Granger Causality/Block Exogeneity Wald Tests
Date: 05/22/22   Time: 02:55
Sample: 1990 2020
Included observations: 29

Dependent variable: DGDP

Excluded	Chi-sq	df	Prob.
DFDI	0.244264	1	0.6211
All	0.244264	1	0.6211

Dependent variable: DFDI

Excluded	Chi-sq	df	Prob.
DGDP	0.000612	1	0.9803
All	0.000612	1	0.9803

Source: Eviews 10 outputs

In the light of the table above, it has become clear for us that there is no causal relationship – according to the concept of Granger – between the Gross Domestic Product (GDP) and the net foreign direct investment flows; in other words, the Gross Domestic Product does not contribute to improving the forecasting ability of the level of foreign direct investment flows at the significance level of 05%. Likewise, there is no causal relationship – according to the concept of Granger, between the net foreign direct investment flows and the Gross Domestic Product per capita, as the foreign direct investment flows do not contribute to improving the forecasting ability of the Gross Domestic Product. In virtue of which, this can be elucidated by the fact that economic development in Algeria is not linked to the foreign direct investment flows.

b- Test of the Shocks' Response Impulse Function Analysis

The impulsive response functions for shocks show the impact of a shock on an endogenous variable of the studied system at a particular time on the current and future values of such variable, along with the rest of the endogenous variables in the system. Subsequent to which, the analysis and study of the response functions' developments endeavour to reveal the various interlocked relationships and interactions that take place between the variables subject to the study.

In fact, for proper analysis of the impulse response functions for shocks, the condition of the absence of immediate correlation to the renewals of the studied variables' system must be met, so that to be able to isolate the shocks and then the effects of such shocks, accordingly. As consequence, the analysis process must be conducted based on independent renewals that have no common component among them. More to the point, independent renewals can be obtained, based on the transformation of the original renewals using the coefficient resulting from the "Cholesky" decomposition of the variance and covariance matrix of these renewals; as a result of which, obtaining orthogonal renewals. In terms of the simulations, we consider a shock for each variable equal to a standard deviation, and we will carry out studies on the impact of that shock on all variables over 10 years in the future.

A positive shock in foreign direct investment flows will have a positive impact in the second year following the shock, and thereafter turn into a negative impact in the third year; afterwards, it turn again and so on consecutively until end of the period, along with weak values of the response coefficient. However, the weakness of this impact is due to the overcoming of the hydrocarbon sector of most of the foreign direct investment flows, whilst the rest of the other productive sectors remain marginalized, thus weakening the development rate.

Figure n°3: the response of economic growth to foreign direct investment flows shocks
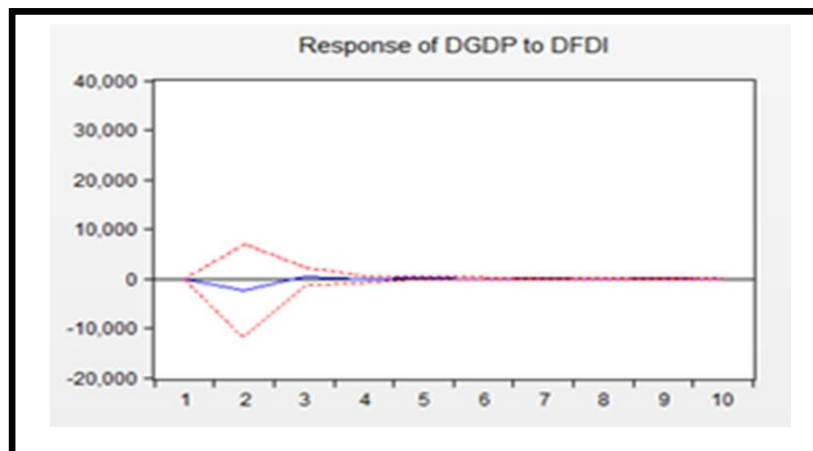
Source: Eviews 10 outputs

c- Variance Decomposition Analysis:

On the other hand, the impulse response functions show the impacts of a shock that takes place in an endogenous variable on the other remaining endogenous variables in the VAR system, we realize that the decomposition analysis process helps to provide clarification for the relative importance of each of the renewals, all the way through dividing the source of the change that takes place in an endogenous variable among such renewals; as a result of which, it reflects the role and importance of each shock in explaining the circumstantial fluctuations of the variables. Nonetheless, as this technique calls also for the availability of the renewals' independence condition, we will implement the same transformation method adopted in the analysis of response functions.

For the purpose of illustrating the variance decomposition, we will rely on the

"Cholesky" decomposition of the shock transformation, for a forecasting horizon that elongates over 10 years into the future. Above and beyond, we shed light more on decomposition of the variance of the Gross Domestic Product per capita growth variable, in virtue of which, the results are shown in the table hereunder.

Table n° 7: Results of the variance decomposition with the Gross Domestic Product variable

Period	S.E.	DGDP	DFDI
1	1.879713	100.0000	0.000000
2	2.079661	99.99420	0.005797
3	2.122077	99.99006	0.009939
4	2.131547	99.98823	0.011774
5	2.133688	99.98757	0.012427
6	2.134175	99.98737	0.012631
7	2.134286	99.98731	0.012691
8	2.134311	99.98729	0.012707
9	2.134317	99.98729	0.012711
10	2.134318	99.98729	0.012712

Source: Eviews 10 outputs

In the light of the table above, it has become clear for us that most of the circumstantial fluctuations witnessed in the economic growth are the result of subjective shocks of the variable itself, seeing that such shocks allow the interpretation of the value of (99.99%) of the economic development changes during the second period following the occurrence of the shock. Nevertheless, the percentage will decline, but at very weak rates over the years, until it reaches the limits of (99.98%) at the tenth year following the shock. With regards to the shocks of the foreign direct investment flows, we come to the conclusion that they do not play a significant role in elucidating the economic development fluctuations and changes, as the contribution thereof to elucidating such fluctuations has shown to be weak, seeing that their contribution rate rises from (0.005%) in the second year following the shock to (0.01%) at the tenth year following the shock. As a consequence, it becomes clear to us that the economic development in Algeria has shown to be weakly linked to the foreign direct investment flows. As for the circumstantial fluctuations witnessed by this latter, they have shown to be the result of the subjective shocks of the variable itself, whilst the economic development shocks play a weak role in providing explanation for the foreign direct investment fluctuations

Conclusion:

We raised an our study relating to the impact of Foreign Direct Investment on Economic Development in Algeria, through this study, whereat the investment climate in Algeria was handled by addressing the several legal regulations that came after multiple economic reforms, whose impact was significant on the path of foreign direct investment flows in Algeria, and subsequently the constituents that make Algeria a favourite destination for foreign investors, in addition to introducing the used model, testing the validity thereof and determining the used method. In virtue of which, the result of this study has shown that no impact of the foreign direct investment exists on the economic development in Algeria.

Recommendations:

- Development of the financial markets and modernization of the functioning of banks in line with the requirements of investors;

- Getting benefit from the experiences of successful countries for attraction purpose of the

foreign direct investments.

- Drawing effective investment policies in such manner to attract foreign investors.

- Eradicating bureaucracy, providing transparency in information being of interest to the local or foreign investors, along with facilitating the access thereto.

- Rehabilitation of small and medium public companies, and enabling the same to reach the participation with the foreign parties.

- Reconsideration of the motivations directed to the foreign investor and directing the same to sectors enjoying competitive advantages, which can contribute to the gross domestic product outside the hydrocarbon sector.

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