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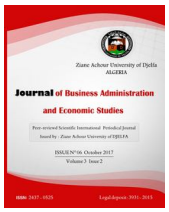

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# The impact of the economic policy on foreign direct investment in Algeria during the period (1990/2020)

# أثر السياسة الاقتصادية على تدفقات الاستثمار الأجنبي المباشر في الجزائر: (1990-2020)

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**Abstract**

In this paper, we attempted to study the impact of economic policy on foreign direct investment flows in Algeria during the period 1990/2020. By using descriptive analysis to deal with the impact of some and most important of these instruments on the evolution of FDI flows, followed by an econometric study in which we used the ARDL model that included a set of variables including government spending, regular taxation, money supply, exchange rate and rediscount rate, and through which it was found out that government spending and money supply contribute to increased FDI while the exchange rate has limited and minimal impacts, as for the regular taxation and rediscount rate, they have a reverse impact on FDI in Algeria.

**Keywords**

Fiscal policy instruments; monetary policy instruments;, foreign direct investment

**JEL Classification Codes:** E17, E6.

**الملخص**

اولنا في هذه الورقة دراسة أثر السياسة الاقتصادية على تدفقات الاستثمار الأجنبي المباشر في الجزائر خلال الفترة 2020/1990. من خلال استخدام التحليل الوصفي للتعامل مع تأثير بعض وأهم هذه الأدوات على تطور تدفقات الاستثمار الأجنبي المباشر، تلتها دراسة اقتصادية قياسية استخدمنا فيها نموذج ARDL الذي تضمن مجموعة من المتغيرات لهذه السياسات، والتي تبين من خلالها أن الإنفاق الحكومي وعرض النقود يساهمان في زيادة الاستثمار الأجنبي المباشر في حين أن سعر الصرف له آثار محدودة وضئيلة، أما بالنسبة للضريبة العادية ومعدل إعادة الخصم، فإنهما لهما تأثير عكسي على الاستثمار الأجنبي المباشر في الجزائر.

**الكلمات المفتاحية**

كلمة مفتاحية؛ كلمة مفتاحية؛ كلمة مفتاحية؛ كلمة مفتاحية؛ كلمة مفتاحية.

**تصنيف JEL:** E17-E6

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## I.INTRODUCTION:

Foreign direct investment (FDI) is currently one of the main pillars for achieving development and economic growth due to its important position in the world economies, especially after the recent economic events and changes of the situation which resulted in international trade openness and increased various exchanges including FDI. All this change prompted the developing countries to correct their situation, improve their economies, keep abreast of the developments and integrate into the world economy by creating an environment that enables them to attract as much FDI as possible in various ways and methods.

Algeria, like other countries in the world, needs to achieve economic development because it is a developing country. It is thus forced to attract the possible maximum FDI, and this can only be achieved through the adoption of targeted and successful economic policies. As fiscal and monetary policies are the most important parts of an economic policy, their instruments must be used to achieve this goal.

**Problematic**:

Developing countries, including Algeria, are seeking to create an investment climate and increase the attractiveness of investment, which requires the government to formulate carefully deliberate and well-considered economic policies with continuous follow-up so as to make sure that the objectives are attained and, on this basis, we can ask the following question:

**How effective is the country's economic policy of attracting FDI to Algeria?**

From which the following sub-questions arise:

- What is meant by economic policy and its financial and monetary branches and what are their instruments?
- What is FDI?
- Has Algeria achieved tangible results through procedures related to the instruments of monetary and fiscal policy?
- Which policy is more effective in attracting FDI to Algeria?

**Research hypotheses:**

The research hypotheses were formulated as follows:

- The contribution of procedures and measures relating to monetary policy instruments and fiscal policy in stimulating investment and improving the investment climate even at a low rate.
- Monetary policy is more effective than fiscal policy in attracting FDI to Algeria.

## II.PREVIOUS STUDIES:

Many researchers addressed this issue through analytical or standard studies because of the importance of economic policies in attracting FDI.

On this basis we will address some of them.

- **PAUL NDUBUISI, KALU, 2016, Apia State University, Nigeria, article entitled**: **"Government policy and foreign direct investment flows to Nigeria"**.

This study addresses experimentally the role of government policy particularly in the monetary and financial fields and determines FDI flows in Nigeria (1980-2014). Data related to the study were collected from secondary sources and analyzed using the Johansen's multiple linear regression for co-integration and error-correction mechanisms.

The results revealed a negative relationship between FDI and policy variables including inflation rate, foreign exchange rate, government fiscal deficit/surplus and the imaginary variable (political risk factor) (PAUL NDUBUISI, 2016).

**- Ateyah M. ALAWNEH and Torki AL-FAWWAZ, 2015, article entitled:**

**"**The Impact of the Fiscal and Quantitative Monetary Policies on the Domestic and Foreign Direct Investment in Jordan".

This study aimed based on the experimental results to identify the impact of quantitative fiscal and monetary policy on domestic and FDI in Jordan (2000-2011). It chose independent variables such as monetary policy instruments (rediscount rate, reserve requirement and open market process), as well as financial instruments including government capital expenditures as they play a major role in the Jordanian economy. The source of data used in this study was the Central Bank of Jordan Statistics Department. The data were analyzed using the simple/multiple linear regression method.

The study used two models, the first being an estimation of the impact of fiscal and monetary policy on domestic investment, and the study found out that there is a negative relationship between the rate of return and domestic investment but not statistically significant, while there iw a positive statistically significant relationship between monetary reserve requirement and domestic investment due to the presence of excessive cash reserves in banks in Jordan. The study also showed a negative relationship between taxes and domestic investment, and a positive relationship between government capital expenditures and domestic investment, which means that fiscal policy effectiveness is greater than the monetary policy in affecting domestic investment.

The second study showed the impact of fiscal and monetary policy on FDI, and a statistically significant negative relationship between the rediscount rate and FDI, while it showed that there is a positive relationship between taxes and FDI, and the reason is that the government grants tax exemptions to encourage FDI.

The study recommends the adoption of a policy of literary persuasion to direct banks to enhance their role in domestic investment, as well as the need for fiscal policy in Jordan which grants tax exemptions to encourage domestic investment. (ALAWNEH, octobre 2015, pp. 1-10)

**- Study of Niti Bhasin, 2014, Delhi University India, article entitled:**

**-The Impact of Fiscal Policy on Foreign Direct Investment Inflows: A Study of India and Select Asian Economies**.

The study dealt with the specific determinants of FDI flows from selected Asian countries and highlighted the role of the host country's financial policy in FDI decisions.

Data of seven countries, which were the largest beneficiaries of FDI flows in the Asian region during the period 1991-2011, were used. (Two countries, Hong Kong and Vietnam, were excluded due to the lack of financial policy data). Based on data of 21 years from 1991 to 2011, the study developed models of the role of fiscal policy in promoting FDI. In addition to the traditional determinants of FDI, this study focused on the role of financial policy variables in affecting FDI.

In order to create an enabling environment for foreign investment, many countries, including India, redesigned their tax systems to make them internationally competitive. Bilateral tax treaties form part of this process to alleviate the problem of international double taxation. Another important variable of fiscal policy was the proportion of government spending which was characterized by a developmental nature.

Data was analyzed using the mini-squares method, and according to the results of the study, the specific factors that appeared to be important included FDI openness and basic structures.

In fat, disparity in FDI openness is important and has a positive significance. Thus, a more liberal and open FDI policy contributes to increased FDI flows in the economy, and the coefficient of the basic structures variable is positive, which means that modern and well-developed infrastructure attracts FDI to economy.

However the coefficients of fiscal policy variables, i.e. bilateral tax treaties and government spending, are not significant. This means that the fiscal policy variables are not yet involved in FDI decision-making. Consequently, the fiscal policy variables are almost non-existent, while competitive fiscal policy may facilitate business transactions; it is still not a primary consideration in investment decisions. (Bhasin, 2014, pp. 74-97)

**- Mohamed Lahcen Alaoui, Karim Beroucha, 09 December 2015, University of El Oued, Algeria, article entitled:**

**"The impact of monetary and fiscal policy on foreign direct investment flows in Algeria".**

The objective of this study was to show the impact of monetary and fiscal policy on the incoming FDI flows to Algeria during the period (1996-2012), using the Vector Autoregression model (VAR).

Independent variables (discount rate, money supply $M_2$, exchange rate) were chosen as variables of monetary policy, (public expenditure) was chosen for fiscal policy and the dependent variable was the value of the incoming FDI to Algeria.

The results showed that there is a one-way causal relationship between the public expenditure, the money supply and the discount rate as well as FDI flows to Algeria. In addition, there is an explanatory power of public expenditure and the money supply that explains the change in the value of foreign investment.

In general, the results showed that there is a positive and significant impact of monetary and fiscal policy on FDI. Consequently, the results of the study were consistent with the economic theory.

**- Study of Abdelhak.Tair and Okba Rimi , 12 December 2017, University of El Oued, Algeria, article entitled:**

**"The effectiveness of fiscal policy in attracting foreign direct investment in Algeria"**

This research study aimed to measure the effectiveness of fiscal policy in attracting FDI in Algeria during the period (1995-2015) by focusing on the processing expenditure indicator from the expenditure side and the tax revenue indicator from the tax side. The study was conducted using the ARDL method and the following results were obtained:

- There is a direct and significant relationship at the level of 5% between the FDI flow indicator and the processing expenditure indicator in the long-term, as the increase in processing expenditure by 1% leads to an increase in FDI flow by 2.16%.
- There is an inverse and significant relationship at the level of 5% between the FDI flow indicator and the revenues indicator**.** (Rimi, december 2017)

## III.THEORETICAL FRAMEWORK OF THE STUDY:

Economic policy is a set of rules, instruments and methods used by the state to achieve economic objectives over a period of time. It is also considered as a special public policy manifestation and includes the economic policy = Instruments + Objectives + Time. Such tools are the branches of the economic policy which include: monetary policy and fiscal policy.

Fiscal and monetary policies gained an important role in achieving the impact on economic development, particularly attracting FDI. Therefore, we will first present generalities about the fiscal policy; then the definition and development of monetary policy, and in the last part we will deal with FDI.

### III-1/ Definition and instruments of fiscal policy:

Fiscal policy is a mirror that shows the role and involvement of the state. The concept of fiscal policy was linked to the principle of the state's freedom to formulate its fiscal policy and has been defined by the economist economic (Bach) as an "instrument for using both government spending and taxes as well as loans for affecting the aggregate demand according to the country's economic conditions, in addition to its role in economic growth, reducing unemployment, distributing resources among different needs and purposes in order to achieve individual welfare and equity through income redistribution". (Lhaj, 1999, p. 201)

Fiscal policy uses a set of instruments to achieve its stated objectives. Therefore, we will try to identify these instruments as it is stated hereafter.

**III-1-1- Public revenue:** (Abdullah, 2009, pp. 268-289)

A collection of different sources from which the State derives what it needs from the funds to pay its expenses, The State revenue can be divided according to its sources into several sections:

**A- First- Sovereign Revenue:**

The government's basic duty to provide public defense and protection to all citizens is the source of its sovereignty and its right to rule. If it fails to fulfill its duty, it should fulfill its sovereign right, and hence its right to deduct funds from individuals sometimes called «Tax» or «Fee» and sometimes «Royalty».

**B- Second- Economic revenue:**

State income from its property, economic project profits, public loans and transfers.

**III-1-2 Public expenditure:** (Fawzi, 1994, p. 25)

It is a monetary amount that comes from the State Treasury to satisfy a general need. In fact, the government performs various public services to protect citizens and achieve public welfare, and the performance of such services requires expenditure by the government.

**III-1-3 Mechanism of the financial policy:** (Mohamed, 2010-2011)

**A- Case of the economic recession:**

In this case, the aggregate supply is greater than the aggregate demand and consequently the inability to sell products. This also means unemployment and lack of job opportunities. In fact, in

this case, the economy is in recession and is fading leading the government to adopt expansionary fiscal policy through:

- **Increasing the level of public expenditure:**

The government increases public expenditure by increasing its purchases (goods and services) i.e. increasing individual income and thus increasing demand. The increase in the demand by institutions increases their production, which makes them in need of a new labor force and which leads them to open up employment opportunities.

- **Tax reduction:**

The government may adopt tax cuts or tax exemptions for individuals rather than increasing public expenditure, because such abandoned deductions result in an increase in the disposal income for consumption and savings, which leads to an increase in aggregate demand, including consumer demand and investment demand.

The government may use both increased public expenditure and tax reduction taxes at the same time to ~~recover from recession and push forward~~ economic development.

**B- Case of inflation in economy:**

It is the constant rise in the general price level. The role of fiscal policy in this case is to pursue a deflationary fiscal policy in order to try to reduce the level of demand and reduce purchasing power depending on:

- **Reduction of the public expenditure level:**

It depends on the ~~multiplying mechanism~~ to reduce the volume of consumption which leads to a deficiency of aggregate demand and thus to a price curb.

- **Raising taxes:**

This leads to lower the disposal income and consequently to demand reduction and this results in a price curb.

The government may reduce public expenditure and raise taxes simultaneously to break inflation.

**III-2/ Concept and instruments of monetary policy:**

Monetary policy is defined as a policy related to money and banking system that affects the money supply either by increasing its size or reducing it.

Monetary policy is defined as “the set of measures taken by the State to control the money supply in order to achieve certain objectives for the economic interest of its members”. (Meliani, 2016, p. 157)

- The objectives of monetary policy can be summarized as follows:
- Increase national income by increasing economic growth.
- Try to reach full employment and reduce unemployment rate.
- Stabilize prices and tighten monetary inflation control.
- Maintain payments balance and currency value.

**III-2-1 Indirect instruments of monetary policy:** (Abdullah, p. 40)

Such instruments indirectly affect the level of bank liquidity and the cost of obtaining funds (loans) in order to change the overall amount of money in circulation. This case concerns both the discount rate and the open market policy.

**A-Discount rate policy (rediscount rate):** It means the interest rate that the Central Bank receives when it offers loans to commercial banks or rediscount the provided commercial papers and bonds.

Determination of the discount rate by the Central Bank affects commercial bank loans.

**B-Open market policy:** It means the intervention of the Central Bank in the financial market either as a securities seller - especially government bonds - in cases of inflation to absorb the additional cash circulating which reduces the money supply, or as a buyer to increase the money supply in a recession trying to create a sort of economic recovery.

**III-2-2 Direct quantitative instruments:** (Fawzi, 1994, p. 49)

These quantitative instruments aim to control the size of the loans as they relate to the identification of various bank shares, the conditions for using the Central Bank's facilities and the compulsory precautions.

**III-2-3 Mechanism for the functioning of monetary policy instruments:**

**A-Cases of inflationary gaps:** The inflationary gap occurs when the aggregate demand increases more than the aggregate supply. To eliminate such gap, aggregate demand can be reduced and the "deflationary monetary policy" is used.

-Open-market operations: In this case, the Central Bank sells government bonds to various commercial banks, institutions and individuals. Through the sale process the amount of currency traded in the economy will decrease, from which consumption spending (c) and investment spending (I) will decrease which leads accordingly to a reduction in the aggregate demand until it reaches the level of the aggregate supply.

-Discount rate: In this case, the Central Bank raises the discount rate and decreases the volume of loans available to commercial banks. The latter raises the interest rate on deposits and loans and thus the funds deposited in banks increase, while loans decrease their volume because of the high cost of lending and the aggregate demand decreases to the level of balance.

-Statutory reserve: The bank increases its statutory reserve ratio and decreases the ability of banks to generate credit, as a result of this rise, the ratio of consumer spending (C), investment spending (I) and the aggregate demand decrease to the balance of aggregate demand and aggregate supply.

B-**Case of the deflationary gap**: The deflationary gap is caused when the aggregate demand is lower than the aggregate supply. Elimination of this gap requires an increase in aggregate demand and an expansionary monetary policy.

-Open-market operations: In this case, the bank enters as a buyer of government bonds from institutions, commercial banks and individuals which leads to an increase in the amount of currency traded in the economy, increasing the purchasing power of individuals as well as the investment spending of the business sector, and as result, the aggregate supply increases to the level of balance with the aggregate supply.

-Discount rate: The Central Bank reduces the discount rate and commercial banks borrow large amounts from the Central Bank which leads to the reduction of the interest rate on deposits and loans, which means that the volume of funds deposited in banks decreases and the aggregate demand increases to the same level as the aggregate supply.

-Statutory reserve: The Central Bank reduces the statutory reserve by increasing the ability of commercial banks to generate credit, and as a result, consumer spending and investment spending increase to a level where aggregate demand is equal to aggregate supply.

**III-3/ FDI definition, determinants and motives**

FDI is defined by many researchers as:

"*The flow of* loans *by the parent company to its subsidiary abroad or ownership of another company provided that the minimum percentage of ownership abroad is not less than 10%"*. (Hadi, First Edition.2014, P.23)

While others defined it as:

"*The* transfer *of capital to invest directly abroad in the form of projects of any kind"*. (Ammar Mohammed Khudair Jubouri, First Edition. 2017, p. 31)

In its annual report on FDI, the International Monetary Fund (IMF) defined it as "an investment that obtains a fixed share in a project established in an economy other than the investor's, and the foreign investor controls the management of the project".

*OECD fixed the foreign investor's share in the capital or voting power by not less than 10% of the total capital or the number of votes in the project.* (azziz & sami younes, First Edition., p. 44)

As for its determinants, they are divided into: (Abdul Karim Kaki, First Edition. 2013, pp. 72-73)

A. **Economic determinants**: Economic determinants play a key role in guiding investments. Such determinants include the existence of a stable, welcoming, stationary and constant economic policies as well as the market size. If the market size is large and dynamic and has all the potential for expansion, it attracts foreign investment, and the degree of economic openness and competitive strength of the national economy are a key factor in attracting foreign investment.

B. **Financial and financing determinants:** They consist in the incentives granted to the foreign investor which may be financial incentives, including tax exemptions, exemptions of capital goods imported from customs duties and other import duties, and the financing incentives which consist in direct government subsidies to cover part of the cost of capital, production and government participation in the ownership of investment projects.

C. **Legislative and regulatory determinants:** The foreign investor will not invest in a country unless he has sufficient legal protection. Actually, the legislative and regulatory framework governing foreign investment activities gives confidence and security to the foreign investor.

D. **Political determinants:** Political stability in the host country is an important determinant for attracting FDI because a democratic system that respects popular will and the absence of internal conflicts is a catalyst for attracting investment.

Moreover, foreign companies seek to invest in other countries to achieve specific objectives, including obtaining raw materials at the lowest cost and benefiting from low labor costs, in addition

to seeking new markets to sell surplus of goods. They may rely on their investments to achieve their desire to impose economic and political control on the host country.

As for polarizing or host countries (developing countries), foreign investments are used to solve their various problems, such as unemployment and the need to acquire high technology in addition to producing products previously imported, and to enable them to export to other markets abroad which lead to the improvement of payments balance and the correction of imbalance in the trade balance. (Nouria K. , 2015-2016, pp. 109-113)

**Table (01): FDI motives**

| **Investment parties** | **- Motives** |
|---|---|
| **Home country** | - Increase returns and sales.<br>- Seek raw materials at the lowest cost.<br>- Create new markets for selling surpluses.<br>- Seek low-cost labor.<br>- Benefit from tax exemptions and incentive legislation.<br>- Impose political and economic control over the host country. |
| **Host country** | - Access to advanced technology and development of production methods.<br>- Acquisition of productive resources previously imported<br>- Provide job opportunities and absorb unemployment. |

**Source**: prepared by the researches based on previous data

## IV.DESCRIPTIVE ANALYTICAL STUDY OF THE IMPACT OF THE INDEPENDENT VARIABLES OF THE STUDY ON FDI

Due to the importance of fiscal policy and monetary policy in attracting foreign investment through its impact on some of its elements, we will try to analyze their relationship with FDI flows in Algeria. (Algeria, 2011-2017-2021)

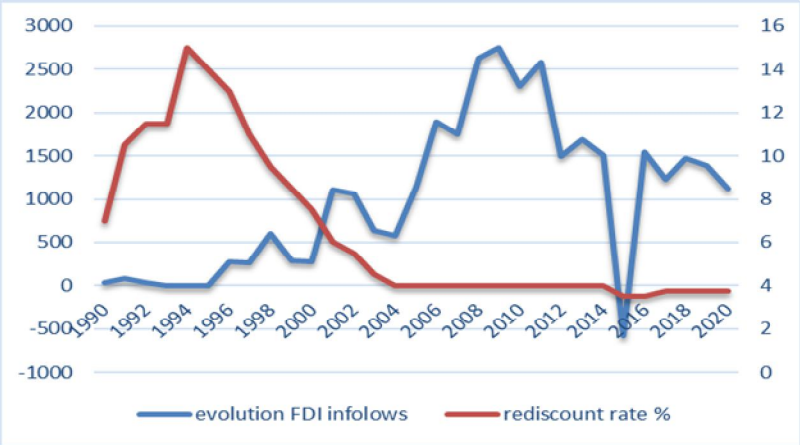
### IV-1/ Impact of monetary policy variables on FDI flows:

Monetary policy has an effective role in affecting FDI flows. We will try to analyze this correlation by addressing the evolution of some elements of monetary policy and FDI flows.

A. **Impact of the rediscount rate on incoming FDI flows**

Monetary policy affects the economic conditions through the use of a range of instruments, including the rediscount rate, which has become a very important instrument. Therefore, we will try to find out the impact of the latter on FDI flows.

**Figure (1): Evolution of rediscount rate and FDI inflows (1990-2020)**



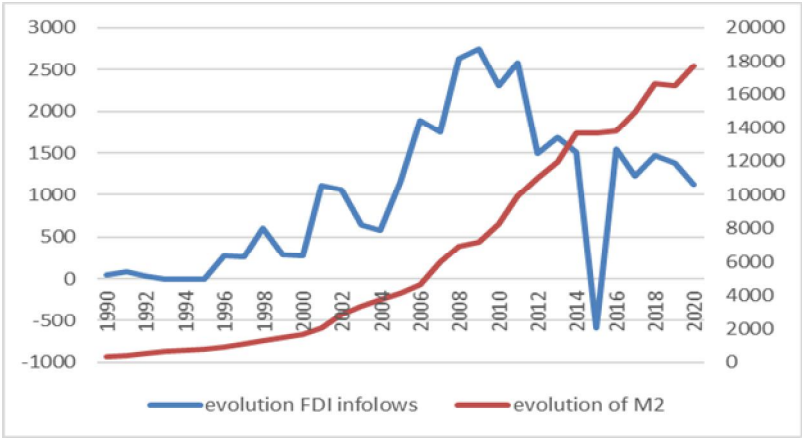

**Source**: Prepared by the researcher based on the website of Bank of Algeria http://www.bank-of-algeria.dz/ Tripartite Statistical Bulletin No. 32, December 2015/No. 37, March 2017, and the website: **www.unctadstat.org**

The figure shows an increase in the discount rate in the first period to a maximum of 15% which knew very low inflows of FDI, followed by a drop in the rediscount rate which reached 9.5% in 1998 and continued to decline to 4% from 2004 to 2015, followed by a drop of 3.75% in 2020 during which foreign investment flows increased significantly. Thus, reduction of the discount rate is considered as an investment support measure.

**B. Relationship of money supply to incoming foreign investment flows:**

The following graph shows the evolution of the amount of money and FDI flows during the study period.

**Figure (02): Evolution of money supply $M_2$ and FDI flows (1990-2020)**




**Source**: Prepared by the researcher based on the website of Bank of Algeria http://www.bank-of-algeria.dz/ Tripartite Statistical Bulletin No. 32, December 2015/No. 37, March 2017, and the website: **www.unctadstat.org**

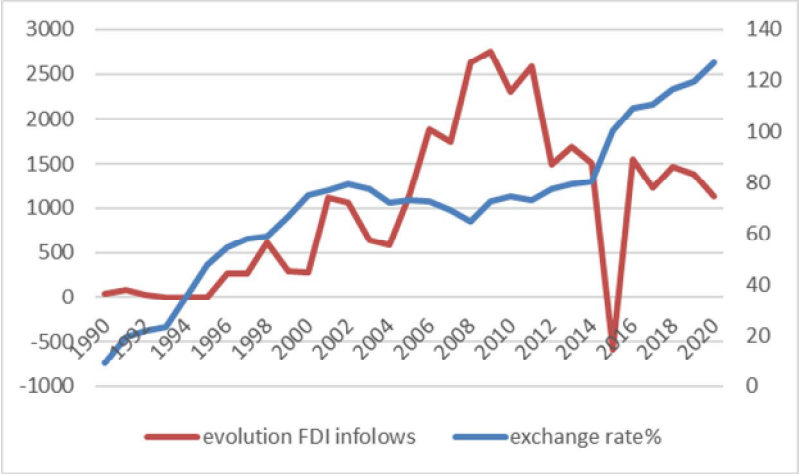
The figure shows that the money supply was characterized by an unstable growth. It also shows that in the first period from 1990 to 2000, during which Algeria adopted a strict monetary policy to restore monetary stability, there was a weak or an almost non-existent investment flows, but starting from 2001, the money supply witnessed a significant development as a result of improved macroeconomic indicators resulting from higher oil prices accompanied by an increase in FDI flows. As in 2015, there was a very weak growth of the money supply due to the impact of oil shock on the economy, and FDI in the same year declined negatively but soon reversed in 2016 achieving positive results due to improved investment policies and the adoption of a new investment law by Algeria.

Thus, it can be said that the growth of money supply positively affects FDI flows and vice versa, but this effect remains marginal.

### C. Impact of the exchange rate on incoming foreign investment flows:

Due to the importance of the exchange rate in the development of economies and since foreign investments have an important role to play in advancing its development; we had to demonstrate the relationship and impact of exchange rate change on FDI.

**Figure (03): Evolution of exchange rate and FDI inflows (1990-2020)**




**Source**: Prepared by the researcher based on the websites of the Ministry of Finance **http://www.mf.gov.dz** and the website: **www.unctadstat.org**

The figure shows that the Algerian Dinar exchange rate was characterized by an increase very often. Such increase was accompanied by an increase in the volume of the incoming FDI inflows to Algeria which increased from **8.96 DZD** in 1990 to **79.68 DZD** in 2002, and continued to rise to **126.82 DZD** in 2020.

Thus, the decline in the Algerian currency has a positive effect on the increase in FDI flows, and we conclude that the reduction in the exchange rate of the dinar contributes to the increase in FDI flows, But there are other factors that make foreign investment flows volatile and weak.

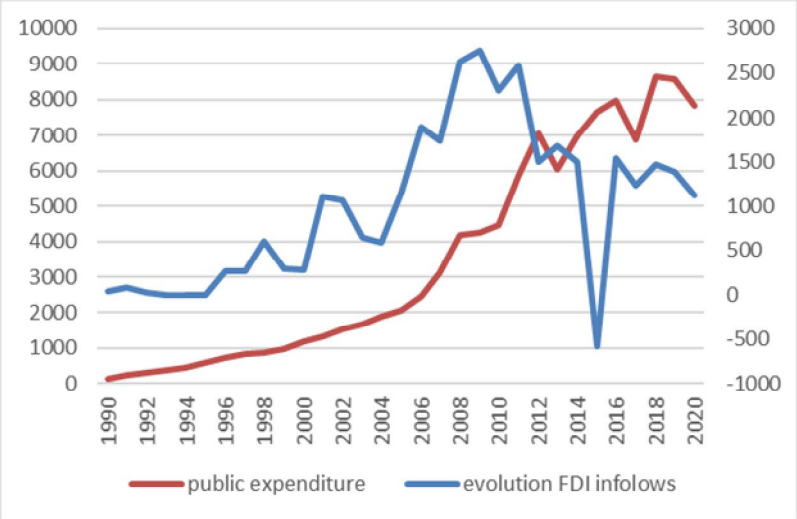
**IV-2/ Impact of fiscal policy on FDI flows:**

In order to attract foreign capital and foreign investment, Algeria used its fiscal policy to achieve such objectives through the policy of revenue and expenditures in accordance with a strategy that allows it to intervene to improve the investment climate and attract foreign investment.

**A. Impact of public expenditure on FDI flows:**

Based on the impacts of the spending policy on the economy as a whole, we will try to determine to what extent the latter affects FDI.

**Figure (04): Evolution of public expenditure and FDI flows (1990-2020)**



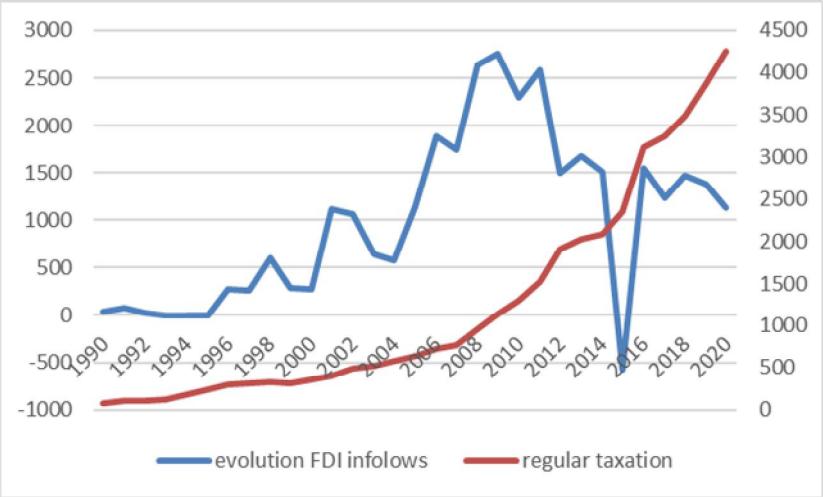

**Source**: Prepared by the researcher based on the websites of the Ministry of Finance **http://www.mf.gov.dz** and the website: **www.unctadstat.org** and the Bank of Algeria **http://www.bank-of-algeria.dz/html/rapport.htm**

The figure shows that the evolution of public expenditure in comparison with FDI flows to Algeria varies from one period to another. In the first period, which coincided with the structural reforms and witnessed the state austerity, FDI inflows were low or almost non-existent. Starting from 2000, public expenditure began to increase in parallel with the economic recovery program, and FDI flows in this period increased and decreased from time to time. In fact, the flows being in contrast with the public expenditure is an evidence of the public sector crowding out the private sector. In 2015, FDI flows were negative despite higher public expenditure during this period, while investment flows increased by 2016 indicating that public expenditure was not a major determinant of FDI during the study period, and that FDI flows were lower than what the State spent on public expenditure, especially from 2017-2020.

**B. Impact of regular taxation on FDI flows in Algeria:**

The tax policy applied in host countries is important and is one of the basics of investment decision for the foreign investor.

**Figure (05): Evolution of regular taxation and FDI inflows (1990-2020)**




**Source**: Prepared by the researcher based on the websites of the Ministry of Finance **http://www.mf.gov.dz** and the website: **www.unctadstat.org**

The graph of the evolution of regular taxation and FDI flows during the study period from 1990 to 2020 shows that regular collection was continuing to increase especially in the last years, and compared to investment flows, we note that during the first period, the flows increased in tandem with the period during which the regular taxation value was low. In recent years, the flows value declined with a very high increase in the value of the regular taxation. We therefore conclude that the development of regular taxation was in contrast to FDI flows, and that the regular taxation had a negative impact on the foreign investment flow.

## V.ECONOMETRIC STUDY

In this part, we will try to conduct an econometric study of the period 1990-2020, and highlight the impact of both fiscal and monetary policies on FDI flows in Algeria. Therefore, we used a model that linking FDI as a variable of the previously addressed fiscal and monetary policy instruments.

### V-1/ Sample and variables of the study:

Based on the previous theoretical aspect and studies, we present in our research the following model:

$$IDE_t=f(G_t, M2_t, TCD_t, TRS_t, TX_t)$$

Where:

$IDE_t$: Incoming FDI to Algeria during the period 1990/2020

$G_t$: Public expenditure during 1990/2020

$M2_t$: Money supply (money supply + demand deposits) during 1990/2020

$TCD_t$: Exchange rate of the Dinar compared to US$ 1990/2020

$TRS_t$: Rrediscount rate 1990/2020

TXT: Regular taxation 1990/2020

Data on these variables were obtained from the database available on the websites of the Bank of Algeria and the Ministry of Finance, and those relating to investment from CNUCED.

In order to avoid non-linearity of the relationship between the variables of the study, we enter the Napierian logarithm on the model.

We will first examine the study variables series by testing the unit root.

**V-2/ Study of the model variables stability:**

The time series stability test in econometric studies based on data related to time series is necessary to avoid falling into false analyzes and misinterpretation. Among the most widely used and common tests in detecting time series properties is the Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) tests. Through this test, we will be able to detect the stability of time series and determine their ranks as follows:

Stationary time series has neither a general trend nor seasonal volatilities. However, historical events and economic facts rarely achieve stable random paths.

There are several unit root tests for examining the time series properties. We used the Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP).

**Table (02): Results of the Phillips-Perron (PP) test**

| | | UNIT ROOT TEST TABLE (PP) | | | | | |
|---|---|---|---|---|---|---|---|
| | **At Level** | | | | | | |
| | | LNG | LNIDE | LNM2 | LNTCD | LNTRS | LNTX |
| With Constant | t-Statistic | -3.5522 | -2.4990 | -2.6897 | -6.6386 | -0.5141 | -6.7358 |
| | ***Prob.*** | ***0.0144*** | ***0.1272*** | ***0.0893*** | ***0.0000*** | ***0.8731*** | ***0.0000*** |
| | | ** | n0 | * | *** | n0 | *** |
| With Constant & Trend | t-Statistic | -3.4086 | -3.1050 | 0.6961 | -5.4622 | -2.8183 | -1.2671 |
| | ***Prob.*** | ***0.0720*** | ***0.1260*** | ***0.9993*** | ***0.0008*** | ***0.2037*** | ***0.8737*** |
| | | * | n0 | n0 | *** | n0 | n0 |
| Without Constant & Trend | t-Statistic | 4.4945 | -0.4025 | 6.4266 | 1.7451 | -0.9041 | 2.8484 |
| | ***Prob.*** | ***1.0000*** | ***0.5287*** | ***1.0000*** | ***0.9773*** | ***0.3152*** | ***0.9981*** |
| | | n0 | n0 | n0 | n0 | n0 | n0 |
| | **At First Difference** | | | | | | |
| | | d (LNG) | d (LNIDE) | d (LNM2) | d (LNTCD) | d (LNTRS) | d (LNTX) |
| With Constant | t-Statistic | -4.8325 | -6.3442 | -2.8603 | -6.4283 | -4.8338 | -5.4327 |
| | ***Prob.*** | ***0.0007*** | ***0.0000*** | ***0.0645*** | ***0.0000*** | ***0.0007*** | ***0.0002*** |
| | | *** | *** | * | *** | *** | *** |
| With Constant & Trend | t-Statistic | -9.0737 | -6.1501 | -3.3151 | -6.1602 | -4.4841 | -12.1697 |
| | ***Prob.*** | ***0.0000*** | ***0.0002*** | ***0.0868*** | ***0.0002*** | ***0.0079*** | ***0.0000*** |
| | | *** | *** | * | *** | *** | *** |
| Without Constant & Trend | t-Statistic | -3.0987 | -6.5031 | -1.4827 | -5.9255 | -4.2347 | -4.2481 |
| | ***Prob.*** | ***0.0033*** | ***0.0000*** | ***0.1263*** | ***0.0000*** | ***0.0002*** | ***0.0002*** |
| | | *** | *** | n0 | *** | *** | *** |

Notes: (*) Significant at the 10%; (**) Significant at the 5%; (***) Significant at the 1%. and (no) Not Significant

**Source:** Based on Eviews10

We note in Phillip Peru table that the series LnIDE and LnTRS are non-stationary but stabilize after the first difference after the non-parametrical correction of Philllips-Perron (PP) and thus become stable at the 1 % , 5 % , 10 % levels.

LnG, LnTX, LnM $_2$ and LnTCD are as per Philllips-Perron stationary at the level.

As for the Augmented Dickey-Fuller (ADF) test, we used the following methodology:

(LnIDE) series:

$$\Delta LnIDE_t = \lambda LnIDE_{t-1} - \sum_{j=1}^{p} \phi_{j+1}\, \Delta \mathrm{LnIDE}_{t-j} + c + bt + \varepsilon_i \quad [M_1]$$

$$\Delta LnIDE_t = \lambda LnIDE_{t-1} - \sum_{j-1}^{p} \phi_{j+1} + c + \varepsilon_i \quad [M_2]$$

$$\Delta LnIDE_t = \lambda LnIDE_{t-1} - \sum_{j-1}^{p} \phi_{j+1} + \varepsilon_i \quad [M_3]$$

To determine the degree of delay, we used the following three criteria: Los-Like lihood, AKaike and Schwarz and chose the smallest lag degree which was mostly zero (Appendix 1).

We estimated the model and chose for most series the following hypotheses:

[$M_1$]

**$H_0$: λ = 0** We accept the hypothesis that there is a root unit in the series if it is Prob > 0.05

**$H_0$: b = 0** If the general trend coefficient is different from zero i.e. Prob (Trend) > 0.05 i.e. series of Ts type and non-stationary.

[$M_2$ ]

**$H_0$: C = 0** We accept the series hypothesis containing a constant derivative if it is Prob © > 0.05

**$H_0$ : λ = 0** We accept the null hypothesis that there is a root unit in the series Prob > 0.05

[$M_3$ ]

**$H_0$: λ = 0** We accept the hypothesis of a root unit

From the two previous tables and according to Appendix No. 01, we show the test results in the following tables:

**Table (04): Results of the ADF test on the LnIDE series**

| **- ADF test of the LnIDE series Number of delays: Lowest value = 0** | | | | | |
|---|---|---|---|---|---|
| **Models** | **$H_0$: λ = 0** | **$H_0$: b = 0** | **$H_0$: C = 0** | | |
| | (Prob) | (Prob) | (Prob) | Result | The series is not stationary |
| **- [$M_1$]** | 0,433 | 0.10 | 0.13 | Unstable | |
| **- [$M_2$]** | 0.5351 | / | 0.13 | Unstable | |
| **- [$M_3$]** | 0.47 | / | / | Unstable | |

**Source:** Prepared by the researchers based on Eviews program

**Table (05): Results of the ADF test on the LnG series**

| - ADF test of the LnG series Number of delays: Lowest value = 0 | | | | | |
|---|---|---|---|---|---|
| **Models** | **$H_0$: λ = 0** | **$H_0$: b = 0** | **$H_0$: C = 0** | | |
| | (Prob) | (Prob) | (Prob) | Result | The series is stationary |
| **- [$M_1$]** | 0.07 | 0.10 | 0,0008 | Stable | |
| **- [$M_2$]** | 0.01 | / | 0.001 | Stable | |
| **- [$M_3$]** | 1,00 | / | / | Unstable | |

**Source:** Prepared by the researchers based on Eviews program

**Table (06): Results of the ADF test on the $LnM_2$ series**

| - ADF test of the $LnM_2$ series Number of delays: Lowest value = 0 | | | | | |
|---|---|---|---|---|---|
| **Models** | **$H_0$: λ = 0** | **$H_0$: b = 0** | **$H_0$: C = 0** | | |
| | (Prob) | (Prob) | (Prob) | Result | The series is stationary |
| **- [$M_1$]** | 0.99 | 0.64 | 0.98 | Unstable | |
| **- [$M_2$]** | 0.053 | / | 0.02 | Stable | |
| **- [$M_3$]** | 0.97 | / | / | Unstable | |

**Source:** Prepared by the researchers based on Eviews program

**Table (07): Results of the ADF test on the LnTRS series**

| - ADF test of the LnTRS series Number of delays: Lowest value = 0 | | | | | |
|---|---|---|---|---|---|
| **Models** | **$H_0$: λ = 0** | **$H_0$: b = 0** | **$H_0$: C = 0** | | |
| | (Prob) | (Prob) | (Prob) | Result | The series is stationary |
| **- [$M_1$]** | 0.24 | 0.20 | 0.01 | Unstable | |
| **- [$M_2$]** | 0.92 | / | 0.96 | Unstable | |
| **- [$M_3$]** | 0.03 | / | / | Stable | |

**Source:** Prepared by the researchers based on Eviews program.

**Table (08): Results of the ADF test on the LnTX series**

| **- ADF test of the LnTX series Number of delays: Lowest value = 0** | | | | | |
|---|---|---|---|---|---|
| **Models** | **$H_0$: λ = 0** | **$H_0$: b = 0** | **$H_0$: C = 0** | | |
| | (Prob) | (Prob) | (Prob) | Result | |
| **- [$M_1$]** | 0.77 | 0.33 | 0.06 | Unstable | The series is stable |
| **- [$M_2$]** | 0.08 | / | 0.003 | Stable | |
| **- [$M_3$]** | 0.99 | / | / | Unstable | |

**Source:** Prepared by the researchers based on Eviews program

**Table (09): Results of the ADF test on the LnTCD series**

| **- ADF test of the LnTCD series Number of delays: Lowest value = 0** | | | | | |
|---|---|---|---|---|---|
| **Models** | **$H_0$: λ = 0** | **$H_0$: b = 0** | **$H_0$: C = 0** | | |
| | (Prob) | (Prob) | (Prob) | Result | |
| **- [$M_1$]** | 0.0015 | 0.11 | 0.00 | stable | The series is stationary |
| **- [$M_2$]** | 0.00 | / | 0.00 | stable | |
| **- [$M_3$]** | 0.98 | / | / | Unstable | |

**Source:** Prepared by the researchers based on Eviews program

We note that all series do not contain general trend vehicle, then they are DS series.

We followed the previously listed stages as shown in the tables above and all the independent variables were stationary at the level.

The variable LnIDE is non-stationary at the level, and after the first differences the variables became stationary so we have:

LnTRS (0), LnTX (0), LnTX (0), LnTCD (0)

So we estimate the Autoregressive Distributed Lag (ARDL) model.

**V-3/ Methodology of cointegration using the Autoregressive Distributed Lag (ARDL):**

Cointegration tests such as Engle and Granger (1987) and Johansen and Juselius (1990) require that the variables are integral and of the same degree. They cannot be performed with the existence of variables of varying degrees. Therefore, the Autoregressive Distributed Lag (ARDL) test emerged and was developed by **Pesaran**, **Shin**, **& Smith**, **2001** and it is considered as an alternative to the common cointegration tests known.

This test developed by Pesaran et al. (2001) has advantage compared to the other tests because:

-It does not require that the time series are all integrated of the same degree (0)I or (1)I. The only condition for applying this test is that the degree of integration of any of the variables is not (2)I.

-ARDL can be applied if the sample size is small and this is the opposite of most traditional cointegration tests that require a large sample size so that as the results are more efficient.

-The ARDL model enables us to separate short-term effects from the long-term ones, and we can through this methodology determine the complementary relationship of the dependent variable and the independent variables in the long and short term in the same equation.
-Determines the size of the impact of each of the independent variables on the dependent variable.
-In this methodology, we can also estimate the parameters of independent variables in the short and long term, their short-and long-term parameters are more consistent compared to other methods such as those of Engle and Granger (1987) and Johansen and Juselius (1990).
To determine the length of the distributed lag periods, the (AIK) and (SC) criteria are usually where the length of time that decreases the value of (AIK) and (SC) is chosen.

- ARDL model of equation (1) is written as follows:

$$(LnIDE_t) = c + \beta_0 LnIDE_{t-1} + \beta_1 LnG_{t-1} + \beta_2 LnM2_{t-1} + \beta_3 LnTCD_{t-1} + \beta_4 LnTRS_{t-1} + \beta_5 LnTX_{t-1} + \sum_{i=0}^{k} \propto_{1i} d(LnIDE)_{t-i} + \sum_{i=0}^{k} \propto_{2i} d(LnG)_{t-i} + \sum_{i=0}^{k} \propto_{3i} dLnM2_{t-i} \sum_{i=0}^{k} \propto_{4i} d(LnTCD)_{t-i} + \sum_{i=0}^{k} \propto_{5i} (LnTRS)_{t-i} + \sum_{i=0}^{k} \propto_{6i} + (LnTx)_{t-i}$$

The first difference parameters (α) are short-term parameters while (C) and (travel) point to the cut-off and random-limit errors respectively.

The lagged dependent variable parameter for one period on the equation represents (β) long-term relationship parameters, while the first difference parameters (α) are parameters of the short period while (C) and ($\mathcal{E}$) refer to the cutter segment and random limit errors respectively.

The ARDL model test includes first testing the existence of a long-run equilibrium relationship between the model variables and the parameters of the independent variables in the short term, so we calculate the Fisher statistic (F) through (Wald test) where the null hypothesis is tested because there is no cointegration between the model variables (absence of a long-run equilibrium relationship), then we compare them with Pearson et al. table values for the critical values of the highest and lowest bounds at significant levels.

**V-4/ Results and analysis:**

After defining the model and the study variables, we highlight the results of the model estimation:

A. **Cointegration test using the bounds approach:**

The following table shows the (ARDL) bounds test by calculating Fischer's statistics and comparing them with the highest critical values (1)I and the lowest ones (0)I, as stated previously, to test the null hypothesis that there is no cointegration.

The results were as follows :

**Table (10): Test of the bounds approach on the long-run relationship**

| **Release** | **Fisher calculated statistics $F_C$** | | **The result** |
|---|---|---|---|
| **Sample** | 29,03947 | | There is a cointegration relationship |
| **Critical values** | **Highest bound (1)I** | **Lowest bound (0)I** | |
| **At a significant level of 1%** | 4.68 | 3.41 | |
| **At a significant level of 2.5%** | 4.18 | 2.96 | |
| **At a significant level of 5%** | 3.79 | 2.62 | |
| **At a significant level of 10 %** | 3 , 45 | 2.26 | |

**Source:** Prepared by the researchers based on Eviews program

As the calculated F value is significant and greater than the critical values of the highest ~~bounds~~ at a significant level of 1%, 5% and 10%, then it is in the cointegration area and thus there is a long-run equilibrium relationship between the study variables (independent and dependent variable).

B. **Conclusion of the long-run relationship:**

We measured the long-run relationship between the variables of fiscal policy, monetary policy and FDI under the ARDL model and the following table shows the estimation results.

**Table (11): Estimates of the long-term parameter (dependent variable LnIDE)**

| **Variable** | **Parameter** | **Significance** |
|---|---|---|
| LnG | 17.66 | 0.0016 |
| LnM2 | 23.99 | 0,0004 |
| LnTCD | 4.42 | 0.1525 |
| LnTRS | -7.99 | 0.0131 |
| LnTX | -4.21 | 0.0277 |
| C | 31.89 | 0.0723 |

**Source:** Prepared by the researchers based on Eviews program

We selected the following lagged values (1, 2, 2, 2, 1, 1)

When we entered the Napierian logarithm on the study model, the parameters of this model became flexible, i.e., if one of the independent variables changes by one unit, then the IDE variable changes by the parameter value. Then on this basis, the results of long-term parameters estimation will be interpreted.

We note that the long-term dollar exchange rate parameter is not significant, i.e. it does not affect the IDE flow because prob > 0.05. The other variables are significant at the levels 1 %, 5 %, and 10 % as we note the positive impact of the money supply and government spending variable on FDI flows, which is consistent with the descriptive study of national data and theoretical study.

The rest of the variables, such as the rediscount rate and regular collection have a negative impact.

**C. Estimation of the ARDL ( DLnIDE ) model error correction**

After confirming the long-run relationship, we will identify the short-run relationship between variables using the non-structural error correction model.

**Table (12): Results of UECM error correction model estimates of the ARDL model**

| Variable | Parameter | Significance |
|---|---|---|
| DLnG | 18.72 | 0.0042 |
| DLnM2 | -25.44 | 0.0019 |
| DLnTCD | 4.68 | 0.0884 |
| DLnTRS | -8.47 | 0.0339 |
| DLnTX | 4.47 | .0563 |
| cointEq (-1) | -1,060 | 0.0001 |
| DC | 33.81 | 0.1159 |

**$R^2$** = 0.564 **Dw** = 2.11 **p(F)** = 0.000023

**Source:** Prepared by the researchers based on Eviews program

We obtained the error correction bound ECM (-1) with a negative and significant signal where its value is -1.06 and significant Prob = 0.0001 which confirms the existence of the long-run equilibrium relationship. This rate is the speed of correction of the short-term imbalances in the long term. As for the effect of the independent variables in the short term, we note that all the parameters of these variables are significant as FDI flows are affected by the previous periods of both government spending positively and the dollar exchange rate and regular collection. The money supply was the result of the negative study and this is somewhat in contradiction with the theoretical framework

The model is significant as Fischer's is value is greater than the calculated value Prob (0.00002) < 0.05. As for the explanatory capacity of the model, it was estimated at 56.4 % which is acceptable.

The value of DW = 2.11 is almost within the area of rejection of the first intrinsic correlation between errors.

**D- Model diagnostic tests:**

This model cannot be used until we diagnose it through a range of tests such as:

**Table (13): Results of the model diagnostic tests**

| Type of test | The null hypothesis $H_0$ | Statistical value of the test | | Test result |
|---|---|---|---|---|
| LM m0Serial correlation of errors | **There is no serial correlation between errors** | $F_c$ : 8,26 | Chi-deux : 11,96 | Prob > 0.05<br>$F_{c>} F_T$<br>Acceptance $H_0$ |
| | | Prob : 0,11 | Prob : 0,10 | |
| Jaque- Bera test for natural distribution of residuals | **Residuals are naturally distributed** | Jaque Bera : 0.45<br>Prob : 0.79 | | Prob > 0.05<br>Acceptance $H_0$ |
| Breusch-Pagan-Godfery test for heteroscedasticity | Homogeneity of residues | $F_c$ = 0.79<br>Prob = 0.66 | | Prob > 0.05<br>$F_{c>} F_T$<br>Acceptance $H_0$ |

**Source:** Prepared by the researchers based on Eviews program

The above table shows that the diagnostic tests were positive, i.e, the model did not contain any problem of intrinsic correlation between the errors and their heteroscedasticity, and that they are naturally distributed.

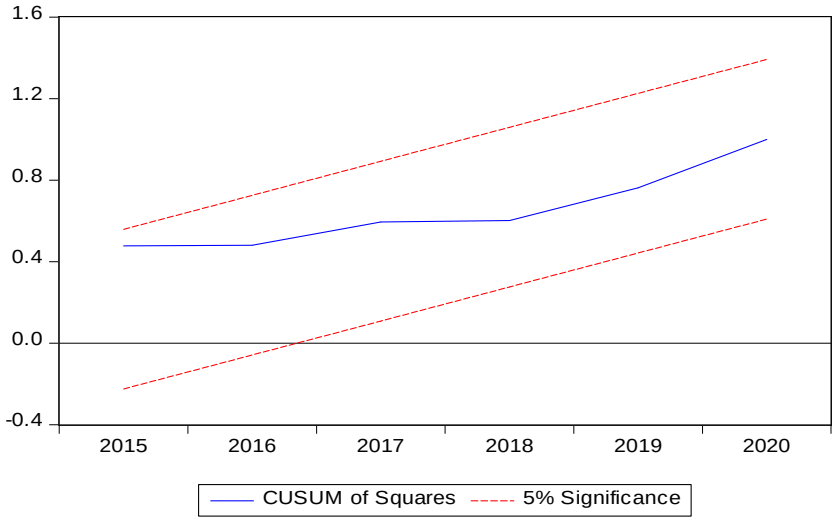
**E- Stability test of the model:**

There are several reliable tests to confirm that the data used are free from any structural changes such as the Cumulative sum of recursive residuals (Cusum of Squares). These tests show two facts which are the demonstration of any structural change in the data and the stability of long-term parameters with short-term parameters. Many studies showed that such tests are associated with the ARDL methodology.

Structural stability of the estimated coefficients of the model error correction formula is achieved ARDL If the graph is for both tests Cusum and CusumSQ Proposed by both Brown Dublin And Evans

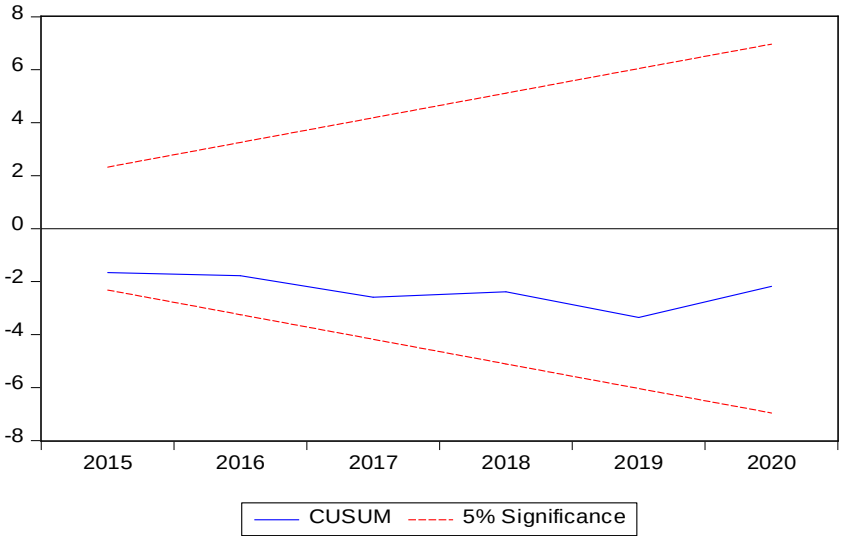
Structural stability of the estimated parameters of the ARDL model correction formula is achieved if the graph for the tests of both the Cusum and the CusumSQ proposed by Brown, Dublin and Evans.

**Figure(06): CusumSQ test results**




**Source:** Based on the EViews10 outputs

**Figure (07): Cusum test results**




**Source:** Based on the EViews10 outputs

The graph representing the CUSUM test of the study model shows that it crosses a linear center within the region's bounds and this is evidence of a kind of stability in the model at the level 5%.

As for the test of Cumulative Sum of Recursive Residuals CUSUMSQ, it also indicates the stability and constancy of estimated coefficients over time. Therefore, it can be said that there is consistency in the model between the short and long-term results.

Finally, we confirmed the quality and significance of the model; that it has no measurement problems and that it can be used to predict the changes that can be caused by the deliberate and well-considered fiscal and monetary policy variables to the model on future foreign investment flows.

## VI.Conclusion

We tried through our research to examine the impact of fiscal policy and monetary policy on FDI flows in Algeria. This required us to address the various definitions of fiscal and monetary policy, its objectives and the instruments used to affect the economic activity in general.

In order to show the impact of fiscal policy and monetary policy on FDI in Algeria during the period 1990-2020, we used a model that included a range of variables, such as government spending, regular collection, money supply, exchange rate and rediscount rate, and obtained a set of results:

- The relationship between monetary policy, fiscal policy and FDI is important and has an important role in affecting the foreign investment flows.
- Both government spending and money supply are of great importance in explaining changes and developments in the value of foreign flows to Algeria. Actually, there is a direct relationship between government spending and foreign investment in the long and short term, i.e. State spending on infrastructure and increasing investment spending in various sectors contributed to increasing FDI, and thus the State uses fiscal spending to support and encourage investment.

As for the money supply, there is a causal relationship between FDI and money supply in the long term, but there is a negative relationship between them in the short term, and this is due to the instability of economic conditions for a period of time.

- Regarding the re-discount rate and regular collection, there is an inverse relationship with the long-term FDI flows, the higher the regular collection is, the lower the investment flows are. This indicates that the State uses very high levels of tax pressure which affects the foreign investor. As for the re-discount rate, it has an inverse relationship with foreign investment flows, the higher the discount rates are, the lower the foreign investment flows are, which shows the effect of monetary policy on the rediscount instrument. Actually, reducing the discount rates is considered as one of the measures to support and encourage investment. However, the exchange rate did not have a very significant impact on FDI flows during this period and in the long term.

The following are some of the most important recommendations that we conclude this research with:

- The State should encourage private investment, especially foreign investment, to invest in infrastructure projects to reduce its burdens, increase the efficiency of such projects and improve its investment climate.

- The State should highlight its economic and development priorities and support the FDI flow in accordance with its objectives, and grant incentives and facilities for the kind of investment which enables it to achieve its objectives at the lowest possible cost.

- Finally, fiscal policy must be synchronized with the indispensable monetary policy. Actually, more effective policies must be developed to target inflation, maintain exchange rate stability and avoid extreme fluctuations.

- Eliminate bureaucracy and provide administrative facilities.

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