Foreign direct investment and economic growth in Algeria During the period 1990-2018-An application of the autoregressive distributed lag model(ARDL)

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SummaryThe aim of this study is to analyze the Impact of foreign direct investment on economic growth in Algeria over the period 1990-2018.We used the Auto regressive Distributed Lag (ARDL), developed by Pesaran& al (2001), The study shows 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.

the study also found that local capital and imports have had a positive effect on the economic growth in Algeria.

Keywords: Foreign Direct Investment; Economic growth; Imports; local capital; ARDL.

Jel Classification Codes:F43 ; P45.

I-Introduction:

The importance of foreign direct investment (FDI) has grown over the past years as a component of the capital flows of developing countries,.

Many developing country governments did not welcome foreign direct investment in the 1970s because of the tendency of multinationals to profit without paying attention to improving the economies of these countries.

In the 1980s, this position changed and governments were competing to attract FDI, because it is a source for raising the efficiency of human capital, technological change and absorbing unemployment in the economies of developing countries. Thus, it has become a catalyst for economic growth;

It is also one of the most important instruments of economic development.

For this importance, Algeria has been keen to attract many foreign investments by re-examining and modernizing the foreign investment system to develop its provisions and policies to suit the successive global changes. This is in order to win the advantages that it offers, especially the increase in economic growth rates.

Research Questions

In this paper, we try to answer the following question: Is there a relationship between foreign investment flows and economic growth in Algeria and what are their trends?

Hypotheses of the study

To answer our problem, we have put the following hypotheses:

- Foreign investment flows have a positive impact on Algeria's economic growth.
- Domestic investment has an important role in creating economic growth.
-Most of these foreign investments are directed to non-productive activities.

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Objective of the study

The objective of this study is to measure the impact of FDI on economic growth in Algeria during 1990-2018 using the simultaneous integration model, and to determine the causal relationship between foreign investment and economic growth in Algeria.

II– Methods and Materials:

II.1.the theoretical framework

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

Many studies are based on both theoretical and empirical considerations .When hestudied the impact of FDI on economic growth, De Mello (1999) finds only weak indications of a positiverelationship between FDI and economic growth despite using both time series and panel data fixed effects estimations for a sample of 32 developed and developing countries (De Mello, 1999),In a study by RafikNizari, entitled Foreign Direct Investment and Economic Growth, the case of Tunisia, Algeria and Morocco during the period 1991-2005, he found that foreign direct investment had a negative impact in Tunisia, but a positive in Algeria and Morocco.

The Salth study in 1992, concerned with the impact of foreign investment and GDP growth, found that there is a reverse correlation between foreign direct investment and the GDP growth rate between 1975 and 1980,. The study also found that the applied results do not Consistent with economic theory.

Borensztein, Gregorio and Lee examined the impact of foreign investment on economic growthin 69 developing countries using the multiple regression equation, and found that foreign investment is an important tool in the transfer of technology, the raise of economic growth, domestic investment, especially if attention is paid to human capital.

Dees (1998),in a study on the determinants and effects of foreign directinvestments in China found that FDI has been important in explaining China'seconomic growth (Dees, 1998).

Barreland Pain (1999) explored the benefits of FDI of United States multinational and find that FDI may affect the host country's performance positively in case there are transfers of technology and knowledge through the FDI to the host economy(Barrel & Pain, 1999).

Daniel .O. Abala (2014) findings show that FDI in Kenya are mainly market-seeking and these require growing GDPs, political stability and good infrastructure, market size as well as reduction in corruption levels(Abala, 2014).

GhaithAlzaidy, MohdNaseem, Bin Niaz Ahmad, ZakariaLacheheb (2017), found that financial development plays an essential role in mediating the impact of FDI on economic growth in Malaysia. This implies that well-developed financial sectors lead to further and facilitate FDI spill over and hence yield economic growth, particularly for the case of Malaysia.

Impact of foreign investment on economic growth (theoretical framework):

FDI is one of the most interesting topics on the global level, becoming one of the most important sources of economic growth in developing countries.

Its definitions have been varied and therefore we will list some of them as follows:

As defined by the World Investment Report as that investment, the majority of which is the capital of the foreign investor, represents the foreign natural or legal interest and includes a long term commitment. The investor has an active role in managing the investment(Zahid , p. 152).

As for the International Monetary Fund (IMF), as defined in the IMF Balance of Payments book (1993), it is the investment under which a sustainable interest is acquired in projects managed in a foreign country. It is defined also as well as the acquisition of an active role by the foreign investor in the administration. By owning 25% ownership of the project, it enables him to control project management(Nazih Abdel , 2007, pp. 31,32).

It is defined by the World Trade Organization as the process of recruiting the local investor for its assets in countries of other countries with their management(Real, 2010, p. 5).

Through the above definitions, we conclude that foreign direct investment is a foreign investor to invest in another country provided that he has authority and control over the project, and that this investment is in one of the following ways: buying an investment exists in the host country, the establishment of a new company, or enter into a partnership.

On the other hand, the economic theory bears mixed predictions about the potential effects of FDI on economic growth, as macroeconomic impacts are growing to affect the overall productivity of production factors and to maximize the efficiency of the resources available in the economy(OECD, 2002, pp. 8-10).

In general, the relationship between FDI and economic growth is complex for several reasons: First, in terms of capital accumulation in a host economy, this accumulation is expected to be enhanced by FDI through the promotion of the integration of inputs and technologies into the productive sector of the host State(Bayoud, 2011, pp. 112-123). Secondly, FDI improves the efficiency of the host country's domestic firms through communication, replication and extreme competition by foreign companies.Thirdly, FDI is believed to be a means of technological development and human capital development in developing countries. Technological development occurs through the process of capitalist deepening in the form of the emergence of a new set of knowledge-based capital goods, as well as by directing work and developing skills by foreign companies(Buckley, Clegg, & Chengqi Wang , 2002, p. 1).

In order to understand the impact of foreign direct investment on economic growth, the traditional and innovative views of the school will be briefly reviewed.

According to the traditional school view, foreign investment is a win-win game with only one player, foreign companies(Abu Qahf, 1992, p. 213), it takes more than it gives, considering that foreign direct investment leads to a decline in growth in gross national product, as a result of the purchase of some national companies by foreign companies and the transfer of profits abroad, in addition to the exit of national companies from the domestic market as a result of competition with foreign companies, As well as strangling local companies and restricting them to acquire the economic sector in which these companies exercise their activities, thus limiting the future economic development efforts represented in the growth of GDP(Ghanem & Saleh Al-Musibli, 2003, p. 189).

As for the view of the modern school, it is based on the basic assumption that both parties to the investment (foreign companies and the host country) have a common interest, both of which depend on or benefit from each other to achieve a goal or set of specific objectives. In other words, there is no one-sided game, as I suppose, but it is a special game, in which each party gets a lot of revenue. However, the size, number and type of returns received by each party depend largely on the other party's policies, strategies and practices on investment, which is the basis and substance of their relationship. These investments increase the potential for rapid growth in developing countries, owing to their ability to finance both domestic and external sources, in excess of the capacity of their domestic competitors, enabling foreign enterprises to finance their new investments and to boost their growth potential(Ghanem & Saleh Al-Musibli, 2003, p. 190).

II.2.Characteristics of foreign direct investment in Algeria:

During the period of reforms, Algeria has adopted a set of laws and regulations, all of which seek to create a conducive environment to the development of investments. The most important of these laws are the establishment of investment promotion agencies and other bodies, notably the Investment Promotion and Support Agency (IPSA), The National Investment Promotion Agency (NIPA), the National Agency for Investment Development (NAID), the National Investment Council (NIC), the Single Network (SN), the Investment Support Fund (ISF), the Ministry of Investment Promotion And follow up on repairs ... etc. But despite these efforts, it has not been

able to create an attractive investment environment for investors and this is confirmed by the following elements.

Figures (01) shows that FDI levels in Algeria generally remained low, with a maximum value of USD 2846.5 million in 2008, below USD 1 billion, although its value increased from USD 40 billion in 1990 to USD 2846.5 million in 2008, and then significantly decreased from 2009 to reach USD2572 million in 2011.

The flow of foreign investment fell significantly in 2015 to USD 4559million due to the decline in investment in the oil sector due to the decline in prices, but improved in the years to come to settle at USD 9920million in 2018Contribution of foreign direct investment to GDP

Figures (2) shows that the contribution of foreign direct investment to economic development in 1991 reached 0.06% and this percentage has increased since 1995 and reached at best 2.3% in 2009, but from 2010 it declined significantly to reach 2011 To 1.37%, Afterward, the flow of foreign direct investment was known to decline and remained within 1.2 % until 2018. It can be said that the participation of foreign investment in the development of the Algerian economy remains very weak during the last period, despite the beginning in 1995 to participate in economic development(IMF, 2011, p. 5).

On the one hand, most investments directed to Algeria were for non-productive sectors, foremost of which were the services sector and the oil sector, while sensitive sectors such as agriculture (0.12%), health (0.35%) and tourism (1.57%) were absent altogether, in improving the standard of living and achieving food security (Cherakrak, 2015).

II.2. Measuring the impact of foreign direct investment on economic growth in Algeria.

The most important goal of this empirical study is to investigate the nature of the relationship between foreign direct investment and economic growth. In this part, we estimate an autoregressive distributed lag (ARDL) model for system of five serials of data about FDI, GDP, X, and K.

In order to measure the effect of foreign direct investment on economic growth in Algeria during the period 1990-2018, we will depend on the Cobb-Douglas production function, based on the model used by Marwah, Tavakoli (2004)(Arafat Abu Lila, 2005, pp. 57-58).

The model came in shape.

GDP: is denominated in US dollars.

K: Local capital is denominated in US dollars.

FDI: Foreign investment is measured by the accumulation of foreign investment denominated in US dollars.

L: Employment.

M: Imports of goods and services are denominated in US dollars.

Where the previous equation is written as follows:

By making some simple adjustments after dividing the equation on the labor, we come out with the proverb that avoids the problem of heterogeneity of variance, as well as avoid the problem of multiple linear correlations.

We try to estimate and test the sample rates through Eviews 10, where we will test the stability of the series.

- **Stationarity Test:**

To test the stationarity of the underlying variables, the standard augmented unit root test of Dickey and Fuller was used. As shown in Table (1), the testing results show that all series are not stationary at the level. However, these series become stationary at the first difference.

- **Optimum lag selection:**

The ARDL procedure starts with determining of an appropriate lag order (p) in equation (1). For this purpose, the Akaike Information Criterion (AIC) and Schwartz Criteria (SC) were used to select the number of lags required in the co-integration test.

Figure (3) which representing optimal lag lengths, as results are out of Eviews 10 selected two lag for dependent variable (GDP), while, for lag for FDI, M, and one lag for K. In the following step we tested for the presence of long run relationships among variables by using the bound test.

- **Bound test:**

The ARDL bound test is based on the Wald test (F-statistic). When the computed Fstatistic is greater than the upper bound critical value, we can reject the null hypothesis meaning that the variables are co-integrated. The results of the bound test (Table 2) indicate that the calculated F statistics 5.0239 surpassed the upper Bound critical value(3.2)(3.67) (4.08) (4.66) and the null hypothesis of no cointegration is rejected. It means there is a long-term equilibrium among the considered variables, in the examined period.

- **Co-integration of long run relationship:**

The long-run equation was estimated using the optimal ARDLorder according to theAkaike Information Criterion. The initial maximal lag hasbeen set equal 3, which is the maximal order recommended by PesaranShin (1999) for annual data. The estimated long term elasticities are given inTable (3).

The equilibrium correction coefficient (The coefficient of ECM (-1)) is estimated as(-0.96) (0, 0001) for the model which is reasonably large and highly significant at 5% level.And imply that deviations from the long-term growth rate in GDP are corrected by 0.96percent over the following year (that mean the speed of adjustment is 96%) meaning that96% of the disequilibrium due to the previous year's shocks is adjusted back to the long-runequilibrium in the current year. This means that the adjustment takes place relativelyquickly.

The long-term coefficients for the model show thatin the long-run the foreign direct investment has a very significant effect on GDP and a one

Percent increase in this variable leads to -1.24% decrease in GDP. Alternatively, a onepercent increase in local capital leads to a 0.063% increase on GDP. Thisindicates that local capital in Algeria does have an important effect on GDP.

The results also show that a onepercent increase in total imports leads to a 2.12% increase on GDP.

- **Diagnostic Test**

From Table (4) below, the test of serial correlation was carried out on the model; the result revealed that there is no serial correlation, since the (Prob- Value = 0.5199> 0.05). The implication is that the GDP model is good for forecasting. The test of Heteroskedasticity test was carried out on the model, the result revealed that the variance of the residual is constant, since the (Prob-Value= 0.4042> 0.05). Jarque-Bera test is a test of normality, since the (Prob-Value = 0.4813> 0.05). We conclude that population is normally distributed.

- **Test of Stability for the Long-Run Model**

Figures (4)(5) show that all the plots of statistics CUSUM and CUSUMSQ are inside the critical bounds at 5% level of significance (the blue line is within two red lines) mean that all the coefficients in the error correction model are constant.

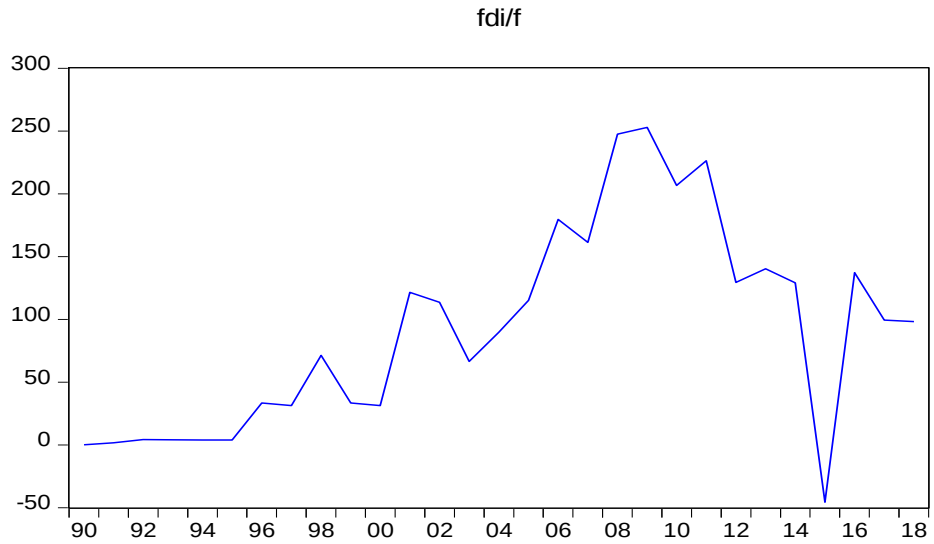
So our ARDL model is stable which means that the coefficients of regression are changing systematically.

III-Conclusion:

There has been a growing interest in foreign direct investment in Algeria for decades, and this is evident through the programs and reforms adopted by the Algerian authorities in an attempt to provide an appropriate investment climate, which aims to promote and encourage foreign direct investment outside the hydrocarbons sector, Especially in the field of agriculture and tourism, which in turn supports economic growth. The main objective of this article is to determine the effect of foreign direct investment on economic growth. To analyze this relationship, we used the Auto regressive Distributed Lag (ARDL), developed by Pesaran et al (2001). The Econometric analysis has shown that in the short and long term, FDI has a significant negative on growth in Algeria in the short and long run. This means that foreign direct investment has had a negative effect on the economic growth of Algeria. Also, we found that the increase in CAPITAL leads to increase on GDP (0.063%). This indicates that Capital in Algeria does have an important effect on GDP.The results also show that increase in total imports leads to increase on GDP (2.12%).

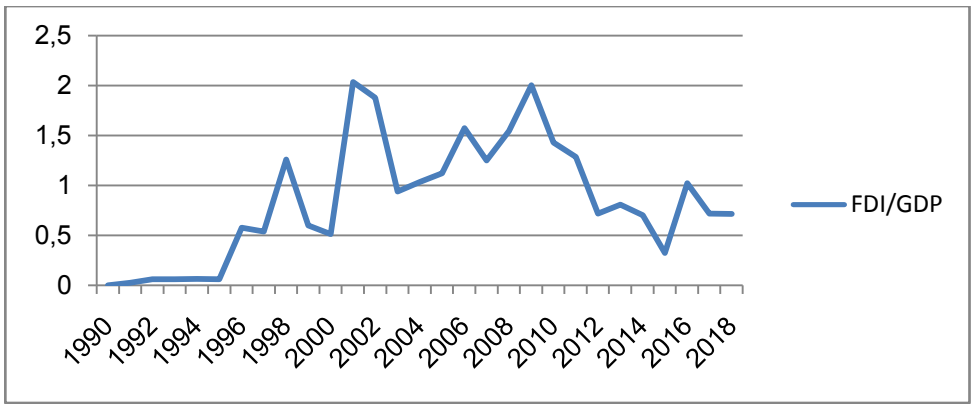
- Appendices:

Figure (1): Algeria's foreign direct investment flows (1990-2018) (million/$)



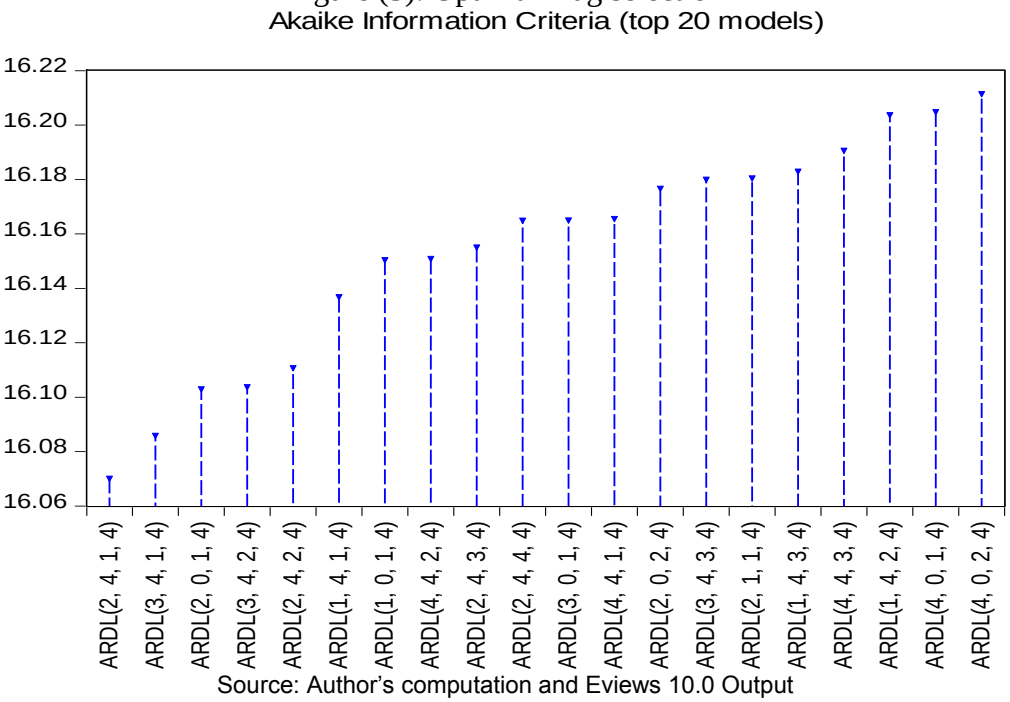
Source .United Nations Conference on Trade and Development (UNCTAD) database, World Investment Report; 2018.

Figure (2): Contribution of FDI to GDP in Algeria (1990-2018).



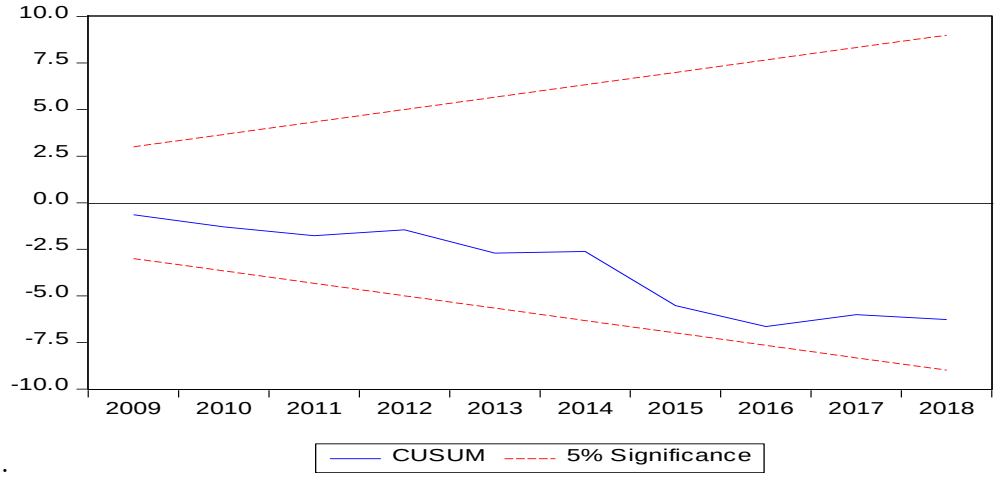
Source: UNCTAD ,world Investment Report 2004.2007
IMF, http://www.imf.org/external/french/pubs/ft/scr/2011/cr1139f.pdf.

Figure (3): Optimum lag selection



Source: Author's computation and Eviews 10.0 Output

Figure (4): Plot of CUSUM Test for Coefficients Stability of ARDL Long-Run



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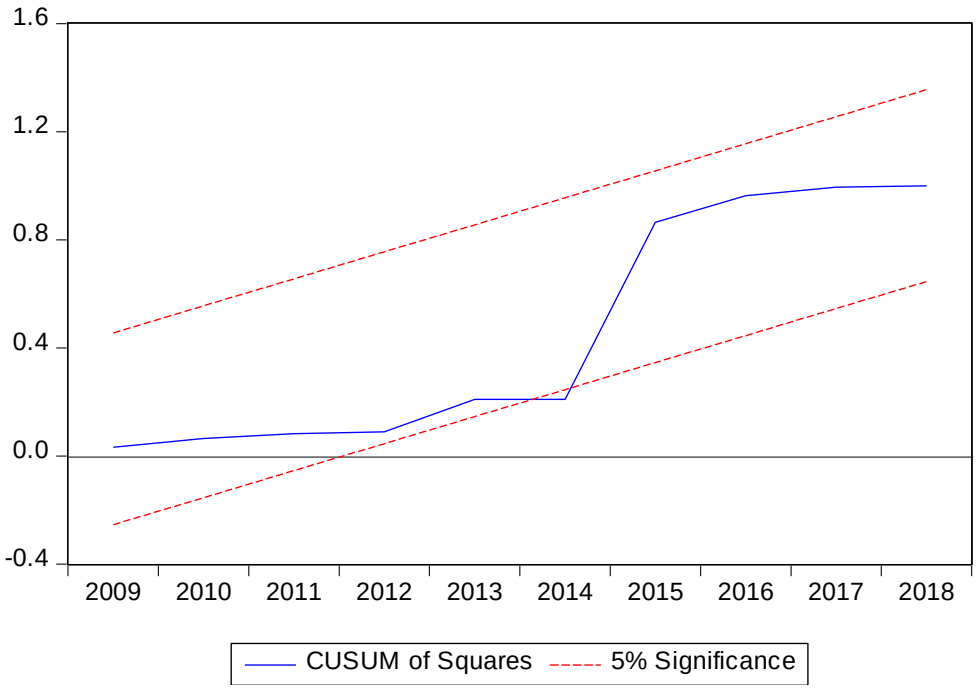
Source: Author's computation and Eviews 10 Output

Figure (5): Plot of CUSUMSQ Test for Coefficients Stability of ARDL Long-Run



Source: Author's computation and Eviews 10 Output

Table(1): Unit root test statistics

	***test* ADF**					
Variables	***Levels***			***Differences***		
	Intercept	*Intercept and trend*	*No Intercept and trend*	*Intercept*	*Intercept and trend*	*No Intercept and trend*
GDP	-0.806558	-2.321860	0.105710	-5.422815	-5.270347	-5.400800
FDI	-2.281360	-3.634302	-0.641514	-7.894628	-7.863467	-8.004308
K	-5.271294	-3.631100	1.118661	-3.925124	-3.805927	-1.572187
M	3.609844-	2.814340-	0.735800	3.759297-	3.759697-	2.201010-
	P-P test					
Variables	***Levels***			***Differences***		
	Intercept	*Intercept and trend*	*No Intercept and trend*	*Intercept*	*Intercept and trend*	*No Intercept and trend*
GDP	-0.886964	-2.443047	0.064081	-5.425974	-5.272832	-5.400800
FDI	-2.201010	-2.607274 -0.988957	-8.189998	-8.177611	-8.275817	-2.201010
K	0.370346-	-2.198460	0.721166	-3.890389	-3.766233	-3.654635
	-0.477811	-2.259481	0.454586	-3.738568	-3.730838	-3.699900

Source: Author's computation and Eviews 10.0 Output

Table (2): Results from ARDL Bounds Test

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	5.023977	10%	2.37	3.2
k	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66

Source: Author's computation and Eviews 10.0 Output

Table (3): Results from long run relationship

Dependent Variable: D(GDP)
Selected Model: ARDL(2, 4, 1, 4)
Case 2: Restricted Constant and No Trend
Date: 05/23/19 Time: 09:53
Sample: 1990 2018
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	0.322737	0.143104	2.255264	0.0478
D(FDI)	-2.401236	2.303679	-1.042348	0.3218
D(FDI(-1))	-3.656129	2.587520	-1.412986	0.1880
D(FDI(-2))	-4.554960	3.094227	-1.472083	0.1718
D(FDI(-3))	-10.25234	3.805012	-2.694430	0.0225
D(K)	3.587017	0.374955	9.566521	0.0000
D(M)	1.115800	0.634626	1.758201	0.1092
D(M(-1))	1.197115	0.476868	2.510368	0.0309
D(M(-2))	0.820088	0.397322	2.064036	0.0659
D(M(-3))	1.286713	0.408451	3.150222	0.0103
CointEq(-1)*	-0.964896	0.162708	-5.930248	0.0001

Cointeq = GDP - (0.0637*K -1.2424*FDI + 2.1212*M + 3393.9175)

Source: Author's computation and Eviews 10.0 Output

Table (4): Results of diagnostic tests

	X2-statistic	Probability
Breusch-Godfrey Serial Correlation LM Test	0.220899	0.5199
Heteroskedasticity Test: Breusch-Pagan-Godfrey	0.656909	0.4042
Jarque-Bera test	1.4624	0.4813

Source: Author's computation and Eviews 10 Output

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