



## **Determinants of Private Sector Investment: An Econometric Study of the Algerian Case (1980-2017)**

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### **Abstract :**

This study investigates the determinants of private investment in Algeria over the period of 1980-2017. Employing modern time series econometric techniques the Auto Regressive Distributed Lag(ARDL). The results suggest that investment decisions seem to be determined, In the long run, by foreign direct investment, public investment, credit to private sector, real exchange rate, trade liberalization and external debt. while real gross domestic product, foreign direct investment, public investment, real exchange rate, trade liberalization and external debt are statistically significant in the short run. This study provides important results for policymakers in framing investment behavior in policy formulation.

**Key Words:** Algeria, ARDL test, co-integration, crowding-in, private investment.

**JEL Classification :** D92, E22.

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### **Introduction :**

The problem of state intervention and the quality of the existing economic system in the developing countries is reflected to the ideological orientation. The economic thought shows two prominent schools are classicism and Keynesianism that have dominated economic thinking. in which The 1929 crisis gave rise to the emergence of the distinction between private firms of classicals and public firms of Keynesians thought, More specifically by the private sector and the public sector.

Recent attention in terms of the requirements of economic growth is the impact of the private sector in the formation of the value. Unlike the public sector which can weigh the public treasury costs. Several studies indicated that The private sector is the main driver of growth and hence the development of this sector is a prerequisite for accelerating growth like the report of the Organization for Economic Cooperation and Development (OECD, 2007). The European Commission for 2014 stated that the private sector has the potential to achieve comprehensive and sustainable growth in developing countries.

Private investment plays a more influential role in determining economic growth, given that public sector investments are often limited to low-cost industries



based on natural resources (Khan & Reinhart, 1990) also (Rosemary & Dorcas, 2018) (Makuyana & Odhiambo, 2018) showed it. The focus of structural adjustment programs and grassroots reforms is to find a more appropriate incentive for the private sector to achieve sustainable economic growth (Oshikoya, 1994) In addition, we gain competition policy especially important for developing and emerging economies. Often, where monopolistic structures that represent local economic and political forces are concentrated, And are a major obstacle to development (Oman, 2000).

On the theoretical level, (Yaya & Sanni, 2005) indicated that the private sector is better in terms of property rights, transaction costs, efficiency and agency. This essentially calls for the development of a vital private sector in developing countries that is a strategy to accelerate growth in terms of job creation, sustainable development, integration into the scientific economy and poverty reduction. Through what we mentioned earlier to give the subject importance. There should be empirical studies of economic policy-making to encourage private investment in the form of key determinants of private capital formation so that the private sector's response to investment opportunities can match the period of economic reforms.

In the context of Algeria , like other developing nations, adopted Structural Adjustment programs after 1986 crises As a result of the excessive dependence on the export of crude oil and the failure of the existing approved system is a large public companies in achieving economic diversification and away from the problem of indebtedness. Forcing Algeria to enter into agreements with the International Monetary Fund to provide reforms in the framework of economic restructuring, which allowed the emergence of private companies in the nineties, contrary to the period preceded by the ideological orientation, which relied heavily on public companies that did not succeed in achieving rates of decline in economic growth The public treasury weighed on costs, with the exception of the hydrocarbon sector.

Algeria has sought to create a favorable environment by encouraging private investment through its market economy. The business sector is the private sector mainly because it covers a whole range of economic activities ranging from agriculture to services, including trade, through and aspires to expand it to the infrastructure and social services sectors in the face of the challenges of globalization in building human and institutional capacity to exploit their trade and investment opportunities and open its scope both for domestic and foreign investment in addition to the enactment of many laws and legislation for this sector.

Based on what we mentioned previously, we can ask the following problematic:

What are the macroeconomic determinants of private sector investment in Algeria?  
**as hypothesis:**

- The behavior of private investment depends on economic factors in Algeria.
- The behavior of private investment is not dependent on economic factors in Algeria.



In this paper, we try to delve deeper into local determinants of private investment behavior in Algeria, which is necessary to understand how private investment is driven in the country. This may provide empirical evidence for formulating policies that can reform the private sector in driving growth Economy and give it an effective weight in the economy.

## **I. LITERATURE REVIEW :**

In this section, we will try to explain the investment behavior by providing an overview of the theoretical and empirical assessment in order to identify the private investment determinants.

### **1. Theoretically:**

The investment is based on five models to give an explanation of the trends it follows: the simple accelerator model, the liquidity theory, the expected profits theory, the Tobin's Q Theory and the neoclassical flexible accelerator theory (Bazoumana, 2004). according to (Kamgnia & Mama, 2001) there are two directions in traditional approach used to analysis investment is :

#### **1.1 stock optics:**

(Clark, 1917)try to give "an exact formulation to the relationship, in quantity and in time, between demand for products and demand for the means of production". In the form of term simple acceleration that mean net investment adjusts to product variations, and replacement investment to existing capital stock, gross investment is defined as a function of changes in the product and the existing capital stock.

flexible accelerator model represents a general form of accelerator model, The model is flexible in the sense that it allows investment to vary with other relevant variables preserve The basic idea that is to explain The realization of the investment by the will to invest.

#### **1.2 Flow optics:**

(Jorgenson, 1963) Suggest another form of investment model or another analysis accurately, so he emphasized the importance of anticipated levels of production as well as the anticipated costs of capital. And in another study on developing countries 1971 he posited that :the real rate of interest, the rate of depreciation , the tax and the price of capital goods are the determinant of investment decision.

In another concept of investment behavior, (Tobin, 1969)introduced a new term in the economy specialy in investment decision through his study about the ratio between the market value (discounted value of the return on the new investment) and the book value (cost) of the capital. According to Tobin, the investment decision depends on the study of costs and the market value of the various forms, which means that the marginal value of the investment must be less than value in the market, Which is marked by (Q)tobin.

### **2. Effecting factors of private sector investments:**

The relationship between variables and investment behavior and the differences that arise in the contradictions of the analysis process:



The relationship of the interest rate with the investment was going in one direction in a period of time as the analysis that was based on the pioneers of economic thought shows an inverse relationship between the rate of investment and the price like classic and neoclassic ;The real interest rate is a fundamental variable in determining the level of investment from the idea of (Jorgenson, 1963)and Keynesians see (APPELT, 2016) , In contrast, the study of (McKinnon, 1973) and (Shaw, 1973)presented an addition to the investment relationship and interest rate, but with a different analysis, where the theory of financial depression and liberalization showed a positive correlation between them, Developing countries will necessarily lead to a real interest rate hike, which will encourage the channeling of funds towards saving, which helps to raise the volume of investment, leading to economic growth. He stressed that easing financial restraint by allowing the market to set real interest rates and remove control On credit among other things The high real interest rate also helps to guide investment towards the most productive projects and to facilitate technological innovation leads to growth on the other.

The real GDP growth rate shows the level of development of economic activity so that it has a significant impact on investment decisions, especially private investment. By tracking the development of this output, it is clear that the economy goes through three cases that take into account during economic analysis its impact on investment decisions and behavior. At the level of real GDP leads to an increase in investment as companies will invest in new capital, more jobs will be created and personal revenues will expand. The second is a slowdown in real GDP growth. Companies will exclude Investment in new purchases and employment until we know whether economic conditions will improve, thus reducing income. If real GDP growth is negative, this means that the economy is heading towards recession or is already having a significant impact on investment Especially because it reduces the chances of an increase compared to total investments. See (Eshun, Adu, & Buabeng, 2014)

The nature of the relationship between public investment and private investment remains ambiguous as there is a conflict of opinion about their impact on domestic gross investment, both theoretical and applied. The study of the relationship between public investment and private investment and their impact on economic growth is of great importance in advanced economies And emerging markets as public investment is part of public spending and decision-making in public finance to form an addition to the size of public capital and also formed with private investment the volume of total investment, but the latter may be adversely affected by public investment in the Z circumstances (Afonso & Aubyn, 2016) . The effect of public investment on private investment is contradictory. The trend that supports the positive impact is that government investments in infrastructure such as roads, energy and schools, for example, will create interrelated relationships with the private sector and thus constitute complementary factors, namely enhancing capital productivity Through the improvement of public capital (Aschauer, 1989). The negative impact, known as the impact of competition,



affects two ways, either directly by reducing financial resources available to the private sector or indirectly through higher interest rates and prices. To curb private investment activity and thus decrease overall domestic investment (Mittra, 2006).

The economic analysis of the impact of foreign direct investment on private investment confirms that there is a difference in the results of studies between the need for and the presence of foreign investment flows. For the supporting party, it is considered a tool for the transfer of technology, the formation of human capital, Productivity, cost reduction and introduction of modern management methods and development of new activities. Contrary to what is mentioned, domestic investment can be adversely affected by FDI inflows . Private investment activity as a result of competition, technological superiority and monopoly has no current effect, which means that the volume of domestic investment is reduced to a lesser extent than foreign direct investment.

Credit to the private sector as a percentage of GDP is a fundamental variable in the study of private investment trends, where the impact of financial intermediation in the economy and the efficiency of the banking system. (Misati & Nyamongo, 2011) shows that credit to the private sector has a significant impact on private investment. The weakness of the stock market index reflects the low level of development of the stock market in most economies African countries.

The impact of the exchange rate on the private sector remains ambiguous as a result of the divergence of results. On the one hand, reducing it can increase competitiveness and export volume, thereby enhancing investment in these sectors. On the other hand, it increases the cost of imported capital goods, thereby reducing investment in production sectors dependent on imported raw material.

The impact of external debt may discourage investment, especially private investment, as a result of the imposition of future taxes to finance debt service, while it may be a catalyst for financing investments despite the burden of debt servicing.

### **3. Previous studies:**

The results are summarized in the following table:

**Table 1: « Previous studies »**

study citation	Place and periode of study	Econom-etric model	short run determinants	long run determinants
(Bazoumana, 2004)	Senegal 1970-2000	ARDL	Not mentioned	Public investment real income Foreign aid flows. Credit to private sector . Terms of trade.
(Frimpong & Marbuah, 2010)	Ghana 1970-2002	ARDL	Public investment. Inflation. real interest rate. Openness. Real exchange rate. Regime of constitutional rule.	Real output. Inflation. External debt. Real interest rate. Openness . real exchange rate
(Kazeem & Olukemi, 2012)	Nigeria 1970-2010	ARDL	Public investment. Real GDP . Terms of trade.	Public investment real GDP Real interest rate. Exchange rate. Credit to the private sector. Terms of trade. External debts.
(Adugna, 2013)	Ethiopia 1981-2010	OLS model	Real GDP per-capita. External debt . Inflation.	Public investment, Real GDP per- capital. External debt Investment climate
(Magableh & Ajlouni, 2016)	Jordan 1976 - 2012	ARDL	Interest rate. Public investment. Real income.	Interest rate. Public investment. Real income.
(Bal, Mamun, Mowla, Hoque, & Bhuiyan, 2019)	Bangladesh 1980 - 2017	ARDL	Real income. Interest rate. fdi. Real effective exchange rate.	Real income. Fdi. Real effective exchange rate.

**Source:** By the authors.

## II. Analysis of the legal legislation for private investment in Algeria:

### 1. Private investment laws in Algeria :

To explain the behavior of private investment in Algeria, we must refer to the investment law, which clarifies the most important points reached by the private sector in Algeria, as the effect on the latter appears in the sectors in which it is concentrated. Of course, Algeria suffers from capital accumulation, as it is very weak compared with countries The emerging sector despite the rate of investment achieved by an average of 37%, due to the dependence of private investment,



especially on non-productive sectors, due to its exclusion from the strategic sectors defined by the Investment Law due to the government's directives through economic policies, the most important of which are industrial industries and their adoption of the public sector in their production.

**With regard to the most important points that private investment suffered during the study period, we mention:**

- Law No. 82-11 of August To explain the behavior of private investment in Algeria, we must refer to the investment law, which clarifies the most important points reached by the private sector in Algeria, as the effect on the latter appears in the sectors in which it is concentrated. Of course, Algeria suffers from capital accumulation<sup>21</sup>, 1982: Subject private investment projects to prior approval and a single sum that any project should not exceed a ceiling of 30 million dinars.
- Law No. 25-88 of July 12, 1988, discussed the issue of mixed companies, where it was stated that the foreign investor's share does not exceed 49%.

In fact, this period witnessed special ideological restrictions in terms of banking financing and obtaining hard currency while preserving the independence of decision-making in Algeria, that is, control over the board of directors.

- Law No. 25-88 of July 12, 1988: abolishing the aforementioned, except for the principle of quotas. At the same time, it defined the strategic sectors that are within the jurisdiction of the state, as mentioned earlier.
- Legislative Decree No. 93-12 of October 5, 1993, which brought with it the signs of liberalization of investment in the sense of complete freedom of investment as a kind of economic openness.

With the beginning of the second millennium and the emergence of the term globalization, trends towards liberalization began, but also the term strategic sectors that are within the jurisdiction of the state, such as the hydrocarbons sector, maritime and air transport, were preserved except in special circumstances and many laws were issued that clarify the principle of investment in Algeria. Through the exemptions and privileges and studying the files in the content of the following laws:

- Presidential Ordinance 01-03 of August 20, 2001.
- Presidential Ordinance 06-08 of July 19, 2006.
- Law No. 16-09 of August 3, 2016.

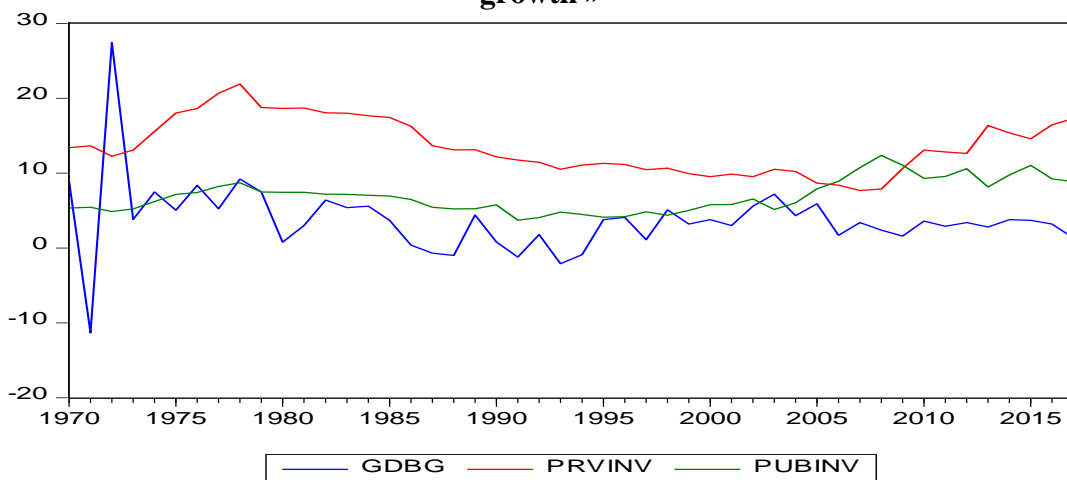
## **2. Evolution of private and public investment compared to economic growth:**

The next figure shows the effect of both private and public investment on the Algerian national economy, despite the variation in rates and the high private rate, but it appears that the public sector today retains an important part in the Algerian economy, and this is what we mentioned earlier in the strategic sectors. Especially private investment (PRVINV), but in fact it is related to the gross domestic product, and as is known, it is limited in value compared to a country the size of Algeria and the capabilities it acquires, and this is what is shown in the rate of economic growth (GDBG) in the figure.





**Fig. 1: « Evolution of private and public investment compared to economic growth »**



Source: Prepared by authors.

### III. DATA AND METHODOLOGY

#### 1. Data – Sources and Description

Our study uses an annual time series data covering the period from 1980 to 2017 where seven determinants of private investment are used to estimate the private investment models.

The data were retrieved from the World Bank database World Bank's World Development Indicators and IMF's International Financial Statistics .

Based on the theoretical review and empirical considerations, the following basic eclectic functional model incorporating accelerator, neoclassical and uncertainty variables is posited for the study:

$$PI = f(GDPG, RIR, FDI, PUI, CRPS, RER, OPNESS, EXTDEBT)$$

- Where:
- $PI$ = Private investment as a percentage of GDP
- $GDPG$ = real gross domestic product growth rate.
- $PUI$  = General government investment as a percentage of GDP.
- $RIR$  = Real interest rate ,
- $FDI$  = foreign direct investment influx as a percentage of GDP.
- $RER$ = real exchange rate.
- $CRPS$ = credit to private sector as a percentage of GDP.
- $OPNESS$ = trade as a percentage of GDP.
- $EXTDEBT$ = external debt as a percentage of GDB.

The study employ a advanced econometric technique of Auto-Regressive Distributed Lag (ARDL) bounds testing approach developed by Pesaran et al (2001).

We use the following model in this paper:





$$\begin{aligned} \Delta PI_t = & \alpha_0 + \sum_{i=1}^n \alpha_1 \Delta PI_{t-1} - 1 + \sum_{i=1}^n \alpha_2 \Delta GDPG_{t-1} + \sum_{i=1}^n \alpha_3 \Delta RIR_{t-1} \\ & + \sum_{i=1}^n \alpha_4 \Delta FDI_{t-1} \\ & + \sum_{i=1}^n \alpha_5 \Delta PUI_{t-1} + \sum_{i=1}^n \alpha_6 \Delta CRPS_{t-1} + \sum_{i=1}^n \alpha_7 \Delta RER_{t-1} \\ & + \sum_{i=1}^n \alpha_8 \Delta OPNESS_{t-1} + \sum_{i=1}^n \alpha_9 \Delta EXTDEBT_{t-1} + \beta_1 PI + \beta_2 GDPG \\ & + \beta_3 RIR + \beta_4 FDI + \beta_5 PUI + \beta_6 CRPS + \beta_7 RER + \beta_8 OPNESS \\ & + \beta_9 EXTDEBT + \epsilon_i \end{aligned}$$

Where:

$\Delta$ : Denotes the first difference operator.  $\alpha$ : is the drift component;  $\epsilon_i$ : is the white noise residuals.

**Table 2: « descriptive statistics of variables »**

	PI	GDPG	RIR	FDI	PUI	CRPS	RER	OPNESS	EXTDEBT
<b>Mean</b>	0.155	2.823	-2.185	0.659	0.072	27.38	181.75	57.22	34.51
<b>Median</b>	0.126	3.200	-3.67	0.587	0.07	14.61	121.42	57.31	36.93
<b>Maximum</b>	0.99	7.20	21.56	2.033	0.12	69.31	449.49	76.68	83.51
<b>Minimum</b>	0.080	-2.10	-29.77	-0.32	0.036	3.90	95.52	32.68	2.55
<b>Std. Dev.</b>	0.143	2.24	9.965	0.65	0.024	24.18	115.30	10.48	25.13
<b>Skewness</b>	5.401	-0.32	-0.04	0.50	0.45	0.77	1.16	-0.33	0.07
<b>Kurtosis</b>	32.07	2.563	3.681	2.23	2.14	1.86	2.70	2.60	1.83
<b>Jarque-Bera</b>	1523.1	0.98	0.75	2.56	2.49	5.80	8.67	0.97	2.17
<b>Probability</b>	0.00	0.610	0.68	0.27	0.28	0.05	0.013	0.61	0.33
<b>Sum</b>	5.90	107.29	-83.05	25.05	2.75	1040.6	6906.76	2174.734	1311.44
<b>Sum Sq. Dev.</b>	0.75	185.66	3674.4	15.64	0.021	21636.01	491918.5	4067.601	23380.3
<b>Observations</b>	38	38	38	38	38	38	38	38	38

Source : Computed by Authors using Eviews10

## 2. Empirical Results and Discussions :

### 2.1 unit root tests:

The table below reports Augmented Dickey –Fuller unit root tests for stationarity.

**Table 3: « ADF unit root tests »**

At level										
		PI	GDPG	RIR	FDI	PUI	CRPS	RER	OPNESS	EXTDEBT
with constant	t-statistic	-6.188	-3.78	-3.94	-246	-1.27	-1.09	-1.78	-1.52	-0.43
	prob	0.00***	0.00***	0.00***	0.13 <sup>no</sup>	0.62 <sup>no</sup>	0.70 <sup>no</sup>	0.37 <sup>no</sup>	0.50 <sup>no</sup>	0.89 <sup>no</sup>
With constant and trend	t-statistic	-6.114	-3.70	-4.44	-3.35	-2.00	-0.79	-1.69	-2.13	-1.20
	prob	0.00***	0.034**	0.00***	0.072*	0.58 <sup>no</sup>	0.95 <sup>no</sup>	0.73 <sup>no</sup>	0.51 <sup>no</sup>	0.89 <sup>no</sup>
Without constant and trend	t-statistic	-3.39	-1.46	-3.97	-0.63	-0.19	-1.14	-3.75	-0.55	-1.09
	prob	0.00***	0.13 <sup>no</sup>	0.00***	0.43 <sup>no</sup>	0.61 <sup>no</sup>	0.22 <sup>no</sup>	0.00***	0.46 <sup>no</sup>	0.24 <sup>no</sup>
At First Difference										
		d(PI)	d(GDPG)	D(RIR)	d(FDI)	d(PUI)	d(CRPS)	d(RER)	d(OPNESS)	D(EXTDEBT)
with constant	t-statistic	-10.13	-6.20	-6.73	-7.01	-6.00	-4.24	-3.58	-4.73	-4.64
	prob	0.00***	0.00***	0.00***	0.00***	0.00***	0.002**	0.012**	0.0005***	0.0006***
With constant and trend	t-statistic	-9.98	-6.10	-6.64	-7.02	-5.97	-4.27	-5.23	-4.68	-4.67
	prob	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.0032***	0.0033***
Without constant and trend	t-statistic	-10.28	-6.29	-6.83	-7.12	-6.08	-4.26	-2.99	-4.79	-2.04
	prob	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.04**
Order of integration		I(1)	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)

Source : Computed by Authors using Eviews10

Note: The null hypothesis is that the series is non-stationary, or contains a unit root. \*\*\*, \*\*, \* denotes the rejection of null hypothesis of unit root at the 1%, 5% and 10% significance levels respectively.

The lag length in the ADF test is based on the Akaike Information Criterion (AIC).

- All variables are integrated in the same order we can run an ARDL model.

## 2.2 Bounds test for co-integration analysis:

Results of the bounds test procedure for co-integration analysis between real private investment and its determinants are presented in the table below:

**Table 4: « bounds test co integration »**

Test statistic	Value	signif	I(0)	I(1)
F statistic k	12.33464 8	10%	1.85	2.85
		5%	2.11	3.15
		2.5%	2.33	3.42
		1%	2.62	3.77

Source : Computed by Authors using Eviews10

The result show a long-run co integration relationships among the variables in Algeria's private sector investment at all level 10% 5% 2.5% 1% , It can be seen that the computed F-statistic is above the less bound value.



### 2.3 Results of the Long Run ARDL Model of Private Investment in Algeria:

The long-run ARDL model was estimated based on the Akaike Information Criterion (AIC) .

The optimal lag length based on Akaike Criterion is ARDL(2, 1, 0, 1, 2, 0, 1, 2,2)

**Table 5: « The long-run ARDL model »**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
<b>GDPG</b>	0.008329	0.021393	0.389308	0.7022
<b>RIR</b>	-0.007632	0.004959	-1.538942	0.1434
<b>FDI</b>	-0.526566	0.196272	-2.682838	0.0163
<b>PUI</b>	33.03180	11.32633	2.916373	0.0101
<b>CRPS</b>	-0.038860	0.013176	-2.949236	0.0094
<b>RER</b>	0.006286	0.002144	2.931216	0.0098
<b>OPNESS</b>	-0.028346	0.011353	-2.496862	0.0238
<b>EXTDEBT</b>	0.007448	0.004172	1.785086	0.0932
<b>C</b>	-0.759534	0.558366	-1.360280	0.1926

Source : Computed by Authors using Eviews10

$$EC = PI - (0.0083 * GDBG - 0.0076 * RIR - 0.5266 * FDI + 33.0318 * PUI - 0.0388 * CRPS + 0.0062 * RER - 0.0283 * OPNESS + 0.0074 * EXTDET - 0.7595)$$

#### The results:

Real GDPG is correctly signed but statistically insignificant. the result may indicate a significant accelerator theory effect on private sector investment in Algeria . The findings confirm to some previous studies like (Frimpong & Marbuah, 2010) , (Kazeem & Olukemi, 2012) But it was statistically significant. Real interest rate results indicate that The McKinnon and Shaw (1973) hypothesis at long-term is rejected while the real interest rate hinders the expansion of private investment , but the result is statistically insignificant .

The results of FDI vary according to the countries' economic trends, the case of Algeria indicates a negative coefficient significant at 1% level cover the period 1980-2017 confirming a crowding out relationship Despite the rule applied in Algeria 51/49 (51% for local investor), the negative impact of foreign direct investment on the private sector is the result of the policies and advanced technology it adopts., The results are opposite to study (Kazeem & Olukemi, 2012).

For public investment, there is a correlation between it and private investment because Public investment ratio has a positive and significant coefficient at 5 % what refer to crowding in situation, Through the results we can point out that increase in public investment by 1 % stimulate private investment by 33.03 in long term . Which leads to the creation of relationships with the private sector and helps in the expansion and entry of new areas and activities . This result fits into the (Aschauer, 1989) study.



Furthermore The coefficient on  $crps$  is negative and statistically significant at the 1 % level . This result is contrary to the principle, This can be explained by directing activities that do not stimulate capital accumulation.

The coefficient on  $rer$  is positive and statistically significant at the 1 % level. Given the gradual decrease of the national currency with time, we can explain this economically by increasing the competitiveness and volume of exports, but in reality at a very low rate, indicates that some industries benefited from the depreciation of the currency, especially on the basis of imported raw material in long run. The result is similar to (Bal, Mamun, Mowla, Hoque, & Bhuiyan, 2019)study. and contrary to (Serven, 2002) study.

The coefficient on  $OPNESS$  is negative and statistically significant at the 5 % level, This can be explained by the fact that expanding commercial activities and achieving significant profits directs the private investor towards these activities, which affects the accumulation of capital. The result is similar to (Frimpong & Marbuah, 2010) study.

The coefficient on  $EXTDEBT$  is POSITIVE and statistically significant at the 10 % level, This can be explained by the fact that long-term external debt helped provide financing for investment requirements.

## 2.4 Results of the short run dynamic in Algeria:

**Table 6: « short run dynamic test »**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
$D(PI(-1))$	-0.544756	0.061910	-8.799120	0.0000
$D(GDPG)$	0.022911	0.005510	4.158101	0.0007
$D(FDI)$	-0.232074	0.028742	-8.074501	0.0000
$D(PUI)$	-0.294816	1.226451	-0.240382	0.8131
$D(PUI(-1))$	-11.68297	1.481679	-7.884956	0.0000
$D(RER)$	-0.003398	0.000611	-5.562388	0.0000
$D(OPNESS)$	0.009383	0.002635	3.560907	0.0026
$D(OPNESS(-1))$	0.032772	0.003841	8.532015	0.0000
$D(EXTDEBT)$	-0.018090	0.002196	-8.237120	0.0000
$D(EXTDEBT(-1))$	-0.023795	0.002710	-8.779290	0.0000
$CointEq(-1)^*$	-0.633596	0.045639	-13.88268	0.0000

Source : Computed by Authors using Eviews10

### The results:

First, The  $ECM_{t-1}$  is equal to -0.63 and highly significant , that confirms the existence of stable long-run relationship.

With regard to the impact of economic growth in the short term commensurate with the long term that confirm a significant accelerator theory effect on private sector investment in Algeria. The difference is in the coefficient of effect, so the increase in economic growth rate by 1%, private domestic investment will increase by 2.29% and unlike long term ,the result is statistically insignificant at.



Like the long run, the coefficient of foreign direct investment is négative and statistically significant at the 1 % level, that mean a 1 percentage increase in the ratio of foreign direct investment influx to GDP (i.e. FDI) will reduce private investment by 23.20 % . The result is contrary to (Al-Sadig, 2013) study

In contrast to the long-run results the government investment have negative effects in the short term and significant at 1% level which means public investment reduce private investment with 11.68 if it increase by 1% What indicates crowding out effect. (Eduardo & Daude, 2011)

Also, The coefficient on rer is negative and statistically significant at the 1 % level, this is because the economic structure is far from production and depends on sectors such as services, trade and construction, which necessitates imported raw materials or manufactured materials. The result is similar to (Bal, Mamun, Mowla, Hoque, & Bhuiyan, 2019)study.

The coefficient on OPNESS is positive and statistically significant at the 1 % level, This can be explained by the fact that trade is considered a factor in increasing investments in the short term, especially after the emergence of technology that showed new and rapidly updating products that stimulate private investment.

Finally, The coefficient on EXTDEBT is negative and statistically significant at the 1 % level, This can be explained by the fact that the foreign debt in the short term, the Algerian private sector did not fully benefit from it as a result of the fact that he was suffering from the bureaucracy in obtaining the necessary funding for its activities. The result is similar to (Kazeem & Olukemi, 2012) study.

## 2.5 Model Diagnostic Tests:

We rely on the following tests: serial correlation , heteroscedasticity, and normality. The result confirm the efficiency of the model .

The result in table below:

**Table 7: « Diagnostic test »**

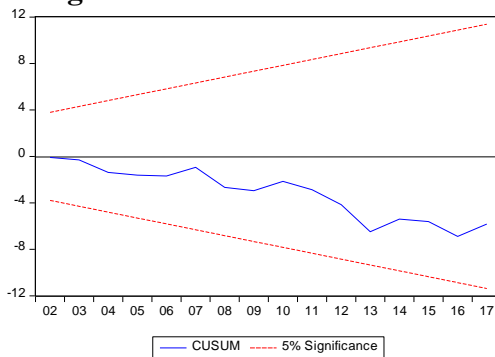
	Test statistic	P.value
<b>Heteroscedasticity</b>	0.9466	0.5503
<b>Normality (Jarque-Bera)</b>	1.4239	0.4906
<b>Serial correlation</b>	2.9320	0.0733

Source : Computed by Authors using Eviews10

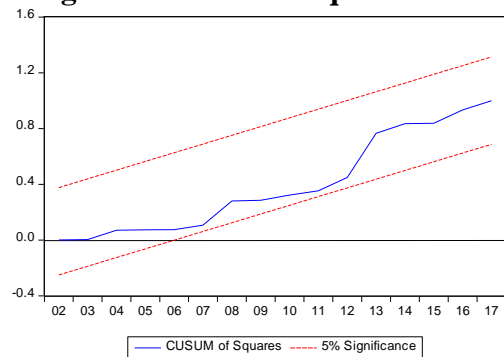
## 2.6 Structural stability of long-term and short-term relationships:

Relying on the test proposed by Brown, Durbin and Evans (1975) through Cumulative Total (CUSUM) and Cumulative Squares (CUSUMSQ).

As we shown in fig. 2 and 3. However, the model parameters do not suffer from any structural instability. Because The principle of the tests is that if the CUSUM and CUSUMSQ plot remain within the critical 5 % binding the null hypothesis that all coefficients are stable cannot be rejected.

**Fig. 2: « CUSUM test »**

Source: Authors , using Eviews10

**Fig.3: « CUSUM of Squares test »**

Source: Authors , using Eviews10

### Conclusion:

The paper has investigated the long run determinants of private investment in Algeria over the period of 1980-2017. The period was determined by the situation of the Algerian economy, which witnessed a change in the ideological approach in addition to the 1986 crisis of low oil prices, which necessitated the formulation of new policies and the promotion of private initiative.

The study employ a advanced econometric technique of Auto-Regressive Distributed Lag (ARDL) bounds testing approach developed by Pesaran et al (2001). The empirical findings obtained in the three decades showed that foreign direct investment ,public investment, credit to private sector, real exchange rate, opness and external debt are the key long run determinants of domestic private investment in Algeria while gross domestic product , foreign direct investment, public investment, real exchange rate, opness and external debt are statistically significant in the short run.

The analysis of these results indicates that:

The results show that the accelerator theory is realized in short term implies a relationship between total demand and the accumulation of private capital

The complementary effect between public investment and the private sector in long term shows the impact of government programs on private capital growth, particularly in relation to infrastructure.

The impact of foreign direct investment (FDI) in economies remains ambiguous because of the different characteristics of the receiving country. In the case of Algeria, the impact is negative in the short and long run. This would require developing long-term foreign ownership strategies.

The real exchange rate is positive in the long run and negative in the short term, which poses some problems in the analysis.

Private sector credit has a negative effect on private investment in the long run, the result being contrary to economic theory.

External debt has a positive effect in the long term, while a negative impact in the short term can be explained by the need for Foreign currencies to develop its investments, especially as it was suffering from an economic and financial deficit.



Among the paradoxes that the study showed is the negative impact of foreign direct investment and credit provided to the private sector, especially in the long term, and as a result of this, we can clarify some things for the two previous elements in order to be in a clearer picture. As for foreign direct investment, it has become necessary because the level difference Technology has become large between developed and emerging countries compared to developing countries, which calls for providing an appropriate institutional environment to attract foreign direct investment in order to be able to keep pace with the difference in the technological level. Although our study showed a negative impact, but if we compare the volume of foreign direct investment, we find its value is negligible compared to countries The other, especially after the issuance of Law 51/49 in 2009, which dampened its size, and this calls for decision makers to provide the appropriate environment, especially in terms of investment climate, to achieve economic growth.

As for the credit provided to the private sector, it must also be transferred to the productive sectors in need of financing that the Algerian economy suffers from, especially heavy industries, and therefore the nature of the sectors that require credit, although they are complementary, such as construction and public works that depend heavily on public expenditures, but may inhibit the growth of investment Concerning the concept of economic diversification, which calls for budget-makers in the size of the requirements of the Algerian economy.

As a special recommendation in the long term, the Algerian authorities should activate the monetary policy tools in line with the requirements of private sector development, making foreign direct investment a tool for achieving economic growth, which will positively affect the accumulation of physical capital, with regard to loans directed to the private sector, directing them to the productive sector in a large proportion and finally Activating economic integration with neighboring countries in particular.

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