The Impact of Domestic Investment on Economic Growth: New Policy Analysis from Algeria

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Abstract

This paper investigates the relationship between domestic investment and economic growth in Algeria, by using co integration analysis of Vector Error Correction Model. The equation of the long run relationship shows that domestic investment has a negative effect on economic growth. However, in the short run term, domestic investment causes economic growth. These results prove that domestic investment is a source of economic growth for Algeria, but unfortunately it suffers from several obstacles and problems that are directly related to the poor management and the weak strategy for development and investment.

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KEYWORDS: Domestic Investment, VECM, Causality, Economic Growth, Algeria.

JEL Classification: C13, E22, F14.

I. Introduction

Domestic investment has an important place in the economies of countries, because it is very paramount in achieving economic development and its impact on several economic variables and the international economic reality is proof that the countries of the world are racing to join the international competition. The size of its investment stock uses various means and methods to help stimulate and stabilize investment. Most of the existing literature treats the current flow of government expenditure as the source of contribution to productive capacity. For example, Aschauer and Greenwood (1985), Aschauer (1988), Barro (1989), and Turnovsky and Fisher (1995) do so in neoclassical Ramsey framework. Barro (1990) and Turnovski (1995) employ a simple 'A-K' endogenous growth model. While the flow specification has the virtue of tractability, it is open to criticism that insofar as productive government expenditures are intended to represent public infrastructure, such as roads and education, it is the accumulated stock, rather than the current flow, that is relevant. Despite this criticism, few authors have adopted the alternative approach of specifying productive government expenditure as stock. Arrow and Kurz (1970) were the first authors to formulate government expenditure as a form of investment. More recently, Baxter and King (1995) study the macroeconomic implications of increases in the stocks of public goods. They derive the transitional dynamic responses of output, investment, consumption, employment, and interest rates to such policies by calibrating a real business cycle model. Futagami and al. (1993) extend the Barro (1990) A-K growth model to include government capital. In 1993, Algeria underwent a period of transition, from a centralized socialist approach to a market economy. In this manner, her natural resources played the most important role. Algeria has Africa's fourth-largest economy. Algeria's national income is estimated at more than $ 211.9 billion in 2014, with GDP growing 4 percent from last year. Socialism also played its role in disrupting the agricultural role, headed towards the industrial sector without ruddiness, but the arrival of President Chazli Bennid confirmed the importance of changing the old policy as a whole. The events of Black October in 1988 were behind the acceleration of the reform process. Political and Economic Reforms during the President's period, the world oil price slump in 1986 was behind the country's crisis at the time. The oil sector is the mainstay of the Algerian economy, accounting for about 60% of the general budget, 30% of GDP and 97% of total exports. Algeria aspires to reduce the dependence on oil revenues by focusing on agriculture to limit the import of agricultural products such as cereals, potatoes and fruits in particular. And the development of export of other products such as dates, which is famous

for. Algeria also has other natural resources such as iron, coal and uranium. The main objective of the reforms, the transformation of the market economy, was to seek investment and create a competitive environment within the country. The State left the administration in public institutions by 2/3 and abolished its monopoly on imports. Finally, it frequently encouraged the privatization of the agricultural sector. Algeria's economic indicators rose in the second half of the 1990s due to the World Bank's support for reform policies and the debt rescheduling[1] process approved by the Paris Club[2]. Although Algeria's ranking in terms of GDP is 49 out of the 190 countries surveyed, its unemployment rate is relatively high at 9.8% according to 2013 statistics. In particular, this work tries to empirically find an answer for the question of whether there is a nexus between domestic investment and economic growth in Algeria, to achieve this objective the paper is structured as follows. In section 2, we present the review literature concerning the nexus between domestic investment and economic growth. Secondly, we discuss the Methodology Model Specification and data used in this study in Section 3. Thirdly, Section 4 presents the empirical results as well as the analysis of the findings. Finally, Section 5 is dedicated to our conclusion.

II. Literature Survey

Various empirical studies inquire the acquaintance betwixt domestic investment and economic growth. These studies encompass:

[1] Debt restructuring is a process that allows a private or public company, or a sovereign entity facing cash flow problems and financial distress to reduce and renegotiate its delinquent debts to improve or restore liquidity so that it can continue its operations.

[2] The Paris Club is a group of officials from major creditor countries whose role is to find coordinated and sustainable solutions to the payment difficulties experienced by debtor countries. As debtor countries undertake reforms to stabilize and restore their macroeconomic and financial situation, Paris Club creditors provide an appropriate debt treatment. Paris Club creditors provide debt treatments to debtor countries in the form of rescheduling, which is debt relief by postponement or, in the case of concessional rescheduling, reduction in debt service obligations during a defined period (flow treatment) or as of a set date (stock treatment).

Table 1: Studies related to the relationship between domestic investment and economic growth

NO	Authors	Countries	Periods	Econometric techniques	Keys Findings
1	Aschauer, D. A. (1989)	G-7	1949 - 1985	OLS	Domestic investment →GDP
2	Naqvi, N. H. (2002)	Pakistan	1964 - 2000	Cointegration Analysis VECM	GDP→ Domestic investment
3	Nikolaos Dritsakis and al (2006)	Greece	1960-2002	Cointegration analysis VAR Granger Causality Tests	Domestic investment ≠GDP
4	Samuel Adams (2009)	Sub-Saharan Africa	1990 - 2003	Correlation Analysis OLS	Domestic investment →GDP
5	Ahmad ghazali(2010)	Pakistan	1981-2008	Cointegration analysis Granger Causality Tests	Domestic investment ↔GDP
6	Tokunbo S. O and al(2010)	Nigeria	1970-2005	Cointegration analysis VECM	Domestic investment →GDP
7	Adhikary (2011)	Bangladesh	1986-2008	Cointegration analysis	Domestic investment →GDP
8	Abdulmumini B.A and al(2012)	Nigeria	1981-2010	Cointegration analysis Granger Causality Tests	Domestic investment →GDP
9	Ouedraogo. N. B. (2013)	Kazakhstan	1993-2002	Cointegration analysis Granger Causality Tests	Domestic investment →GDP
10	Charles Ruranga and al (2014)	Rwanda	1970-2011	VAR Granger Causality Tests	GDP →Domestic investment

III. Data and Methodology

The analysis used in this study cover annual time series of 1969 to 2015 or 46 observations which should be sufficient to capture the relation between Export, Import, Fixed Formation Capital and economic growth in Algeria. The data set consists of observation for GDP, exports of goods and services (constant US$), imports of goods and services (constant US$) and Fixed Formation Capital (constant US$). All data set are taken from World Development Indicators 2016. We will use the most appropriate method which consists firstly of determining the degree of integration of each variable. If the variables are all integrated in level, we apply an estimate based on a linear regression. On the other hand, if the variables are all integrated into the first difference, our estimates are based on an estimate of the VAR model. When the variables are integrated in the first difference we will examine and determine the cointegration between the variables, if the cointegration test indicates the absence of cointegration relation, we will use the model VAR. If the cointegration test indicates the presence of a cointegration relation between the different variables studied, the

model VECM will be used. The augmented production function including domestic investment, exports and imports is expressed as:

$$\text{GDP}_t = f(\text{Exports}, \text{Imports}, \text{Domestic Investment}) \quad \textbf{(1)}$$

The function can also be represented in a log-linear econometric format thus:

$$\log(\text{GDP})_t = \beta_0 + \beta_1 \log(\text{Exports})_t + \beta_2 \log(\text{Imports})_t + \beta_3 \log(\text{Domestic Investment})_t + \varepsilon_t \quad \textbf{(2)}$$

Where:

- β_0 : The constant term.
- β_1: coefficient of variable (Exports)
- β_2: coefficient of variables (Imports)
- β_3: coefficient of variable (Domestic Investment)
- t: The time trend.
- ε: The random error term assumed to be normally, identically and independently distributed.

IV. Empirical Analysis

1) Fixing the stationarity of variables: ADF and PP

Table 2: Tests for unit roots: ADF and PP

Log (GDP)	Stationary in first difference, at thresholds of 1%, 5% and 10% with constant
Log (Domestic Investment)	Stationary in first difference, at thresholds of 1%, 5% and 10% with constant
Log (Exports)	Stationary in first difference, at thresholds of 1%, 5% and 10% with constant
Log (Imports)	Stationary in first difference, at thresholds of 1%, 5% and 10% with constant

2) Determination of number of lags

Table 3: VAR Lag Order Selection Criteria

VAR Lag Order Selection Criteria						
Lag	**Log L**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
1	288.1479	NA	2.02e-11	-13.27551	-12.60679*	-13.03200
2	316.3318	45.36920*	1.14e-11*	-13.86984*	-12.53242	-13.38283*
3	324.3212	11.30217	1.77e-11	-13.47908	-11.47295	-12.74856
4	340.4180	19.63026	1.95e-11	-13.48381	-10.80896	-12.50978
5	358.5276	18.55125	2.12e-11	-13.58671	-10.24316	-12.36917

*** indicates lag order selected by the criterion**

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

3) Cointegration analysis: Johanson TEST

Table 4: Johanson Test

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.723314	124.5746	47.85613	0.0000
At most 1 *	0.642209	68.04034	29.79707	0.0000
At most 2 *	0.364868	22.81687	15.49471	0.0033
At most 3	0.062598	2.844272	3.841466	0.0917

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level

*** denotes rejection of the hypothesis at the 0.05 level**

****MacKinnon-Haug-Michelis (1999) p-values**

4) VECM Estimation

Table 5: Vector Error Correction Estimates

Vector Error Correction Estimates				
Standard errors in ( ) & t-statistics in [ ]				
Cointegrating Equation:			CointEq1	
DLOG(GDP(-1))			1.000000	
DLOG(FBCF(-1))			0.075563	
			(0.06063)	
			[1.24636]	
DLOG(EX(-1))			-0.209154	
			(0.05093)	
			[-4.10633]	
DLOG(IM(-1))			-0.390460	
			(0.04778)	
			[-8.17161]	
C			-0.021249	
Error Correction:	D(DLOG(GDP))	D(DLOG(FBCF))	D(DLOG(EX))	D(DLOG(IM))
CointEq1	-0.613394	0.422353	-1.179610	3.479765
	(0.27565)	(0.42875)	(0.61860)	(0.69800)
	[-2.22529]	[0.98507]	[-1.90690]	[4.98531]
D(DLOG(GDP(-1)))	-0.303282	-0.181604	0.661287	-1.001465
	(0.26623)	(0.41411)	(0.59748)	(0.67417)
	[-1.13916]	[-0.43854]	[1.10680]	[-1.48549]
D(DLOG(FBCF(-1)))	-0.223101	-0.696232	-0.270172	-0.360628
	(0.10435)	(0.16231)	(0.23417)	(0.26423)
	[-2.13807]	[-4.28961]	[-1.15372]	[-1.36482]
D(DLOG(EX(-1)))	-0.065414	0.026888	-0.641381	-0.161013
	(0.13246)	(0.20603)	(0.29726)	(0.33541)
	[-0.49385]	[0.13051]	[-2.15766]	[-0.48004]
D(DLOG(IM(-1)))	-0.004921	0.421152	-0.136786	0.564890
	(0.07508)	(0.11678)	(0.16849)	(0.19012)
	[-0.06555]	[3.60633]	[-0.81183]	[2.97127]
C	0.002215	-0.001185	0.005733	0.001221
	(0.00658)	(0.01024)	(0.01478)	(0.01667)
	[0.33638]	[-0.11570]	[0.38801]	[0.07321]

a- Long run effect

Table 6: Estimation of the cointegration equation: the long-run equilibrium equation

Dependent Variable: D(DLOG(GDP))				
Method: Least Squares (Gauss-Newton / Marquardt steps)				
D(DLOG(GDP)) = C(1)*(DLOG(GDP(-1)) + 0.0755632859208*DLOG(FBCF(-1)) - 0.209153614381*DLOG(EX(-1)) - 0.390460040444*DLOG(IM(-1)) - 0.0212488654828) + C(2)*D(DLOG(GDP(-1))) + C(3)*D(DLOG(FBCF(-1))) + C(4)*D(DLOG(EX(-1))) + C(5)*D(DLOG(IM(-1))) + C(6)				
	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.613394	0.275647	-2.225289	0.0321

b- Short term effect

Table 7: VEC Granger Causality/Block Exogeneity Wald Tests

VEC Granger Causality/Block Exogeneity Wald Tests			
Dependent variable: D(DLOG(GDP))			
Excluded	Chi-sq	df	Prob.
D(DLOG(FBCF))	4.571326	1	0.0325
D(DLOG(EX))	0.243886	1	0.6214
D(DLOG(IM))	0.004297	1	0.9477
Dependent variable: D(DLOG(FBCF))			
Excluded	Chi-sq	df	Prob.
D(DLOG(GDP))	0.192316	1	0.6610
D(DLOG(EX))	0.017032	1	0.8962
D(DLOG(IM))	13.00561	1	0.0003
Dependent variable: D(DLOG(EX))			
Excluded	Chi-sq	df	Prob.
D(DLOG(GDP))	1.225008	1	0.2684
D(DLOG(FBCF))	1.331076	1	0.2486
D(DLOG(IM))	0.659074	1	0.4169
Dependent variable: D(DLOG(IM))			
Excluded	Chi-sq	df	Prob.
D(DLOG(GDP))	2.206668	1	0.1374
D(DLOG(FBCF))	1.862730	1	0.1723
D(DLOG(EX))	0.230443	1	0.6312

5) Checking the quality of model

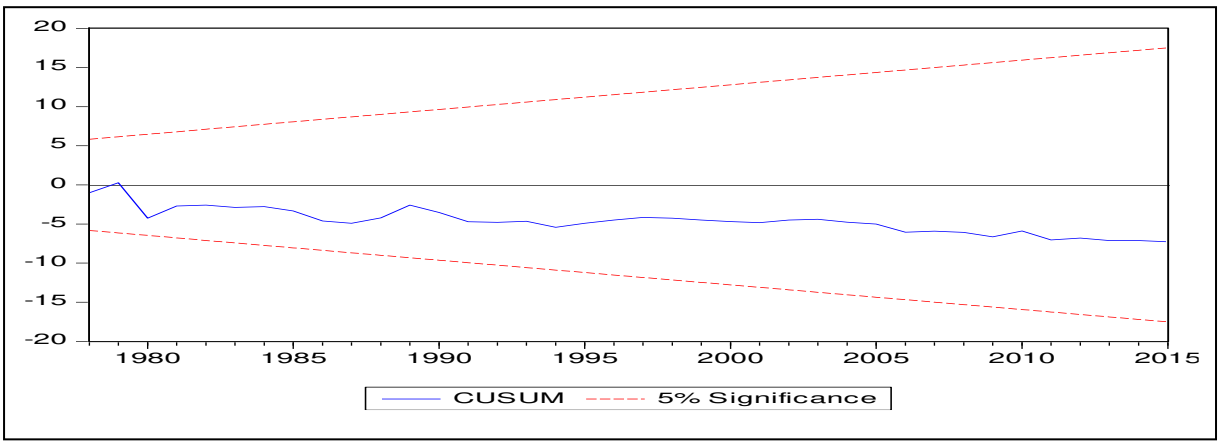
a- Diagnostics tests

Table 8: Diagnostics Tests

Heteroskedasticity Test: Harvey			
F-statistic	1.135180	Prob. F(12,31)	0.3692
Obs*R-squared	13.43223	Prob. Chi-Square(12)	0.3384
Scaled explained SS	18.70070	Prob. Chi-Square(12)	0.0960
Heteroskedasticity Test: ARCH			
F-statistic	0.890714	Prob. F(1,41)	0.3508
Obs*R-squared	0.914301	Prob. Chi-Square(1)	0.3390
Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.249534	Prob. F(1,37)	0.6204
Obs*R-squared	0.294756	Prob. Chi-Square(1)	0.5872

b- Var Stability

Graph 1: Test CUSUM



In our estimation, we began by studying the stationarity of the variables by applying the two tests of stationarity ADF and PP. Otherwise, the analysis of the stationary of the two tests shows us that all the variables are stationary and integrated into first differences. Then, we applied the information selection criterion to determine the number of delays existing in our model. According to the criterion of the AIC we find that the number of the optimal lags is equal to 1. As soon as the order of integration and the number of lags are complete and are realized, we then apply the cointegration analysis using the Johanson test which proves the

existence of the cointegration relation between the variables studied, which leads us directly to apply the error correction model. The VECM model shows that the equation of long-run equilibrium is significant, which justifies the credibility of the effect of the independent variables on the dependent variable, of which we find that domestic investments have a negative effect on the Economic growth (a 1% increase in domestic investment leads to a decrease of 0.075563% GDP). On the other hand, the long-run equilibrium equation also shows that exports and imports have a positive effect on economic growth (a 1% increase in exports and imports leads to an increase of 0.3% and 0.2% Of GDP). On the other hand, and for the short-term relationship, the application of the WALD test shows the existence of a causal relationship of domestic investment to economic growth and a causal relationship of imports to economic growth. Finally, we applied the diagnostic tests and the CUSUM test to check the robustness and the stability of our estimate and the quality of the model. The results of verification of our empirical investigation show that our results are satisfactory and acceptable.

V. Conclusion

The aim of this study was to explain the nexus between domestic investment and economic growth in Algeria during the period 1969-2015. The Co-integration, Vector Error Correction Model and Granger's Causality tests are applied to investigate the relationship between exports, imports, domestic investment and economic growth. The unit root properties of the data were examined using the Augmented Dickey Fuller test (ADF) and the Phillips–Perron test (PP) after that the cointegration and causality tests were conducted. Empirical results show that all variables are stationary in the first differences. The equation of the long run relationship shows that (i) domestic investment has a negative effect on economic growth, (ii) exports have a positive effect on economic growth, (iii) and imports have a positive effect on economic growth. However, in the short run term, the Granger Causality Tests shows that only domestic investment and imports cause economic growth in Algeria. These empirical results can be explained by four raisons which make domestic investment can be able to produce economic growth in Algeria. The First reason is the lack of a competitive market. Despite the existence of the previous legal arsenal, Algeria has not yet reached the required level of reforms and this is relatively acceptable for the country's past security crisis as well as drought and natural disasters. This is due to the inability of the private sector to participate in the investment process. The sector has not yet reached the required level, although its activity represents 44% of the national activity. In addition, the lack of experience and experience in

this sector make it not contribute as required. We also note from the Algerian economy that the commercial activity related to imports is predominant and this is because of the high profitability compared to the investment activity. The facilitations and manipulations in this area encouraged the private to continue this activity rather than venture into the investment process. In addition to the previous reasons, the decline in investments can be attributed to the absence of a competitive market in the sense of the word. This is because of the large number of informal activities which represent a quarter of the economic activity. This situation does not allow any investor to invest in a market where the black market is dominant; this issue is sensitive and must be dealt with wisely because it employs 1.2 million workers. The other side is that the public economic institutions in particular have not been separated in their status either by continuing or closing or privatizing. This does not allow the investor to invest in an environment that does not know how the economic future will be because the strengthening of the Algerian state in these sectors are contradicts about the facilitation and investment laws which are enacted. Also, there is another side, which has failed, is the inefficiency of the banking institutions, especially the private sector, and its lack of development. Finally, we note the calamity of the Khalifa Bank and the closure of some other banks due to its failure to honor its commitments to the customers and the community. Prefer to go to other countries where the financial environment is effective and appropriate. The other serious phenomenon is the spread of the phenomenon of drugs and trafficking in them makes the Algerian market in doubt, because the dirty money is driven by local and international gangs organization is trying to wash this money and enter into economic activity, and this limits the ability to compete for locals or foreigners. According to the statement of the National Gendarmerie, the number of files on this subject reached 10,000 files within 10 years, and this disease must be fought because of the severe damage to social and economic conditions. The second reason is the lack of transparency in transactions related to investment. The existence of transparency is an important element for investment companies. The existence of corrupt practices in many countries of the world is the focus of interest of investors and civil society on these practices, which aim to achieve the maximum profit in the shortest time and illegally. This can be done either by trading in arms or by trading in drugs and financial crimes, so those who do this are trying to carry out the subsequent process of corruption, which is money laundering so that it can be seen as a legitimate source, so they try to contact and search for the link that is achieved. They have this objective, and this is done by dealing with the bank, judges, lawyers, politicians, businessmen, police and others to achieve this goal. Therefore, the more information and transparency is

clear in the transactions of these bodies, the more the reasons for making local investments. Therefore, the state should make great efforts to eliminate corruption, and this is to monitor all activities and those responsible for corruption, and this is done if there is an administrative, judicial, journalist, civil society and independent media. Corruption at the international level requires the intensification of efforts and the provision of information to the concerned bodies, including Interpol, to combat corruption. A World Bank study has shown that public media do not reveal corruption compared to private media, so countries that have allowed free media experience have seen an improvement in the amount and quality of corruption coverage, so corruption cannot be fought domestically, Civil society at the local and national level can use its capacity and authority to confront corruption at all levels of local and national levels. Cooperation at an international level, such as Transparency International can help and monitor corruption at a higher level, as well as the agreement of 169 countries called for in October 2002 by Interpol member states to adopt comprehensive anti-corruption measures. The presence of bribery has a direct impact on the cost of the transaction, as a catalyst to raise the cost of the product or the completion of the project more than reasonable, and this bribe may be in transactions or transactions linked to abroad and this leads to an increase in the cost of imports and this affects the increase in the decline of hard currency For developing countries, bribery may be a factor in disregarding the achievements that are technically rejected. It may be a reason to import goods that society does not need. This is in terms of priority. It may be a reason to import goods that the society does not need. This is in terms of priority. And may also be encouraging factors the introduction of corrupt goods that harm the welfare and wealth of society. Therefore, the spread of this serious epidemic eliminates competition and fair treatment and leads to the spread of economic crimes and financial mafia. Other aspects of transparency must be property rights, which may be material in the form of industrial assets or property. The connection of the investment process for obtaining the land on which the plant is built or to carry out any activity requires the provision of clear facilities and laws in terms of obtaining them. This facilitates the transactions of ownership, lease or assignment. It should be simplified and expedited to win them. The ownership of the assets of official documents, allows the investor to use them as collateral to obtain loans to finance his projects at reasonable costs. The existence of laws that protect property from expropriation and nationalization or its removal without acceptable compensation makes the owner of the capital secure in his property. The third reason is the lack of transparency in economic policy, because the existence of a clear economic policy will be an incentive to make investments in various fields such as, monetary policy, finance,

taxation, social legislation on the conditions of employment and insurance. A government that operates in stable and clear conditions is better than governments that are characterized by volatility and a change in economic policy. The objective of the investor is to know the climate and the economic environment in which he conducts his activity. In other words, he knows the previous operations of the investment process and the following. This is because investing in fixed assets is a long-term process that can be up to 50 years. The successive governments 'credibility is a key factor in encouraging investments because the divergence and retreat from the previous economic policies of Algeria has affected its credibility and this has made the investor in a volatile and unstable situation in the event of fear of future governments' retreat on agreed agreements and laws. For example, in the area of privatization, the lack of clear information and laws encourage the investor to refrain from entering this activity, and the change of laws at random and without justification is an indicator of the instability of the economic system, and the transparency of financial transactions is an incentive to Investment. And finally, the last reason is the weakness of agricultural sector. Algeria now ranks first in the list of countries importing food and agricultural products with a population of more than 30 million and an average bill of 2.5 billion dollars annually. The industrialization of the "industrialized industry" of the 1970s, on the one hand, and the agricultural reforms applied after independence (July 1962), on the other hand, are interpreted from the point of view of the literature of the dominant economy in Algeria, as well as the lack of exploitation of agricultural resources, Weak technology, and on the whole they reveal this deep crisis in the agriculture sector. Although the successive investment laws have improved the legal, legislative, economic and political conditions, the privileges of the public system and the special system related to tax and non-tax incentives and customs. In addition to the agricultural sector reforms in supporting and encouraging agricultural investment, of the weakness in the volume of local private investment, and this is due to the existence of a set of constraints that limit the development of investment in this sector. The total area used in agricultural and pastoral activities in Algeria covers 47 million hectares. The area of production is estimated at 1.4 million hectares out of the 8 million hectares planted in the coastal plains and near-shore areas, with only 600,000 hectares of irrigation benefiting. The potential of Algerian agricultural production, concentrated primarily in dry or semi-arid climates, has two main constraints: less than 3% of the cultivated land area is allocated to large-scale irrigation areas, and the share of agricultural land per inhabitant is constantly declining, By 0.75 hectares in 1962, and currently decreased to 0.25 hectares, for several reasons, the most important of which is demographic growth and loss of agricultural land due

to soil erosion and degradation. Although the area is rainy, in recent years, it has become the subject of climate change, resulting in a lack of rainfall. Agriculture in Algeria continues to suffer from other problems that hinder its development, becoming a heavy burden on the ecological balance of the various natural areas. The irrigation system and waterways are often in poor condition, despite efforts to fight land salinity like other Maghreb countries, and Algeria is still suffering from the problem of soil erosion, which is a major hindrance to the future of natural resources in the country. In addition, desertification threatens 32 million hectares of vast land and forest cover in northern Algeria, noting that the intensive exploitation of groundwater resources has reduced its capacity, while poor quality land has endured in the last 10 years attacks from the human population and agricultural techniques that do not it fits the impact on some ecosystems.

The issue of the forms is complicated because it is linked to the long term. Therefore, many of the reforms that are in the process of implementation and study, especially in the field of real estate problem, the elimination of bureaucracy, bank and financial reform, the alleviation of the informal sector and the rehabilitation of economic institutions must be taken firmly. Investment can only be achieved if there is a productive private sector that takes the initiative, and the other is to enforce laws and try to streamline them to be an incentive for the investor to undertake the investment**.**

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