The Effect of Financial Intermediation on Economic Growth in Algeria, using VECM model

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Abstract— A strong and well-developed financial sector is seeing as a key condition for achieving development and promoting economic growth, so we will try to analyze the nature of the relationship between financial intermediation and economic growth under the financial liberalization policy theoretically and experimentally in Algeria, using Granger causality test, co- integration tests of Engel- Granger and Johansen and the error correction model in the period 1984-2013.

The results of this study indicate that: the success of any application of the policy of financial liberalization in Algeria must be preceded by an increased level of financial development and achieving the macroeconomic level stability

***Index Terms*— Financial Intermediation, Economic Growth, Financial Liberalization, Endogenous Growth Models, Error Correction Model**

I. INTRODUCTION

The importance of the relationship between financial intermediation and economic growth has been well recognized and emphasized in the field of economic development. It is now widely acknowledged that financial development plays a significant role in economic growth. According to Hamilton (1781), banks are the happiest engines that have ever been invented for spurring economic growth.

As discussed, financial intermediaries can improve the (i) providing information about possible investments so as to allocate capital efficiently; (ii) monitoring firms and exerting corporate governance; (iii) ameliorating risk; (iv) mobilizing and pooling savings; (v) easing the exchange of goods and services.

The relationship of the financial intermediation to economic growth globally has recently been the subject of considerable empirical and theoretical research.

After this brief overview, this study has used (VECM) framework in order to identify the relationship and the causality between financial intermediation and economic growth. As argued by Xu (2000) the advantage of using the (VECM) framework in economy are the following:

Firstly it allows for different economic and institutional arrangements in each country.

Secondly it can deal with simultaneity problem between financial development and other domestic variables. Thus avoiding the difficult task of determining which variables are truly exogenous.

Thirdly, it permits to identify not only the short term effect but also the long term cumulative effect of financial development on domestic variables by allowing the interaction among these variables.

- The problem of the study

Financial intermediaries serve as the medium of the savings-investment process. One fundamental question is: will development of financial intermediaries exert a positive or negative effect on economic growth in Algeria?

- Hypotheses of The Study

Through previous problematic we ask the following assumptions:

- There is a unidirectional causality from financial intermediation to economic growth, where Patrick (1966) was considered the causal occur in the opposite direction in the developed and the final stages of economic growth.
- Development of financial intermediation has a negative impact on economic growth in Algeria. This is due to the poor performance of its financial system and banking.
- Financial liberalization policy has achieved positive results on the level of development of financial intermediation and increase their effectiveness in raising the pace of economic growth.

- Objectives of The Study

Based on the problem statement of the study, the principal objective is to explore the linkages between financial intermediation development and economic growth in Algeria. In the process, this study will employ three indicators of financial intermediadion development, with the objective of considering the main elements that could explain either the development or weaknesses of the financial intermediation of this countrie.

The study will investigate this topic, using the Vector Error Correction (VECM) in order to test the possible relationship and causality (or otherwise) between increasing economic growth in Algeria with its sophisticated financial sector.

Evaluate the results of the policies of reform and financial liberalization, in order to reach solutions and suggestions that will help the success of financial development in Algeria.

II. AN INTRODUCTION TO FINANCIAL INTERMEDIATION

The theory regarding financial intermediation was developed starting with the 60's in the XX century, the starting point being the work of Gurley and Shaw (1956). In money markets (markets for short-term instruments) and in capital markets (markets for long-term instruments), investors channel their surpluses directly to deficit firms, creating marketable securities and instruments in the process. Alternatively, a

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financial intermediary facilitates this channeling process from surplus to deficit agents by transforming assets.

The theory of bank financial intermediation in the middle of 70s of the last century was based on so called transaction and information approaches.

Information approach in the theory of financial intermediation was founded on studying of the phenomenon of asymmetry of information as exemplified by relationship "creditor bank" and "borrower bank" and originates from 70s of the last century in the works of leading theorist of "information economy" George A. Akerlof who showed universality of information asymmetry phenomenon, its presence at many markets.

Significant contribution into development of information approach was made by Diamond [1984] who developed the concept of financial intermediation as delegated monitoring. The bank specializes in this task, and due to economies of scale, its ability to diversify and for other reasons just characterized, is specially suited for the specialty role as delegated monitor. The following are typical bank monitoring activities:

1. Screening bad loan applications from good. Banks frequently require business plans from borrowers and develop expertise in the evaluation of such applications.
2. Evaluating borrower creditworthiness. Again, development of expertise is key.
3. Observing the extent to which borrowers adhere to the terms of their borrowing contracts.

One of the first works which investigated the connection between the functions of financial intermediation in economy and existence of transaction costs was written by Benston and Smith [1976] where the authors argue that the "raison d'être for this [financial intermediation] industry is the existence of transaction costs." Financial intermediaries reduce the contracting costs between providers and users of capital. Generally, the financial intermediary reduces the costs of transacting by engaging in a variety of services, ranging from brokering to asset transformation. Scale economies and diversification are key factors leading to transactions costs reduction.

Leland and Pyle (1977), suggests that an intermediary can Signal its informed status by investing its wealth in assets about which it hasspecial knowledge.

In modern studies the theory of financial intermediation is formed mainly by the concept of liquidity provision based on the model of Diamond and Dybvig (1983), by authors opinion the banks are considering as coalitions of depositors that provide households with insurance against idiosyncratic shocks that adversely affect their liquidity position.

So, study of financial intermediation theory allows to conclude that it has evolved from traditional theory which described functioning of banks through the prism of quality, quantity and temporal transformation of asserts: this modification was a response to financial innovations and universalization of activity of financial intermediaries in post-industrial countries, diversification of banking activity, stronger competition in financial sector of economy.

III. Financial Intermediation and Growth: A Literature Review

Nineteenth Century Classical Economists ignored financial intermediation as an important element in explaining economic growth until Bagehot. Bagehot, for the first time, gives explicit examples of how money market developments in England could make capital flow across the country in search of the highest rate of return. However, analysis of Bagehot was incomplete.

Schumpeter in 1911 was among the first to point out that banks facilitate technological innovation in their role as financial intermediaries. His argument focuses on the ability of banks to allocate savings more effectively.

Robinson (1952) argues that economic growth creates demand for more financial services and thereby leads to financial development.

Gurley and Shaw (1956) have made an important contribution to the literature by expressing the relationship between the financial sector and economic growth for the first time, they do not make any comment about whether or not there is a causality relationship between financial development and economic growth or if there is, what the direction of this relationship is.

Patrick (1966) for the first time dealt with the relationship between the financial sector and economic growth by conceptualising. He expressed the idea that the causality between the financial sector and economic growth could be in two different forms and explained this relationship by using the demand-following and supply-leading concepts. On the demand-following case he expresses the financial sector growth to supply the demand occurring as a result of the developments in real sector and in supply-leading he explains that the growth of the financial sector would institutionally stimulate economic growth.

Recent theoretical studies have tried to establish precise mechanism through which financial systems influence economic development. For example, Greenwood and Jovanovic (1990) developed a model in which both financial development and growth are endogenously determined. With respect to the growth effects of financial development, they demonstrated that by pooling idiosyncratic investment risks and eliminating ex ante uncertainty about rates of returns, financial development can lead to faster growth. In the model proposed by Bencivenga and Smith (1991), it was shown that the development of banks increases economic growth by channeling savings to the activity with high productivity but offering risky and illiquid assets, while allowing individuals to reduce the risk associated with their liquidity needs. In their model, Roubini and Sala-i-Martin (1992) showed that financial repression reduces the productivity of capital and lowers savings, thus hampering growth. The upshot of these theoretical studies is that financial development leads to stronger economic growth.

Levine (2005) presented a survey of theories on the issue and listed five possible channels through which finance may influence growth. These channels include:

1. providing information about possible investments so as to allocate capital efficiently;
2. monitoring firms and exerting corporate governance;
3. ameliorating risk;
4. mobilizing and pooling savings;
5. easing the exchange of goods and services.

There is also a vast empirical literature on the issue. Early cross-country studies based on cross-sectional regressions documented a positive correlation between financial development and economic activity (Goldsmith, 1969; King and Levine, 1993; Levine and Zervos, 1998; La Porta et al., 2002).

Goldsmith (1969) is a pioneer in the economic growth analysis and others indicators nexus. He used the ratio of the financial mediation assets to the GDP to study the available data of 35 countries between 1860 and 1963 and concludes the existence of a parallelism between financial development and economic growth. He concluded that financial structure in the economy "accelerates economic growth and improve economic performance to the extent that it facilitates the migration of funds to the best user, that is, to the place in the economic system where the funds will yield the highest social return . Besides, his work did not systematically control for other relevant explana-tory variables.

King and Levine (1993) added more control variables to their regression model and employed a dataset containing more countries. They ran regressions on a cross-country sample of 77 countries over the period 1960–1989, after controlling for other factors affecting economic growth, such as trade, education and political stability. However, the causality issue was again not formally dealt with.

Levine and Zervos (1998) further added measures of stock markets to their regression model and systematically controlled for other factors affecting long-run growth including banking development. They showed that stock market liquidity and banking development can predict economic growth. However, none of these cross-country studies gave a satisfactory answer to the causality question. To answer the question of whether financial development is a leading indicator or a fun-damental factor of economic growth, instrumental variables were employed in several cross-country studies.

Levine (1998, 1999) and Levine, Loayza and Beck (2000) identified a coun-try's legal origin as a valid instrumental variable and found that financial development has a significant positive impact on economic growth. Levine, Loayza and Beck (2000) further ap-plied a more advanced econometric technique, the generalized moments method (GMM) for dynamic panel data, on a panel of 71 countries over the period 1960–1995. This advanced technique yielded the same result as the traditional cross-sectional instrumental variable re-gressions. That is, the exogenous component of financial development is positively associated with economic growth.

Beck, Levine and Loayza (2000) also used GMM estimators for dy-namic panel data and found that financial development has a large and positive effect on total factor productivity growth.

Benhabib and Spiegel (2000) found that the indicators of financial development that are correlated with total factor productivity growth are different from those that stimulate investment using GMM. Dynamic panel models permit the use of instrumental variables for all the explanatory variables so that more precise estimates can be obtained.

Thus, quite a few studies have examined the relationship between finance and growth using dynamic panel models in recent years. For example, Rousseau and Wachtel (2002) examined whether the relationship between finance and growth varies with inflation. Rioja and Valev (2004a) examined the effects of financial development on the sources of growth in different groups of countries with panel data of 74 countries. Rioja and Valev (2004b) further found that the impact of financial development on growth may be nonlinear. Rousseau and Wachtel (2000) and Beck and Levine (2004) applied dynamic panel techniques to their regression analyses after adding measures of stock markets to their models. Their results suggested that some exogenous components of bank and stock market development can have a large impact on economic growth. Finally, many time-series studies on the relationship between finance and growth have also documented financial development's positive impact on economic growth (Jung, 1986; Demetriades and Hussein, 1996; Neusser and Kugler, 1998; Arestis and al., 2001; Xu, 2000; Christopoulos and Tsionas, 2004; Bekaert et al., 2005).

IV. RESEARCH METHODOLOGIE

1. The formulation of the standard model:

After our study to the theoretical side of the effect of financial intermediation on economic growth and drawing on previous studies, were limited to a number of variables affecting the productivity and are as follows:

$$Yt=\beta_0+\beta_1 Mt+\beta_2 CRt+\beta_3 Bt+\beta_4 INFt+\beta_5 COMt+\beta_6 INVt+\beta_7 Kt+\varepsilon t \ldots (1)$$

Where: Yt : real GDP per capita income; Mt : M2 to GDP Ratio.; CRt : Ratio of bank credit to the private sector to nominal GD; Bt : Deposits banks to GDP; INFt: Inflation; COMt: Trade openness (Export+Import/GDP); INVt: Investment to GDP; Kt: Financial liberalization index (KAOPEN)

2. The stability of time series' study:

Table 1: ADF and PP unit root tests

Variable	ADF test		PP test	
	LEVEL	First differentiation	LEVEL	First differentiation
Mt	-1.245154 (-3.574244)	*-4.278664 (-3.580623)	-1.245154 (-3.574244)	*-4.241842 (-3.580623)
CRt	-0.934279 (-3.574244)	*-4.843093 (-3.587527)	-0.934279 (-3.574244)	*-4.278664 (-3.580623)
Bt	-2.635076 (-3.580623)	*-4.389989 (-3.580623)	-2.635076 (-3.580623)	*-4.843093 (-3.587527)
INFt	-1.980434 (-3.574244)	*-4.204107 (-3.580623)	-1.980434 (-3.574244)	*-4.389989 (-3.580623)
COMt	-3.007934 (-3.574244)	*-5.433739 (-3.587527)	-3.007934 (-3.574244)	*-4.204107 (-3.580623)
INVt	-2.178010 (-3.574244)	*-5.636903 (-3.580623)	-2.178010 (-3.574244)	*-5.433739 (-3.587527)
Kt	-2.340361 (-3.574244)	* -3.598812 (-3.580623)	-2.340361 (-3.574244)	*-5.636903 (-3.580623)
Yt	-1.946033 (-3.574244)	* -3.598812 (-3.580623)	-1.946033 (-3.574244)	* -3.598812 (-3.580623)

the time series (**M**, **CR**, **B**, **INF, COM, INV, K, Y**) are stable, integrated in first class (1) at the level of moral 5 %, since these variables integrated of the same class, it can be a simultaneous integration test.

3-Determination of Lags: To make the period of delay is appropriate for the form as a whole are estimating equation for a slow one followed the other until they get the form that best selection criteria form (AIK. SC. HQ. FP) and depending on the program EVIEW8.1 the following results were obtained:

Table 2: Lag-order selection criterion

Sample: 1984-2013

Included observations: 28

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-739.1757	NA	2.08e+13	53.36970	53.75033	53.48606
1	-420.6092	105.8758*	1.21e+08*	39.75780*	46.22851*	41.73596*
2	-555.3602	249.4640	4.83e+09	44.81144	48.23711	45.85870

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)

The result shows lags order at one. So, we precede further tests with lags (1)

4-Johansen Co-integration Test: Co-integration rank (rank of matrix) is estimated using Johansen methodology. The results are presented in Table 3.

Table 3: Results of Johansen co-integration test

Sample (adjusted): 1986 2013

Included observations: 28 after adjustments

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical value	Prob.**
None	0.995738	*360.6102	159.5297	0.0000
At most 1	0.912912	*207.7883	125.6154	0.0000
At most 2	0.842707	*139.4449	95.75366	0.0000
At most 3	0.717653	*87.65475	69.81889	0.0010
At most 4	0.562171	* 52.24540	47.85613	0.0183
At most 5	0.495736	29.11944	29.79707	0.0597
At most 6	0.298957	9.949079	15.49471	0.2847
At most 7	0.000138	0.003858	3.841466	0.9492

Trace test indicates 5 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

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

The results indicate the presence of five cointegrating relations in the long term between independent variables and the dependent variable of the model. Nevertheless, we will proceed to estimate the VECM model.

5-Granger Causality test: The summary of all Granger causality test results is reported in Table 4.

Table 4: Granger causality test

Null Hypothesis:	F-Statistic	Prob	Causal inference
-M does not Granger Cause Y.	2.00745	**Prob**=0.1572> 0.05	Accept H0
-Y does not Granger Cause M	2.18312	**Prob**=0.1355> 0.05	Accept H0
- CR does not Granger Cause Y.	6.88995	**Prob**=0.0045*< 0.05	Reject H0
- Y does not Granger Cause CR.	0.63805	**Prob**=0.5374> 0.05	Accept H0
- B does not Granger Cause Y.	0.68267	**Prob**=0.5152> 0.05	Accept H0
- Y does not Granger Cause B	2.60562	**Prob**=0.0955> 0.05	Accept H0
- INF does not Granger Cause Y.	1.65526	**Prob**=0.2130> 0.05	Accept H0
- Y does not Granger Cause INF.	3.80291	**Prob**=0.0374*< 0.05	Reject H0
- COM does not Granger Cause Y.	2.62498	**Prob**=0.0940> 0.05	Accept H0
- Y does not Granger Cause COM	0.27385	**Prob**=0.7629> 0.05	Accept H0
- INV does not Granger Cause Y.	1.25504	**Prob**=0.3039> 0.05	Accept H0
- Y does not Granger Cause INV	7.13685	**Prob**=0.0039*< 0.05	Reject H0
- K does not Granger Cause Y.	3.60112	**Prob**=0.0436*< 0.05	Reject H0
- Y does not Granger Cause K	0.35631	**Prob**=0.7041> 0.05	Accept H0

Note: * indicate significance level of 5%.

The test results reveal unidirectional causality from financial development represented by CR to economic growth, we find that economic growth Granger-causes INF at significance level of 5%, we find also causality running from Y to INV, and finally a unidirectional causality from kaopen to economic growth.

Again, there is no evidence of granger causality between: financial development measured by M2/GDP and economic growth, financial development measured by B and economic growth, and between trade openness and economic growth.

6- Engel-Granger Co-integration Test:

We appreciate the regression relationship of the equation N°. 01. The following table shows the results:

Table 5: Engel-Granger co-integration test.

Dependent Variable: Y

Method: Least Squares

Sample (adjusted): 1983 2010

Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2833.159	828.3519	3.420236	0.0025
M	43.03591	18.48156	2.328587	0.0295
CR	-8.156881	7.755462	-1.051760	0.3043
B	-33.54049	26.45737	-1.267718	0.2182
INF	-37.26141	13.32909	-2.795496	0.0105
COM	45.81460	10.68578	4.287435	0.0003
INV	63.53113	20.02210	3.173051	0.0044
K	-494.5761	388.4434	-1.273226	0.2162

R-squared	0.913822	Mean dependent var	8707.220
Adjusted R-squared	0.886402	S.D. dependent var	1002.487
S.E. of regression	337.8816	Akaike info criterion	14.70645
Sum squared resid	2511607.	Schwarz criterion	15.08010
Log likelihood	-212.5967	Hannan-Quinn criter.	14.82598
F-statistic	33.32652	Durbin-Watson stat	1.163649
Prob(F-statistic)	0.000000		

Based on results of the table, When we subjected the model parameters individually to the Student test turns out that the M2/GDP parameter, inflation, total exports and imports to GDP and investment are significant, this is because the values are less than 5%, while the rest of the parameters were not significant, but the statistical Fisher value (F-Statistic) was

less than 5%, which demonstrates the moral model as a whole, meaning that all the variables included in the model when they are combined they are moral.

The value of the coefficient of determination was estimated at 0.913822 means that nearly 91% of the changes in the economic growth model are explained by variables.

Both: M2, total exports and imports and investment associated to growth with a positive relationship , there are variables associated with negative relationship, such as loans to the private sector, deposits, inflation and the coefficient of financial liberalization KAOPEN.

Dependent Variable: D(Y)
Method: Least Squares
Included observations: 28 after adjustments

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	**-0.197217**	0.110168	-1.790155	**0.0451**
C(2)	32.48683	15.90139	2.043019	0.0603
C(3)	-44.48272	23.98522	-1.854589	0.0848
C(4)	-19.70787	7.068642	-2.788070	0.0145
C(5)	-28.67008	11.67160	-2.456397	0.0277
C(6)	0.145808	0.173331	0.841215	0.4144
C(7)	-16.75263	13.95299	-1.200648	0.2498
C(8)	9.848401	15.25801	0.645458	0.5291
C(9)	11.39576	4.776158	2.385967	0.0317
C(10)	-25.30623	10.73469	2.357425	0.0335
C(11)	-0.902185	9.316442	-0.096838	0.9242
C(12)	18.13460	10.81702	1.676487	0.1158
C(13)	863.4145	350.0946	2.466232	0.0272
C(14)	31.25901	30.90871	1.011333	0.3290

R-squared	0.811830	Mean dependent var	49.16776
Adjusted R-squared	0.637101	S.D. dependent var	223.9758
S.E. of regression	134.9255	Akaike info criterion	12.95418
Sum squared resid	254868.6	Schwarz criterion	13.62028
Log likelihood	-167.3585	Hannan-Quinn criter.	13.15781
Durbin-Watson stat	2.181723		

Sample: 1984 2013

Included observations: 28

Dependent variable: D(Y)

Excluded	Chi-sq	df	Prob.
D(M)	1.441555	1	0.2299
D(B)	0.416615	1	0.5186
D(CR)	5.692840	1	0.0170
D(INF)	-5.557451	1	0.0184
D(COM)	0.009378	1	0.9229
D(INV)	2.810610	1	0.0636
D(K)	6.082300	1	0.0137
All	16.85399	7	0.0184

7- VECM model:

Table 6: Estimation of VECM model.

7-1- In the long term:

Error correction coefficient shows with a negative signal, and the probability accompanying smaller than 0.05 means that this parameter is negative and significant, this indicates a long-term relationship between the dependent variable Y and independent variables M, CR, B, INF, COM, INV, K, And the probability of error correction coefficient is smaller than 0.05 and thus is moral

The value of the coefficient of determination amounting to 81.18%, which is greater than 60%, meaning that the independent variables explain 81% of the changes in economic growth and that's good.

Table 7: VEC Granger Causality/Block Exogeneity Wald Tests

7-2-In the short term:

We note from VEC Granger Causality / Block Exogeneity Wald Tests test results that the independent variables in the error correction model, CR, B, INF, COM, INV, K can be considered collectively as external variables, as the likelihood of rejection is equal to 0.0184, which is less than 0.05, this confirms the correctness of the representation of the error correction model with one equation.

As can be seen from the results of the same test, the credit extended to the private sector as a percentage of GDP, causing the real rate of growth in per capita GDP in the short term, because the probability accompanying him is equal to 0.0170, which is less than 0.05, and if we go back to the results of Table (06) shows us that the credit extended to the private sector coefficient C9 has a positive and significant signal at the 5% level because the probability 0.0317 less than 0.05, which means that the credit extended to the private sector as a percentage of GDP has a positive and significant affect on real rate of growth in the short and long term in Algeria.

The same observation for inflation and financial liberalization, and thus it can be concluded that the coefficient of inflation and financial liberalization significantly affect the real rate of growth in the short and long term in Algeria.

The rest of the variables: M2 / PIB, deposits as a percentage of PIB, total exports and imports and investment as a percentage of PIB does not cause the real rate of growth in the short term due to the fact that the probability is larger than 0.05.

8-Diagnostic tests of the model: To test the quality of error correction model VECM, we will use the following tests:

Table 8:Heteroskedasticity Test ARCH

F-statistic	0.159538	Prob. F(1,25)	0.6930
Obs*R-squared	0.171209	Prob. Chi-Square(1)	0.6790

$X^2_{0.05}(1)= 3.841 > LM=n\times R^2=0.171209$

Prob(1)= 0.6790>0.05.

Accept H0.

H0: there is no impact ARCH in the model and that's good.

Table 9:Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.369115	Prob. F(2,12)	0.6989
Obs*R-squared	1.622708	Prob. Chi-Square(2)	0.4443

$X^2_{0.05}(1)= 3.841 > LM=n\times R^2=1.622708$

Prob(1)= 0.4443>0.05.

Accept H0.

H0: there is no correlation between residuals in the model and that's good.

Table 10:Correlogram of residuals

Date: 07/11/15 Time: 13:57
Sample: 1984 2013
Included observations: 28

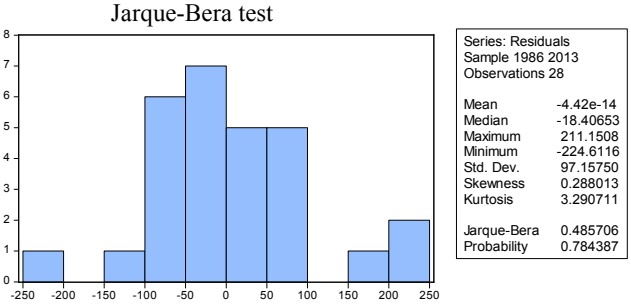
Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. *| . |	. *| . |	1	-0.108	-0.108	0.3622	0.547
. *| . |	. *| . |	2	-0.072	-0.085	0.5317	0.767
.**| . |	.**| . |	3	-0.284	-0.308	3.2503	0.355
. | . |	. *| . |	4	0.017	-0.074	3.2602	0.515
. *| . |	. *| . |	5	-0.085	-0.170	3.5249	0.620
. *| . |	.**| . |	6	-0.146	-0.327	4.3379	0.631
. |* . |	. | . |	7	0.148	0.006	5.2133	0.634
. | . |	. *| . |	8	0.014	-0.140	5.2210	0.734
. |* . |	. *| . |	9	0.088	-0.093	5.5597	0.783
. *| . |	. *| . |	10	-0.109	-0.126	6.1114	0.806
. |* . |	. | . |	11	0.083	-0.052	6.4482	0.842
. *| . |	. *| . |	12	-0.090	-0.167	6.8697	0.866

All borders are located within the area of trust and this is an indicator of the absence of autocorrelation of residuals, We also note that all the statistical likelihood of Ljung-Box greater than 0.05.

Accept H0.

H0: residualsis a white noise and that's good.

Jarque-Bera test



Jarque-Bera = 0.485706 and it is less than the critical value. The probability equal to 0.7843, which is greater than 0.05.

Accept H0.

H0: residuals series follow a normal distribution, and that's good.

CONCLUSION

Our aim in this study was to examine the nature of the relationship between financial intermediation and economic growth in Algeria for the period 1984-2013. For this task, we applied Granger causality tests within a framework of a co-integration and error-correction model. Our model included real GDP per capita, three financial development measures, financial liberalization index, and Some macroeconomic stability indicators.

Our results revealed a unidirectional causality from: Financial development represented by CR to economic growth; Again, there is no evidence of granger causality between: financial development measured by M2/GDP and economic growth, financial development measured by Deposits banks and economic growth.

The results obtained from the VECM model suggest that financial intermediation represented by credit to the private sector as a percentage of GDP and economic growth in Algeria are positively and significantly related in the short and long-term, and this is consistent with some studies that have been presented, this indicates the positive role played by the development of financial intermediation on the dynamic economic growth, due to the state's efforts in supporting the private sector through investment loans allocated to private institutions and young people to motivate them for the success of their own business, although this percentage is weak due to the lack of specialized banks in the financing of productive investments in Algeria, as well as policies that followed by banks in the distribution of loans and the imposing of high interest rates as well as weakness in mobilizing domestic savings enough to allow the financing of investment.

While the rest of the financial variables are not significant due to the weakness of financial intermediation bank in Algeria and its inability to achieve an effective pace of economic growth, despite the application of many of the reforms in the area, which calls for more work on the rehabilitation and development of structure and functioning of the system, to along with some preconditions and supporting this vital sector processing and try to resurrect the financial market due to its important role in the era of globalization and liberalization.

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