The Relationship between Democracy and Economic Growth in Algeria: A causal Analysis

العلاقة بين الديموقراطية و النمو الاقتصادي في الجزائر: تحليل اتجاه العلاقة السببية

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Abstract: Does democracy cause economic growth or does economic growth cause democracy, a crucial question has been investigated by many scholars. The existing literature point out conflicting views in this regard. Therefore, this study aims to explore the causality direction in Algeria during 1999-2018. We delve this problematic by using a Vector Error Correction Model Causality Analysis. Democracy is measured by polity index and economic growth by GDP growth.The study supports the Lipset'srevisit theory and shows that in Algeria democracy causes economic growth in both the short and the long run.

Keyword:Democracy; Economic Growth; Vector Error Correction Model.

JELclassification code : F68, O11, C22

ملخص: في إطار التداخل بين الباحثين حول فكرة اتجاه العلاقة السببية بين الديموقراطية و النمو الاقتصادي و كذا عدم توافق النتائج في الدراسات التجريبية، رأينا أهمية دراسة و تحليل هذه العلاقة حيث تم أخذ الجزائر كدراسة حالة خلال المدة 1999-2018.في الدراسة قمنا بتحليل اتجاه السببية على المدى الطويل و القصير باستخدام منهجية نموذج تصحيح الخطأ. النتائج أظهرت أنه في الجزائر خلال الفترة 1999-2018 العلاقة السببية تنتقل من الديموقراطية إلى النمو الاقتصادي في كل من المدى القصير و الطويل و هذا ما يوافق النظرية العكسية لنظرية Lipset.

الكلمات المفتاحية : الديموقراطية؛ النمو الاقتصادي؛ نموذج تصحيح الخطأ.

تصنيف JEL: F68، O11، C22

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1. Introduction :

Economic growth is one of the most important elements in macroeconomic analysis. Therefore, confirming the actual catalysts of growth is essential to the formulation of efficient policy instruments that will promote economic growth. Since the days of Adam smith and Max Wiber it has become generally accepted that economic performance and development is causally linked to the political and institutional environment of business activities. Studies have shown that there is a strong relationship between democracy and economic growth .According to Paula Becker and Dr. Jean-Aimé A. Raveloson (2008), the word "democracy" is a term that comes from Greek and it is made up with two other words demos= People and kratein= to govern, to rule. "Democracy" can then be literally translated by the following terms: Government of the People or Government of the Majority. Democracy, as a State form, is to be distinguished from monarchy, aristocracy and dictatorship[1]

Exploring the relationship between democracy and economic growth a subject has known many Analyses from both politicians and Economists. Theoretical research which especially performed by politicians have taken economic growth as a process that lead to democracy while economists in their empirical studies have seen democracy as a catalyst for economic development.

Since the days of SemonLipset (1959) it was seen that economic performance is a crucial factor for democratization through (Modernisation, Industrialisation…) under the name of modernization theory. This output was the same in a study performed by Dahl (1971). Moreover, Barro (1999) in his paper he found that countries that tend to be democracies without a growth they cannot continue to be democratic for a long period "democracies that arise without prior economic

[1]Paula Becker andDr. Jean-Aimé A. Raveloson, 2008, P4.

development ...tend not to last"[2]. In 2005 this research area has known new theory which was conducted by DaronAcemoglu, Simon Johnson, James A. Robinson, and Pierre Yared (INCOME AND DEMOCRACY). They took on consideration the problematic of causality direction and they work with two instrumental variables for Economic growth in order to figure out the right way of causality. Results showed that democracy is the independent variable and economic growth is the dependent variable which means that democracy causes economic growth in their model. After this research most of studies have investigated the nexus democracy-economic growth by taking democracy as a causal variable of economic growth. Through this theory studies show three different results (democracy fosters economic growth, democracy hinders economic growth and others find that there is no relationship between democracy and economic growth). However, till our days we still find outputs support the both theories (Lipset theory and the revisited one). In our research we found some studies that have inquired this problematic in the Middle East and North Africa region (MENA), as well as in the African countries as a group of studies. Heterogeneity and the type of democracy in these countries may not give clear and general results. Therefore, we decide to explore this problematic in Algeria during 1999-2018 to figure out which variable causes the other one and which theory fit in Algeria.The rest of the paper proceeds as follows: Section 2 a review of related literature. Third section devoted for the empirical model and econometrics approach, meanwhile, discussion of results. Section 4 is dedicated for the conclusion.

[2]R. Barro, 1999, P167.

2. Review of related literature:

UK Heo and Alexander C.Tan (2001) Democracy and Economic Growth: A causal Analysis, this paper analysed the way of causality amid the two variables democracy and economic development in 34 countries during the period 1950-1982. In the study, economic growth was measured by GDP growth whereas democracy by Arat's measurement of democracy (civil liberties, participation, competitiveness and inclusiveness). Granger causality showed that there is two- way granger causality between democracy and economic growth. Sam HakKan TANG and Linda Chor Wing YUNG (2008) conducted a paper titled "Does Rapid Economic Growth Accelerate Democratization? Time-Series Evidence from High Performing Asian Economies", the aim of the study is to examine the causality direction between growth and democratization in 8 Asian economies. Using a time series autoregressive distributed lag (ARDL) results showed that the direction of causality moves from democracy to growth.

In the context of democracy causes economic growth,HoussemRachdi and HichemSaidi (2014) investigated the impact of democracy on economic growth in the MENA region in the period of 1983-2012 for 17 countries, according to the authors it was the first study performed in the MENA countries. They measured economic growth by GDP growth and democracy by the polity1 components (Institutionalized democracy index, Institutionalized Autocracy index, and Competitiveness of Executive Recruitment, Openness of Executive Recruitment and Executive constraints). Using a Panel data: fixed effect, Random effect and the generalized method of moments. They pointed out that economic growth is negative and statistically significant for four measures of democracy. LamiaArfaoui (2016), The Relationship between Democracy and Economic Growth in Tunisia during the period 1980-2014: An Application of ARDL. The

output shows that democracy improves economic growth in the long run.Another important study performed by Tianfang Song, Paul D. Berger, Hanjoon Kim (2017) which its aim is to answer the following question "Is democracy indeed the cause, or is it actually the consequence of, economic development?" 215 countries were included in the period 1960-2014. In this paper the authors take on consideration the debate of "how to measure democracy". Thus, two datasets of democracy applied in the delving, the polity and the democracy-dictatorship index as a dummy variable. Both multiple linear regressions and a panel data was performed in the examination. Results showed a no significant relationship between democracy and economic growth. Consequently, nations may become rich under many regime types. This study disagrees with what the previous studies found (LamiaArfaoui 2016). An econometric study of the role of the political stability on the relationship between democracy and economic growth (2018), a study performed by NedraBaklouti and YounesBoujelbene in the MENA region during 1998-2011. Its aim is to examine the linkage between democracy and economic growth while taking into account the role of political stability. Basedon a panel data model and dynamic simultaneous equation panel data (to explore the causality way between democracy and economic growth), results show that Democracy stimulates economic growth through political stability and Economic performance.

A recent study by Rita Yi Man Li, Edward Chi Ho Tang, Tat Ho Leung (2019), examined the relationship between democracy and economic growth, they discussed the impact of both democracy and corruption using a panel data included 167 countries. Democracy was measured by the Economic Intelligence Unit (EIU) and GDP growth as a metric of economic growth. Results showed that democracy causes economic growth and slows it down indirectly for short period.

3. Data and Method:

To explore this problematic, we have applied both the Analytical and the empirical approaches. The Analytical methodology dedicated to depict and analyse the existing literature. For the empirical study it is based on stationarity tests, cointegration test according to the Engle-Granger (1987) and Johansen approach. Moreover,wehave used aVector Error Correction Model to check the short and the long run causality direction between democracy and economic growth. The study covers the annual data from 1999 to 2018 in Algeria. In our study we have used two basic variables Democracy and Economic Growth. Democracy is measured by Polity index and Economic Growth is measured by GDP growth. The Data are collected from the World Bank indicators and Polity dataset.

3.1.Stationarity tests:

In order to analyse if GDP growth (Gross Domestic Product) and Dem (Democracy) series are stationary or not, we have applied ADF (Augmented Dickey Fuller)test as an initial test then the Philips Perron test to confirm the results.

Table 1 shows the results of thestationarity tests that we have conducted.

- Hypothesis of ADF test:

  H0: there is a unit root, series is not stationary

  H1: there no unit root, series is stationary

- Hypothesis of PP test:

  H0: there is a unit root, series are not stationary

  H1: there no unit root, series are stationary

Table 01: ADF and Philips Perron Output for GDP

Testes	level			First Difference		
	Intercept	Intercept and Trend	None	Intercept	Intercept and Trend	None
ADF	0.4923	0.2099	0.2535	0.0000*	0.0002*	0.0000*
Philips Perron	0.0702	0.0690	0.1523	0.0000*	0.0002*	0.0000*

*statistical significance at the 5 % *the optimal lag of ADF test has been determined according to Schwarz Information Criterion (SC) **Source:**Authors construction based on Eviews.10

Table 02: ADF and Philips Perron Output for Dem

Testes	level			First Difference		
	Intercept	Intercept and Trend	None	Intercept	Intercept and Trend	None
ADF	0.4146	0.7552	0.1663	0.0063*	0.0185*	0.0005*
Philips Perron	0.4226	0.7697	0.1663	0.0063*	0.0091*	0.0005*

*Statistical significance at the 5% *the optimal lag of ADF test has been determined according to Schwarz Information Criterion (SC)

Source: Authors construction based on Eviews.10

At the level, both series are no stationary because in a statistical significance of 5% all probabilities are more than 0.05 which lead us to not reject the null hypothesis that says there is a unit root. In compared to the first difference of series, probabilities are less than 5% which means that the two series become stationary.

According to ADF test and Philips Perron test, the output shows that GDP and Democracy series are not stationary in level but they

become stationary when their first differences are taken. In other words series are integrated in first I (1) degree. These results indicate that it is possible to apply the cointegration test between variables.

3.2.The Cointegration Tests:

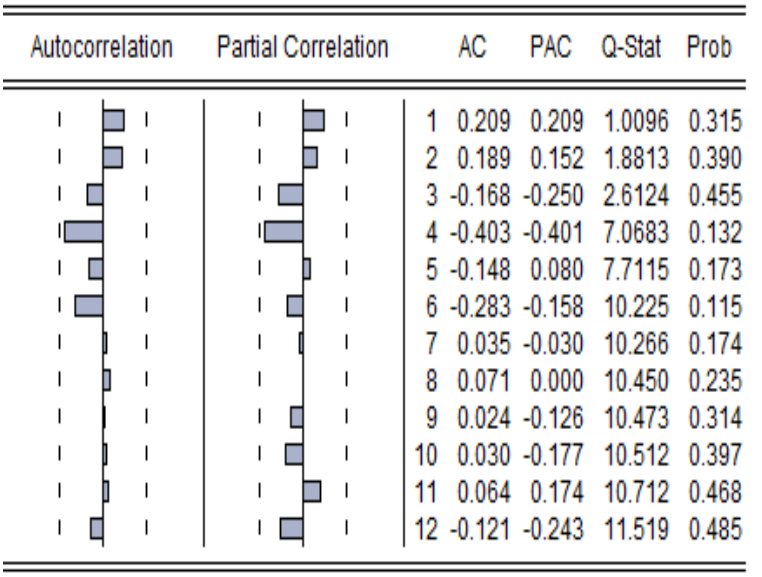
Engle Granger Cointegration Test and Johansen Cointegration Test were performed in order to inquire the cointegration between series.

3.2.1. Engle Granger Cointegration Test:

First we applied the Method of **Engle Granger** which based onrunning a regression model between the two series and then analyse the residuals of the estimated model. Deciding whether GDP and Dem series are cointegratedexistonly when the residuals are stationary.

The results are shown in Figure 1 and table 3.

Fig.1: Correlogram of residuals in level



	AC	PAC	Q-Stat	Prob
1	0.209	0.209	1.0096	0.315
2	0.189	0.152	1.8813	0.390
3	-0.168	-0.250	2.6124	0.455
4	-0.403	-0.401	7.0683	0.132
5	-0.148	0.080	7.7115	0.173
6	-0.283	-0.158	10.225	0.115
7	0.035	-0.030	10.266	0.174
8	0.071	0.000	10.450	0.235
9	0.024	-0.126	10.473	0.314
10	0.030	-0.177	10.512	0.397
11	0.064	0.174	10.712	0.468
12	-0.121	-0.243	11.519	0.485

Source: Eviews Program

Table 03: Residual stationarity analysis

Test	Level		
	Intercept	Intercept and Trend	None
ADF	0.0237*	0.0143*	0.0014*

*Statistical significance at the 5% *the optimal lag of ADF test has been determined according to Schwarz Information Criterion (SC)

Source: Authors construction based onEviews

For the coreelogram, the figure shows that Q-stat (prob) is more than 5% as well as theresults of the ADF test which means that the residuals arestationary. Therefore, there is a long-term relationship between GDP and Democracy. As a result, we can say that GDP and Dem are cointegrated.

3.2.2. Johansen Cointegration Test:

To confirm the output of the Engle Granger Cointegration Test we decided to use the Johansen Cointegration Test. Results are shown in the table 4.

Table 04: The output of the Johansen cointegration test

Test	Prob	Decision
Unrestricted Cointegration Rank Test (Trace)	0.0004*	Series are cointegrated (one cointegration)
Unrestricted Cointegration Rank Test (Trace)	0.0015*	Confirm that series are cointegrated (one cointegration)

*Statistical significance at the 5%

Source: Authors construction based on Eviews.10

Johansen test has confirmed the previous results of the existing of a cointegration between GDP and Dem series.

3.3.Vector Error Correction Model:

The vector error correction model is used when a long-term relationship between the variables are present, because error correction model indicates the deviation in thelong term (balance) relationship[3]. In the error correction model the variables should be stationary and lagged term of errors is added. Therefore, in order to check the causality direction (Long and short run) between GDP and Democracy we used the following equations:

$$\Delta y_t = a_0 + \sum_{i=1}^{m} a_1 i\, \Delta\, yt - i + \sum_{i=1}^{m} a_2 i\, \Delta\, X\, t - i + a_3 i\, ECTt - 1 + ut \quad (1)$$

$$\Delta X_t = a_0 + \sum_{i=1}^{m} a_1 i\, \Delta\, X\, t - i + \sum_{i=1}^{m} a_2 i\, \Delta\, yt - i + a_3 i\, ECTt - 1 + ut \quad (2)$$

*With: Y is GDP and X is Democracy variable.

To test the causality we have run the VECM, first we take Dem as a dependent variable and GDP as an independent variable (to check whether democracy causes GDP). Then, we did the same test but we take democracy as independent and GDP as the dependent variable.

We analysed both the long run causality (Error correction Model) and the short run correction model using the OLS estimator. The Hypotheses in this regard are established as follows:

- One we take Democracy as an independent variable:

H0: Democracy does not cause GDP

H1: Democracy is the cause of GDP

[3]MahmutYadimcioglu and AhmetIlhan, 2016, P172.

Table 05: Results of the first model after using VECM

Coefficient	Prob	Sign and significance	Results
Long run causality (error correction model)	0.0007*	Negative and significant	✓ Democracy causes GDP in the long run
Short run causality (coefficient jointly)	0.0045*	significant	✓ Democracy causes GDP in the short run

Statistical significance at the 5% **Source:**Authors construction based on Eviews.10

- When we take GDP as an independent variable:

H0: GDP does not cause Democracy

H1: GDP is the cause of Democracy

Table 05: Results of the second model after using VECM

Coefficient	Prob	Sign and significance	Result
Long run causality	0.3404	Positive and non-significant	GDP does not cause Democracy in both short and the long run
Short run causality	0.0885	Non-significant	

Statistical significance at the 5%

Source: Authors construction based on Eviews.10

According to the causality tests based on the vector error correction Causality model we found that:

- For the model (1), the null hypothesis is: democracy does not cause GDP. We find that the coefficient of the error correction model is negative and the (prob) is 0.0007 which is less than 5%. This led us to reject null hypothesis while the alternative hypothesis is accepted (Democracy causes GDP in the long run). For the short run causality we run Wald test to check the significance of the coefficients jointly. Prob is 0.0045 which is less than 5%, thus, we reject the null hypothesis of the insignificance of coefficients. As a result, Democracy causes GDP in the short run.

- For the Model (2), the null hypothesis is: GDP does not cause Democracy. According to the results, there is no causality moves from GDP to Democracy.

4. Study Results :

In Algeria during 1999-2018, we found that the causality direction between democracy and economic growth in the long and short run moves from Democracy to Economic Performance, which means that democracy affects Economic Growth. Our study starts from 1999 because this year was the beginning of the political stability and peace in Algeria after the Dark decade which had a negative impact on the Algerian economy and institutions, hence, democracy.

Our study supports the output and the theory of DaronAcemoglu, Simon Johnson, James A. Robinson, and Pierre Yared (2005). However, this does not mean that Democracy has a positive effect on Economic Growth. The study shows only the way of causality. Therefore, our upcoming research will investigate the impact of Democracy on Economic Development in Algeria.

5. Conclusion :

The aim of this study is to analyse the relationship between democracy and economic growth in Algeria during the period 1999-2018 in the context of figuring out the way of causality in both long and short run. The question was investigated is "the causality direction; is it from economic growth to democracy or from democracy to economic growth?" An empirical and econometric study has been performed to explore this nexus. In this regard, we have used two series: GDP growth for economic growth and polity dataset for the measurements of Democracy.The study have based on the cointegration test and causality analysis. Using a vector error correction causality model, we found that in Algeria, in the short and long run causality moves from democracy to economic growth. The output of this study elucidates which theory should we follow to investigate the impact of democracy on economic development in Algeria. One factor we did not take it on consideration in our study which it is the impact of Dark Decade (1991-2002). Thus, we recommend future research to add this variable in their model.

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7. Liste of Appendices :

Appendix 01: VECM output with Democracy as an independent variable

ıdent Variable: D(GDP)
d: Least Squares
)9/30/19 Time: 14:31
e (adjusted): 2002 2018
ed observations: 17 after adjustments
²) = C(7)*(DEM(-1) + 1.54191444757*GDP(-1) - 3.90298544479) +
'8)*D(DEM(-1)) + C(9)*D(DEM(-2)) + C(10)*D(GDP(-1)) + C(11)
)(GDP(-2)) + C(12)

	Coefficient	Std. Error	t-Statistic	Prob.
C(7)	-0.882012	0.190107	-4.639563	0.0007
C(8)	0.863043	0.268560	3.213600	0.0083
C(9)	-0.005620	0.280180	-0.020057	0.9844
C(10)	0.029976	0.197111	0.152076	0.8819
C(11)	-0.113446	0.163229	-0.695013	0.5015
C(12)	-0.225343	0.248098	-0.908280	0.3832

ared	0.845226	Mean dependent var	0.025415
ed R-squared	0.774874	S.D. dependent var	1.896361
regression	0.899775	Akaike info criterion	2.897219
quared resid	8.905538	Schwarz criterion	3.191295
elihood	-18.62636	Hannan-Quinn criter.	2.926451
stic	12.01426	Durbin-Watson stat	2.542656
-statistic)	0.000373		

Appendix B: VECM output with GDP as an independent variable

ɨndent Variable: D(DEM)
od: Least Squares
: 09/30/19 Time: 14:29
ple (adjusted): 2002 2018
ded observations: 17 after adjustments
:M) = C(1)*(DEM(-1) + 1.54191444757*GDP(-1) - 3.90298544479) +
ɔ(2)*D(DEM(-1)) + C(3)*D(DEM(-2)) + C(4)*D(GDP(-1)) + C(5)*D(GDP(
2)) + C(6)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.224917	0.225677	0.996631	0.3404
C(2)	-0.202970	0.318810	-0.636648	0.5374
C(3)	-0.126469	0.332604	-0.380240	0.7110
C(4)	0.251633	0.233993	1.075389	0.3052
C(5)	0.450515	0.193770	2.324993	0.0402
C(6)	0.448049	0.294520	1.521284	0.1564

uared	0.466628	Mean dependent var	0.294118
ɜted R-squared	0.224186	S.D. dependent var	1.212678
ɔf regression	1.068131	Akaike info criterion	3.240262
squared resid	12.54994	Schwarz criterion	3.534337
ikelihood	-21.54223	Hannan-Quinn criter.	3.269493
tistic	1.924698	Durbin-Watson stat	2.183722
(F-statistic)	0.169758		