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Does Democracy nurture Corruption in Algeria? An Empirical Study of the Impact of Democracy on Corruption during the period 1984-2018

Brahim ZIRARI[1,*], Youcef SOUAR[2]

[1] ITMAM Laboratory,Department of Economics, University of SAIDA (Algeria)
(ziraribr@mail.com)
[2] MIFMA Laboratory,Department of Economics, University of SAIDA (Algeria)
(syoucef12@yahoo.fr)

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Summary: In the context of the relationship between democracy and corruption, this paper aims to delve the impact of democracy and religion in politics on corruption rates in Algeria during the period 1984-2018. Based on a Vector Error Correction Model, and OLS estimator, the results show that there is a long run association (Co-integration) between democracy, religion and corruption, moreover, in the short run and during 1984-2018, democracy is considered as one of the causes that stimulate corruption (1% increase in democracy, increases corruption by 3.6%), while religion might hinder it.

Keywords: Corruption; Democracy; Economic Growth; Vector Error Correction Model; Algeria.
Jel Classification Codes : K42 ; F68 ; O11 ; C22

* Brahim ZIRARI ziraribr@mail.com

I- Introduction :

The research area that concern about the relationship between corruption and economic development has known much interest by scholars. Recent empirical studies point out that corruption which is defined as the abuse of public office for private gain (Ivar Kolstad & Arne Wiig , 2011, p.03), is a negative factor for economic growth, in other words, corruption lowers investment to GDP, hence, lowers economic growth (Mauro, 1995). Since the days of Max weber and Adam smith it has seen that economic growth is related to institutional and political factors and regime type is one of the variables that cause economic performance (Zirari & Souar, 2019, p. 20). Studies have shown that democracy may affect positively growth through protection of rights and civil liberties, hence, obstructs corruption (Ghardallou & Sridi , 2019) .In this regard, researchers tend to investigate the causes of corruption, furthermore, ways of reducing corruption rates.

The nexus democracy- corruption has been a subject of many studies since the start of the wave of democratization in the 1970's by seeing that democracy is the rule of people, which lead to limit corruption while autocratic regimes cause corruption because the power is on the hands of the elite. The existing literature shows an ambiguity in the relationship amid democracy and corruption. The first hypothesis says that there is a negative association between democracy and corruption, which is ostensibly shown in a study performed by (Hung-En, 2004) and (Alok, Neil , & Carl), (Treisman , 2007), (Rock, 2009), all this studies suggested that democracy and election system increases the possibility of punishing corrupted people. On the other hand, (Mohtadi & Roe ,2003) and (Shrabani , 2008) pointed out that it exists a U inverted effect which means that corruption occurs in new democracies, then it turns to become less when a country follow such democracy.

However, other studies show that there is no relationship between these two variables (Democracy and Corruption), see (Fisman & Gatti , 2002) and (Graf Lambsdorff , 2005). According to (Ades & Di Tella, 1999), this was the case of Asian countries. Even they have low political rights they experience very low rates of corruption.

Academic interest has grown concerning the linkage between democracy and corruption. They have explained these different results and conflicting views depending on the type of democracy. Regarding to this, they distinguished between two types of democracy: transition and consolidation democracy. (Lazreg & Si Mohammed , 2018, p.60) said that consolidation democratic depends to competitive elections, institutional transparency, processes and values by the political class and the masses without any control and intervention by the army while transition democracy exist in countries that moves from authoritarian regime to be democracies which is the case of MENA region (Faulenbach , 2007). A summary of the literature mentioned above shown in the table (1).

I.1.Theoretical Evidence about corruption in Algeria:

According to (B & Aggoun, 2018) and the paper of (Hadjadj, 2007), we summarized the history of corruption in Algeria as follows. After the independence in 1962, Algerian people were looking for freedom, peace and a better life. However, this period when Ahmed Ben Bella was a president has known many conflicts and corrupted actions in the context of having good positions and offices, the issue of fictitious Mujahidin. Moreover, stealing the money of governments, this shows the corruption.

In 1965 and because of the military coup, Houari Boumediene became the second president of Algeria. This period and especially in 1971 was an important in the history of Algeria because of the nationalisation of hydrocarbons. Algeria has benefited from an increase in oil prices in 1973 "the first price shock of oil". Unfortunately, the bad management of these revenues led to spend huge amounts of money on the industrialization process that needed qualified human resources and advanced technologies. Therefore, that deal opened a new ways for corruption which reached new rates. After the death of the president in 1978, Chadeli Ben Jedid assigned as a president. This period known another facet of corruption which seen in other sectors.

Government spending was dedicated for building and rail ways constructions which also encouraged corruption. After the bad days that Algeria faced (demonstrations of 1988 and the dark decade 1992-2002) the FMI provides sanctions and lengthened the period of paying debts in exchange for deep reforms in the country. In first sight, this seems to limit corruption and build a new Algeria but it didn't work. On those days, the Algeria Market needed much equipment whenever the price which opened the door to greedy international intermediaries that led to throw Algerian money from the window. Since 2004, the corruption in Algeria known new records, in the previous years, corruption was under table and secretly while recently stealing money of the people becomes publicly and as a an example the scandal of el KHALIFA. Figure (1) shows the causes of corruption.

I. 2. Literature Review:

(Rury, Rieckhaus, & Lus, 2006) conducted a study titled: Corruption, Democracy and Economic Growth. The aim of this study was to investigate the impact of corruption on economic growth in democracies. Using a time series and cross-sectional data for more than 100 countries from 1982-1997, results showed that democracy affects positively economic performance while corruption cramps the economic performance.

(Ivar Kolstad & Arne Wiig, 2011), investigated the following question: Does democracy reduces corruption? In this paper authors emphasized on the idea that democracy is an endogenous variable which means that democracy can cause and be the cause at the same time. They said that previous research that didn't find a relationship between democracy and corruption is because neglecting this idea which leads to biased empirical methods, hence, to different results. Using

instrument variables for democracy during 1946-2009 for 32 countries, results found that democracy reduces corruption.

(Shadabi , 2013), the study explored the relationship between religion and corruption in 174 countries in 2010. The conclusion was that Islam and Christianity have no significant effect on corruption; hence, religion does not increase corruption.

The Effect of Democracy on Corruption: Income is Key, a study performed by (Jetter, Montoya Agudelo, & Ramírez Hassan, 2015). Authors investigated the relationship between democracy and corruption during the period 1998- 2012 using a 3SLS estimator. They pointed out that democracy mitigates corruption in countries that have higher per capita GDP whereas it increases corruption in the poorer nations.

(Nguyen Ngoc Thach, Mai Binh Duong, & Tran Thi Kim, 2017), they examined the impact of corruption on economic growth in 19 Asian countries in the period 2004-2015. By applying a GMM data processing techniques and quartile regression. They found that corruption cripples economic growth in those countries. Moreover, results showed that economic growth is stimulated by institutional quality, democracy, freedom and economic freedom.

Mohammed Lazreg and Kamel Si Mohammed (2018) examined the relationship between democracy and corruption in 13 MENA countries. The output of this paper is based on dynamic generalized method of moments that shows GDP in exporting oil countries feed corruption and lower rate of democratization. Furthermore, religion founded to be significantly negative with corruption.

(Yi Man Li, Chi Ho Tang, & Leung, 2019), explored the nexus between democracy and economic growth. To analyse this relationship they employed index of corruption. By using a panel data included 167 countries, results showed that in developed countries corruption harms economy and if a country reaches a well-developed economy, the country will gradually transform into a democratic.

The Impact of Corruption on Economic Growth in the MENA Region, a paper performed by (Sbaouelgi, 2019) with an aim of investigating the impact of corruption on investments and economic growth in MENA countries during 1990-2017. Based on a dynamic panel they figured out that political institutions enhance growth while corruption is a hindrance factor to economic growth.

II– Methods and Materials:

II.1. Model Specification:

According to the literature and the history of corruption in Algeria, it has seen that, Democracy and Religion have a relationship with corruption. Therefore, in this study we attempt to perform an empirical study using econometric models. Our model is extracted from Leila Shadabi (2013) . The general model takes the following form:

$$CPit = \alpha + \beta 1\ DEMit + \beta 2\ RE\ it + \varepsilon\ it$$

Where:

(CP) is corruption index.

(DEM) is democracy variable.
For (REL) it is variable of religion in politics, and as we said before the main two variables in this model are democracy and corruption.

II.2. Data:

Our model spans annual data from 1984-2018. The estimation starts from 1984 because it is the date of the beginning of liberalism and the wave of democratization; meanwhile, because of the availability of data. For the variables, corruption index and religion in politics are collected from International Country Risk Guide, and democracy from Polity dataset (Polity Index). Polity index is one of the most frequently measurements of democracy used in current research. This index covers data from 1800 to present for 195 countries. It composed from five variables (Competitiveness of Executive Recruitment, Openness of Executive Recruitment, and Constraint on Chief Executive, Competitiveness of Political Participation and Regulation of participation). The index range from: -10 (strong autocratic) to +10 (strongly democratic). More details in the Table (2).

III- Results and discussion :

III.1. Unit Roots Testing:

In this section, we analyse the behaviour and the type of our series in order to figure out which econometric model we should follow to explore the impact of democracy on corruption in Algeria. First step and because we have a time series data, a unit root testing must be conducted to see if our three series are stationary or not. To do this, we need to run an Augmented Dickey-Fuller test (ADF). The rule is: if the series has a unit root that means no stationary while the absence of a unit root is the absence of time effect which is a stationary. According to the results presented in Table 03, all of our variables are no stationary in level in a significance of 5% (all values are greater than 0.05), which means the existence of a unit root. However, they are stationary in first level I (1). Therefore, because of the series found to be integrated in the first order, there is a possibility of a long run association between them "Co-integration". Results are shown in Table (3).

The output shows the possibility of a co-integration between democracy, corruption and religion, thus, based on this results we run a Johansen co-integration test to delve the long run association between these variables. A long run relationship means that series move together in the long run. Results of the Johansen test are shown in the Table (4).

As we see in the table above, both Trace statistic and Eigenvalue statistic are less than 5% in the non-hypothesis, which lead us to refuse this hypothesis of the absence of co-integration. However, for the "At most 1" values are more than 0.05, thus, we accept the null hypothesis. As a result, Johansen test shows the existence of one co-integration equation between the variables. According to this, we still have another test to in order to analyse the short run impact of democracy and religion non corruption. Meantime, analyse the significance and the adjustment speed coefficient of the model in the long run by estimating the Vector Error Correction Model.

III.2. Diagnostic tests of the Model:

In first before analyse the results of the Vector Error Correction Model (VECM) we need to do some diagnostics for the model. If the model is a good fit for data it must pass all tests. The coefficient of determination R^2 is 60%, which means that 60% of the variation of the dependent variable (Corruption) is explained by the model variables (democracy and religion) and the rest is explained by the error term. The fisher statistic is 0.00096 and it is less than 5%. This means that the independent variables jointly are significant to influence the dependant variable. For the other diagnostics (Serial correlation of residuals, Heteroscedasticity test, and the normality of residuals) are shown in the Table (5).

III.3. Analysis of the Model (VECM):

All tests show that the Model (VECM) is ready for the analysis. Every required test is approved. The test is composed of two parts, the short run impact and the long run adjustment.

- **The short and the long run impact:** Based on the output of the test that shown in the table 06 below, democracy lagged one year is positively significant to Corruption with a coefficient of 0.03672. In other words, a 1% increase in democracy, corruption increases by 3.6% in the short run. However, results show no significant impact of religion on corruption in 5% level but in 10% level, religion founded to affects corruption negatively: an increase in religion by 1% may decrease corruption by 10%. For the error correction model it founded to be negative and significant (prob= 0.0005) at 5% level with value of -0.3244. This confirms the long run association between the variables, and the model need around 3 years to readjust to the long-run equilibrium. The output is in the Table (6).

IV- Conclusion:

The aim of the study is to explore the impact of both democracy and religion in politics on corruption in Algeria during the period 1984-2018. In this research and according to previous studies, we considered democracy variable and religion in politics variable as variables that affect corruption and we perform an empirical study to enquire the type of this impact, in other words, whether democracy and religion act as a solution or as a cause for corruption.

Based on an econometric model (Vector Error Correction Model) and by applying OLS estimator, results show that in Algeria during 1984-2018: democracy has a positive impact on corruption and a 1% increase in democracy lead corruption to increase by 3.6% which clearly shows that democracy is one of the causes of corruption in the study period. However, religion founded to affect corruption negatively; an increase in religion by 1% may decrease corruption by 10%. As a result and according to the output of the study, in Algeria democracy found to be as a factor that nurtures corruption.

- Appendices:

Table (1): The nexus Democracy-Corruption

Democracy and Corruption	Literature
A negative relationship between democracy and corruption	Sung (2004) and Bohara Mitchell and Mittendorff (2004) Treisman (2007) M. Rock (2009) Mohammed Lazreg and Kamel Mohammed (2018)
The exist of U inverted effect	Mohatdi, Roe (2003) Shrabani Saha (2008)
No relationship	Ades and Di Tella (1999). Fisman and Gatti (2002). Lambsdorff (2005).

The source: Authors Construction

Table (2): Description of Data

Variable	Label	Source	Definition
Democracy	DEM	Polity dataset	A measure quantifies democracy in a country based on 5 dimensions that range from -10 to +10

Religion in Politics	REL	International Country Risk guide	Measure of religious domination of society in a way that replaces civil law by religious law, excludes other religions from the political, suppresses religious freedom or expressions of religious identity
Corruption	CP	International Country Risk guide	A measure of corruption in all sectors range from 0 to 6

The source: Authors construction based on the datasets information

Table (3): Unit root test

Variable	Included in Equation	Level	First Difference	Integration Order
		ADF	ADF	
Democracy (DEM)	Intercept	0.4020	0.0000*	I(1)
	Trend and Intercept	0.1573	0.0002*	
	None	0.3391	0.0000*	
Religion in Politics (REL)	Intercept	0.3302	0.0006*	I(1)
	Trend and Intercept	0.8368	0.0017*	
	None	0.0941	0.0000*	
Corruption (CP)	Intercept	0.9762	0.0001*	I(1)
	Trend and Intercept	0.7508	0.0136*	
	None	0.3212	0.0000*	

The source: Authors construction based on Eviews.10
*sig at 5% level

Table (4): Johansen test

Variables	Johansen test				Decision
	Trace		Eigenvalue		
	One	At most 1	None	At most 1	
Democracy (DEM), Corruption (CP) and Religion in Politics (REl).	0.012*	0.0592	0.0065*	0.2471	There is one co-integration equation between the three variables.

The source: Authors construction based on Eviews.10

*sig at 5% leve

Table (5): Diagnostic of the Model

Diagnostic	Test performed	P-value	Decision
Serial correlation of residuals	Breusch-Godfrey Serial Correlation LM test	0.8057	There is no serial correlation
Heteroscedasticity	Breusch-Pagan-Godfrey	0.9984	There is no Heteroscedasticity
Normality of residues	Jarque-Bera test	0.9616	Normality of residues is approved

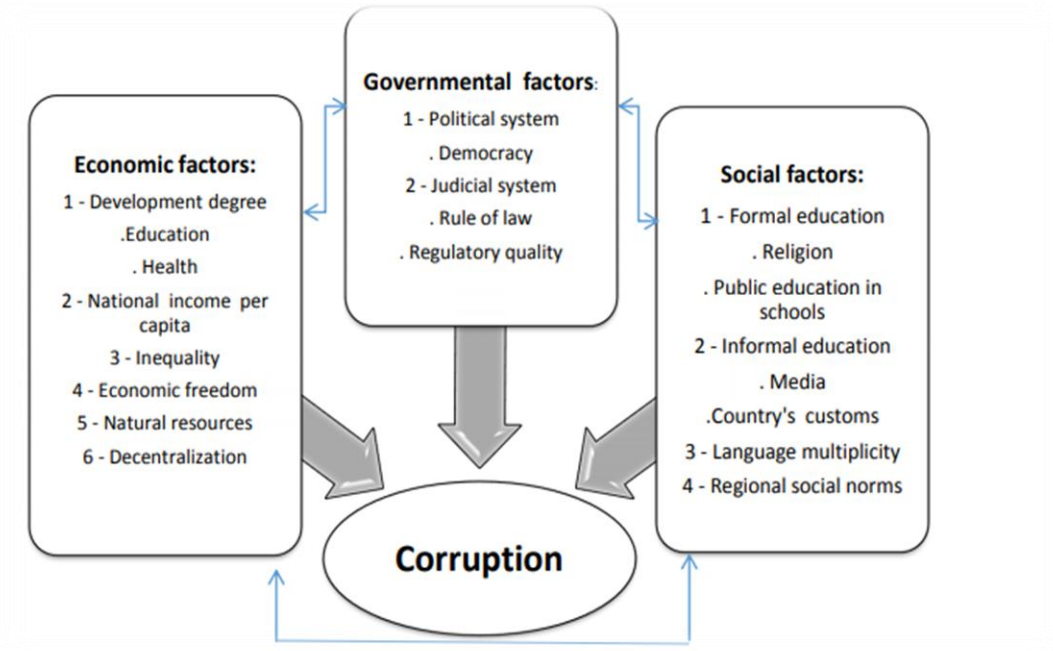
The source: Authors construction based on Eviews.10
*Sig at 5% level

Table (6): Vector Error Correction Model Test

Varibles	Coefficient	P-value
D(dem(-1))	0.0367	0.0337*
D(rel(-1))	-0.1062	0.0779**
CointEq(-1)	-0.3244	0.0005*

The source: Authors construction based on Eviews.10
*sig at 5% level,
**sig at 10% level

Figure (1): The Causes of Corruption



The source: (Shadabi, 2013, p.108)

Table (I): Model Diagnostic (Autocorrelation of Residual)

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.150540	Prob. F(2,22)	0.8611
Obs*R-squared	0.432023	Prob. Chi-Square(2)	0.8057

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 02/06/20 Time: 11:57
Sample: 1987 2018
Included observations: 32
Presample missing value lagged residuals set to zero.

The source: Authors construction, based on Eviews.10

Table (II): The estimation of the Vector Error Correction Model

Dependent Variable: D(CP)
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 02/06/20 Time: 11:53
Sample (adjusted): 1987 2018
Included observations: 32 after adjustments
D(CP) = C(1)*(CP(-1) + 0.15068366992*DEM(-1) - 0.412045469746*REL(-1) - 1.34638674599) + C(2)*D(CP(-1)) + C(3)*D(CP(-2)) + C(4)*D(DEM(-1)) + C(5)*D(DEM(-2)) + C(6)*D(REL(-1)) + C(7)*D(REL(-2)) + C(8)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.324468	0.080498	-4.030772	0.0005
C(2)	0.085782	0.149165	0.575082	0.5706
C(3)	-0.153220	0.102674	-1.492295	0.1487
C(4)	0.036727	0.016308	2.252105	0.0337
C(5)	0.029137	0.016833	1.730936	0.0963
C(6)	-0.106236	0.057678	-1.841883	0.0779
C(7)	0.012763	0.053667	0.237823	0.8140
C(8)	-0.091870	0.031690	-2.899014	0.0079

R-squared	0.605761	Mean dependent var	-0.062500
Adjusted R-squared	0.490775	S.D. dependent var	0.203502
S.E. of regression	0.145219	Akaike info criterion	-0.808832
Sum squared resid	0.506124	Schwarz criterion	-0.442398
Log likelihood	20.94132	Hannan-Quinn criter.	-0.687370
F-statistic	5.268110	Durbin-Watson stat	1.969142
Prob(F-statistic)	0.000960		

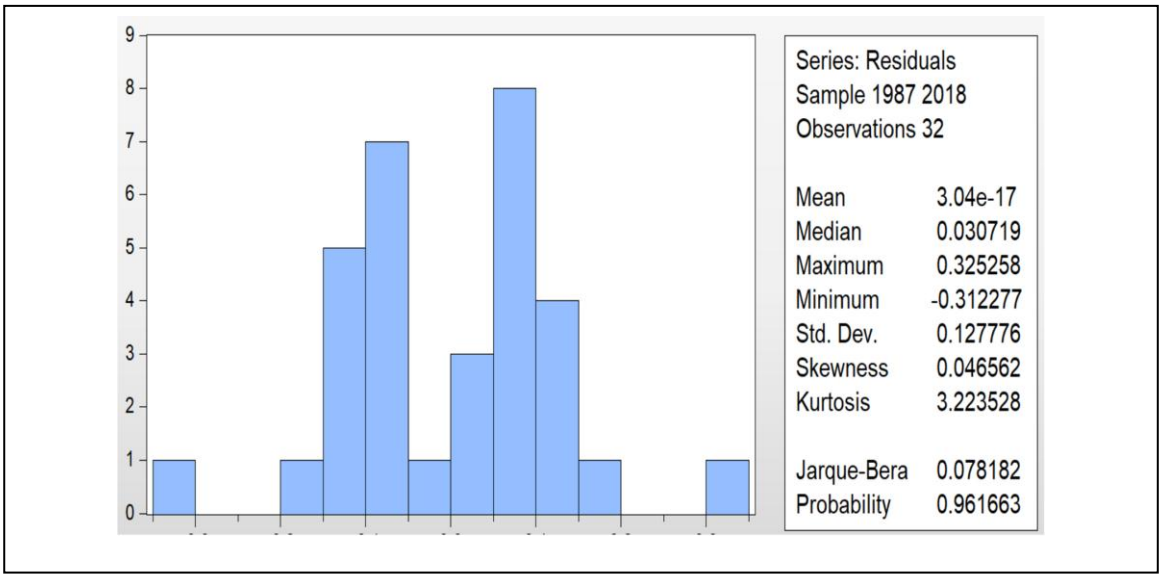
The source: Authors construction, based on Eviews.10

Table (III): Model Diagnostic (Heteroskdasticity)

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.102316	Prob. F(9,22)	0.9993
Obs*R-squared	1.285594	Prob. Chi-Square(9)	0.9984
Scaled explained SS	0.803968	Prob. Chi-Square(9)	0.9998

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 02/06/20 Time: 11:59
Sample: 1987 2018
Included observations: 32



The source: Authors construction, based on Eviews.10

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