Does Democracy level Effect on Corruption size? An Empirical Study Using Panel Data

هل يؤثر مستوى الديمقراطية على حجم الفساد؟ دراسة تطبيقية باستعمال بيانات البانل

REZKI Mohamed [1], MELIKAOUI Mouloud[2]

[1] Bordj Bou Arreridj University(Algeria), mohamed.rezki@univ-bba.dz
[2]Bordj Bou Arreridj University(Algeria), mouloud.melikaoui@univ-bba.dz

Received: 17./08/2019 *Accepted: 20/11/2019* *Published:.01/01/2020*

Abstract:

This paper aims to examine the impact of the level of democracy on the corruption perceptions index, throughout applying to 153 countries during the period 2012-2017 using the panel data.

The study came out that 97,11% of the changes in the corruption index and thus the size of corruption can be explained by the indexes of democracy, the index of control of corruption and the size of GDP per capita. It also found that both Functioning of government index and the political participation have a statistically significant negative impact on the corruption index. Likewise, indexes of the electoral process and pluralism, civil liberties and political culture have no statistically significant impact on the corruption index. The study eventually found that both GDP per capita and control of corruption had a positive impact on the corruption index.

Keywords: corruption, democracy, indexes, world countries, panel data.

JEL Classification Codes: D72, D73, K_{42}, P_{16}

ملخص:

تهدف الدراسة إلى اختبار تأثير مستوى الديمقراطية على مؤشر الفساد وبالتالي حجم الفساد في الدول وذلك بالتطبيق على 153 دولة خلال الفترة 2012- 2017 باستخدام بيانات البانل.

وقد توصلت الدراسة إلى أن 97,11 % من التغيرات في مؤشر مدركات الفساد وبالتالي حجم الفساد يمكن تفسيرها من خلال مؤشرات الديمقراطية ومؤشر السيطرة على الفساد وحجم

***Corresponding author**: Melikaoui Mouloud, **e-mail:** melikaouim@yahoo.fr*

الناتج المحلي الخام الفردي، كما توصلت الدراسة أن كل من مؤشر الأداء الحكومي والمشاركة السياسية لها تأثير سلبي ذات دلالة إحصائية على مؤشر مدركات الفساد، أما مؤشرات العملية الانتخابية والتعددية، الحريات المدنية والثقافة السياسية فليس لها تأثير ذو دلالة إحصائية على مؤشر مدركات الفساد، كما توصلت الدراسة أيضا أن كل من حجم الناتج المحلي الخام الفردي ومؤشر السيطرة على الفساد له تأثير إيجابي على مؤشر مدركات الفساد (تأثير سلبي على حجم الفساد).

كلمات مفتاحية: فساد، ديمقراطية، مؤشرات، دول العالم، بيانات البانل.

تصنيفات JEL: D73، D72، K_{42}، P_{16}

1. INTRODUCTION

Corruption is an international phenomenon that affects most countries of the world, but it is mainly widespread in the developing countries and oil states in particular. Its various features may include bribery, nepotism and the using of public function for personal benefits as well as the waste and squandering of public money, which affects the financial structure of the public sector, the efficiency of privatization and operation of public finance of the state and economic performance in general. Therefore, measures should be taken to reduce this phenomenon and its negative effects on the economy and society through economic rationalization policies and the application of the principles of good governance, including rationalization of public expenditure and transparency in the State's financial transactions.

Academic researchers have long been interested in understanding that some countries are more corrupt than others. Research had initially focused on exploring factors affecting corruption within the country, but more recently, with the introduction of many good quality macroeconomic indicators that measure the perceived levels of corruption in all countries worldwide, the area of research interest has changed considerably towards international studies using different measures of corruption.

Some studies have found a strong correlation between corruption and country-specific characteristics such as the level of economic development and the proportion of Protestants within the population, as well as other characteristics and characteristics such as the level of democracy within the

country. The quality and level of democracy prevailing in the country in all its indexes are factors that have had the attention of researchers to determine their impact on levels of corruption in countries, despite the great difference on the quality of the relationship between the two variables. This is because some countries with high levels of democracy are experiencing high levels of corruption such as India. By contrast, some countries have low levels of democracy characterized by low levels of corruption such as Qatar and the United Arab Emirates. Accordingly; we asking the following question: **Do high democracy indexes reduce the level of corruption.**

The research hypotheses

H11: There is a statistically significant impact of the electoral process and pluralism index on the level of corruption.

H12: There is a statistically significant impact of Functioning of government index on the level of corruption.

H13: There is a statistically significant impact of the political participation index on the level of corruption.

H14: There is a statistically significant impact of the political culture index on the level of corruption.

H15: There is a statistically significant impact of the index of civil liberties and freedom of the press on the level of corruption.

H16: There is a statistically significant impact of GDP per capita on the level of corruption.

H17: There is a statistically significant impact of the corruption control index on the level of corruption.

Previous Studies

The study of Amanda .S entitled: Corruption and democracy: an empirical investigation using panel data (2011).This study aimed to investigate the possibility of a non-linear link between democracy and corruption. If democracy and reductions in levels of corruption are in fact incompatible in the early stages of political liberalization, the policy must be modified to take that into account. The study used cross-sectional data and panel data to test the robustness of the relationship as corruption as a dependent variable by applying to 156 countries during the period 1995-

2009. The study came out with results that support most of the results of the nonlinear theory between democracy and corruption. The results also indicate that high levels of income and economic freedom are consistent with low levels of corruption, while ethnic linguistic discrimination and levels of unemployment increase corruption. (Amanda, 2011, pp. 2-66)

The study of Davide Grassi and vincenzo memoli(2017) entitled: Democracy, support for democracy and corruption: a longitudinal study of Latin American countries. It aimed at measuring the relationship between democracy and the level of corruption in 14 countries in Latin America during the period 2005-2010 using the data of the panel. These countries have experienced high levels of corruption, according to Transparency International and the World Bank, despite the recent unification of democracies and the reshaping of forms of anti-corruption, based on information on perceptions of democratic performance and corruption obtained from latinobarometro. The results of the study showed that levels of democracy and individual assessment of government justice have a positive impact on corruption. (Davide & Vincenzo, 2017, pp. 26-46)

The study of Michael T. Rock (2007) entitled Democracy and Corruption. The study addressed the problematic relationship between democracy and corruption. In most models, analysts assume a negative relationship. With more democracy, there is a lower level of corruption, however recent theoretical developments support a cross-correlation according to (U) between corruption and democracy. The study was based on panel data covering a large number of countries during the period 1996-2003, which found results that support the inverse relationship (U) between democracy and corruption. (Mechael, 2007, pp. 1-18)

The study of Shrabani Saha and Neil Campbell (2007) entitled Studies of the Effect of Democracy on Corruption. This paper examines the impact of democracy on the level of corruption. Theoretical views reveal a consensus on the inverse relationship between democracy and corruption, in the sense that more democracy reduces corruption. However, this study confirms that simple democracy is not enough to reduce corruption, and emphasizes the role of sound democratic institutions, independent judiciary and independent media alongside effective political participation as crucial to fighting

corruption. (Shrabani & Neil, 2007, pp. 1-20)

The study of Alexander Blums (2017) entitled Democracy and Corruption: a cross-national study. This paper adds to the academic debate whether levels of corruption differ with changing levels of democracy using data from 173 countries. Unlike many academic literature, this study found that control of economic development; Protestant levels, colonial heritage and democratic levels remain a statistically significant index of corruption in both the short and long term. (Alexander, 2017, pp. 1-37)

2. Theoretical literature

2.1 Definition of corruption

La Free and Morris defines corruption as an abuse of public office by encroachment on formal and informal rules, which earns a direct or indirect benefit to a public official and provides the third party with services and resources that are difficult or impossible to obtain. (Amanda, 2011, p. 11) UNDP defines corruption as an abuse of public office, office or power for private benefit through bribery, extortion, nepotism, fraud, quick money-making or embezzlement (John, 2009, p. 8). It is clear from these definitions that the substance of abuse of power is the core of most definitions of corruption. Treisman(2000) claims that most corrupt activities involve a transaction between an official and a special agent where an administrator can interfere with regulations or taxes to give the agent a market advantage. According to Huntington (1968), corruption is the behavior of public officials who deviate from accepted standards for their own purposes, and it includes not only inappropriate behavior by public officials but also by private and independent agents (Amanda, 2011, p. 11)

Corruption is defined as abuse of public office for private gain, or misuse of power-holders for special gain (Ivar & Arne, 2011, p. 3).It is well-known that corruption, defined as a violation of public service rules for personal gain, is known to hinder economic growth, weaken the quality of governance and reduce the level of trust that citizens place in political institutions (Davide & Vincenzo, 2017, p. 26). Judge.J.Noonan and Professor Robert Klitgaard believe that corruption has a dual meaning. The first definition is purely moral in reference to any behavior that is corrupt,

perverted or morally corrupt. The second often means dishonesty and the use of a trust position for personal benefit. (Philip, 1996, p. 324)

2.2 Definition of democracy

Democracy is an elusive concept and there seems to be a general consensus that democracy does not exist. Nowadays, most people agree that the minimum core features of democracy include the protection of human rights, the existence of free elections and a government based on majority rule and the consent of the governed. Although democracy and freedom are sometimes used as synonyms, they are not. Democracy can be viewed as a system that institutionalizes and ultimately protects freedom. The basic elements of liberal democracy according to Sung (2004) are defending the civil liberties, free elections, the distribution of power, independent courts and freedom of expression. Tollock (2002) simply uses a word of democracy to express the government in which officials or higher-ranking people are elected by a large group of people. Bolen (1980) defines political democracy as minimizing the political power of the elite and maximizing non-elite power (Amanda, 2011, p. 12). Dahl (1971) focuses on two dimensions of democracy: general competition and inclusiveness. In order for a country to be classified as fully democratic there are eight (08) institutional factors that must be met: freedom of organization, freedom of vote, the right to vote, the fair estimate of each vote, large access to competition in public office, implementation of officials' orders, availability of information on alternatives in elections, adoption of public policies on citizens' preferences (Amanda, 2011, p. 13).

Vanhanen (2000) defines democracy as a political system in which various groups, ideologically and socially, have the right to compete for political power. Politicians are elected by the people and accountable to the people (Vanhanen, 2001, p. 252). This definition is compatible with the democratic dimension of Dahl, as it focuses on the aspect of competition in elections and involves public participation. The requirement of free, fair and competitive elections appears to be a vital element of all definitions of democracy. Civil liberties and basic human rights, such as freedom of expression, freedom of the press, freedom of religion, etc., seem to be essential prerequisites for what is often called liberal democracy (Amanda,

2011, p. 13). Sodaro(2004) believe that the main idea of democracy is that the citizens have the right to choose who governs them, they elect the responsibles and hold them accountable for their actions. democracy also impose a legal restrictions on government authority through insure some rights and freedoms to their citizens. (Frederic, 2015, p. 78)

The concept of democracy has been widely discussed in political science as an institutional arrangement where citizens express their preferences through elections. This definition has evolved into describing democracy in various forms of government accountability. Vertical accountability refers to government accountability to the people through elections. Horizontal accountability refers to checks and balances within government, while societal accountability refers to the existence of a free press, civil society..etc. (Ivar & Arne, 2011, p. 3)

2.3 The relationship between democracy and corruption

2.3.1The linear approach

According to Treisman (2000), politically more open societies should show less corruption because freedom of association and freedom of the press put pressure on corrupt practices and revealed misuse of public funds. Competent political parties also have incentives to discover and expose abuse of office because of their desire to vote.

The possibility that officials commit violations and punishing them as dishonest should increase with democracy due to press freedom, freedom of expression and protection of civil liberties allow for greater transparency.

If the impact of democratization is a higher degree of political stability, it will affect the time horizon of officials. Increasing the cost of providing or accepting bribes will reduce corruption, as more democratic achievements result in higher wages. This should reduce corruption by reducing incentives for officials to accept bribery. Also, since democracy makes corrupt officials accountable to voters, and voters are presumed to favor less corruption, increasing the public's ability to express their views should lower levels of corruption. Saha (2009) suggested another reason for the need to reduce democracy to the level of corruption is that it brings competition among officials, and non-competition is what promotes corruption. (Amanda, 2011,

p. 16)

Democracy works to reduce corruption by facilitating the discovery of corrupt practices and punishing unscrupulous officials. The opposition also seeks to expose acts of corruption committed by current office holders, and voters will not re-elect politicians seeking private interests rather than public interests. Given that the political official in democracy cannot guarantee his staying in power to take care of the interests of those seeking corruption, the likelihood of bribery will be reduced and corruption will be curbed. In addition, accountability and monitoring provided by democracy create a public area where pressure is placed on elected governments to remove corrupt people, respect law and public interests rather than private interests. Democracy, accountability and follow-up raise the costs of corrupt behavior and are likely to deter bribery, thereby limiting the number of opportunities for corruption (Davide & Vincenzo, 2017, p. 27).

The most basic hypothesis discussed in the literature claims that democratic transformation must lead to low corruption or, in other words, a linear negative impact on corruption. This optimistic expectation is derived from the philosophical and normative ideals of democracy based on principles such as justice, equality, citizenship, openness and accountability, or so-called anti-corruption values (Bianca, 2014, p. 5). It can also be traced back to the theories of democratic representation, which depict representative democracy as a system in which rulers are systematically urged to act in accordance with the interests of citizens (Adam, Susan, & Bernard, 2001, p. 29). Since corruption involves actions aimed at private benefit at the expense of collective benefit, genuine democratic representation theoretically prevents corrupt acts. More specifically, representative democracy must motivate elected officials because voters can eventually threaten to remove them from office if they act in ways that are against the public interest (Adam, Susan, & Bernard, 2001, p. 29). This hypothesis is also linked to the literature of public choice, which explores how the introduction of elections and political competition change the incentive structure for politicians. Given the assumption that politicians care about themselves and are interested in retaining the post, incumbents expect voters to punish them, thus acting in a representative manner to voters' interests and avoiding corruption. Moreover,

electoral competition will give the opposition an incentive to expose their political opponents in case of corruption (Bianca, 2014, p. 5).

In addition, democratic freedoms and transparency should contribute to reducing information asymmetry between voters and office holders, and thus the ability of voters to monitor the government is expected to be enhanced. Finally, monitoring mechanisms and balances associated with democratic systems are expected to restrict the ability of government officials to engage in corruption (Bianca, 2014, p. 6).The second hypothesis about the impact of democracy on corruption claims that the duration of democratic systems is negatively linked to corruption, and this is linked to the argument that long-term democratic transformations mean the unification of democratic standards and the promotion of the principle of rejection of corruption by citizens, which should contribute to strengthening the social control of the Government. In addition, a longer experience with democracy contributes to the creation of more robust accountability mechanisms that restrict corruption. (Bianca, 2014, p. 6)

2.3.2The non-linear approach

Are there clear cases in which political liberalization has increased corruption instead of declining? There are many young democracies in Southeast Asia, Latin America and former members of the Soviet Union. For example, the Philippines, Argentina and Russia have been hit by several corruption scandals. In India, which has been a federal democracy with popularly elected state governments since independence in 1947 and with a relatively free and independent press, corruption is a way of life and there are small and large forms of corruption prevalent in India. Thus, studies that find a continuing negative relationship between democracy and corruption are contrary to the evidence of these countries. (Amanda, 2011, p. 17)

Huntington (1968) views corruption as the result of rapid modernization of backward societies, leading to normative confusion and increasing the potential for influencing public choice. As people play new roles and create a larger and more diverse society, indigenous society and trust pillars are lost and transactions can not be conducted on the basis of trust, but must be done on the basis of contracts and laws that may not yet be

fully developed. At a time when stable institutions are developing, a gap is opening up opportunities for officials to engage in corrupt activities. Democracy is also behind writing new laws and constitutions and contribute to corruption by creating new sources of wealth and power. The extent to which new laws are applied and the degree of acceptance of laws by the general public also affect the level of corruption. In this view, corruption is a transitional phenomenon because of the lack of liberal culture and effective institutions that support bureaucratic practices. One of the confusion sources in the transition from tyranny to democratic rule is the change in core values. When new values get embedded, the traditional rules of providing services to relatives become unacceptable and corrupt. This tends to undermine the legitimacy of all values, and the conflict between traditional and new standards offers opportunities for individuals to act in ways that are not justified. For instance, officials in an authoritarian society may feel obligated to provide rewards and employment to their families, which is unacceptable in democracy.With the emergence of the merit system, these officials may find it necessary to seize as much as possible and as soon as possible. (Amanda, 2011, pp. 17, 18)

Montinola and Jackman (2002) found that moderate levels of democracy did not reduce corruption. Manow (2005) and Rock (2009) found similar conclusions that corruption was higher in democracies than in authoritarian regimes (Davide & Vincenzo, 2017, p. 28). Other studies have suggested that democratic transformation has a non-linear effect on corruption, leading to increased corruption, and only in the long term and at a more advanced stage, democratic transformation helps curb corruption. Two different sets of theoretical explanations related to this idea can be presented: the first indicates that the nonlinear effect is explained by the negative impact of democracy on corruption, that is, the mechanisms through which democracy helps to curb corruption take too long to be activated. One of the arguments behind this proposal is that in the early stages of democratic transition the electoral control mechanism remains weak and can not ensure effective accountability among voters and politicians. It is also said that top-down censorship by authoritarian governments in the economic and political spheres contributes to keeping corruption under control, but once these forms

of censorship are broken after transition to democratic governance, other oversight mechanisms such as accountability structures and audits are not yet fully unified, what increase corruption in the short term. (Bianca, 2014, p. 9)

The second set of interpretations is based on the notion that the various developments associated with democratization may have contradictory effects on corruption. This view also considers that the above-mentioned oversight mechanisms take time to unify them and to affect the expected negative impact on corruption. Electoral competition creates both opportunities and incentives for politicians to be under increasing pressure from business men or engage in electoral corruption through vote buying and illegal party funding to maximize voters' support. (Bianca, 2014, p. 9)

3. Empirical Study

3.1 Study sample and population

The study population is represented in all 193 United Nations countries members. However, the study sample includes only 153 countries with the required data for the econometric study. The rest of the countries do not have all data. Therefore, they were excluded from the study sample during the study period from 2012-2017.

3.2 Econometric methodology used in the analysis

The methodology used in the analysis is the cross section and panel data, in which certain phenomenon data are collected for a group of companies, countries, or ... for a certain period, it takes into account the impact of time change or the effect of changing the difference between the cross section units. In the current decade, these models have gained considerable attention, especially in economic studies. Therefore, we will use this type of model in this study because the study.

3.3 Study model

Through the theoretical and empirical studies presented previously, we will test this effect at 153 countries during the period 2012 to 2017. We suggest the following linear model:

$$CPI_{i,t}=\beta_0+\beta_1 EPP_t+\beta_2 FG_t+\beta_3 PP_{it}+\beta_4 PC_{it}+\beta_5 CL_{it}+\beta_6 LnGDP_{it}+\beta_7 CC_{it}+\varepsilon_{i,t}$$

3.4 Description of study variables

The above model includes a dependent variable and seven independent

variables as shown below:

- Corruption Perception Index (CPI): it is the dependent variable in this study. Its value is zero (0) in the case of the country with high levels of corruption and (100) in the case of the country with low levels of corruption. This indicator is obtained from Transparency International (TI).
- Control of Corruption(CC): this index measures the extent to which public authority can make special gains, including forms of corruption, and reduce the control of elites and private stakeholders on the State's governance instances. (Kaufmann et al, 2010, p. 4)
- GDP Per capita: it expresses the gross domestic product of each individual. The natural logarithm has been introduced to exclude the effect of the large values of this indicator. It is obtained from World Bank data.
- Election Process and Pluralism (EPP): the value of this democratic index ranges from zero (0) for countries with low democracies to ten (10) for countries with high democracies. This index was obtained from the Economic Intelligence Unit (EIU).
- Functioning of government Index (FG): this index is from zero (0) for low-performing governments to ten (10) for well-performing governments. It is obtained from the Economic Intelligence Unit (EIU).
- Political Participation Index (PP): the value of this index is from zero (0) for countries that do not enjoy political participation and ten (10) for countries with large political participation and wide, this index was obtained from the Economic Intelligence Unit (EIU).
- Political Culture index (PC): the value of this index is zero (0) for countries without a political culture and ten (10) for countries with high political culture. It was obtained from the Economic Intelligence Unit(EIU).
- Civil Liberties index (CL): The value of this index is from zero (0) for countries that do not enjoy civil liberties and ten (10) for countries with large civil liberties, obtained from the Economic Intelligence Unit (EIU).

3.5 Estimating the model using the three panel models

Table 1. Parameters of the model using the three panel models

Period: 2012-2017 N=153 T= 6 total panel views= 918			
Explanatory variables	**Pooled regression model(PRM)**	**Fixed Effects Model(FEM)**	**Random Effects Model (REM)**
Constante	40.86967	-1.620320	35.70953
EPP	0.203630	0.165482	0.177632
FG	-0.396967	-0.264401	-0.286815
PP	-0.151562	-0.120285	-0.080878
PC	0.128490	-0.057542	0.213993
CL	0.123988	0.523296	0.145052
Ln GDP Per capita	0.424710	4.718854	0.824260
CC	18.73822	11.87120	17.75563
R- squared	0.9794	0.9916	0.9294
Adjusted R-squared	0.9793	0.9899	0.9289
F- statistic	6205.78	567.36	1712.95
Prob (F- statistic)	0.0000	0.0000	0.0000

Source: Eviews 9 output

3.6 Selection among the three models

3.6.1 Differentiation between the PRM and FEM models by testing homogeneity by using the Fisher test restricted to the pooled regression model and the fixed effects model as follows: (William, 2002, p. 289)

$$F(N-1, NT-N-k) = \frac{(R^2_{LSDV} - R^2_{Pooled})/(N-1)}{(1-R^2_{LSDV}/(NT-N-k)}$$

If we accept the null hypothesis, the pooled regression model is appropriate and if we reject it the fixed effects model is appropriate.

$H_0 : \beta_{0(i)} = \beta_0, \forall i \in [1, N]$

$$F_{cal}(152,758) = \frac{(0.9916-0.9794)/(152)}{(1-0.9916)/(758)} = \frac{0.00008016}{0.00001099} = 7.292$$

$F_{tab}(0.05 ; 152 ; 758)=1.516$

We note that the Fcal is larger than the Ftab, and therefore we reject the null hypothesis and accept the existence of the fixed effects model, as proved by the value of probability (p-value), which is equal to 0.0000.

Table 2. Restricted Test of Fisher

F test that all u_ i=0:	F(152, 758)=7.29	Prob > F=0.0000

Source: Stata13 Output (Appendice 01)

3.6.2 Choose between the Fixed Effect model (FEM) and the random effects model (REM) using the Hausman test, as follows:

$$H = (\hat{\beta}_{FEM} - \hat{\beta}_{REM})'\left[\text{var}(\hat{\beta}_{FEM}) - \text{var}(\hat{\beta}_{REM})\right]^{-1}(\hat{\beta}_{FEM} - \hat{\beta}_{REM})$$

Where its hypotheses are as follows: (William, 2002, p. 301)

H_0: The random effects model is the appropriate (based on the GLS method)

H_1: The fixed effects model is the appropriate (the OLS method is used)

Table 3. Hausman test

Test: H_0: difference in coefficients not systematic	
Chi2(7)=	97.66
prob>chi2=	0.0000

Source: stata 13 output (Appendice 02)

the Hausman test show that the value of the statistic with a chi2 and a freedom degree of 7 and a significant level of 0.05 is equal to 97.66, which exceeds the tabular value (Chi2. df) at the same degree of freedom and the same significant level which is valued at 14,067, this is proven by (P-value) which is equal to 0.0000, thus rejecting the null hypothesis, indicating that the appropriate model for the panel data is the fixed effects model(FEM).

3.7Estimating the parameters of the model using the fixed effects model

After the Hausman test results, we estimate the model using the fixed effects model using the OLS method, and the following table shows:

Table 4. Results of estimation of parameters of the fixed effects model

R-sq=0.9282	N^0 of obs=918		N^0 of groups= 153		prob> F=0.0000	
CPI	**Coef**	**Std. Err**	**t**	**p>|t |**	**95%conf**	**Intervall**
EPP	.1654816	.153316	1.08	0.281	-.1354928	0.466456
FG	-.2644014	.2058178	-1.28	0.199	-.668442	.1396392
PP	-.1202849	.1773912	-0.68	0.498	-.4685213	.2279515
PC	-.0575416	.1956957	-0.29	0.769	-.4417116	.3266284
CL	.5232956	.2364007	2.21	0.027	.0592177	.9873735
Ln GDP	4.718854	.9672944	4.88	0.000	2.81996	6.617748

CC	11.8712	.714478	16.62	0.000	10.46861	13.27379
Cons	-1.62032	9.170535	-0.18	0.860	-19.62298	16.38234

Source: stata13 output (Appendice 03)

The results of Table (4) show that the relationship between the dependent variable and the independent variables is strong by means of the R^2 parameter, which is equal to 0.9282, meaning that the independent variables account for 92.82% of the changes in the CPI and the rest is due to other factors. We also note that the overall significant of the model is accepted by the value of the probability of Fisher F statistic, which is equal to (0.0000). The estimated model for each country can be determined by using 152 Dummy Variables in estimating the model to avoid multicollinearity. However, we did not put in the imaginary variables because the present study aims to study the effect rather than determining the optimum ratio. Consequently, the results indicate a statistically significance relationship at a significant level 5% among the variables are civil liberties(CL), GDP per capita, control of corruption (CC) and dependent variable, while variables: electoral process and pluralism (EPP), functioning government (FG), political participation (PP)and political culture(PC) Has no statistical significance at the level of significance 5%.

After verifying the validity of the model statistically, we will test it in terms of econometric.

- Test for the existence of autocorrelation errors

Because the autocorrelation in the linear panel data models leads to standard errors and causes the results to be less efficient, and to test whether or not this correlation is used the Wooldridge test because it can be applied under general conditions and is easy to implement (David, 2003, p. 168). The test depends on residual estimated regression, where the null hypothesis and the alternative hypothesis is as follows:

H_0: Lack of autocorrelation H_1: Existence of autocorrelation

Table 5. Wooldridge test

H_0: no first-order autocorrelation	
F(1, 152)=	56.260
prob>F=	0.0000

Source: stata13 output (Appendice 04)

Since Prob>F=0.0000, the null hypothesis is rejected and then accepted the alternative hypothesis which provides existence autocorrelation.

- Heteroskedasticity test

Heteroskedasticity is a systematic pattern of errors where the variation in errors is not constant. The Modified Wald test was used to ensure that the variance of the error limits was constant or not. This was done by examining the instability of variance in errors for each group in the fixed effects model. The null hypothesis is as follows:

H_0: The variation in errors is constant between the units of the section, where: $\sigma i\ 2 = \sigma 2$ for i = 1 ... Ng and Ng: the units of the section (countries).

Table 6. Modified Wald test

H_0: sigma(i)^2 for all i	
Chi 2(153)=	12058.11
prob>chi 2=	0.0000

source: stata 13 output (Appendice 05)

Since Prob> chi2 = 0.0000, the null hypothesis is rejected and the alternative hypothesis is accepted that there is no consistency of variance. The problem of variance instability and autocorrelation of errors is handled by using the panels corrected standard errors ($PCSE_s$) proposed by Beck and Katz in 1995. (Nathaniel & Jonathan, 1995, p. 638)

Where the parameters of the model are estimated in the ordinary lower squares (OLS) or in the Prais-Winsten method. This method is used when calculating standard errors and estimating the variance and heterogeneity with the basic assumption that the random error limits are characterized by variance instability and linked simultaneously, where the linear regression model is based on many hypotheses, including the hypothesis of homogeneity of variance and the absence of autocorrelation of errors. Thus, the use of the OLS method in the presence of such problems makes its capabilities lose some of its desired characteristics and the Statistical inference will become unacceptable.

Table 7. Results of the corrected panel model

R-squared=0.9711	Number of obs=918	Number of groups=153
Wald chi2(7)= 85012.15	prob> chi2= 0.0000	rho= .4290072
Panel- corrected		

CPI	Coef	Std. Err	z	p>|z|	95%conf	Intervall
EPP	.1462249	.0975859	1.50	0.134	-.04504	.3374899
FG	-.3069418	.1059013	-2.90	0.004	-.5145046	-.099379
PP	-.1316669	.0669566	-1.97	0.049	-.2628995	-.0004344
PC	.1949361	.114282	1.71	0.088	-.0290525	.4189246
CL	.1573186	.1153602	1.36	0.173	-0.0687832	.3834204
LnGDP	.4917175	.2538905	1.94	0.053	-.0058987	.9893338
CC	18.33079	.4505937	40.68	0.000	17.44764	19.21394
Cons	39.46562	2.562849	15.40	0.000	34.44253	44.48871

Source: stata 13 output (Appendice 06)

3.8 The results and testing hypotheses

The table (07) above shows the following:

- The relationship between the dependent variable and the independent variables is strong, through the coefficient of determination (R^2), which is 0.9711, meaning that independent variables explain 97.11% of changes in the CPI and the rest due to other factors. We also note that the overall significance of the model is accepted by the p-value of chi2 (0.0000), and the value of RHO indicates that 42.9% of the unobservable changes through the laboratories of each State, and the rest is due to vague errors;
- The variables of functioning government (FG) and political participation (PP) have a statistical significance at level 5%, and the estimated value of the parameter is negative, which means that it has a negative impact on the CPI and positive impact on the corruption. This corresponds to the non-linear approach and the reverse linear approach. So we accept the alternative hypothesis (H_{12}, H_{13}) and reject the null hypothesis (H_{02}, H_{03});
- GDP per capita and control of corruption (CC) have a statistical significance at the level of 5%, and the estimated value of the parameter is positive, which means that they have a positive impact on the(CPI), i.e, reduce corruption by increasing these two indexes. So we accept the alternative hypothesis (H_{16}, H_{17}) and reject null hypothesis (H_{06}, H_{07});
- For the variables: electoral process and pluralism (EPP), civil liberties (CL), political culture (PC) have no statistical significance at the level of significance 5%, which means that they have no relation with statistical significance of the corruption perceptions index. So we accept the null

hypothesis (H_{01}, H05, H04) and reject the alternative hypothesis (H_{11}, H15, H14).

4. CONCLUSION

Corruption is an economic phenomenon that has negative effects on the economic and financial structure of countries. Its causes are many and various varying among countries. Some economic studies have given great importance to the issue of corruption and its causes. Many studies have focused in recent years on the impact of the levels of democracy in countries on the size of corruption. Some of these results have the opposite effect of democracy on corruption through the linear approach, while others have confirmed that high levels of democracy lead to increased corruption in the short term through the non-linear approach. Our study was conducted to examine this relation. Accordingly, we can present following results:

-there is positive impact of GDP per capita and control of corruption on CPI

- the high democracy indexes not lead to reduce the level of corruption, but the index of functioning government(FG) and political participation(PP) have a negative impact on CPI (positive impact on corruption size).

5. Bibliography List:

Adam, P., Susan, s., & Bernard, M. (2001). Democracy, Accountability, and Representation. *Cambridge university press, UK* , pp29-48.

Alexander, B. (2017). Electoral Democracy and Corruption(working paper). Department of political science, university of gothenburg, sweden, pp1-37.

Amanda, S. (2011). Corruption and Democracy: An empirical investigation using panel data(master thesis). Depertment of economy, Lunds universitet, carolin, pp 2-66.

Bianca, V. M. (2014). Democratization and corruption: the state of the art. *project is co-funded by the 7th framework programme for research and technological development of (EU)* , pp1-30. Germany.

David, M. (2003). Testing for serial correlation in linear panel-data models. *the stata journal* (3).

Davide, G., & Vincenzo, M. (2017). Democracy, Support for Democracy and Corruption: a Longitudinal Study of Latin American Countries. *journal of sociopolitical studies, Italy , 10* (1), pp 26-46.

Frederic, B. (2015). Democracy and Corruption. *dimension empresaria , 13* (2), pp75-85.

Ivar, K., & Arne, W. (2011). Does democracy reduce corruption?, working paper. *Democracy and corruption.* Royal Nerwegian embassy in Bangladesh, pp1-25.

John, s. Q. (2009). combating corruption in the asia-pacific countries: what do we know and what needs to be done? *international public management review , 10* (1), pp5-33.

Kaufmann et al, D. (2010). *The world wide governance indicators: methodology and analytical issues*. Consulté le April 20, 2019, sur https://elibrary.worldbank.org/doi/abs/.

Mechael, T. (2007). Corruption and Democracy. *journal of development studies, USA* (55), pp1-18.

Nathaniel, B., & Jonathan, K. (1995). What to Do(and Not Do)with Time Series Criss-Section Data. *American political science review , 89* (3).

Philip, B. (1996). Democracy and Corruption. *fordham international law journal, Harvard university , 20* (2), pp323-346.

Shrabani, S., & Neil, C. (2007). Studies of the Effect of Democracy on Corruption. *the 36 th Australian conference of economists: economics of corruption session*, (pp. 1-20). Tasmania, Australia.

Vanhanen, T. (2001). a new dataset for measuring democracy. *journal of peace research, UK , 37* (2), pp251-265.

William, H. (2002). *Econometric Analysis.* New jersey: pearson education.

6. Appendices

Appendice1. Restricted Test of Fisher

```
F test that all u_i=0:     F(152, 758) =     7.29            Prob > F = 0.0000
```

Appendice2. Hausman test

```
    Test:  Ho:  difference in coefficients not systematic

                  chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =        97.66
                Prob>chi2 =       0.0000
```

Appendice3. Results of estimation of parameters of the fixed effects model

```
Fixed-effects (within) regression               Number of obs      =       918
Group variable: countrynum                      Number of groups   =       153

R-sq:  within  = 0.3085                         Obs per group: min =         6
       between = 0.9357                                        avg =       6.0
       overall = 0.9282                                        max =         6

                                                F(7,758)           =     48.30
corr(u_i, Xb)  = 0.3029                         Prob > F           =    0.0000
```

CPI	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
EPP	.1654816	.153316	1.08	0.281	-.1354928	.466456
FG	-.2644014	.2058178	-1.28	0.199	-.668442	.1396392
PP	-.1202849	.1773912	-0.68	0.498	-.4685213	.2279515
PC	-.0575416	.1956957	-0.29	0.769	-.4417116	.3266284
CL	.5232956	.2364007	2.21	0.027	.0592177	.9873735
LnGDP	4.718854	.9672944	4.88	0.000	2.81996	6.617748
CC	11.8712	.714478	16.62	0.000	10.46861	13.27379
_cons	-1.62032	9.170535	-0.18	0.860	-19.62298	16.38234
sigma_u	5.1275176					
sigma_e	1.9414069					
rho	.87461748	(fraction of variance due to u_i)				

Appendice4. Wooldridge test

```
Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
   F(  1,     152) =     56.260
         Prob > F =      0.0000
```

Appendice5. Modified Wald test

```
Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

chi2 (153)  =  12058.11
Prob>chi2 =      0.0000
```

Appendice 6. results of the corrected panel model

```
Prais-Winsten regression, correlated panels corrected standard errors (PCSEs)

Group variable:    countrynum                   Number of obs      =       918
Time variable:     B                            Number of groups   =       153
Panels:            correlated (balanced)        Obs per group: min =         6
Autocorrelation:   common AR(1)                                avg =         6
                                                               max =         6
Estimated covariances      =      11781         R-squared          =    0.9711
Estimated autocorrelations =          1         Wald chi2(7)       =  85012.15
Estimated coefficients     =          8         Prob > chi2        =    0.0000
```

CPI	Panel-corrected Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
EPP	.1462249	.0975859	1.50	0.134	-.04504	.3374899
FG	-.3069418	.1059013	-2.90	0.004	-.5145046	-.099379
PP	-.1316669	.0669566	-1.97	0.049	-.2628995	-.0004344
PC	.1949361	.114282	1.71	0.088	-.0290525	.4189246
CL	.1573186	.1153602	1.36	0.173	-.0687832	.3834204
LnGDP	.4917175	.2538905	1.94	0.053	-.0058987	.9893338
CC	18.33079	.4505937	40.68	0.000	17.44764	19.21394
_cons	39.46562	2.562849	15.40	0.000	34.44253	44.48871
rho	.4290072					