Nexus of Corruption Control and Economic Development in African Least Corrupt Countries

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Abstract: The main objective of this paper is to examine the impact of corruption control on the performance of economies of ten least corrupt African countries spanning the period 1996-2014 and make policy recommendations on how to improve it. In detail, the paper makes an effort to: evaluate the extent to which the control of corruption impact on economic performance of the sampled African nations indexed as least corrupt. The study makes use of data obtain from World Development and World governance Indicators (WDI & WGI) and adopts panel granger causality framework, Engle Granger based panel cointegration, and FMOLS (fully modified ordinary least squares) estimation (weighted Estimation). The findings show that the variables are cointegrated in the long run with regards to economic growth and its determinants, as well as the result of Vector Error Correction Mechanism (VECM) confirms that the variables are dynamically interacted among the 10 selected African countries. The result of FMOLS does not support the hypothesis that corruption control and political stability have positive influence on the growth of the economy. However, government effectiveness and gross domestic savings have positive impacts on economic growth. The study recommends more policy that can strengthen the anti-corruption agency by improving the quality of infrastructure in those countries as well as enhancing social responsibility and collective consciousness.

Keywords: Corruption control, Economic development, Least corrupt, African countries, Fully modified ordinary least squares, Panel Granger causality, Vector error correction mechanism.

1. Introduction

Corruption is regarded as an obstacle to economic development of a country. Moreover, corruption has been into existence and spread in human daily lives. It is a risk that is impossible to be resisted at all. Many people and public servants have been involved, which as a result deprived the right of some innocent people or government as a whole. Countries of the world especially the developing countries of the African continent have been affected by corruption to the extent that they find it difficult to implement their economic developmental programmes because corruption has become a principal international serious concern. The growth of economies of international community is in turn affected by this trend at large. A whooping sum of more than one trillion US dollar is spent annually in bribery and corruption involvement globally. This makes some people in the international community to be enriched and became millionaire for corrupt practice and robbing generations of their future (Aidt, 2009).

Corruption is an illegal activity which brings about worldwide poverty, impedes progress and made investments to be retarded. However, it is pertinent to note that economic term alone cannot merely measure corruption. The existence of corruption at any point in time affects the society at large to the extent that it becomes increasingly difficult to control it. Corruption weakens the rule of law and silence

the voice of people through undermining both the legal and political structures that should be applied for the society's good. Africa as a continent has long been seen as not only the most corrupt continent, but also characterized by political instability. In regards to this menace, several African nations have made corruption control a priority in government. If we take as an example, Botswana, the first least corrupt country in Africa as a result of its increase in government budgetary allocation and public service expansion has established the anti-corruption agency which was granted singular authorities to probe, capture, search and seize corrupt transactions of those involved.

According to African Economic Outlook (2015), Namibia as the second least corrupt country in Africa has enjoyed from judicious and sound economic policies. In 2013 'ease of doing business', these countries were ranked as the top nations for doing business within Africa and are constantly categorized among the top countries in terms of good governance index. Among other indicators that has contributed to lower the level of corruption in these countries are independent anti-corruption agencies and impartial judiciary including South Africa which the country is striving firm to fight fraud. For example, in 2012, the South African Treasury issued new rules to fight corruption, demanding departments to give yearly tender programs reduce disparities to orders as well as divulge all instructions.

According to Mousavi and Pourkiani (2013) the establishment of control of corruption agency, administrative reforms policies, robust anti-corruption law, have enabled those countries to be placed and ranked among the 10 least countries with corruption in the continent of Africa. Generally, corruption control is seen to have a direct impact on development of an economy. Most hitherto studies done on the effect of corruption and economic growth concluded that the relationship between corruption and economic growth is negative which is theoretically true because the effects of corruption can be visibly seen in the masses' daily livelihood.

In addition, a nation's socio-political and economic development effects of corruption are visible. It is worthy of note that public expenditure can be reduced through the adverse effects of corruption on economic development, as it, among other things. Furthermore, corruption breeds poverty and income inequalities in a nation. Development ventures are frequently made needlessly complex to defend the level of corrupt and enormous expenditures on it. As a result, the quality of goods and services accessible to the public is eventually reduced due to corruption. More so government spending choices, economic growth and investment are usually affected by corruption; it also decreases private investment. Corruption setbacks ethnic balance, and aggravate complications.

The control of corruption plays a vital role in the economic development of country both in social and economic performance perspective. Most Sub-Sahara African countries tried their best to control corruption in order to increase their attractiveness from developed countries in terms of investment to support their development. Normally the control of corruption makes the country to have sufficient resources to invest which in turn increases economic performance.

This study therefore examines econometrically the positive effects of corruption control in ten countries indexed as the African least corrupt nations. To the government and other policy makers, this study helps at understanding of the alternative options for meeting corruption control target in order to strengthen the anti-corruption agencies for an efficient result. The main objective of this study is to investigate the extent to which corruption control impacts on economic growth of ten top least corrupt countries in Africa, can impact positively and significantly on economic growth. The rationale behind this study is to contribute to the existing body of knowledge due to the fact that previous studies were mostly conducted on corruption and economic growth. This study therefore contributes to the extant body of knowledge in the following way: This study contributes to the existing body of knowledge by looking at control of corruption and not the usual corruption and economic growth to ascertain the extent to which control of corruption can impact economic development of African countries. In addition, the study considers African countries that are indexed as least corrupt.

The study is expected to contribute different alternative to help the countries which are struggling for economic development due to corruption tendencies to improve their policies towards controlling

corruption. This in turn will assist in the implementation of its both economic and social development as a whole for the betterment of African citizens. The findings of this study will be relevant to draw up some highlights for setting up new strategies for those African countries to lessen the prevailing policies. It will also address the importance of control of corruption. A systematic investigation is carried out to come up with possible options and recommendations for 10 least countries to improve their policies to become better and better. Moreover, the recommendations and policies that emanates from this study can be applied in the rest of African countries.

This paper is divided into five sections. Following the introduction in section I is the review of literature which occupies section II. Methodology, data source and sample frame and empirical model occupy section III. Section IV discusses the results, while section V concludes the study with some policy implications.

2. Review of Literature

Previous studies have not dwelt on the impact of corruption control on economic growth rather emphasis of previous studies was on the impact of corruption on economic growth. Therefore this section dwells on reviewing related studies on corruption and economic growth and development.

Leff (1964) investigated economic development through bureaucratic corruption found that corruption itself inhibits developmental process and it arises when the attention on corruption distracts emphasis from other politics and economics in the society. A research conducted by Mobolaji and Omoteso (2009) examined the impact of corruption on the economic growth in some selected emerging economies covering the time frame, 1990-2004 and employing a panel dataset discovered a negative impact of corruption on such economies. By applying a technique of GMM (Generalized Methods of Moments) on a sample data of 146 economies from 1984-2009, Girijasankar (2016) studied the nexus of corruption and economic growth. The finding indicates that a cubic connection between corruption and economic growth exists. This is an indication that corruption mainly hinders the growth process of countries that are most corrupt. d'Agostino, Dunne, and Pieroni (2016) scrutinized the relationship between corruption and economic growth in Africa using an extended endogenous growth model. The result show that corruption and military spending have inverse effects on economic growth. In addition, the findings show that there is an interaction of corruption and military burden via indirect and corresponding effects, to advance the negative effects of corruption.

In another development, Dzhumashev (2014) investigated the level at which governance quality, the magnitude of public expenditure and economic development and how these components affect the link between administrative corruption and economic growth. The findings indicate that only when the actual government dimension is more than the optimum level that corruption can increase economic efficiency. The result further indicates that with economic development in place, corruption also declines. Kunieda, Okada, and Shibata (2014) examined both hypothetically and experimentally the impact of corruption in government on economic growth of 109 countries. By applying dataset spanning from 1985-2009 discover that corruption in government as well as financial openness significantly and inversely affect the growth process of these economies. This implies that financial openness multiplies the inverse effects of government corruption on economic performance of such countries.

By employing panel dataset for over 100 economies spanning the period 1982-1997, Drury, Krieckhaus, and Lusztig (2006) carried out an investigation on the nexus between corruption, democracy, and economic performance. They find that with democracies in place, corruption has no significant effect on economic performance. However, in the absence of democracies, a significant economic damage is suffered from corruption. Breslin and Samanta (2008) examined hypothetically and practically the prevalence of corruption under the framework of FDI (Foreign Direct Investment) in emerging economies; particularly numerous African economies covering the period 1995-2004. The finding shows that corruption is a very severe concern that affects the inflow of foreign direct investment as well as negatively affects developing nations' economic performance.

Efobi (2015) studied the linkage between politicians' attributes and corruption control in sub-Saharan-Africa over the period 1996-2010. By applying the technique of fixed effects model, the results show that politicians' characteristics significantly help in providing explanation on the degree of corruption control in sub-Saharan-African economies. Aidt, Dutta, and Sena (2008) examined tentatively and empirically the linkage between corruption, regimes and economic performance in two governance regimes which is defined by the worth of political organizations. The findings indicate that in the regime of quality political institutions, corruption affects economic performance negatively whereas in the regime of low quality of political organizations, corruption has no significant effect on economic performance.

Halkos and Tzeremes (2010) examined the influence of corruption on economy efficiency in 79 economies using panel dataset spanning the period 2000-2006 discover that corruption has inverse relationship on nations' economic performance. Seyf (2001) in a related development determined the connection between corruption and economic development find that corruption may enhance economic growth. Ulman (2013) in a similar development discussed the impact of corruption on national competiveness found that corruption influence significantly a country's economic performance.

3. Data and Methodology
This section presents the source of data and the method of analysis of the study.

3.1. Data
The paper uses secondary panel dataset spanning from 1996-2014 among the 10 top African countries indexed as least corrupt. Five variables are employed in our model. The choice of these variables relies on the data availability and accessibility which includes the following: control of corruption, government effectiveness, political stability, gross domestic savings/investment as the independent variables and growth rate of the economies as the dependent variable.

The source of the dataset is obtained from Worldwide Governance Indicators (WGI) available at: www.govindicators.org and from Development Indicators (WDI) database with the source from World Bank National Accounts data, and OECD National Accounts data files. The paper uses panel fully modified ordinary least squares (FMOLS) and Granger causality test to investigate the impact of control of corruption on economic growth in 10 top least corrupt African countries (Botswana, Namibia, Ghana, South Africa, Tunisia, Mali, Senegal, Morocco, Swaziland, and Rwanda).

Preliminary panel unit root test is conducted to check the stationarity nature of the variables under investigation. The precondition is that all the variables are integrated of order one, before proceeding to panel co-integration test developed by Pedroni (2004) to examine the long-run relationship between our variables. Having verified that our variables are co-integrated, we applied panel VECM to ascertain the direction of both long and short-run causality between economic growth as the dependent variable and the rest of the independent variables.

3.2. Empirical Model
Following the theoretical underpinning, our empirical model is specified as follows:
$$GR_{it} = f(CC_{it}, GE_{it}, PS_{it}, GS_{it})\varepsilon_{it} \dots\dots\dots\dots\dots\dots(1)$$
Equation (1) is re-specified to include the parameters as follows:
$$GR_{it} = \beta_0 + \beta_1 CC_{it} + \beta_2 GE_{it} + \beta_3 PS_{it} + \beta_4 GS_{it} + \varepsilon_{it} \dots\dots\dots\dots\dots(2)$$
Where:
GR = Gross Domestic Product is measured by the percentage of real GDP annual growth.
CC = Corruption control has a range measurement index from -2.5 to 2.5.
GE = Government effectiveness.
PS = political Stability estimate rating from -2.5 to 2.5.
GS = Gross domestic savings/investments.

ε = Error term.

β = slope coefficient.

Economic growth and human development index can be looked upon by economists to see whether the country is growing or not as well as to examine whether the welfare of citizens is improving or not. Lot of factors can impact the economic growth but our study used 4 variables such as: control of corruption, government effectiveness and gross domestic investment.

Control of corruption is very important for economic growth. As we know corruption is one of the major obstacles to development, its effects on development are catastrophic. Corruption leads to high investment cost and low profits of government and foreign investors. In another term, corruption discourages investments which in turn affect negatively economic growth. The control of corruption which leads to the better management of public budget with consequences such as: good services to the population, lessening of inequalities, encouragement of investors and developing partners is very crucial for sustainable economic growth. Due to the fact that those countries have a good internationally reputation about control of corruption, we expect a positive and significant relationship between economic growth and control of corruption.

The effectiveness of Government and control of corruption are key for economic performance. Two decades ago developing partners, official donors do not hesitate to offer help to governments of these countries regardless of the bad governance (case of Mobutu in Zaire, current Democratic of Congo), however the whole thing has altered. Importance now is to an effective governance and low level of corruption which serves as factor for supporting effectiveness, increase in foreign direct investment inflows which in turn boost economic growth of a country. In this case, we expect a positive and significant connection between government effectiveness and growth of the economy.

For economic growth to expand in a country there must political stability in such a country because it serves as very key element for economic growth. It also serves as the base for the development of an economy. Worthy of note is that, political instability breeds economic sluggishness or deterioration and political unconcern. For steady and constant economic growth, it is very significant to have a good political environment which will have a greater influence on investment attractiveness resulting into job creation, increase of state revenues, foreign investments inflows which in turn boost the economic development. As a result, we expect a positive and significant relationship between political stability and economic growth for the fact most of these countries are politically stable.

Gross domestic savings/investment can play a vital role on economic growth. It is an important component of gross domestic product. Domestic investments from gross domestic savings can cause a high investment return in the domestic economic which impact can be observed through economic growth. Therefore, a positive relationship is expected between gross domestic savings/investment and economic growth.

3.3. Estimation Procedure

In order to avoid spurious results, we perform panel unit root test, Vector Error Correction Model (VECM) panel Granger causality as well the panel co-integration. For this analysis, we choose Panel unit root test of Im, Pesaran and Shin (IPS) based on Augmented Dickey Fuller (ADF) procedures. The regression for each cross-section with individual effects and no time trend can be specified as follows:

$$\Delta y_{it} = \alpha_i + \rho_i y_{it-1} + \sum_{i=1}^{p_i} \beta_{ij} \Delta y_{it-j} + \varepsilon_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(3)$$

where i = 1, . . ., N and t = 1, . . ., T

After the separate ADF regressions estimation, the average of t-statistics for $\mathbf{p}_1$ from the individual ADF regressions, $t_{iT_i}(p_i)$ is follows:

$$\bar{t}_{NT} = \frac{1}{N}\sum_{i=1}^{N} t_{iT}(p_i\beta_i) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(4)$$

Where $\bar{t}$ converges to the standard normal distribution as N and T $\rightarrow \infty$ (Im, Pesaran and Shin, 1997)

3.4. Panel Cointegration Tests

To examine an existence of a long-run cointegration among the economic growth and the independent variables especially control of corruption, using panel cointegration tests suggested by Pedroni (1999); Pedroni (2004) we make use of seven panel co-integration tests by Pedroni (1999). This is because of it appropriateness to estimate residuals from a cointegration after normalizing the panel with errors corrections terms. The model specified by Pedroni includes the residual estimated form as follows:

$$y_{it} = \alpha_i + \delta_{it} + \beta_{it}x_{1it} + \beta_{2i}x_{2it} + ... + \beta_{Mi}x_{Mit} + \varepsilon_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(5)$$

or t = 1, T; i = 1…., N; m = 1, …., M,
where:
T= number of observations.
N= number of cross-sectional units in the panel.
M= number of regressors.
α_i = intercept.
$\delta_i t$ = slope of coefficient.

3.5. Granger Causality Test Based on Panel VECM

Having confirmed that our variables are cointegrated, we perform panel VECM to check the Granger causality test for both long and short run. The method employed is based on (Engle & Granger, 1987). The estimated long-run relationship model is specified as in Equation 5 to obtain the estimated residuals in model (6) and Granger causality model used by Narayan and Smyth (2007) with a dynamic error correction term in model (7).

$$y_{it} = \alpha_i + \delta + \beta_1 x_{1it} + \beta_2 x_{2it} + ... + \beta_M x_{Mit} + \varepsilon_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(6)$$

Where α_i and δ_t are fixed cross-section within and between dimension

$$\Delta y_{it} = \theta_j + \sum_{k=1}^{k}\theta_{1k}\Delta y_{it-k} + \sum_{k=1}^{k}\theta_{2k}\Delta x_{1t-k} + \sum_{k=1}^{k}\theta_{nk}\Delta x_{it-k} + \lambda ECT_{it} + \mu_{it} \dots\dots\dots\dots\dots\dots(7)$$

Where:

Δ denotes the first difference operator of the variable;
K = lag length;
$ECT_{i,t-1}$ = error correction term
$\mu_{i,t}$ = residual of the model

The presence of long run causality can be established if λ, the coefficient of error correction term $ECT_{i,t-1} \neq 0$

3.6. Fully Modified Ordinary Least Squares (FMOLS) Estimation

To estimate the long run coefficients of the variables and provided that a long run relationship exists, the study applies FMOLS estimation method for panel dataset in the presence of heterogeneity (Pedroni, 2001).

The technique of FMOLS regression was initially propounded by Phillips and Hansen (1990) to offer optimum parameters of cointegrating regressions. Cointegrating nexus between non-stationary series lead to endogeneity in the explanatory variables that cannot be avoided by using vector auto-regression as if they were simply in reduced forms.

Table-1.
Panel unit root test of Im, Pesaran and Shin (IPS).

Variable	GR	ΔGR	GE	ΔGE	GS	ΔGS	PS	ΔPS	CC	ΔCC
IPS	-3.2264	-7.1230*	-0.4351	-4.4738*	0.4860	-4.1711*	-0.1047	-5.1631*	-0.8248	-3.1123*

Notes: Critical value at the 1% significance level denoted by *: Im, Pesaran, and Shin (2003) = -2.61. The panel unit root test includes intercept and trend. Test assumes asymptotic normality.

4. Results and Discussions

Table 1 presents the results of the IPS panel unit root test at level and first difference. At level, we assumed that the variables are I (0) in the constant of the panel unit root regression. At the first difference the variables which are not stationary at levels become stationary. The results of the panel unit root tests confirm that the variables are non-stationary at level and show also that the null hypothesis of a panel unit root in the level of the series cannot be rejected at various lag lengths.

Table 2.
Pedroni (Engle Granger based) panel co-integration.

Within dimension		Between dimension	
Test statistic		**Test statistic**	
Panel v-statistic	-1.4795 (0.9305)	Group rho-statistic	1.2610 (0.8964)
Panel rho-statistic	-0.5706 (0.2841)	PP-statistic	-18.5466 (0.0000)*
Panel PP-statistic	-16.0257 (0.0000)*	ADF-statistic	-2.2625 (0.0118)*
Panel ADF-statistic	-2.7821 (0.0027)*		

Note: Out of the seven tests, four reject the null hypothesis of no co integration. Significance level is indicated by * while probability values are reported in parenthesis.

Table 3.
VECM Granger causality test.

Variable	ΔGR_{t-i}	ΔGE_{t-i}	ΔGS_{t-i}	ΔPS_{t-i}	ΔCC_{t-i}	$ECT_{(-1)}$
ΔGR_t	-	1.7272*** [0.0882]	2.8678* [0.0053]	1.9216*** [0.0584]	1.7555 [0.2261]	-1.1062* [-3.9963]
ΔGE_t	0.6563 [0.5136]	-	1.1844 [0.2399]	0.6442 [0.5213]	0.7519 [0.4544]	-0.3284* [-2.6992]
ΔGS_t	-2.2544** [0.0405]	2.0840** [0.0405]	-	-1.7983*** [0.0761]	1.9096*** [0.0600]	-0.5293* [-5.0687]
ΔPS_t	0.5701 [0.5703]	1.0688 [0.2885]	0.1443 [0.8856]	-	0.3812 [0.7041]	-0.3779** [-2.4276]
ΔCC_t	0.1354 [0.1354]	1.4364 [0.1536]	0.2128 [0.8319]	0.4944 [0.6219]	-	-0.2968** [-2.7039]

Note: *, **, *** indicate significance at 1%, 5%, 10% level respectively.

To investigate whether the variables are co-integrated using Pedroni (1999); Pedroni (2001); Pedroni (2004) the results of co integration analysis are presented in Table 2. Using the Within and between dimension, we found that 4 out of 7 statistics reject the null hypothesis of no co-integration at the 1 percent level of significance for the ADF-statistic and panel PP–Statistic, while the panel ADF-statistic is significant at 5% level. It is shown that the variables do hold co-integration in the long run in the 10 least-corrupt African countries with respect to economic performance as the dependent variable. We conclude that there is a long run relationship among our variables.

The short run analysis indicates the existence of a feedback causality effect between gross domestic savings (GS) and growth of the economy (GR) validating the feedback hypothesis. A unidirectional causality runs from government effectiveness (GE), political stability (PS) and corruption control (CC) to economic growth (GR) indicating the presence of growth hypothesis. A unidirectional causality is also detected and runs from government effectiveness (GE), political stability (PS) and control of

corruption (CC) to gross domestic savings (GS) implying that when a country is politically stable, effectively governed and has least corruption indices is capable of saving from its income which can invariably lead to economic growth. The overall summary is that the variables are vigorously interrelated among the 10 African countries indexed as least corrupt.

When long run cause-effect is considered, the findings suggest that in all the VECM, the signs of ECT_{t-1} coefficients are negative and statistically significant, which further stress the existence of long run cause-effect connection among the underlying variables. In addition, the significance of the ECT_{t-1} statistically indicates that the adjustment speed of the variables from short run distortions to the long run path is relatively -1.1062 for economic growth, -0.5293 for gross domestic savings, -0.3779 for political stability and -0.3284 for government effectiveness compared to the speed of adjustment of -0.2968 for control of corruption.

Table 4.
FMOLS Regression (weighted Estimation).

Variable	t-Statistic	Prob.
GE	3.551538	0.0005*
GS	1.702106	0.0906***
PS	-11.71560	0.0000*
CC	-11.23688	0.0000*

Note: *, **, *** indicate significance at 1%, 5%, 10% level respectively

Table 4 presents the results of FMOLS Regression (weighted Estimation). All the coefficients are statistically significant at the 1% significance level. The results indicate that a 1% increase in government effectiveness increases economic growth by 3.55%; a 1% increase in gross domestic saving increases economic growth by 1.702%. The main variables of interest, control of corruption and political stability turn out to be negative though statistically significant. A 1% increase in in control of corruption and political stability dampen economic growth by 11.71% and 11.23% respectively. The result is consistent with the theoretical underpinnings in terms of the effect of government effectiveness and gross domestic savings on economic growth.

In summary, we found that control of corrupt, domestic savings; government effectiveness and political stability are statically significant at 1 and 10 percent significance level, meaning that there is a presence of a long run relationship between economic growth and the explanatory variables. Political stability and control of corruption have negative relationship with economic growth while government effectiveness and gross domestic savings have positive relationship.

5. Conclusion and Policy Inferences

This paper aims at analyzing the impact of corruption control on economic growth of the 10 least corrupt African countries spanning the period of 1996-2014 and applying the technique of FMOLS and panel granger VECM cause-effect analysis. The results of panel cointegration indicate that our variables are cointegrated in the long-run with respect to economic performance. On the basis of this, inference is drawn that that there is a long-run association ship among the underlying variables considered in the study.

The VECM Granger cause-effect analysis of short -run indicates the existence of feedback causality between gross domestic savings and economic growth validating the feedback hypothesis. A one-way causality runs from government effectiveness, political stability and control of corruption to economic growth validating the growth hypothesis. The results of FMOLS Regression (weighted estimation) shows that control of corruption, domestic savings, government effectiveness and political stability are statically significant at 1 and 10 percent significance level respectively. Political stability and control of

corruption have negative relationship with economic growth while government effectiveness and gross domestic savings have positive relationship.

By examining the relationship between control of corruption, government effectiveness, domestic savings, political stability and economic growth in the 10 least corrupt African countries, the study examines whether the control of corruption and the remaining independent variables have positive and significant relationship with economic performance or not. On this note, the study recommends the following: Strengthening of anti-corruption agency in both most and less corrupt countries by improving the quality of infrastructures as well the political environment will help to increase investments attractiveness and hence lead to expansion in economic growth. In addition to that the countries need to diversify their economy to maintain macroeconomic stability for long-run economic development.

6. Acknowledgement

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