

# Effect of Corruption on Economic Growth in Eastern Africa: Disaggregated Approach

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**Abstract:** High corruption phenomenon is a common problem faced by several developing countries. Weak bureaucracy, weak law and justice enforcement are assumed to be the causes of the corruption. However, the available studies majority are of single countries that has focused mainly on the relationship between overall corruption and economic growth and failing to provide the specific relationship between corruption and economic growth in Eastern African countries. The main objective of this study was to investigate the effect of corruption on economic growth in Eastern Africa. This study was modeled using Public choice theory and corruption. Hausman Specification tests was conducted to assess whether to use the fixed effects or random effect panel estimation. The Random effect model results showed that corruption had a negative and statistically significant relationship with economic growth, fixed effect model results on public resource equity had a negative and a statistically insignificant relationship with economic growth whereas the random effect model results on public sector management had a negative and statistically significant relationship with economic growth. The study concluded that Corruption decreases the growth rate of per capita income directly by decreasing the productivity of existing resources and indirectly through reduced investments and also discourages investment savings and culture of hard work among the Eastern African countries. The study recommended that there should be formulation of policies in Eastern Africa that aims to help and improve the quality of the public sector management and minimize corruption activities in the public sectors.

**Key Words:** Corruption, public sector resource equity, public sector management, Economic growth, Kenya

## I. INTRODUCTION

Corruption is attracting a lot of attention all around the world and more so in Africa. In June 2007, the OECD, European Union especially the European Council, the United Nations and many others realized the danger of corruption on societies. And of course, corruption has different forms and dimensions which threatened societies and governments to their way of development. (European Union, 2007). Abdulkadir (2018) defines "corruption- as illegal behavior (misused power) especially by people in official positions, or any person related to responsibility in the public sector which leads misallocation of resources and hence diminishes social welfare and common development of the society. Cited by (Dong, 2011).

Alexandra (2012) on the other hand states that the term "corruption" has social, moral, political or economic dimensions that can all be expressed in the definition of

corruption. It involves the misuse of public office for unofficial gains and misallocation of resources and thereby diminishes the access of basic services, raises prices on the national level as well as with the individual participants in the economic process and hence diminishes the economic growth of a country in which corruption exist (Kaufman,1998).In this sense, since all these definitions of corruption vary according to the purpose for which they are used, we can regard a specific area of it as a working definition which is: misuse of public resources, low quality of public institutions and low accountability and transparency in public sectors. High corruption phenomenon is a common problem faced by several developing countries. Weak bureaucracy and weak law and justice enforcement are assumed to be the causes of the corruption in some countries (Klitgard, 2001). In economics perspective, the increasing number of rent seeking and corruption are caused by several points such as the international trade barriers. Price control conducted by government, the applicable multiple exchange rates, and the low rate of government officer's salary (Mauro, 1997). The effect of corruption is extensive including the decrease on human resource quality, poor road infrastructure development and hindered economic growth.

## II. LITERATURE REVIEW

### 2.1 Introduction

### 2.2 Theoretical Framework

Most previous studies regarding corruption and economic growth use endogenous and exogenous growth theory which often is complemented with institutional theory as theoretical framework.

#### 2.2.1 Public Choice Theory and Corruption

Corruption occurs when an individual, usually an official, tries to maximize his or her own utility because they believe that the potential benefit of being corrupt exceeds the potential costs (Abdulkadir, 2018 and Rose-Ackerman, 1978). By complementing these two theories with growth model, the model is the Augmented Cobb-Douglas production function is applied.

$$Y = F(KL)^{b_1 b_2} \dots \dots \dots (1)$$

We start by adopting the Solow's two factor production function with factor productivity (A) which puts forward that there is a linear relationship between factors of production

capital and effective labor with output. According to Solow (1956), it is not only changes in Capital stocks and Labor force that account for economic growth but also other factors donated as (A) can influence growth which stands any exogenous factor that influence production:

$$Y = AK^{b_1}L^{b_2} \dots \dots \dots (2)$$

In this study we donate Y as our GDP, K and L are the capital and labor used in producing GDP over the time period (2005-2016) and the exogenous factor (A) is incorporating of corruption with Solows growth model labor and capital that account for economic growth.

$$A = f(R, QI, AT) \dots \dots \dots (3)$$

Combining equation 2 and 3 the growth model now becomes:

$$GDPR = R^{b_3} QI^{b_3} AT^{b_3} K^{b_1} L^{b_2} \dots \dots \dots (4)$$

### 2.3 Empirical Literature

#### 2.3.1 Corruption and economic growth

Abdukadir (2018) investigated the impact of Corruption on Economic Growth in Uganda using a time series data for the period between 2015 and 2016. The principal agent problem and public choice theories are the main theories based on this study. The study also uses Solow's growth model and Cobb-Douglas production function to investigate the effect of corruption on economic growth utilizing an aggregate annual data. The annual data is then converted into quarterly to get enough number of 48 observations which is relevant for a time series study. The study employs a unit root test to test for stationarity of the data using Augmented Dickey Fuller (ADF) test. It also investigated whether a long run equilibrium relationship exist among dependent and independent variables of the study using error correction model and Johansen - Juselius co-integration techniques. Finally, the study employs a diagnostic test to test for multicollinearity. Heteroskedasticity, serial correlation. Based on the results of the analysis, the study recommends formulating a number of policies to improve quality of public sector management and find a higher accountability and transparency within public institutions.

Kiganda and Ochieng (2018) examined the effect of economic crime on economic growth in Kenya. The study employed correlational research design involving correlational analysis, Ordinary Least Squares (OLS) analysis and Granger casualty tests based on annual time series data spanning 8 years from 2006-2013. The result indicated that economic crime had a significant negative effect on economic growth in Kenya such that a percentage increase in economic crime decreased economic growth by 0.87%. The result also indicated that economic crime had a significant negative effect on economic growth by 0.87% which may be attributed to the fact that economic crimes discourages investment, savings and culture of hard working among Kenyans due to increased fraud, bribery and corruption. There was also unidirectional casualty running from economic crime to growth in Kenya economic

#### 2.3.2 Public Resource Equity and economic growth

Musila (2015) examined the relationship between equity Financing and financial performance for firms in the energy and petroleum sector listed at the Nairobi Securities Exchange in Kenya from the period from 2005 to 2014. Financial data from balance sheets, profit and loss accounts and cash flow statements were used to calculate and analyze return on equity which is the dependent variable, while growth opportunities: firm size, liquidity ratio and equity ratio are independent variables. The study used a regression model to analyze the relationship between equity financing and financial performance of the firms. Control variables namely growth opportunities, liquidity ratio, and firm size were used in the regression model. F-test was used to determine the fitness of the regression model in analyzing the relationship. The coefficient of determination was used to explain how much of the variations in financial performance were explained by equity financing. The results of the study showed an insignificant but positive relationship between equity financing and financial performance. The study also showed a significant positive relationship between financial performance and growth opportunities and equity ratio.

Omondi (2015) examined the effect of financial deepening on economic growth in Kenya for the period from 1995 to 2014. The basis of this study was the finance-growth nexus which argues that the development of financial sector significantly promotes economic development. Secondary data used was collected from the Kenya National Bureau of Statistics, Central Bank of Kenya, Nairobi Stock Exchange and World Bank. Descriptive research design was adopted for this study whose objective was to investigate the effect financial deepening on economic growth in Kenya. The findings of the study revealed a positive correlation between the Gross Domestic Product (GDP) and Financial Deepening variables.

#### 2.3.3 Public sector management and economic growth

Ogindo (2015) investigated the effect of public sector borrowing on economic growth in Kenya using secondary data for the period covering from 1964 to 2014. The research was based on Debt Overhang Theory, Theory of Expenditure and Neoclassical Growth Theory. The study established a significantly strong positive correlation between economic growth and domestic debt, external debt, domestic interest, domestic debt redemption, external interest, external debt redemption. The study also established a significantly weak and negative correlation between the rate of inflation and economic growth. The study concludes that Kenyan economic growth rate is significantly influenced by public borrowing. Particularly, debt payment and interest negatively influence economic growth in Kenya. Excessive domestic borrowing can be inflationary and may crowd out private sector borrowing; therefore, close monitoring of government borrowing through the domestic market is therefore necessary. The study also revealed that moderate inflation rates can yield gains in GDP growth: therefore, policy makers in Kenya

should low rates of inflation in order to foster higher economic growth.

Kiroti (2010) investigated managing rapid growth in Kenya, the case of equity bank. The objective of the study was to establish the rapid corporate growth management practices of Equity Bank limited and the lessons and experiences they have learnt along the way. The study collected data from three very senior Directors who provided very deep insights into the growth management practices of the Bank. It emerged that the bank pursues a Low Cost, high volume business model. This model generates revenues by maximizing on the number of transactions. The Bank has deliberately executed a very ambitious expansion strategy that is well planned, monitored and financed. The study established six critical success factors that form the pillar of the expansion strategy. These include, being market led and customer focused innovation, Information technology, strategic partnerships, corporate governance and capacity building and leadership development. The Bank learnt that expansion must be matched by capacity both human and financial. The bank is actively investing in alternative delivery channels both to increase its reach and reduce congestion at its branches but struggling to personalize customer service to a rapidly growing customer base.

### III. RESEARCH METHODOLOGY

#### 3.1 Introduction

The section presents the model specified for the study. The variables used in the study are defined. The data sources and the methods used in data analysis are explained

#### 3.2 Model Specification

$$\ln gdp = \beta_0 + \beta_1 \ln tac_{it} + \beta_2 \ln preu_{it} + \beta_3 \ln psm_{it} + \beta_4 \ln gfcf_{it} + \beta_5 \ln popl_{it} + \varepsilon_{it} \dots (3.12)$$

Where GDP= is the GDP growth rate measured by economic growth

Ln= Natural logarithm

$\ln gdp$  = natural log of gross domestic product

$\ln tac$  = natural log of corruption

$\ln preu$  = natural log of public sector resource equity

$\ln psm$  = natural log of public sector management

$\ln gfcf$  = natural log of gross fixed capital formation

$\ln popl$  = natural log of population growth

$\varepsilon_i$  = the error term = ...n, where n is the number of firms.  $\beta_0$  = constant/the intercept point of the regression line and the Y-

axis.  $\beta$  = is the slope /gradient of the regression line.  $\varepsilon$  = is the error term. The expected signs  $\beta_1 \geq 0, \beta_2 \geq 0, \beta_3 \geq 0$

Source derived Maingi (2010)

#### 3.3. Diagnostic Tests

To examine whether fixed and or random effects in the panel data, joint validity of fixed and period effects and Hausman's test were conducted.

##### 3.3.1. Panel Unit Root Test

Panel unit root test was conducted to investigate whether there were any variables in the model that were non-stationary. The test was developed by Levin-Lin-Chu(2001).

According to the Levin-Lin-Chu test results presented in table 4.1 in the appendix shows that the test statistics for the variables natural log of gross domestic product, natural log of population growth rate and natural log of gross capital formation were statistically significant at one percent. These implies that these variables were stationary at level. However, tests statistics for variables natural log of corruption, natural log of public sector management and natural log of public resource equity were not statistically significant. This suggests that these variables were not stationary at level and had to be differenced at least once for them to become stationary case in point natural log of public sector management and natural log of public resource equity. The table indicates that LLC panel unit root test after including constant plus trend natural log of gross domestic product, natural log of population growth rate and the natural log of public sector management were stationary at one percent level while natural log of gross fixed capital formation was stationary at 5% level of significance. After including constant plus trend, variables natural log of corruption and natural log of public resource equity were statistically insignificant implying that they were not stationary and had to be differenced at least once for them to become stationary. Variables that could be considered not to be stationary at level in accordance with LLC was natural log of public resource equity. When this variable was differenced once they became stationary suggesting that they were integrated of order I (1). Thus, panel unit root tests results in table 4.3 shows that variables on corruption and economic growth have mixed orders of integration. Some variables were integrated of order I (0) while others were integrated of order I (1).

##### 3.3.2 Panel Cointegration Test

Panel cointegration test was carried out to investigate whether there are more than a single cointegration relationship between corruption and economic growth countries in Eastern Africa. The concept of cointegration implies the existence of a long run relationship between economic variables, (Mahmoud and Fatima, 2007).

Table 4.2 in the appendix section shows that majority of the tests statistics of panel cointegration tests and group mean

cointegration tests indicate that we strongly reject the null hypothesis of no cointegration since the probability values are significant at 1% level except the panel v-statistics, panel Rho-statistics and group Rho-statistics. Basing on the Pedroni (1999) cointegration tests we hence conclude that there is a long-run relationship between economic growth and government expenditure variables in Eastern African countries. The null is no cointegration and alternative hypothesis cointegration exists. Thus, we rejected the null and accepted the alternative.

IV. RESULTS AND DISCUSSION

4.1 Introduction

This chapter summarizes results and discussion which includes summary of the variables, presentation, interpretation and discussion of the results.

4.2 Disaggregated approach: Effect of corruption on economic growth

The results obtained from the fixed effect model are present in table 4:3below. The table shows that corruption had negative and statistically significant relationship with economic growth at one percent level of significance. Population growth rate had also negative and statistically significant relationship with economic growth at one percent level of significance whereas gross fixed capital formation had a positive and statistically significant relationship with economic growth at one percent level of significance.

Fixed effect model Table.4.3 Corruption and economic growth in Eastern Africa

Fixed-effects(within) regression				Number of obs = 105		
Group variable: id				Number of groups = 7		
R-sq: within = 0.2933				Obs per group: min = 15		
Between = 0.8701				avg = 15.0		
Overall = 0.8050				max = 15		
				F(3,95) = 13.14		
corr(u_i, Xb) = 0.6213				Prob > F = 0.0000		
lngdp	Coef.	Std. Err.	T	P> t	[95% Conf. Interval]	
Intac1	-.577299	.1752669	-3.29	0.001	-.9252478	-.2293502
lnpopl	-.3425723	.0903141	-3.79	0.000	-.5218684	-.1632761
lngfcf1	.1396368	.0251033	5.56	0.000	.0898004	.1894731
_cons	7.232781	.1943565	37.21	0.000	6.846935	7.618627
sigma_u				.48387881		
sigma_e				.28154809		
rho				.74707308 (fraction of variance due to u_i)		
F test that all u_i=0:				F(6, 95) = 22.72		Prob > F = 0.0000

Source: Research data

Random effect model

Table 4.4 Corruption and economic growth in Eastern Africa

Random-effects GLS regression				Number of obs= 105		
Group variable: id				Number of groups = 7		
R-sq: within = 0.2911				Obs per group: min = 15		
Between = 0.8730				avg = 15.0		
Overall = 0.8094				max = 15		
				Wald chi2(3) = 68.06		
corr(u_i, X) = 0 (assumed)				Prob > chi2 = 0.0000		
lngdp	Coef.	Std. Err.	Z	P> z	[95% Conf. Interval]	
Intac1	-.6684537	.1560584	-4.28	0.000	-.9743226	-.3625848
lnpopl	-.4135034	.0801527	-5.16	0.000	-.5705999	-.2564069
lngfcf1	.1477332	.0243795	6.06	0.000	.0999503	.1955162
_cons	7.35286	.2313917	31.78	0.000	6.899341	7.806379
sigma_u				.41277273		
sigma_e				.28154809		
rho				.682479 (fraction of variance due to u_i)		

Source: Research data

The first objective of the study was to examine the effect of corruption on economic growth in Eastern Africa. Analysis of data on this objective was based on the null hypothesis that corruption has no effect on economic growth in Eastern Africa. Random effect model was the preferred model based on Hausman specification test and the results presented in the table 4.4 above showed that Corruption had a negative and statistically significant relationship with economic growth at one percent level of significance.

Results are inconsistent with Abdukadir (2018) who found a positive and significant relationship between the coefficient of corruption and economic growth in Uganda. If the positive relationship of corruption is true, it helps the claim by some literatures that corruption is good and favor to economic growth and social development. For example, Leff (1964) argued that corruption may improve efficiency and hence promote economic growth by allowing enterprises to avoid difficult regulations with bribes especially in developing countries. According to Abdukadir(2018) corruption among other things assist in capital formation, fosters entrepreneurial abilities, allows business interests to penetrate bureaucracy and permits the logic of markets to insinuate itself into transactions from which public controls exclude it. However, other scholars believe that some levels of corruption may encourage the economic growth but incase of high level of corruption will have very harmful effects on economic, social and political development.

Results are also contrary with Karagu (2012) who found positive relationship between corruption and economic growth in East African countries. Some researchers suggest that corruption might be desirable, Leff (1964), Acemoglu and

Verdier(1998). Corruption works like piece-rate pay for bureaucrats, which induces a more efficient provision of government services and it provides a leeway for entrepreneurs to bypass inefficient regulations. The view that corruption can be efficient or that it greases the wheels of commerce has a long history. It first gained prominence back in the 1960s with a provocative article called Economic development through Bureaucratic corruption by Leff(1964). Back in the early 1960s, the relevant government agencies in Chile and Brazil were charged with the task of enforcing price controls for food products. In Chile an honest agency enforced the freeze and food production stagnated.

In Brazil, a corrupt agency effectively sabotaged the freeze and production increased to the joy of consumers. Since then, it has been given a theoretical foundation by works of for example Lui (1985) and Beck and Maher(1986) and most recently, various empirical claims have been made in its favour. Leff (1964) that corruption can be beneficial in circumventing regulatory and administrative restrictions. The general idea that corruption facilitates beneficial trades that would otherwise not have taken place. In doing so, it promotes efficiency by allowing individuals in the private sector to correct pre-existing government failures of various sorts. Other inconsistent results are Amran *et al* (2014), Kwabena(2002).

However, results are consistent with Kiganda and Ochieng(2018) who examined the effect of economic crime on economic growth in Kenya and found a significant negative effect of economic crime on economic growth. Also, Obilikwu (2018) whose findings revealed that corruption exerted a significant negative impact on economic growth in Nigeria. Nguyen *et al*(2017) results showed that corruption is a hindrance to economic growth in African countries. Therefore, the study rejects the null hypothesis and accepts the alternative hypothesis which states that corruption affects economic growth in Eastern Africa, because corruption is statistically significant and negatively affects economic growth in Eastern African countries.

*Hausman specification test*

Table 4.5 Hausman specification test on corruption and economic growth

---- Coefficients ----				
(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))	
	Fixed	Random	Difference	S.E
Intac1	-.577299	-	.0911547	.0797763
lnpopl	.3425723	-	.0709312	.0416194
lngfcf1	.1396368	.1477332	-.0080965	.0059845
b = consistent under Ho and Ha; obtained from xtreg				
B = inconsistent under Ha, efficient under Ho; obtained from xtreg				
Test: Ho: difference in coefficients not systematic				
chi2(3) = (b-B)[(V_b-V_B)^(-1)](b-B)				

= 4.01	
Prob>chi2 = 0.2599	
(V_b-V_B is not positive definite)	

Source: Research data

Table 4.5 above was the Hausman specification test which showed that random effect model was the preferred model. The null hypothesis was that the preferred model was random effect and the alternative fixed effect model preferred model. The probability was 0.2599 which was statistically not significant. The probability was insignificant implying that we shall accept the null hypothesis and reject the alternative hypothesis. Thus, the random effect model was the preferred model. Also, the chi-square test value 4.01 was less than the probability value at 25.99% which is greater than the 5% level of significance and indicated that there was no correlation between the unique errors (ui) and the regressors.

Table 4.6 Heteroscedasticity teston corruption and economic growth

Breusch and Pagan Lagrangian multiplier test for random effects		
lngdp[id,t] = Xb + u[id] + e[id,t]		
Estimated results:		
Var sd = sqrt(Var)		
lngdp	1.009261	1.00462
e	.0792693	.2815481
u	.1703813	.4127727
Test: Var(u) = 0		
chibar2(01) = 168.04		
Prob > chibar2 = 0.0000		

Source: Research data

Table 4.6 above Breusch –Pagan test of heteroscedasticity for economic growth was conducted. The null hypothesis was that no heteroscedasticity existed and alternative heteroscedasticity exists. The chi-square value at 1 degree of freedom was 168.04 less than the probability value at 0.0000. The probability was 0.0000 % which was less than the 5% significant level. This indicated that heteroscedasticity existed.

*Effect of public resource equity on economic growth*

Fixed effect model Table 4.7 Public resource equity and economic growth in Eastern Africa

Fixed-effects (within) regression	Number of obs = 105
Group variable: id	Number of groups = 7
R-sq: within = 0.2126	Obs per group: min = 15
Between = 0.9134	avg = 15.0
Overall = 0.7761	max = 15

					F(3,95) = 8.55	
corr(u_i, Xb) = 0.8180					Prob >F = 0.0000	
ln gdp	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
lnpreu1	-.0135836	.1707663	-0.08	0.937	-.3525976	.3254303
lnpopl	-.3183406	.0950149	3.35	0.001	-.5069691	-.129712
ln gfcf1	.1107919	.0248638	4.46	0.000	.0614311	.1601527
_cons	6.682924	.2216068	30.16	0.000	6.242979	7.122869
sigma_u					.71230994	
sigma_e					.29718051	
rho					.85174417 (fraction of variance due to u_i)	
F test that all u_i=0:					F(6, 95) = 20.19 Prob > F = 0.0000	

Source: Research Data

The second objective of the study was to examine the effect of public resource equity on economic growth in Eastern Africa. Analysis of data on this objective was based on the null hypothesis that public resource equity has no effect on economic growth in EAC. Public resource equity had a negative and a statistically insignificant relationship with economic growth. Results are in tandem with Kombe (2014) who examined the effect of seasoned equity offerings on stock prices performance of firms listed at the Nairobi securities exchange and found negative relationship. The observed decrease in stock returns after the announcement of seasoned equity offerings was also similar to the findings of Frijns *et al* (2006) who found that stock price performance for both the completed and the withdrawn offerings was poor after the announcement. And conforming also to Shahid *et al* (2010) whose study found seasoned equity offerings price effects to be significantly negative around other event announcement date. Also, Gatundu (2007), Mwangangi (2011) and Mugun *et al* (2019). Results are however contrary with Kiruri (2009) who studied the stock market reactions to macroeconomic announcements in Kenya and results showed a positive variation between the stock prices at the Nairobi stock exchange and the GDP announcement. Results showed the existence of a very strong relationship between the Nairobi stock exchange and balance of payment announcement. Kiama (2013) results were also inconsistent which revealed an insignificant but positive relationship between seasoned equity offerings and financial performance. Results also indicated a significant positive relationship between financial performance asset growth and leverage. And Gachuhi (2013) results indicated that actual stock returns were significantly higher after banks issue than before the bonus issue. Therefore, the study does not reject the null hypothesis but rather accept the null hypothesis which states that public resource equity has no effect on economic growth in Eastern Africa.

Random effect model Table 4.8 Public resource equity and economic growth in Eastern Africa

Random-effects GLS regression						Number of obs = 105	
Group variable: id						Number of groups = 7	
R-sq: within = 0.1995						Obs per group: min = 15	
Between = 0.9107						avg = 15.0	
Overall = 0.8138						max = 15	
						Wald chi2(3) = 46.18	
corr(u_i, X) = 0 (assumed)						Prob > chi2 = 0.0000	
ln gdp	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]		
lnpreu1	-.2108439	.1586782	-1.33	0.184	-.5218474	.1001596	
lnpopl	-.4471923	.0871611	-5.13	0.000	-.6180248	-.2763597	
ln gfcf1	.1171335	.0254612	4.60	0.000	.0672305	.1670365	
_cons	6.970724	.2583653	26.98	0.000	6.464337	7.477111	
sigma_u						.41523958	
sigma_e						.29718051	
rho						.66128634 (fraction of variance due to u_i)	

Source: Research Data

The random effect results are presented in table 4.8. The results shows that public resource equity has a negative and statistically insignificant relationship with economic growth. While population growth rate had a negative effect and statistically significant relationship with economic growth with one percent level of significance. Gross fixed capital formation on the other hand had positive coefficient and statistically significant relationship with economic growth at one percent level of significance.

*Hausman specification test*

Table 4.9 Public resource equity and economic growth

---- Coefficients ----				
(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))	
	Fixed	random	Difference	S.E.
lnpreu1	-.0135836	-.2108439	.1972603	.063106
lnpopl	-.3183406	-.4471923	.1288517	.0378258
ln gfcf1	.1107919	.1171335	-.0063416	.
b = consistent under Ho and Ha; obtained from xtreg				
B = inconsistent under Ha, efficient under Ho; obtained from xtreg				
Test: Ho: difference in coefficients not systematic				
chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B)				
= 9.31				
Prob>chi2 = 0.0254				
(V_b-V_B is not positive definite)				

Source: Research data

Table 4.9 above was the Hausman specification test which showed that fixed effect model was the preferred model. The null hypothesis was that the preferred model was random effect and the alternative fixed model preferred model. The probability was 0.0254 which was statistically significant at 5%. The probability was significant at 5% implying that we shall reject the null hypothesis and accept the alternative hypothesis. Thus, the fixed effect model was the preferred model. Also, the chi-square test value 9.31 which was more than the probability value at 5% which indicated that there was correlation between the unique errors (ui) and the regressors.

Table 5.0 Breusch –Pagan test of heteroscedasticity for public resource equity and economic growth was conducted as shown in the appendix section. The null hypothesis was that no heteroscedasticity existed and alternative heteroscedasticity exists. The chi-square value at 1 degree of freedom was 124.91 less than the probability value at 0.0000. The probability was 0.0000% which was less than the 5% significant level. This indicated that heteroscedasticity existed.

*Effect of public sector management on GDP in EA*

The fixed effect model results at the appendix section are presented in the table 5.1. The results shows that public sector management had a negative and statistically significant relationship with economic growth at one percent level of significance. Population growth also had also a negative and insignificant relationship with economic growth at one percent level on significance. Whereas gross fixed capital formation had positive coefficient and statistically significant relationship with economic growth at one percent level of significance.

Random effect model: Table 5.2 Public sector management and economic growth in Eastern Africa

Random-effects GLS regression			Number of obs = 105			
Group variable: id			Number of groups = 7			
R-sq: within = 0.2688			Obs per group: min = 15			
Between = 0.8688			avg = 15.0			
Overall = 0.8042			max = 15			
			Wald chi2(3) = 66.83			
corr(u_i, X) = 0 (assumed)			Prob > chi2 = 0.0000			
ln gdp	Coef.	Std. Err.	Z	P> z	[95% Conf. Interval]	
lnpsm _1	-.432344 4	.109203 9	-3.96	0.00 0	-.646380 1	-.218308 8
lnpopl	-.411141 3	.081259 1	-5.06	0.00 0	-.570406 3	-.251876 3
lngfcf1	.149383 4	.024977 8	5.98	0.00 0	.100427 7	.198339 1
_cons	7.39957 8	.241713	30.6 1	0.00 0	6.92582 9	7.87332 7
sigma_u			.39227607			
sigma_e			.2858771			
rho			.65312583 (fraction of variance due to u_i)			

Source: Research Data

The third objective of the study was to examine the effect of public sector management on economic growth on Eastern Africa. Analysis of data on this objective was based on null hypothesis that public sector management has no effect on economic growth in Eastern Africa. From the random effect model results presented in the table 5.2 public sector management had a negative and statistically significant relationship with economic growth at one per cent level of significance. Results are consistent with Lufunyo (2013) who examined public sector reforms impact on service delivery in Tanzania and the findings revealed that the contribution of public sector reforms in local authorities has a significant impact. Findings were in agreement with the literature that reforms are necessary for improved service delivery.

Results are also in tandem with Abdukadir (2018) whose results revealed that public sector management variable had negative and statistically significant relationship with economic growth in Uganda at one per cent level of significance. This results implies that the misuse of public resources and low quality of institutions will negatively impact on economic growth in the long run statistically significant in Eastern African countries. Therefore, the study rejects the null hypothesis and accepts the alternative hypothesis which states that public sector management affects economic growth in Eastern African countries.

Table 5.3 in the appendix section was the Hausman specification test which showed that random effect model was the preferred model. The null hypothesis was that the preferred model was random effect and the alternative fixed effect model preferred model. The probability was 0.1100 which was statistically not significant. The probability was insignificant implying that we shall accept the null hypothesis and reject the alternative hypothesis. Thus, the random effect model was the preferred model. Also, the chi-square test value 6.03 was less than the probability value at 11.00% which is greater than the 5% level of significance and indicated that there was no correlation between the unique errors (ui) and the regressors.

Table 5.4 in the appendix section Breusch –Pagan test of heteroscedasticity on public sector management and economic growth was conducted. The null hypothesis was that no heteroscedasticity existed and alternative heteroscedasticity exists. The chi-square value was 166.26 less than the probability value at 0.0000. The probability was 0.0000% which was less than the 5% significant level. This indicated that heteroscedasticity existed.

V. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This paper uses panel data from seven countries in Eastern Africa namely; Kenya, Uganda, Tanzania, Ethiopia, Madagascar, Mauritius, Rwanda and Seychelles for the period from 2005 to 2019. The purpose of the study was to investigate the effect of corruption on economic growth in

Eastern African countries. Random effect model was the preferred model based on the Hausman specification test. Random effect results revealed that corruption had a negative and statistically significant relationship to economic growth in Eastern Africa. The results support the hypothesis that corruption hinders economic growth in Eastern Africa. The negative and significant effect of corruption on economic growth in Eastern Africa is a problem because the continuity of the low accountability and less transparency in the public sector leads to low quality of institution and public sector management which in turn leads to a misuse of public resources and hence negative impact on economic growth in the long run. Corruption decreases the growth rate of per capita income directly by decreasing the productivity of existing resources and indirectly through reduced investments. Corruption also discourages investment savings and culture of hard work among the Eastern African countries due to increased accountability fraud procurement fraud bribery and corruption which in turn reduces economic growth.

### 5.2 Policy Recommendations

On the basis of the study results, the following recommendations were offered to enhance a higher and sustained economic growth in Eastern Africa. Formulation of policies that aims to help and improve the quality of the public sector management, accelerate the level of accountability and transparency and minimize corruption activities in the public sectors. Also, mobilization of public resources effectively and efficiently in productive sectors to achieve the desired economic growth.

### REFERENCES

- [1] Abdukadir, M.A. (2018). *The effect of corruption on economic growth in Uganda*. (Unpublished Masters Dissertation in economics), Makerere University, Kampala-Uganda.
- [2] Acemoglu, D. & Verdier, T. (1998). Property Rights, corruption and the allocation of talent: A general Equilibrium Approach. *The Economic Journal*, 108, PP 1381-403.
- [3] Amran, H., Ananda, C.F., Santoso, D.B. and Khusaini, M. (2014). An analysis on corruption indication effect toward development in East Indonesia. *Journal of Economics and Sustainable Development*, Vol. 5, NO. 8, PP. 7-16. [www.iiste.org](http://www.iiste.org).
- [4] Beck, P., and Maher, M. (1986). A comparison of bribery and bidding in thin markets. *Economic Letters*, 20, PP. 1-5
- [5] Dong, B. (2011). *Causes and consequences of corruption*. Brisbane, Australia.
- [6] E.U. (2007). Study of corruption within the public sector in the member states of the European Union. *European Union*
- [7] Frijns, B., Navissi, F., Tourani-Rad, A., and Tsai, L. (2006). Stock price performance of seasoned equity offerings: completed vs withdrawn. *Managerial Finance*, 32 (3) pp.234-246
- [8] Gachui, P. (2013). *The signaling effect of bonus issue on stock prices of companies quoted at the Nairobi securities Exchange*. (Unpublished Masters Thesis), University of Nairobi, Nairobi, Kenya.
- [9] Gatundu, S. (2007). *The effects of secondary equity offerings on stock returns of firms quoted on the Nairobi stock exchange*. (Unpublished Master's Thesis), University of Nairobi, Nairobi, Kenya.
- [10] Karagu, M.S. (2012). *Effects of regional financial integration on economic growth and intra-regional trade of East African community member countries*. (Unpublished PhD thesis), Kenyatta University, Nairobi, Kenya.
- [11] Kaufman, D.G. (1998). Corruption and development, Finance and development march 1998. *World Bank*, Washington D.C.
- [12] Kiganda, E.O. and Ochieng, B. (2018). Effect of economic crime on economic growth in Kenya. *EPRA International Journal of Economic and Business Review*. Vol. 6, Issue 9, PP.72-77.
- [13] Kiama, N. (2013). *The relationship between seasoned equity offerings and Financial performance of firms listed at the Nairobi securities exchange*. (Unpublished Master's Thesis) University of Nairobi, Nairobi, Kenya.
- [14] Klitgaard, R. (2001). *Controlling corruption* Berkeley CA: *University of California Press*
- [15] Kiriro, B.E.M. (2010). *Managing cooperate growth: A case study of equity bank limited*. (Unpublished Masters project), University of Nairobi, Nairobi, Kenya.
- [16] Kiruri, S. (2009). *Stock market reactions to macroeconomic announcements in Kenya: A case of stock prices at the Nairobi securities exchange*. (Unpublished Master's Thesis), University of Nairobi, Nairobi, Kenya.
- [17] Kwabena, G.B. (2002). Corruption, economic growth and income inequality in Africa. EcLeff, H. (1964). Economic Development Through Bureaucratic corruption. *American Behavioural scientist*, 8(3), PP. 8-14
- [18] Kombe, S.N. (2014). *The effect of seasoned equity offerings on stock price performance of firms listed at the Nairobi securities exchange*. (Unpublished Masters Project), University of Nairobi, Nairobi-Kenya.
- [19] Leff, H. (1964). Economic Development Through Bureaucratic corruption. *American Behavioural scientist*, 8(3), PP. 8-14
- [20] Levin, A., Lin, C.F. and Chu, J. (2002). Unity root test in pane data. Asymptotic and finite sample properties. *Journal of Econometrics*, 108:1-24
- [21] Lufunyo, H. (2013). Impact of public sector reforms on service delivery in Tanzania. *Journal of Public Administration and Policy Research*. Vol.5 (2), PP.26-49
- [22] Lui, T. (1985). An Equilibrium Queuing Model of Bribery. *Journal of Political Economy*, 93, PP. 760-781, *Economics of Governance*, Vol. 3, PP. 183-2009.
- [23] Maingi, J.N. (2010). *The Impact of Government expenditure on economic growth in Kenya 1963-2008*. (Unpublished PhD Thesis in Economics), Kenyatta University, Kenya.
- [24] Mahmoud and Fatima (2007). Foreign direct investment and economic growth in the GCC countries: a causality investigation using Heterogeneous Panel Analysis, (online), available at [www.iuc.edu/orgs/meea/volume9/pdfs/AL-Iriani% 20-% 20 paper.doc](http://www.iuc.edu/orgs/meea/volume9/pdfs/AL-Iriani%20-%20paper.doc)
- [25] Mauro, P. (1997). The effects of corruption on growth, investment and government expenditure: A cross-sectional analysis in corruption and global economy, Ed by Kimberly Ann Elliot, Washington, D.C, USA, 1997.
- [26] Mugun, W., Odhiambo, S.A. & Momanyi, G. (2019). Effect of Debt-to-equity ratio on financial performance of microfinance institutions in Kenya. *International Journal of Research and Scientific Innovation*. Vol. 6, Issue 7, PP. 154-162.
- [27] Musila, P. (2015). *The relationship between equity financing and financial performance of the energy and petroleum companies listed at the Nairobi securities exchange*. (Unpublished Masters project), University of Nairobi, Nairobi- Kenya.
- [28] Mwangangi, M. (2011). *The information content of seasoned equity issue announcements for firms quoted at Nairobi Stock Exchange*. (Unpublished Masters Research Project), University of Nairobi, Nairobi, Kenya.
- [29] Nguyen, N.T, Mai, B.D. & Tran, T.K.O. (2017). Effects of corruption on economic growth: Empirical study of Asian countries. *Imperial Journal of Interdisciplinary Research*. Vol. 3, Issue 7, PP. 791-804.
- [30] Ogindo, M.O. (2015). *The effect of public sector borrowing on economic growth in Kenya*. (Unpublished Masters in Finance), University of Nairobi, Nairobi-Kenya.
- [31] Omondi, F.O. (2015). *The effect of financial deepening on economic growth in Kenya*. (Unpublished Masters Project), University of Nairobi, Nairobi-Kenya.



- [32] Olibikwu, J. (2018). Corruption and Economic growth in Nigeria. *Journal of Economics and Sustainable Development*. Vol. 9, No. 6 PP. 18-27 [www.iiste.org](http://www.iiste.org).
- [33] Pedroni (1999). Critical values for cointegration tests in Heterogeneous panels with multiple regressors, *Oxford Bulletin of Economics and Statistics*, Special Issue (1999)03059049
- [34] Rose-Ackerman, S. (1978). *Corruption: A study in political economy*: New York.
- [35] Solow, R. (1956). A contribution to the theory of economic growth. *Quarterly Journal of Economics*, 70(1), pp. 65-94.
- [36] Shahid, H., Xinping, X., Mahmood, F. and Usman, M. (2010). Announcement Effects of seasoned equity offerings in China. *International Journal of Economic and Finance*, Vol. 2, No. 3

APPENDIX

Table 5.0 Heteroscedasticity test on Public resource equity and economic growth

Breusch and Pagan Lagrangian multiplier test for random effects		
$ln\text{gdp}[id,t] = Xb + u[id] + e[id,t]$		
Estimated results:		
Var    sd = sqrt(Var)		
lngdp	1.009261	1.00462
e	.0883163	.2971805
u	.1724239	.4152396
Test: Var(u) = 0		
chibar2(01) = 124.91		
Prob > chibar2 = 0.0000		

Source: Research data

Table 5.1 Effect of public sector management on GDP in EA

Fixed-effects (within) regression			Number of obs = 105			
Group variable: id			Number of groups = 7			
R-sq: within = 0.2714			Obs per group: min = 15			
Between = 0.8679			avg = 15.0			
Overall = 0.8014			max = 15			
			F(3,95) = 11.79			
corr(u_i, Xb) = 0.6172			Prob > F = 0.0000			
lngdp	Coef.	Std. Err.	T	P> t	[95% Conf. Interval]	
lnpsm1	-.3554816	.128375	-2.77	0.007	-.6103382	-.1006249
lnpopl	-.3388302	.0916968	-3.70	0.000	-.5208714	-.156789
lngfcf1	.1395477	.0260444	5.36	0.000	.087843	.1912525
_cons	7.24388	.2278706	31.79	0.000	6.7915	7.696261
sigma_u			.48460956			
sigma_e			.2858771			
rho			.74184173 (fraction of variance due to u_i)			
F test that all u_i=0:			F(6, 95) = 22.80		Prob > F = 0.0000	

Source: Research data

Table 5.3 Hausman specification test onPSM and GDP

---- Coefficients ----				
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	Fixed	random	Difference	S.E.
lnpsm1	-.3554816	-.4323444	.0768629	.0674882
lnpopl	-.3388302	-.4111413	.0723111	.0424884
lngfcf1	.1395477	.1493834	-.0098356	.0073769
b = consistent under Ho and Ha; obtained from xtreg				
B = inconsistent under Ha, efficient under Ho; obtained from xtreg				
Test: Ho: difference in coefficients not systematic				
chi2(3) = (b-B)[(V_b-V_B)^(-1)](b-B)				

= 6.03
Prob>chi2 = 0.1100
(V <sub>b</sub> -V <sub>B</sub> is not positive definite)

Source: Research data

*Heteroscedasticity test*

Table 5.4 Public sector management and economic growth

Breusch and Pagan Lagrangian multiplier test for random effects		
lngdp[id,t] = Xb + u[id] + e[id,t]		
Estimated results:		
Var sd = sqrt(Var)		
lngdp	1.009261	1.00462
e	.0817257	.2858771
u	.1538805	.3922761
Test: Var(u) = 0		
chibar2(01) = 166.26		
Prob > chibar2 = 0.0000		

Source: Research data

Table 4.2 Pedroni panel cointegration test

Pedroni Residual Cointegration Test				
Series: LNGDP LNGFCF1 LNPOPL LNPREDU1 LNPSM1 LNTAC1				
Included observations: 105				
Null Hypothesis: No cointegration				
Trend assumption: No deterministic trend				
			Weighted	
	<u>Statistic</u>	<u>Prob.</u>	<u>Statistic</u>	<u>Prob.</u>
Panel v-Statistic	0.103768	0.4587	-0.874936	0.8092
Panel rho-Statistic	1.336070	0.9092	1.829429	0.9663
Panel PP-Statistic	-2.697835	0.0035	-1.277140	0.1008
Panel ADF-Statistic	-2.938592	0.0016	-4.787542	0.0000
Alternative hypothesis: individual AR coeffs. (between-dimension)				
	<u>Statistic</u>	<u>Prob.</u>		
Group rho-Statistic	2.173082	0.9851		
Group PP-Statistic	-2.161634	0.0153		
Group ADF-Statistic	-4.578610	0.0000		

Source: Research data

Table 4.1 Levin Lin Chu panel unit root test

Variable	Level First difference	Constant	Constant +trend
lngdp	Level	-5.9208***	-8.988***
	Unadjusted t	-4.1161***	-5.4751***
	Adjusted t p-value	(0.0000)	(0.0000)
lnpopl	Level	-8.4836***	-9.7034***
	Unadjusted t	-6.8646***	-6.7022***
	Adjusted t p-value	(0.0000)	(0.0000)

Lntac1	Level Unadjusted t Adjusted t p-value	-3.4318 -0.1572 (0.4375)	-3.0618 2.3562 (0.9908)
	1 <sup>st</sup> difference Unadjusted t Adjusted t p-value	-5.5916 0.4418 (0.6707)	-6.8082 0.7592 (0.7761)
Lnpsm1	Level Unadjusted t Adjusted t p-value	-3.7636 -1.2044 (0.1142)	-6.4852** -1.7329** (0.0416)
	1 <sup>st</sup> difference Unadjusted t Adjusted t p-value	-7.4036*** -2.6288*** (0.0043)	
Lnpreu1	Level Unadjusted t Adjusted t p-value	-3.5095 0.1630 (0.5647)	-4.8469 0.5212 (0.6989)
	1 <sup>st</sup> difference Unadjusted t Adjusted t p-value	-7.2773** -1.5605** (0.0593)	-13.5582*** -7.4647*** (0.0000)
Lngfcf1	Level Unadjusted t Adjusted t p-value	-5.7635*** -3.2140*** (0.0007)	-6.8788** -2.4637** (0.0069)

Source: Research data