Impact of Corruption on Economic Growth

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Abstract

In this study, the effect of corruption on economic growth was evaluated by considering econometric analysis of panel models. In alignment with these, the research questions can be identified. What are the effects of corruption on economic growth? Whether there is a positive or negative link between corruption and economic growth in the countries under investigation? To answer these questions, this study introduced the impact of corruption on economic growth through direct and indirect methods. The indirect effects of corruption on economic growth emphasizes on the role of transmission channels. The transmission channels in this study are foreign direct investment and openness through which economic growth is influenced by corruption. The findings of the regression analysis revealed that, the direct effect of a 1% increase in the corruption leads to reduction of the growth rate by about 0.143 percentage points. In addition, the indirect effects of corruption on economic growth through FDI and OPEN are negligible and significant respectively. The reason might be due to the lack of predictability of corruption (uncertainty) in these developing countries. Rent seeking opportunities in terms of import licenses should be reduced, providing increased competition, transparency, and efficiency to the market.

Keywords: Corruption, Openness to Trade, Foreign Direct Investment, Gross Domestic Product

Introduction

Both economic growth and corruption are words that have been frequently used in public debates. Based on the definition of the World Transparency International Organization, corruption is the misuse of public power for personal interests. This phenomenon is the result of weaknesses in the economic, political, and institutional performance of government. The major obstacles to the comparative studies of corruption have been the lack of a general definition of corruption and the absence of objective cross-national data on corrupt behaviour. Although corruption is more common in poorer economies, it does exist in all countries. Public debates in Nigeria have centred on the increasing rate of corruption resulting from inappropriate public finance planning and implementation mostly in some of the developing countries, Nigeria inclusive which in turn reduce the level of economic growth in the country. Corruption made itself visible when the institution of the government was founded due the behaviour of people appoint or elect to manage the government institutions (Aryanwu, 2002; Idomeh, 2006).

An ongoing debate that provides motivation for further research is whether corruption greases or sands the wheels of economic growth (Bardhan, 1997; Pande, 2008; Aidt, 2009). Proponents of the greasing hypothesis (Leff, 1964; Huntington, 1968; Lui, 1985; Mémon and Weill, 2010) are of the opinion that corruption encourages trade that may not have happened
otherwise and promotes efficiency by allowing private sector agents to avoid unmanageable regulations. For instance, Acemoglu and Verdier (1998) contend that some degree of corruption may be part of the optimal allocation of resources in the presence of incomplete contracts or on account of market failure. This point of view is partly acceptable on the ground that illegal payments are required to expedite matters and favourably through the state bureaucracy (Amundsen, 2000). By implication, corruption has the power of producing a more efficient economic agent and in the long run it enhances economic growth.

The opposing school of thought contends that corruption exerts adverse effects on or sands the wheels of long-term economic growth and sustainable development (Gould and Amaro-Reyes, 1983; Mauro, 1995; United Nations Development Program (UNDP), 1997; Wei, 1997; Kaufmann, 1997; World Bank, 2000; Reinikka and Svensson, 2004; 2005). The transmission mechanisms of these negative impacts include, inter alia, reduced domestic and foreign investment, increased cost of production, misallocation of national resources, higher inequality and poverty, uncertainty in decision making. For instance, Mauro (1995) argues that corruption reduces investment across developing countries, thereby negatively affecting growth while Reinikka and Svensson (2004, 2005) find that corruption has detrimental effects on human capital accumulation.

It is imperative to note that empirical studies done in the past to determine the effects of corruption on economic growth and welfare have given mixed results. There has been a lot of controversies among academia and researchers as to whether corruption has either direct impact on corruption, indirect impact on corruption or both direct and indirect impact on corruption. Empirical studies like that of Mauro in (1995) and Aliyu and Elijah (2008) revealed that corruption has both direct and indirect impact on growth. A study by Mauro, (1995) examines the impact of corruption using Business International’s corruption index and growth rates of per capita GDP from 1960 to 1985, Using business international’ corruption index, growth rates of per capita GDP and rate of investment, Mauro shows that a one-standard-deviation decrease in the corruption index significantly increases the annual growth rate of GDP per capita by 0.8 per cent but after controlling for the determinants of investment like political stability, political change, stability of labour, terrorism, legal system beaucracy and red tape, the effect of corruption becomes insignificant.

A study by Aliyu and Elijah (2008) investigated impact of corruption on economic growth in Nigeria from 1986 to 2007 using a barro type endogenous growth model, showed that corruption exerts significant direct impact on economic growth and indirectly via some variables which include government capital expenditure, human capital development and total employment. The paper concluded that 20% increase in government capital expenditure in Nigeria ends up in private pockets.

Objectives of the Study
The main objective of this research was to examine the impact of corruption on economic growth across six West African countries, viz; Nigeria, Ghana, Togo, Cameroon, Chad and Cote divore, between the period of 1995 to 2014 The specific objective is.

a) To find out whether there is a positive or negative link between corruption and economic growth in the countries under investigation?

The research analyzed the impact of corruption on economic growth using panel data econometric models

Literature Review and Theoretical Framework
The issue of increase in corruption and its effect on economic growth has generated a lot of debate among academics, economists, bankers, policy makers, researchers and general public. The impact of corruption on economic growth is still an unresolved issue in both theoretically as well as empirically. This is because the theoretical positions on the corruption are quite diverse and large level of corruption in a country is a source of economic instability or stagnation in developing countries. A few studies reported positive and significant relationship between corruption and economic growth while several others like Rotini, Obasaju, Lawal, and Ise (2013) found no relationship between an increase in corruption and economic growth in real output.

**Review of Concepts and Theoretical Issues**

**Conceptual framework**
The menace of corruption in Africa is endemic and on the increase despite several attempts even by successive governments to ameliorate the blight. The issue is global and it is without a uniform definition. In most African countries, corruption has become the order of the day happening among the young and the old, the politician and the non-politician as well as military and the non-military. The unstoppable social economic scourge has suggested different meanings to different scholars from different schools of thought. Salisu (2000) simply defined corruption as the misapplication of public resources to private ends. This among others include the public officials collecting bribes for issuing permits licenses for authorizing passage of goods at sea/airport, passports or visa, for awarding contracts or for enacting regulations designed to create artificial scarcity, awarding undeserved score or grades to students after exam, availing question papers to students before examination, and at times it may come in the form of sexual or other forms of gratifications. The World Bank (1996) defined corruption as “the abuse of public power for private benefit”. The Transparency International (2005) defined it as “the abuse of entrusted power for private gain”. Corruption also includes bribery, smuggling, fraud, illegal payments, money laundering, drug trafficking, falsification of documents and records, window dressing, false declaration, evasion, under-payment, deceit, forgery, concealment, aiding and abetting of any kind to the detriment of another person, community, society or nation.

**Effects of Corruption**
Corruption is a widespread phenomenon and its effects are immeasurable. It leaves an economy with an untold hardship. However, the effects of corruption are felt in the economic, political and social spheres either directly or indirectly. Although the direct costs of corruption may be high in terms of lost revenue or funds diverted from their intended use the indirect costs in terms of the economic distortions; inefficiencies and waste resulting from corrupt practices are more problematic over the long-term and thus make it more difficult to address (Gbenga 2007). Adsera, Boix and Payne (2003) observe that corruption portends negative effects on democracy in terms of decreasing government effectiveness and political legitimacy and increase in stability.

**Theories of Corruption and Economic Growth**
There are some theoretical models which investigate the effects of corruption on economic growth using a neoclassical model. The model of Everhart, Vazquez and Mncab (2005) was used in this study because they emphasized the indirect effects of corruption on growth through transmission channels. In addition, the growth in Everhart, Vazquez, and Mncab’s model is based on GDP level, which makes it very similar to the model chosen for this study.
Everhart, Vaquez, and Mcnab Model of has both direct and indirect negative effects on economic growth. The indirect effect of corruption on economic growth is via private investment, public investment and human capital,

\[ \ln(y_t') = (\alpha/(1-\alpha-\beta)) \ln(ik) + (\beta/(1-\alpha-\beta)) \ln(ig) + (1/(1-\alpha-\beta)) \ln(ih) - (\alpha+\beta/(1-\alpha-\beta)) \ln(n+g+\gamma+c) \]

In the above equation, the direct and indirect effect of corruption on the rate of growth can be derived. According to the terms of model above, the increase unit of corruption (c) leads to the reduction of growth rate (yt') directly. In addition, the indirect negative effect of corruption on growth rate via transmission channels is determined by Gt public, Kt private, and Ht human capital, which are shown by \( \ln(ig) \), \( \ln(ik) \), and \( \ln(ih) \). Mo (2001) estimated impacts of corruption on economic growth using the direct and indirect model during the period 1970 to 1985 using three transmission mechanisms namely, investment, human capital and political stability. The result indicated that a unit increase in the corruption index reduces the growth rate by about 0.545 percentage point.

Review of Empirical Studies
There are numerous empirical studies that have investigated the effects of corruption on economic growth in different countries. Beginning with the pioneering work of Mauro (1995) which examined the effect of corruption on growth rates of per capital GDP of sixteen (16) countries from 1960-1985. The result of this systematic study shows that one-standard deviation decline in the corruption index leads to an increase in annual growth rates of GDP per capital by 0.8 percent.

Tanzi (1998) investigate the effects of corruption on economic growth and government expenditures. He found that corruption increases government expenditures but decreases expenditures on maintenance and this leads to reduced economic growth since the new capital cannot be put to use for lack of complementary inputs. They also found that corruption decreases private investment. Acemoglu and Verdier (1998), suggested that corruption might be desirable as it may provide a leeway for entrepreneurs to bypass inefficient regulations and hence induce a more efficient provision of government services. Advocates of this view conclude that corruption introduces efficiency in the economy and affects economic growth positively as a result of bureaucratic inefficiencies and thereby make the process of project approval more efficient. This is the ‘greasing the wheel’ argument. Opponents contended that corruption hurts innovative activities because innovators need more of government- supplied goods, such as permits and import quotas. Since the demand for these goods is high and inelastic would make them prime situation for corruption. Fresh innovators are often credit-constrained and cannot find the cash to pay bribes and, thus deterred long run stock of producible inputs (Murphy and Kevin, 1993). Kwabena Gyimah-Brempong (2001) used panel data from African countries and a dynamic panel estimator to investigate the effects of corruption on economic growth. They found that corruption decreases economic growth directly and indirectly through decreased investment in physical capital. A unit increase in corruption reduces the growth rates of GDP and per capita income by between 0.75 and 0.9 percentage points and between 0.39 and 0.41 percentage points per year respectively.

A study by Aliyu and Elijah (2008) investigated impact of corruption on economic growth in Nigeria from 1986 to 2007 using a barro type endogenous growth model, showed that corruption exerts significant direct impact on economic growth and indirectly via some variables which include government capital expenditure, human capital development and
total employment. The paper concluded that 20% increase in government capital expenditure in Nigeria ends up in private pockets.

Methodology
In this research, the effects of corruption on economic growth was analysed using a sample of six West African countries over the period of 1995-2014. This was accomplished by utilizing the econometrics technique of panel data. The model of Everhart, Vazquez and McNab (2005) was used in this study because they emphasized the indirect effects of corruption on growth through transmission channels. In addition, the growth in Everhart, Vazquez, and McNab’s model is based on GDP level, which makes it very similar to the model chosen for this study. The model was also used by Mina Baliamoune-Luts and Leone Ndi Kumana (2008), of the university of Massachusetts to investigate the direct and indirect impact of corruption on economic growth through the transmission channels namely openness to trade, corruption and investment. Emphasis of this work will be demonstrated on various transmission channels through which corruption affects economic growth. Common variables used to quantify transmission channels are the rate of investment, human capital, poverty, rate of tax, foreign direct investment, limitation of opportunities, political instability, and the diversion of the talent of innovators and producers toward rent seeking activities. The independent variables used in this study are corruption perception index, foreign direct investment, and openness.

Data Description

Sample Selection
This study is primarily interested on the impact of corruption on growth in some developing countries. According to the World Bank classification, all developing countries are classified based on level of GDP per capita, which has a threshold between $1,035 and $12,615. This procedure classifies 138 countries as middle-income economies. This research is narrowed down to six West African countries namely, Nigeria, Ghana, Togo, Chad, Cameroon, and Ivory Coast.

Corruption Perception Index (CPI)
Since 1995, the Transparency International Organization has been publishing a corruption perception index (CPI). The CPI generally defines corruption as the misuse of entrusted public power for private benefits when their decision is not made to benefit the public.

Specification of the Model
The primary purpose of this study is to investigate the effects of corruption on growth. In order to meet this question for countries under investigation in this study, we need to specify the model considered. The model of Everhart, Vazquez and McNab (2005) was used in this study because they emphasized the indirect effects of corruption on growth through transmission channels. In addition, the growth in Everhart, Vazquez, and McNab’s model is based on GDP level, which makes it very similar to the model chosen for this study.

\[ Yit = \beta_1 + \beta_2X_{1it} + \beta_3X_{2it} + uit \] (Gujarati 2004)

\[ GGDPit= \beta_0+\beta_1CPI_{it}+\beta_2FDI_{it} +\beta_3OPEN_{it}+Uit \]

GGDP is Economic Growth
CPI is corruption index
OPEN is openness to trade  
FDI foreign direct investment  

In the above model, (i) illustrates the number of countries varying: i=1, 2 ...6; (t) illustrates the number of years: t=1, 2...19.  

Based on apriori expectations CPI should have a negative relationship with GGDP, OPEN should have a positive relationship with GGDP, and lastly FDI should have a positive relationship with GGDP.  

Panel-Fixed Effects  
The researcher uses fixed-effects (FE) model whenever he is only interested in analysing the impact of variables that vary over time. FE explores the relationship between predictor and outcome variables within an entity (country, person, company, etc.). Each entity has its own individual characteristics that may or may not influence the predictor variables.  

Empirical Fixed Effect Model  
\[ Y_{it} = \alpha_i + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + V_i \]

E(Xitεit)≠ 0  (OLS is biased and inconsistent)  

In the above equation, (i) denote the individual countries and (t) shows the number of observations. In this study, each individual represents countries, which are repeated 19 times from 1995-2014. Therefore, N=114 and t = 19 (Yit) is a dependent variable, which measures the growth rate of GDP. Xt is explanatory variables as corruption, investment and openness and β is the parameter under investigation. Both Yit and Xt are observable individual effects, which vary over time.  

Panel-Random Effects  
The rationale behind random effects model is that, unlike the fixed effects model, a variation across entities is assumed to be random and uncorrelated with the Predictor or independent variables included in the model: “…the crucial distinction between fixed and random effects is whether the unobserved individual effect embodies elements that are correlated with the repressors in the model, not whether these effects are stochastic or not” [Green, 2008, p.183]”  

In random-effects one will specify those individual characteristics that may or may not influence the predictor variables. The problem with this, is that some variables may not be available therefore leading to omitted variable bias in the model.  
\[ Y_{it} = \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \alpha_i + w_{it} \]

\( Y_i \) is the dependent variable GDP,  
\( X_{1t} \) is the corruption perception index  
\( X_{2t} \) is the foreign direct investment  
\( Xt \) is trade openness  
\( w_{it} = \epsilon_i + u_{it} \)  
The composite error term \( w_{it} \) has two components: \( \epsilon_i \) which is the cross-section or individual specific error component and \( u_{it} \), which is the combined time series and cross section error component. \( U_{it} \) is sometimes called idiosyncratic term because it varies over cross-section (i.e. individual) as well as time.
Tests to Distinguish the Appropriate Model
This study has data on multiple countries repeated multiple time periods. However, this
description is not satisfactory to determine fixed effect or random effect for our data sets.
Therefore, some econometrics tests like hausmans test, to be explained later, are required.
These tests are necessary in order to determine if the model for the data sets is fixed or
random.

**Hausman Test**
This test is applied to test fixed effect models versus random effect models. The null
hypothesis of this test is constrained by regression model of insignificant fixed effects.
Therefore, in model: \( Y_{it} = \alpha_i + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + V_t \), the null hypothesis of Hausman
test signifies that there is no correlation between \( vt \) and variables in \( x_{it} \), which is as follows:
\( H_0: E (v_{it}/x_{it}) = 0 \). If Chi-Sq. df is less than Chi-Sq Statistic, the null hypothesis (random
effect) is rejected. Therefore, the fixed effect model is the choice; otherwise, random effects
occur.

**Result and Findings**
The primary purpose of this study is to investigate the effects of corruption on growth. In
order to meet this question for countries under investigation in this study, we need to specify
the model considered. In this model, GGDP is Economic Growth, CPI is corruption index,
FDI is foreign direct investment index and OPEN is trade openness index.

\[
GGDP_{it} = \beta_0 + \beta_1 CPI_{it} + \beta_2 FDI_{it} + \beta_3 OPEN_{it}
\]  
Model (3-1)

In the above model, (i) illustrates the number of countries varying: i=1, 2, N; (t) illustrates the
number of years: t=1, 2,...,T. The estimation of this model is done with three methods,
including combined data (pool data), Panel data with fixed effects, and Panel data with
random effects.

**Panel Unit Root Tests**
Before the estimations were done unit, root test was carried out on the data. It is first
necessary to determine whether real GDP per capita and the independent variables evolve as
unit root processes. There are several unit root tests specifically for panel data which have
been introduced in past decades. For this study the Im-Perasan and Shin test and Fisher-type
unit root test was used because majority of the test assume you have a balanced panel but the
Im-Perasan and Shin test and Fisher-type test allow for unbalanced panels.
Table 1:
Im-Pesaran and Shin Unit Root Test

<table>
<thead>
<tr>
<th>VARIABLE NAME</th>
<th>STATISTIC (at level)</th>
<th>P-VALUE</th>
<th>STATISTIC (At first difference)</th>
<th>P-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>-1.77</td>
<td>0.0384</td>
<td>-2.86</td>
<td>0.005</td>
</tr>
<tr>
<td>CPI</td>
<td>1.3523</td>
<td>0.9119</td>
<td>-1.682</td>
<td>0.037</td>
</tr>
<tr>
<td>FDI</td>
<td>-1.6872</td>
<td>0.0458</td>
<td>-3.642</td>
<td>0.006</td>
</tr>
<tr>
<td>OPEN</td>
<td>0.5462</td>
<td>0.7075</td>
<td>-1.248</td>
<td>0.029</td>
</tr>
</tbody>
</table>

Source: Stata/SE 12.0

The Im-Pesaran and Shin panel unit root test as above has the specification for a null hypothesis and an alternative hypothesis. The null hypothesis indicates the presence of a unit root process while the alternative indicates that the variable is stationary. The Im-Pesaran unit root test for GDP growth found that GDP was stationary both at level and at first difference having a P-value of 0.0384, a t-statistics of -1.7701 at level, and a P-value of 0.005, a t-statistic of -2.86 at first difference which led to the rejection of the null hypothesis that GDP has unit root. The null hypothesis was also rejected for FDI indicating that FDI doesn’t have unit root both at level and at first difference using the Im-Pesaran unit root test. FDI had a P-value of 0.0458, a t-statistics of -1.68 at level and a P-value of 0.006, a t-statistic of -3.642 at level and first difference respectively. Also using the Im-Pesaran unit root test for CPI, it was discovered that CPI was not stationary at level having a P-value of 0.9119 and t-statistics of 1.3523 but after taking the first difference it became stationary having a P-value of 0.037 and a t-statistic of -1.3523. Likewise Openness to trade wasn’t stationary using the Im-Pesaran unit root test having a P-value of 0.7075 and t-statistics of 0.5462 but after taking the first difference it also became stationary having a P-value of 0.029 and a t-statistic of -1.248.

Table 2:
FISHER-TYPE PANEL UNIT ROOT TEST

<table>
<thead>
<tr>
<th>VARIABLE NAME</th>
<th>STATISTIC (at level)</th>
<th>P-value</th>
<th>STATISTIC (at first difference)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>Inverse Chi-square(12) P</td>
<td>34.9255</td>
<td>0.0005</td>
<td>20.5513</td>
</tr>
<tr>
<td></td>
<td>Inverse normal Z</td>
<td>-3.3365</td>
<td>0.0004</td>
<td>-2.0166</td>
</tr>
<tr>
<td></td>
<td>Inverse Logit(34) L*</td>
<td>-3.5991</td>
<td>0.0005</td>
<td>-1.9280</td>
</tr>
<tr>
<td></td>
<td>Modified Inv. Chi-square Pm</td>
<td>4.6796</td>
<td>0.0000</td>
<td>1.7455</td>
</tr>
<tr>
<td>CPI</td>
<td>Inverse Chi-square(12) P</td>
<td>8.0423</td>
<td>0.7818</td>
<td>21.2481</td>
</tr>
<tr>
<td></td>
<td>Inverse normal Z</td>
<td>0.8879</td>
<td>0.8127</td>
<td>-1.8112</td>
</tr>
<tr>
<td></td>
<td>Inverse Logit(34) L*</td>
<td>0.8454</td>
<td>0.7981</td>
<td>-1.8423</td>
</tr>
<tr>
<td></td>
<td>Modified Inv. Chi-square Pm</td>
<td>-0.8077</td>
<td>0.7904</td>
<td>2.0003</td>
</tr>
<tr>
<td>FDI</td>
<td>Inverse Chi-square(12) P</td>
<td>30.6501</td>
<td>0.0022</td>
<td>22.7126</td>
</tr>
</tbody>
</table>
The Fisher panel unit root test as above has the specification for a null hypothesis and an alternative hypothesis. The null hypothesis indicates that the panel contains unit root while the alternative indicates that the panel does not contain unit root. Using the Fisher-type unit root test for GDP growth, GDP growth was found to be stationary both at level and at first difference. The P-values at level of P, Z, L*, and Pm were 0.0005, 0.0004, 0.0005, 0.0000 respectively, also the P-values for GDP at first difference of P, Z, L*, and Pm were 0.0574, 0.0219, 0.0311, 0.0404 respectively. This led to the rejection of the null hypothesis that GDP contains unit root both at level and at first difference since the P-values are all less than 0.05. The null hypothesis was also rejected for FDI indicating that FDI doesn’t have unit root both at level and at first difference using the Fisher-type unit root test. At level FDI had a P-value of P, Z, L*, and Pm at 0.0022, 0.0136, 0.0049 and 0.0001 respectively, likewise at first difference FDI had a P-value of P, Z, L*, and Pm at 0.0303, 0.0285, 0.0284, 0.0144. Also using the Fisher-type unit root test for CPI, it was discovered that CPI was not stationary at level having a P-value of P, Z, L*, and Pm at 0.7818, 0.8127, 0.7918 and 0.7904 but after taking the first difference it became stationary having a P-value of of P, Z, L*, and Pm at 0.0418, 0.0306, 0.0375 and 0.0244 respectively. Likewise Openness to trade wasn’t stationary using the fisher-type unit root test having a P-value of P, Z, L*, and Pm at 0.2481, 0.3439, 0.4153, and 0.2783 respectively, but after taking the first difference it also became stationary having a P-value of P, Z, L*, and Pm at 0.0345, 0.0298, 0.0294 and 0.0197 respectively.

**Results**

The results of the pooled, fixed and random effects models appear in the following table.

**Table 3**
The Estimation of Model (3-1) With Three Methods Including Pooled OLS and Fixed and Random Effects Models.
Dependent Variable: GGDP

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>POOLED</th>
<th>FIXED EFFECTS</th>
<th>RANDOM EFFECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONSTANT</td>
<td>5.3116</td>
<td>-1.7246</td>
<td>3.0095</td>
</tr>
<tr>
<td></td>
<td>(0.05)</td>
<td>(0.648)</td>
<td>(0.513)</td>
</tr>
<tr>
<td>CPI</td>
<td>-0.5201</td>
<td>0.7282</td>
<td>-0.1433</td>
</tr>
<tr>
<td></td>
<td>(0.552)</td>
<td>(0.648)</td>
<td>(0.009)</td>
</tr>
<tr>
<td>OPEN</td>
<td>-0.0875</td>
<td>0.04893</td>
<td>0.0126</td>
</tr>
<tr>
<td></td>
<td>(0.764)</td>
<td>(0.400)</td>
<td>(0.761)</td>
</tr>
<tr>
<td>FDI</td>
<td>0.6179</td>
<td>0.5471</td>
<td>0.5364</td>
</tr>
<tr>
<td></td>
<td>(0.005)</td>
<td>(0.013)</td>
<td>(0.009)</td>
</tr>
<tr>
<td>R Square</td>
<td>0.1015</td>
<td>0.05</td>
<td>0.093</td>
</tr>
<tr>
<td>R Adjusted Square/Rho</td>
<td>0.0683</td>
<td>0.25</td>
<td>0.21</td>
</tr>
<tr>
<td>Wald Chi²</td>
<td></td>
<td></td>
<td>6.85</td>
</tr>
<tr>
<td>Prob&gt;Chi²</td>
<td></td>
<td></td>
<td>0.000</td>
</tr>
</tbody>
</table>

SOURCE: Stata/SE 12.0

Note. The value in parentheses in above table shows the probability.
The table above indicates the values of the coefficients for the pooled OLS, fixed effect and random effect model. FDI is the only variable that is statistically significant under the pooled OLS and the fixed effect model having a P-value of 0.005 and 0.013 respectively. The random effect model from the table above, CPI and FDI are the only variables that are statistically significant having a P-value of 0.009 and 0.009 respectively. Before detailed analysis of the results can be made, a hausman test was conducted to determine which model between the fixed effect and random effect would be adopted for this study.
Table 4

Hausman Test for Model (3-1)
Dependent Variable: GGDP

<table>
<thead>
<tr>
<th>Calculated value</th>
<th>P-value</th>
<th>Judgment about test</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.18</td>
<td>0.7577</td>
<td>H₀ is accepted</td>
</tr>
</tbody>
</table>

SOURCE: Stata/SE 12.0

Since p value is greater than 0.05, the null hypothesis was accepted. Consequently, the appropriate model for this study is random effects. As a result, the results of the coefficient of the random effects in accordance with above table are determined. Therefore, the model (3-1) for the random Panel data, which are based on all coefficients of table 1 is as follows:

Model (3-1)

\[
GGDP = -0.1433 \text{ CPI} + 0.5364 \text{ FDI} + 0.0126 \text{ OPENK} + 3.0095 + w_{it}
\]

\[
T = (1.1908) \quad (0.2067) \quad (0.0416) \quad (4.5963)
\]

\[
P = (0.009) \quad (0.009) \quad (0.761) \quad (0.513)
\]

The value in parentheses above indicates the values of t and the level of significance of the coefficients (p value). We found that a one unit increase in the corruption level reduces the growth rate by about 0.1433 percentage points.

Discussion of Preliminary Analysis for the Random Effect Model (3-1) Accepted by the Hausman Test

It can be observed in the above equation that the effect of corruption on economic growth is negative. Therefore, this model (3-1) meets the first question of this study, which is about what the effects of corruption on growth are. The coefficients of the above model are consistently significant and they have expected values, which go along with the mentioned theories of Everhart, Vaquez and Mcnal and Shleifer and Vishny Models, which are described in Chapter two. A Wald test, for RE, is conducted to examine the overall significance of the regression (Wooldridge, 2009). With P-values at 0.000, the Wald test clearly rejects the null-hypothesis and it can therefore be concluded, that the empirical model is acceptable.

In addition, in the above model, \( R^2 \), (the explanatory power of model) is 9.3 percent. This means that 9.3 percent of variation of economic growth is explained by the model. CPI is found to be statistically significant, having a P-value of 0.009. A one unit decrease in corruption (one unit decrease in CPI) is associated with about 0.1433 percentage point increase in the growth rate of real GDP per year for the countries in the panel(Nigeria, Ghana, Cameroon, Ivory Coast, Chad and Togo.). This figure shows that corruption has a strong negative effect on the economic growth rates of the countries in the panel. The negative and significant coefficient of corruption (CPI) has answered the second question of this study and we can conclude that corruption has a negative impact on economic growth. This is consistent with the results of Mauro (1995, 1997); Wei (2000); Tanzi and Davoodi (1997).

This mentioned result aligns with empirical research done by Kwabena Gyimah-Brempong.
(2001) where they used a dynamic panel estimator to investigate the effects of corruption on economic growth. They found that corruption decreases economic growth directly. A unit increase in corruption reduces the growth rates of GDP and per capita income by between 0.75 and 0.9 percentage points and between 0.39 and 0.41 percentage points per year respectively.

Openness is found to be insignificant having a P-value of 0.761. A one unit increase in openness (one unit increase in Open) is associated with about 0.0126 percentage point increase in the growth rate of real GDP per year for the countries in the panel (Nigeria, Ghana, Cameroon, Ivory Coast, Chad and Togo.).

FDI is also found to be significant having a P-value of 0.009. A one unit increase in foreign direct investment (one unit increase in FDI) is associated with about 0.5364 percentage point increase in the growth rate of real GDP per year for the countries in the panel (Nigeria, Ghana, Cameroon, Ivory Coast, Chad and Togo.). This figure shows that corruption has a strong negative effect on the economic growth rates of the countries in the panel.

Conclusion
The findings obtained from the above models indicate that in countries (Nigeria, Ghana, Cameroon, Ivory Coast, Chad and Togo) under investigation in this study, economic growth is adversely and directly influenced by corruption. A one unit decrease in corruption (one unit decrease in CPI) is associated with about 0.1433 percentage point increase in the growth rate of real GDP per year for the countries in the panel (Nigeria, Ghana, Cameroon, Ivory Coast, Chad and Togo). This figure shows that corruption has a strong negative effect on the economic growth rates of the countries in the panel.

Recommendations
It is shown that growth is negatively influenced by corruption directly and adversely for those countries considered in this study. Reformers should expect the benefits that are limited to this direct effect. However, indirect effects of corruption reduction via investment spending is not expected to help because these transmission channels are shown to play no role. Thus, reformers should reduce corruption through some other explanatory variables, which are openness to trade, human capital investment, competition, property rights, and political stability. Moreover, governmental systems can reduce corruption by giving incentives for positive points like morality instead of only paying attention to reducing negative points like immorality. When virtuous behaviours are rewarded, this can help to encourage people to be more honest. To increase the individuals’ incentives to be more moral, it is better to emphasize motivating factors and control some disincentive factors, which cause the opportunity for corruption. The motivating factors are as follows: human capital channels like education, the level of public trust, and support for disclosure violations, have a high relationship with corruption.

References


Kwabena, Gyrman-Brempong (2001). Corruption, economic growth, and income inequality in Africa
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