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Interdependence of Corruption and Poverty in Africa

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Abstract

This paper examines the relationship and causal linkages between corruption and poverty. The effects of governance on both corruption and poverty are also analyzed in the study. Data for 23 Sub-Saharan African countries over the years 2000 – 2009 are used in a dynamic panel model applying System-Generalized Method of Moment Estimation. Our results confirmed that corruption affects poverty positively in a statistically significant way indicating increased incidence of corruption increases poverty and vice versa. Poverty in capability as measured by the Human Poverty Index (HPI) also affects corruption, with the same sign. The causal link between corruption and poverty is found to be bidirectional running both from corruption to poverty and from poverty to corruption. That is, current and past information on corruption helps to improve the prediction on poverty, similarly current and past information on poverty helps to improve the prediction on corruption. The quality of governance affects poverty, whereby improved governance contributes to poverty reduction and poor governance increases poverty. It is, therefore, important to understand the corruption-poverty nexus while developing and implementing development policies. Policies intended for combating corruption and alleviating poverty should be an integral component of the same strategy and should not be treated separately.

Keywords: corruption, poverty, governance quality, generalized method of moment

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Introduction

Corruption, commonly defined as "the abuse of public office for private gain," is pervasive in developing countries. The Africa Development Indicators Report (2010) indicates that corruption in Africa is multifaceted and ranges from "big-time" to "quiet" corruption[3]. The complexity of the matter is more pronounced because the 'quite' one, which is characterized as malpractices, performed by frontline service providers, is widespread in the continent and because a large number of citizens in the region rely on the services provided by the government.

We also note that corruption is not a recent phenomenon but has a long history. Most of the literature cites the speech in ancient India by Kautilya (4 BC) from the book of Arthashastra[4]. Even though much of the discourses in the antiquities focused on illegal trade and theft of public revenues, it is apparent that the effect of corruption is much more widespread and more corrosive to the state. It emerged as an issue of international concern in 1990's following the international community's cognizance of its crippling effects (Khemani, 2009).

It is now widely accepted that improving the conditions of the poor is both a widespread political demand and central to the realization of the Millennium Development Goals (MDGs) and other international obligations. Improving governance then becomes an integral part for achieving these goals. Where the mechanisms of good governance are weak or lacking, as it is the case for most Sub-Saharan African (SSA) countries, poor people are often marginalized and development outcomes suffer.

Sub-Saharan African countries are characterized by co-existence of various economic, political, and social problems. Among these, the co-existence of corruption and poverty is apparent. The Transparency International Corruption Perception Index Report (2009) indicates that corruption is a major issue in SSA countries. Almost 70% of the investigated SSA countries scored an index below three, indicating that corruption is rampant. In comparison, this proportion is

about 33% for the Americas, 43% for the Asian Pacific region, and 55% for Eastern Europe and Central Asia. In sixteen of thirty five countries considered in SSA, 50% of the firms reported an expectation of informal payments to get things done (Africa Development Indicators, 2010).

Not only is corruption rampant throughout the African continent but it is also deep rooted in its societies, public domain, and critical sectors. Most African countries are characterized by what is termed "embedded levels of corruption", involving inter-woven networks of politicians, bureaucrats, the private, and the security sectors (Khemani, 2009). According to the United Nations estimate, in 1991 alone, more than 200 billion dollar in capital was siphoned out of Africa by the ruling elites. This outflow of wealth from corruption forms part of capital flight, and on an annual basis, exceeds the inflows to Africa during the year in the form of foreign aid. The amount was also more than half of African foreign debt, during the time.

Similarly, among the 1.75 billion people of the world's poor, living in the 104 countries covered by Human Development Report (2010), those living in SSA constitute the lion's share. The incidence of poverty in the region ranges from three percent in South Africa to 93 percent in Niger, with an average of 45-69 percent. The HDI for most countries in SSA has stagnated or declined since 1990, leaving this region as the poorest in the world. Thirty five out of the 42 countries with low level of human development are found in SSA (UNDP, 2010).

Following the co-existence of corruption and poverty in Africa, it is imperative to question the causes and consequences of both, including their linkages. Literature regarding causes and consequences of corruption show that both the causes and consequences of corruption that are common to all countries are subject to debate. They depend on countries' social, political, and economic backgrounds. While definite causal linkages are difficult to establish, the literature suggests that corruption prevails wherever these factors exist. These factors include weak rule of law, low wage of civil servants, wider discretionary power owned by politicians, legacy of colonial rules, historical dominancy of the state in economic and political affairs, and interest to keep status quo, among others. Some indicate that due to the unstable political conditions and

uncertainty about their future positions, officials and civil servants in developing countries prioritize corruption benefits to keep their own living and that of their extended family (Ampratwum, 2008; Aidt, 2003).

Tanzi (1998) classifies the causes of corruption as factors that affect their demand for and those that affect supply of corrupt acts[5]. Voskanyan (2000), acknowledging to Leslie Holmes (1993), classifies the causes of corruption into three categories: cultural, psychological and system related[6]. Most cross-sectional studies indicate that poverty is among the causes of corruption, presenting the following theoretical reasoning. Often, the poor has low education, less exposure to media, low political participation, and less asset or wealth. Yet, these factors empower people with capacity to protest and complain on corrupt acts. These factors, which can be seen as both supply and demand sides of corruption, may make the poor accept and practice corruption (You and Khangram, 2005).

On the other hand, the debate on the impact of corruption as beneficial and harmful are commonly categorized as "greasing the wheels" and "sanding the wheels" hypotheses[7]. The basis for the former argument is the predominance of dysfunctional and inefficient institutions in developing countries. The latter strongly argues that, under whatever circumstances, the net effect of corruption does not indicate any supplementary role on growth or development. It would rather lead to persistent national welfare loss. Before the cognizance of the international community about its crippling effects, until the 1990s, corruption was regarded as grease to the bureaucratic wheels in most countries.

In recent years, however, the forces that consider corruption as beneficial to economic and political development have all been discredited. Though corruption may lead to some benefit, such benefits are completely negated by their costs. It has generally stunted the creation of wealth and severely limited governments' ability to deal effectively with poverty and deprivation. Apart from the negative social and economic consequences, corruption would also have a political impact; whereby corruption is used by the politically dominant

groups to monopolize the political space and limit the participation of certain ethnic, social, and racial groups (Zemanovicova *et al.*, 2002).

A number of studies show that corruption exacerbates poverty and deprivation. For example, corruption, according to Gupta *et al.*, (1998), may create biased tax systems which favor the 'haves' and hurt the 'have-not' that aggravate income inequality. It also results in poor targeting of social programs, diversion of human capital distribution and formation, and increase the risk on investment premium for the poor which end up in inequality and poverty. Similarly, Mauro (1995; 1996), Rose-Ackerman (1997), Bardhan (1997), Kaufmann (1997), Tanzi and Davoodi (1997), Gupta *et al.* (1998), Gyimah-Brempong (2002), Zemanovicova *et al.* (2002), Lambsdorff (2003), Pelligrini and Gerlagh (2004), N'ZUE and N'GUESSAN (2005), Anoruo and Braha (2005), Cho and Kirwin (2007), Razafindrakoto and Roubaud (2007), Lawal (2007), Nbaku (2008), Dincer and Gunalp (2008), Ampratwum (2008), Hadley *et al.* (2009), Negin *et al.* (2010), to mention some, show that corruption, in one way or another, adversely affects poverty reduction, growth, equity, public trust, institutions, and social, economic, and political developments.

The theoretical framework followed in this paper, regarding the link between corruption and poverty, is examined following the structuralist approach of explaining poverty. That is, the problem of poverty in Africa is due to the factors beyond individual control. In other words, poverty is mainly a result of social, economic, and political structures that constrain people's choices. According to the review by Ulimwengu (2006), millions of people may get poor no matter how hard they work and no matter what their skills are, which is much more attributed to the structures in which they live in. Poor people are poor because of the circumstances beyond individual control such as lack of basic education, adequate health coverage, job opportunities, political participation, protection from abuse, good governance, and other conducive factors necessary to get out of poverty. Even in a situation where countries perform exceptionally well in alleviating poverty, a significant proportion of their population may remain poor merely due to structural barriers.

Among the structural barriers, corruption and governance are preeminent. Therefore, in order to gain efficiency in production and efforts that are being exerted by governments and donors to eradicate poverty in SSA, it seems

mandatory that issues of corruption must be dealt with. In the course of dealing with corruption and poverty, understanding the nexus and the direction of causality between them is important. This study, therefore, investigates the relationship between corruption and poverty based on the notion of causality by using panel data.

The Data and the Model

The Data

The study considers annual data from 23 Sub-Saharan African countries for the years 2000 - 2009. Data, for any particular variable, for all countries, are taken from a single source and include those from World Development Indicator (WDI, 2010), Annual Human Development Reports of the UN, Annual Reports of the Transparency International, and the World Bank Governance Indicators database.

The annual Corruption Perception Index (CPI) published by Transparency International is taken as a proxy for corruption. It is the best known index of corruption, which ranks 180 countries in an index between zero and ten (where 10 indicates the lowest and zero refers to the case where most transactions/relations are tainted by corruption) based on perceived level of corruption, as determined by expert assessment and opinion surveys.

This index, however, is not without limitation. It only reflects respondents' perceptions, and is not based on objective and quantitative measures of actual corruption. Despite its limitations, most researchers (Gupta *et al.*, 1998; N'ZUE and N'GUESSAN, 2005; Negin *et al.*, 2010; Mauro, 1995; Tanzi, 1998; etc) use the index among the available measures of corruption. Tanzi (1998) argues that developing a measure that indicates the quantitative amount of corruption in a country is difficult and it is not even clear what one wants to measure. Simply measuring bribes paid would ignore a whole range of corrupt acts which are not accompanied by the payment of bribes. Similarly, if one attempts to measure acts of corruption rather than the amounts of bribes paid, there is a possibility to count many relatively unimportant actions and also faces difficulty in identifying each act. Therefore, we have chosen CPI as a proxy for corruption.

The decision about what data to take for poverty depends on the type of associated problems to be addressed in a study. The argument basically dwells

on the outstanding controversy on the definition of poverty (Ravallion, 1996). Some favor the use of head count ratio while others prefer to use poverty gap, or squared poverty gap. Others, still, use Human Poverty Index (HPI) especially for an analysis made on developing countries. Measuring poverty in terms of GDP or Purchasing Power Parity may not fully capture the phenomenon of poverty. A broader definition treats it as multidimensional, including low income, low levels of education and health, vulnerability to (income loss, natural disaster, crime and violence, education curtailment), and voicelessness and powerlessness (feeling discrimination, lacking income earning possibilities, mistreatment by state institutions, and lacking status under the law) among the many aspects of well-being.

While measuring poverty in terms of income level seems relatively straight forward, the multidimensional approach may be more complex and includes variables that are difficult to quantify. Hence, we preferred using the Human Poverty Index (HPI) as a Multidimensional Poverty Index that was published for the first time in the United Nations Human Development Report (2010). The rational for this is that HPI[8] focuses on the most basic dimensions of deprivation such as a short life, lack of basic education, and lack of access to public and private resources, which are real concerns in developing countries and span beyond material well-being. The notion of HPI was introduced by the 1997 Global Human Development Report. The report defined human poverty as "the denial of choices and opportunities to lead a tolerable life" which is beyond lack of material well-being.

Data for other variables such as inflation, rural population, and gender are taken from World Development Indicator (WDI, 2010) database. We use the Consumer Price Index as an indicator of inflation, as often suggested for studies that need to take into account the cost of living in a country. Rural population represents the percentage of rural population out of the total population. The variable 'Gender' indicates female labor force participation rate (or female in labor force as a percentage of total labor force).

Governance quality data is obtained from the World Bank Governance Indicators database. It is calculated from the database as the average of five indicators - voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, and rule of law. Though the World Bank Governance Indicator comprises 'control of corruption' as one of the governance indicators, we excluded it from the components of governance quality data developed for this particular study. The exclusion is basically motivated by the need to enhance the power of other governance indicators in explaining corruption and poverty, as a separate corruption measure (CPI) is already considered. Moreover, its inclusion may result in severe multicollinearity problem in poverty regression. The governance indicators data developed by the World Bank are rescaled for this particular study. The original scale that ranges from -2.5 (the lowest) to 2.5 (the highest) is rescaled to an index between 0 and 1. Such a rescaling helps to enjoy the benefit of avoiding the complication that arises from dealing with negative numbers.

The Model

Specific to our objectives of examining the relationship between corruption and poverty using dynamic panel data, our study rests on the following basic model:

$$Y_{it} = \alpha \boldsymbol{Y}_{i,\,t-j} + \beta \boldsymbol{X}_{it} + \delta \boldsymbol{Z}_{it} + \varepsilon_{it} \qquad (3.1)$$

$$\varepsilon_{it} = \mu_i + \lambda_t + \nu_{it}$$

Where, Y and X are poverty or corruption, and Z represents control variables used as mediators between poverty and corruption such as inflation, governance quality, rural population, GDP per capita growth rate, and gender. $i = 1, \ldots, N$ is cross-section/country while $t = 1, \ldots T$ is time period. The notations μ_i, λ_t, and ν_{it} are the individual and time effects, and the disturbance term, respectively.

We have two models where the first captures the effect of corruption on poverty and the second addresses the effect of poverty on corruption. Both equations capture the relationship between corruption and poverty including causality between them. In both models, we introduced time dummies to consider for the time effects as suggested by Islam (1998).

The first equation (Equation 3.2) specifies the effect of corruption on poverty. That is,

$$Y_{it} = \gamma + \sum_{j=1}^{m} \alpha_j Y_{i,t-j} + \sum_{r=0}^{n} \beta_r X_{i,t-r} + \sum_{k=0}^{q} \delta_k \boldsymbol{Z}_{i,\,t(L)} + \sum D_t + \mu_i + \nu_{it} \qquad (3.2)$$

Where Y_{it} is poverty (HPI (in natural logarithm), *LnHPI*), $Y_{i,t-j}$ = lagged poverty ($LnHPI_{i,t-j}$), $X_{i,t-r}$ = corruption (corruption perception index (in natural logarithm), *LnCPI*), and $Z_{i,t-k}$ = a matrix of other explanatory variables, i.e., inflation (*INF*), GDP per capita growth rate (*GDPPCGR*), governance quality (*GQ*), rural population (in natural logarithm, *LnRP*), and Gender (female in labor force as a percentage of total labor force, *LnGN*), and D_t = time dummy. μ_i, ν_{it}, i, and t are as defined earlier and L represents lag of the variables. The lag (L) is taken as an option to incorporate for the possibility of some of the control variables to affect the dependent variable by their lag; γ, α, β, and δ are vectors of coefficients, m and n are number of lags and q is a number attached to the vectors of control variables for identification.

Our second equation is similar to Equation 3.2, with the exception of interchanged notations between Y and X and exclusion of GDP per capita growth rate from vector Z. Thus,

$$X_{it} = \gamma + \sum_{j=1}^{m} \alpha_j X_{i,\,t-j} + \sum_{r=0}^{n} \beta_r Y_{i,\,t-r} + \sum_{k=0}^{q} \delta_k Z_{i,\,t(L)} + \sum D_t + \mu_i + \nu_{it} \qquad (3.3)$$

Where X and Y are corruption and poverty respectively and Z comprises a vector of all control variables indicated under Equation 3.2, except GDP per capita growth rate. In both the models, we assume that $E(\mu_i) = 0$, $E(\nu_{it}) = 0$, $E(\mu_i\, \nu_{it}) = 0$ for $i = 1,\ldots N$ and $t = 2,\ldots T$. We also assume that $E(\nu_{it}\, \nu_{is}) = 0$ for $i = 1, \ldots, N$ and $t \neq s$. In other words, the individual effect and the error term are independent of each other and among themselves.

There are different estimation methods which are often used for panel data models. Some are criticized for their weak performances while others are considered better depending on the degree of their strengths and the available remedial measures for associated problems. The OLS estimator for dynamic

panel data, for example, is both biased and inconsistent because the lagged dependent variable (one of the regressors) is correlated with the error term.

Similarly, the standard within group or least square dummy variable (LSDV) transformation to remove the individual effects produces biased and inconsistent estimates due to the correlation between the transformed lagged dependent variable and the transformed disturbance (Baltagi, 2005; Roodman, 2006). The Anderson-Hsiao estimator is also found inefficient and does not use all the available instruments, though it eliminates the problem of correlation between the lagged dependent variable and the individual specific effects, as a result of first differencing and the employment of instrumental variables (Arellano and Bond, 1991).

Using the Generalized Method of Moment (GMM) is suggested as a means of addressing the problems encountered by the Anderson-Hsiao estimator. The key intuition behind the GMM method is that the panel structure of the data provides a large number of instrumental variables in the form of lagged endogenous as well as exogenous variables. It is generally known that using many instruments can improve the efficiency of various IV and GMM estimators (Blundell and Bond, 1998). Hsiao and Tahmiscioglu (2007) recommend GMM estimators for dynamic panel data models showing that the method is applicable with the presence of either random or fixed individual and time- specific effects, and is consistent and asymptotically normally distributed when N or T or both tend to infinity.

The Difference GMM (DIFF-GMM) and System GMM (SYS-GMM) estimators, while widely suggested for dynamic panel model, are not free of limitations. They are sometimes criticized as they may produce biased estimators. The DIFF-GMM estimator, which corrects for the problems associated with the cross-sectional estimators, may perform poorly in certain situations. When the time series is persistent and when the time under consideration is small, this estimator behaves poorly (Hayawaka, 2005). Blundell and Bond (1998) show that the DIFF-GMM estimator displays large downward biases and a serious lack of precision in estimating the autoregressive parameter when it approaches to unity (or often be greater than 0.8).

Considering these scenarios, Blundell, Bond, and Windimeijer (2000) suggest another type of GMM estimator - the SYS GMM - which resolves the problems

by exploiting additional assumptions about the initial condition. The system GMM combines moment conditions for the differenced equation along with moment conditions for the model in levels. The system GMM estimator, despite using more instruments, is less biased than the first differencing and the level GMM estimators (Blundell and Bond, 1998; Hayakawa, 2005; Roodman, 2006). Hayawaka (2005) especially argues that the primary reason for the system estimators to be less biased is the fact that the bias of the system GMM is composed of a weighted sum of the biases of the first differencing and the level estimators which have opposite effects.

However, the SYS-GMM estimator too has some limitations. For instance, increased bias and unreliable inference may result from the use of large number of instruments in estimation (Newey and Smith, 2004; Hayawaka, 2005). We handled this problem by conducting the Sargan-test for over identifying restrictions as suggested by Roodman (2006). In other words, the appropriateness of the instruments is checked by testing for the absence of any correlation between the instrumental variables and the disturbances. When the p-value fails to reject the null hypothesis, it implies that the instruments used are appropriate for the estimation.

It is important to note that the consistency of our estimators depends on our assumption that v_{it} are serially uncorrelated. If serial correlation exists, some of our instruments will be invalid and the moment conditions used to identify parameter may not hold. In other words, the use of lagged values (and first differences of lags) of the endogenous variable as instruments would be invalid in the presence of serial correlation. Therefore, we conduct serial correlation test to judge the reliability of our estimates. Arellano and Bond (1991) provide a test for autocorrelation, AR (1) and AR (2), appropriate for linear GMM regression. If the test shows first order autocorrelation but no second order autocorrelation, it is indicating that the instruments are valid.

In order to address the causality between corruption and poverty, we used the Engle-Granger causality test (Wald test). Engle and Granger defined causality between variables as "a given variable Granger causes another variable if better predictions of the latter variable are obtained using lagged and current information on the former variable." The Wald test on lags of corruption in

Equation 3.2 and on lags of poverty in Equation 3.3 is used to infer whether corruption causes poverty or poverty causes corruption.

Results and Discussion

From the descriptive statistics, the HPI for the sample countries ranges between 9.5 and 60.3. The average value (Annex 1) implies that the most basic dimensions of deprivation such as short life, lack of basic education, and lack of access to public and private resources is, on average, severe for the countries. The mean value of corruption perception index ranges within the values defining the most corrupt countries of the world as per the scale of Transparency International. The calculated governance quality index (0- highly poor and 1- good quality) data reveal that the sample countries are, on average, below the average governance quality. The governance indicators data show that governments in SSA are, on average, not hearing to the voices of their citizens and are not responsive to the questions of those from which they drive the authority; there is high unrest rate in the sub-region; the ability of the governments to formulate and implement sound policies is lower; the quality of public and civil services, of their independence from political pressure, of policy implementation and the credibility of governments to their policies in the countries are lower; and the effectiveness and predictability of judiciary in the countries is low.

Results from Model 1 show that corruption is significantly affected by its lag, lag of poverty, and governance quality. The persistent nature of corruption and poverty supports the reported effect of the lag of the variables. The result that poverty positively affects corruption confirms the established argument that poor people are obliged to pay additional offer (in monetary term or in kind) to enjoy their rights since they lack the capacity and power to resist corrupt acts and monitor officials (You and Khagram, 2005). The result, in addition, supports the assertion that the possibility for corruption activities to flourish and strengthen in poverty-stricken society is higher than that of the rich economies, though the monetary amount involved may be larger in the latter. Some individuals in poor economies may decide to take-up undue benefits instead of generating their dues. Moreover, the deficient institutions in the poor nations make the poor (with frequent contact with the service providers) prone to corruption.

Table 1: System-GMM results of corruption-poverty model (where Model 1 represents corruption model and Model 2 represents poverty model)

Parameter Estimate	Model 1	Model 2
$(Lncpi)_t$		-.2181354 (.1277027) *
$(Lncpi)_{t-1}$	.6045649 (.0851254)***	.0743865 (.1383905)
$(Lncpi)_{t-2}$	.0547957 (.0585212)	.1227841 (.1033918)
$(Lncpi)_{t-3}$		-.2129632 (.1057158) **
$(lnhpi)_t$	-.0540233 (.1201532)	
$(lnhpi)_{t-1}$	-.2568508 (.1172094)**	.783091 (.1139479) ***
$(lnhpi)_{t-2}$	.1623472 (.1217349)	-.0377213 (.1050622)
Inf	.0000576 (.0013308)	.0008983 (.0017132)
Lngn	.1936857 (.197344)	
$(Lngn)_{t-3}$		.116448 (.261656)
Lnrp	-.0649759 (.1142988)	
$(Lnrp)_{t-1}$		.1909782 (.1091927) *
Gq	.779901 (.25069) ***	
Gq_{t-1}		-.7245777 (.4185355) *
GDPpccgr		-.0002759 (.0030696)
Constant	.0786551 (.823084)	-.0704367 (.0379175) *
No. of observations	139	132
No. of groups	23	23
Sargan test (p- value)	0.2990	0.2706
AR(1), p- value	0.0045	0.0092
AR(2), p- value	0.3403	0.4737
Wald test, p-value (Ho:$(lnhpi)_{t-1}$= $(lnhpi)_{t-2}$ = 0)	0.0287	
Wald test, p-value (Ho:$(logcpi)_{t-1}$=$(logcpi)_{t-2}$=$(lncpi)_{t-3}$ = 0)		0.0495
Wald test, p-value (Ho: yr03 = yr04=….=yr09 = 0)	0.0029	0.0182

*Figures in parentheses are standard errors. *** indicates significance at 1% level, ** indicates significance at 5% level, and * indicates significance at 10% level. Abbreviations are as defined before. Time dummies are not reported.*

The quality of governance affects corruption statistically significantly, indicating the strong relationship between governance and level of corruption. The positive coefficient shows that improved governance may lead to lower corruption and poor governance indicates higher possibility for spread of corruption. The result is consistent with theoretical and empirical justifications that improved governance lowers corruption and poor governance creates and breeds corruption (Pillay, 2004).

Model 2 shows that the lag of poverty, and the level and lag of corruption are significant whereas the remaining lags of both variables are found insignificant. The sign of the coefficient of corruption is negative mainly because lower values of corruption data indicate higher corruption level. The significance of corruption in the model reveals that corruption has an impact of aggravating poverty. In an economy where provision of services is tainted by corruption, poor people are often marginalized from the services, and in the case where they decide to pay bribes, it is at the expense of their other best alternative uses. The poverty levels in SSA countries have shown less improvement (UNDP - Human Development Report) for the past years may be because of the adverse effect of rampant corruption in the region. This finding is in line with those of Gupta *et al.* (1998) and Razafindrakoto and Roubaud (2007).

Both the quality of governance and rural population are found significant in Model 2. The quality of governance affects poverty negatively, meaning improved governance helps to reduce poverty. Poor people need a system that offers them equal opportunity in accessing services. Improving governance, therefore, creates a mechanism that pushes the poor out of poverty. On the other hand, the likelihood of increasing poverty is higher among the rural population since rural areas are often characterized by poor infrastructure and are marginalized from other facilities necessary to reduce poverty. These results are consistent with the finding in Haughton and Khandker (n.d).

The standard causality test results reveal that there exists bidirectional causality between corruption and poverty in SSA[9]. The Wald test result from Model 2 rejects the null hypothesis of no causality. This indicates that corruption

Granger-causes poverty which, in turn, means that current and past information on corruption helps to improve prediction on poverty. Similarly, the test result on lagged values of poverty in Model 1 rejects the null hypothesis of no causality showing that poverty also Granger-causes corruption meaning current and past information on poverty helps to improve the prediction on corruption.

Three types of diagnostic test were used to determine the validity of our empirical models. These tests include the Sargan test of identifying restrictions, autocorrelation test, and significance tests of the included time dummies. The Sargan test of identifying restrictions under the null hypothesis of the validity of instruments (Roodman, 2006) examines the quality of specification of the model and the appropriateness of the instruments used. For both models, a high p-value of Sargan test statistics was observed and hence the null hypothesis fails to reject. This shows that the models were well specified and that the instruments were appropriate.

Second, the autocorrelation tests for the presence of serial correlation in the first differenced residuals of first and second order were conducted. The test results of first-order autocorrelation (AR (1)) particular to each model show that the null hypothesis of no autocorrelation was rejected as the p-values exhibit significance. The test results of the second-order autocorrelation (AR (2)) from both models, on the other hand, fail to reject the null hypothesis of no autocorrelation as indicated by higher p-value. The absence of serial correlation shows that the differenced residuals have significant negative first-order serial correlation and no second order serial correlation. In line with this, the observed high p-value results of AR (2) in both models reveal that the instruments used in both models were independent of the error term and hence were appropriate for estimation.

Finally, the joint significance test for time dummies was tested to examine the validity of the time dummies considered in each model. Results from both models show that the null hypothesis that the coefficients of all the time dummies considered were jointly equal to zero was rejected and hence the time dummies were found relevant and appropriate for the estimation.

Concluding Remarks

This paper attempted to show the relationship between corruption and poverty as well as the causal link between them. The estimation results show that the relationship between corruption and poverty is bidirectional, meaning corruption has a significant effect on poverty and poverty has a significant effect on corruption. The results of causality test also show that bidirectional causality exists between them. It is shown that corruption Granger-causes poverty, and poverty Granger-causes corruption. This indicates that the severity of the variables may reinforce each other unless they are carefully managed together. Moreover, the quality of governance has a significant effect on both corruption and poverty. Good governance limits corruption and helps to reduce poverty while poor governance begets a breeding ground for corruption and increased poverty. Larger rural population which is characterized by underdeveloped facilities also exerts negative pressure on poverty.

The significance and bidirectional causality between corruption and poverty necessitates the need to develop pro-poor and anti-corruption strategies that are tied together. Poverty alleviation strategies of a country should also be within a framework of laying corruption-free channels of implementing the strategies. Since the causality is running from both directions, governments have to put 'combating corruption' and 'poverty reduction' simultaneously among their priorities. Due attention should also be given to improving the quality of governance while working towards poverty alleviation and combating corruption. The stakeholders should not treat poverty alleviation and combating corruption as different strategies, rather they have to be treated as integral components of the same strategy. Further research also has to be conducted for each country to explore country-specific linkages.

Endnotes

[1] 'Big-time' corruption refers to administrative and political corruption at the highest government level. 'Quite' corruption indicates deviation from an expected conduct at lower level which includes various types of malpractice of frontline providers (that may/may not involve monetary exchange).

[2] The quotation is "just as it is impossible not to taste honey or poison that one may find at the tip of one's tongue, so it is impossible for one dealing with government funds not to taste, at least a little bit, of the King's wealth".

3The demand side includes authorization and regulations, bad characteristics of tax system, spending decisions, and provision of goods and services at low market prices. The supply promoters include bureaucratic tradition, level of public sector wage, the penalty systems, institutional controls, the transparency of rules, laws, and processes, and the examples provided by the leadership.

[4] The details regarding the factors included in each of the three categories can be referred from Voskanyan (2000)

[5] The details on "grease the wheels" and "sand the wheels" hypotheses is available in Meon and Sekkat (2005).

[6] HPI-1= $[1/3(P_1^{\alpha} + P_2^{\alpha} + P_3^{\alpha})]^{1/\alpha}$ where P_1 = the probability at birth of not surviving at age 40 (times 100), P_2 = adult illiteracy rate, P_3= 1/2 (population not using an improved water source) + 1/2 (children underweight for age), and α= 3. The details are found in technical note for human development calculation by Doraid (1997).

[7]Test results can be referred from Table1 corresponding to each model.

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Annexes

Annex 1: Summary statistics of descriptive results

Variable	Observation	Mean	St. deviation	Minimum	Maximum
HPI	199	37.99648	10.38898	9.5	60.3
CPI	211	2.994787	1.131927	1	6.4
INF	220	11.82386	26.08144	-8.24	325
GN	230	44.02474	6.050731	27.85	53.1
RP	230	61.28565	14.10946	38.28	87.9
GQ	207	0.4063768	0.1271262	0.15	0.68
GDPPCCGR	230	2.880124	3.942682	-15.1565	22.61792

Source: Own computation from the raw data, 2011

Annex 2: List of sample countries

Angola
Botswana
Cameron
Congo, Rep.
Cote d'Ivoire
Ethiopia
Gambia
Ghana
Kenya
Madagascar
Malawi
Mali
Mauritius
Mozambique
Namibia
Nigeria
Senegal
Sierra Leone
South Africa
Sudan
Tanzania
Uganda
Zambia