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SHAPING TOMORROW: ASSESSING THE LINK BETWEEN CORRUPTION, ECONOMIC FREEDOM, AND GROWTH IN SUB-SAHARAN AFRICA

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Abstract
Institutional weakness, including corruption and weak governance, has been identified as a major hindrance to economic growth in Sub-Saharan African (SSA) countries. This study investigates the relationship between corruption, economic freedom, and economic growth in SSA countries from 1996-2014 using a multivariate cointegration and error-correction framework. The study finds that economic freedom Granger-causes economic growth in the short term, while economic freedom and economic growth Granger-cause corruption in the long term. Furthermore, there is positive unidirectional causality from economic freedom and economic growth to corruption in the long term and positive unidirectional causality from economic freedom to economic growth in the short term in SSA countries. The findings suggest that good policies, quality institutions, and good governance are essential for the process of economic growth and development in the region. The study has important policy implications for SSA countries.

Keywords: Corruption, Economic Freedom, Economic Growth, Institutional Weakness, Sub-Saharan Africa, Governance.

Introduction

Corruption is a global problem that has persisted for decades, and it has a profound impact on social and economic growth in many countries. Institutional weakness is often the root cause of corruption, which can lead to negative economic performance and other related problems. Over the last two decades, the issue of corruption and its impact on economic growth has become a topic of interest among economists and researchers. The effects of corruption can be significant, as it undermines the rule of law, weakens institutional foundations, and hinders economic growth (World Bank, 2013).

According to the World Bank, corruption is the "single greatest obstacle to economic and social development." This assertion highlights the significance of corruption as a hindrance to growth, which can be especially problematic in developing countries such as those in Sub-Saharan Africa (SSA). SSA has experienced unsatisfactory economic performance over the past decade due to both exogenous and endogenous factors. The exogenous factors include global financial crises and unfavorable terms of trade, while the endogenous factors include weak governance structures, inappropriate policy regimes, ethnic conflicts, and protracted civil wars, among others (Asiedu, 2014).

Endogenous factors, including corruption and weak governance structures, are often related to governance issues. Corruption has become an endemic problem in SSA, and this has had a negative impact on the region's economic performance (Richards et al., 2003; Kofele-Kale, 2006).

Governance has been a significant challenge in harnessing domestic investment and attracting foreign inflows for growth. This is further worsened by a long history of poor governance, as poor governance has been a major hindrance to increasing domestic investment over the years (Akanbi, 2010).

Many studies have explored the relationship between institutional quality, corruption, and economic growth. The focus of these studies has been on the perceived levels of corruption, institutional framework quality, and economic growth in order to test various hypotheses. One particular feature of these studies is to investigate the impact of both institutional framework quality and corruption on economic growth (Asiedu, 2014). In this paper, the linkage between corruption, economic freedom, and economic growth is examined in an empirical context for SSA, over the period 1996-2014, in both directions: corruption causes economic growth or economic freedom or vice-versa, economic freedom serves as a deterrent to corrupt activity.

1. Theoretical Framework And Empirical Review

Corruption increases the cost of operations and maintenance in public institutions. This enhances inefficiency in public institutions, and raises the prices of public and social services, potentially increasing inflation rates in countries. Krueger (1974) represents a classic study of socially inefficient rent-seeking through corrupt trade restriction enforcement. In cases of corruption such as these, the de facto institutional environment would restrict economic activity more than the de jure legal restrictions on the official books. Colombatto (2003) also analyzes corruption theoretically in a variety of different institutional environments and finds that in some cases corruption can be efficient in developed countries as well as in totalitarian ones.

Recent studies have begun to examine corruption's impact on economic growth contingent on a country's institutional environment. Mendez and Sepulveda (2006) use the Freedom House democracy index, which measures civil liberties and political rights. After splitting countries into groups classified as "free" or "not-free," they find no relationship between corruption and growth in "not-free" countries but a small, positive, growth-maximizing level of corruption in "free" countries. This finding is consistent with Klitgaard's (1988) hypothesis discussed above but not consistent with the idea that corruption mitigates some of the impact of poor institutions.

Aidt, et. al., (2008) control for political institutions using the voice and accountability index, one of five indicators of governance constructed by Kaufmann, et. al., (1999). This index attempts to measure the degree to which citizens participate in the selection of their government and have the ability to hold government officials responsible for policy outcomes. Aidt et al. also find a non-linear relationship between corruption and growth once institutions are controlled, but the pattern is somewhat different from the findings of Mendez and Sepulveda (2006). Aidt et al. conclude that when institutions are of low quality, corruption has little impact on growth. However, unlike Mendez and Sepulveda, they find that high quality institutions result in corruption being harmful to growth.

Meon and Sekkat (2005) examine whether corruption "greases the wheels" or "sands the wheels" of economic growth when institutional quality and corruption interact. Their measure of institutional quality combines both political and some economic institutions. The Study's findings suggested that a weak rule of law, an inefficient government and political violence tend to worsen the negative impact of corruption on investment and that corruption slows the process of growth in countries suffering from a weak rule of law and an inefficient government. The study concludes that corruption not only impacts on growth through reduced accumulation of capital but also through other

channels. The results of this study show that by reducing the levels of corruption, a country's growth increases even if other aspects of governance remain poor.

In a related issue, the more recent empirical literature highlights that the effect of corruption on growth cannot be explained without taking into account the institutional framework of countries. A number of studies argued that the relationship between corruption and economic growth is non linear, suggesting that the impact of corruption on growth might vary across countries according to the quality of their institutional setting. For instance, the decisive role of institutions in determining the effects of corruption on economic growth was recently examined by Méon and Weill (2010). Theses authors provide evidence that corruption is substantially less harmful in countries where the institutional framework is less effective. This finding that seems in favor of an efficient corruption that helps overcoming the existing institutional deficiencies is also confirmed by Heckelman and Powell (2010). Precisely, they show that corruption is positively associated to economic growth in countries where economic freedom is limited, but this positive impact tends to decrease as economic freedom increases.

The studies carried out by Johnson, Kaufmann and Zoido-Lobaton (1998), Bonaglia, et al. (2001) and Fisman and Gatti (2002) found a positive correlation between corruption and the size of the unofficial economy. But some studies have contrary findings like Treisman (2000), Ali and Isse (2003). They found a positive impact of state intervention; state intervention reduces the level of corruption. Above all, Lambsdorff (1999) found that government involvement neither increases nor decreases the level of corruption; the poor institutions are the main sources of corruption. Knack and Keefer (1995) find that a variable of institutional quality, which incorporates perceived corruption, exerts a significant negative impact on growth.

There is a consensus among policy makers and scholars that the poor economic performance in developing countries is influenced by many factors including lack of proper policy, high corruption and poor quality of governance and institutional setup (Forster and Forster, 2010). If the recipient country's quality of governance and institutions is poor, the process of growth will be undermined. Mo (2001) and Mauro (1995) indicate that poor quality of governance and institutions characterized by higher level of corruption may impede economic growth. Therefore, it is believed that good policies, quality institutions and together with good governance could expedite the process of economic growth and development.

These views are not uncontested (Baumol, 1990), but a major drawback of the theoretical literature is also that it disregards that the relationship between corruption and growth depends on its institutional environment. It is well known that a close web of formal and informal institutions and distortions determine the way economies function (North, 1990). Removing one distortion, say corruption, alters this web and may leave the economy worse off. The effects of corruption in a particular society can therefore not be studied without taking into account its institutional framework. Corruption will have different effects in different institutional settings, and the economic effects of corruption will therefore differ

from place to place and from time to time. Studying corruption without taking heed of corruption's interdependencies with other institutions, as the theoretical literature does, is therefore inappropriate and may lead to wrong inferences.

Furthermore, Mobolaji and Omoteso (2009) investigated the impact of corruption and other institutional factors on economic growth in some selected transitional economies for the period of 1990-2004 based on corruption indices and institutional variables drawn from International

Country Risk Guide analyzed through the panel data framework. The study's results supported Mauro's hypothesis that corruption has negative impact on growth in the transitional economies.
Furthermore, Swaleheen and Stansel (2007) attempted to extend the empirical literature on the relationship between corruption and economic growth by incorporating the impact of economic freedom. The study used an econometric model with two improvements on the previous literature: the model accounts for the fact that economic growth, corruption, and investment are jointly determined and the study includes economic freedom explicitly as an explanatory variable. The results of the study led to conclusions that contradicted the generally accepted view in the literature that corruption is harmful to growth.

2. The Linkage Between Corruption, Economic Freedom And Economic Growth

The linkage between corruption, economic freedom and economic growth brings to forefront the method of correlation, that opened new ways for quantitative social science. In our paper, the causality, as a simple explanatory principle, of events was broadened to include the notion of association between events.

2.1. The Linkage Between Corruption And Economic Growth

Empirically, there is broad consensus that corruption is detrimental to the economic performance of countries on the long term, in contrast with the ideas that corruption is a standard distortion, because corruption exhibited its harmful effects on growth. Mauro (1995) in the first econometric study about impact of corruption on economic growth and investment across countries finds that much of the effects of corruption on growth take place indirectly, through the effect on investment, and when investment is controlled for, the direct effect of corruption on growth is weak. Although he did not find a significant relationship between corruption and growth, he did find a significant relationship between bureaucratic efficiency and growth (Mauro's results were later confirmed by Aliyu and Elijah (2009), Méon and Sekkat (2005) and, Aidt et al. (2008), Haque and Kneller (2005), Blackburn and ForguesPuccio (2007), who report consistently that corruption is detrimental to economic growth).
Rahman et al. (1999) examined the effects of corruption on economic growth and gross domestic investment for Bangladesh. This study modifing Mauro's model by including two regional dummy variables, find that corruption is significantly and negatively associated with cross-country differences in economic growth and gross domestic investment. The authors suggest that corruption retards economic growth by reducing foreign direct investment, so, the caution is that endogeneity must be looked at more seriously in investing the relationship between corruption and economic growth. Méndez and Sepúlveda (2006) argue that the relationship between corruption and growth is nonmonotonic (quadratic) and that this relationship depends on the degree of political freedom, because corruption has a beneficial impact on long-run growth at low levels of incidence but is harmful at high levels and that there therefore may exist a growth maximizing level of corruption

2.2. The Linkage Between Economic Growth And Economic Freedom

The main conclusion of the studies was that more economic freedom fosters economic growth, so, there exists a positive impact of various measures of economic freedom on the rate of economic growth: Dawson (2003), De Haan and Sturm (2000), Adkins et al. (2002), Pitlik (2002), Weede and Kampf (2002), using as dependent variable the growth and as independent variable the change in economic freedom index obtained as result an effect significant positive; Ayal and Karras (1998), Goldsmith (1995), Ali and Crain (2002), Mahmood et al. (2010) using as dependent variable the growth and as independent variable the level of economic freedom index obtained as result an effect

significant positive; Hanke and Walters (1997), Leschke (2000), using as dependent variable the GDP per capita and as independent variable the level of economic freedom index obtained as result an effect significant positive; Gwartney et al. (2006, 2011), Heckelman and Stroup (2002), using as dependent variable the GDP per capita and as independent variable the level of economic freedom index obtained as result an effect not significant; Cebula (2011) investigates the impact of the ten forms of economic freedom on economic growth in OECD nations, per capita real GDP in OECD nations was positively impacted by monetary freedom, business freedom, investment freedom, labor freedom, fiscal freedom, property rights freedom, and freedom from corruption.

A number of other studies attempting to clear the relationship between economic growth and economic freedom, answering the question whether freedom causes growth, growth causes freedom, or the two are jointly bilateral: The empirical result of Farr et al. (1998), in one of the earliest studies on causality between economic freedom and the level of GDP was the existence of feedback between economic freedom and the level of GDP; Then, Heckelman (2000) in an attempt to perform the causal relationship with economic growth, suggested the average level of economic freedom precedes economic growth. De Haan and Sturm (2000) also pointed out that economic freedom brought countries to their steady state level of economic growth more quickly, but did not increase the rate of steady state growth. VegaGordillo and Álvarez-Arce (2003) yielded interesting results that economic freedoms appeared to enhance economic growth. Dawson (2003) shows that economic freedom is the result of growth rather than a cause of growth.

2.3. The Linkage Between Corruption And Economic Freedom

To better understand the link between corruption and economic freedom, most of the studies examine this relationship both in the form of informal economic activity and in the publicsector bureaucracy: Jong-Sung and Khagram (2005) argue that economic factors are often considered to be the prime causes of corruption. For instance, wealthy people have greater motivation and more opportunity to exhibit corrupt practices, whereas poor people are more vulnerable to being exploited and are less able to hold wealthy people accountable for their decisions and actions. Graeff and Mehlkop (2003) report that, depending on whether a country is rich or poor, different types of improvements in economic freedom have differential effects on corruption. They indicate that the legal structure affects corruption more in rich countries, whereas access to sound money is significant for poor countries. Billger and Goel (2009) show that, among the most corrupt nations, greater economic freedom does not appear to cut corruption

The findings on the relationship between corruption and economic freedom are conflicting. The majority of authors find a negative relationship between economic freedom and corruption Kunicova and Rose-Ackerman (2005), Gurgur and Shah (2005), Ali and Isse, Graeff and Mehlkop (2003), Park (2003). In contrast, Paldam (2001) finds a positive relationship between economic freedom and corruption. Intuitively, we would expect a

negative relationship between economic freedom and corruption. As Shabbir and Anwar (2007) put it, economic freedom reduces the involvement of public officials with the masses. This limited connection minimizes the chances of indulging into corruption by politicians and public office bearers to grab a part of profit attached to the concessions allowed there-under.

There is a relatively widespread literature which, by applying the econometric methods developed mainly in growth econometrics, examines the relationship between corruption, economic freedom and economic growth, but, in these empirical studies, many difficulties lies in obtaining proper

measures of corruption, that identify and describe its linkage with the components of economic freedom and economic growth.

3. Model Specification and Data

Our measure of corruption comes from Transparency International's Corruption Perceptions Index (CPI), which has been utilized in many studies. The CPI is an "index of indexes" that averages scores from 16 different surveys of the perceived level of corruption in a country. A nation must have a score for at least two of the surveys to be included in the CPI. The index is scaled from 0 (most corrupt) to 10 (most clean). In our empirical analysis we have inverted the index so that greater values represent more, rather than less, corruption. The recent studies that examine corruption and growth while controlling for institutions (Meon and Sekkat 2005, Mendez and Sepulveda 2006, Aidt et al. 2008) use a variety of different measures of corruption, but the CPI is the only measure used in all of them. Thus, our choice of the CPI as a measure of corruption better enables comparison of our results with these studies.

Our measure of economic institutions comes from Gwartney and Lawson's Economic Freedom of the World Annual Report. Their economic freedom of the world (EF) index currently uses 37 criteria to measure freedom levels in five broad areas: size of government; legal structure and property rights; access to sound money; freedom to exchange with foreigners; and regulation of credit, labor and business. Each area score is based on the average value of the different components in that area. Each component is assigned a value from 0 (least freedom) to 10 (most freedom). The overall index value is the simple average of the five area scores. The EF index provides us with a more direct measure of restrictive policies for which the "grease the wheels" form of corruption would be necessary to circumvent. Meon and Sekkat's (2005) measures of government effectiveness, regulatory burden, and rule of law have come the closest thus far to measuring the inefficient institutions that corruption might circumvent. The EF index also has the advantage over the Kaufmann et al. (1999) index in its coverage of the size of government, which includes measures of government spending, transfers, ownership of enterprises and investment, and tax rates. Our base regression also includes the starting level of GDP per capita and investment to GDP ratio, both taken from the World Bank's World Development Indicators.

To estimate the relationship between the variables, we formulate three models in which corruption (CPI), economic freedom (EF) and economic growth (GDP) are specified as a function of the other variables. That is,

$$CPI_{it} = \alpha_0 + \alpha_1 EF_{it} + \alpha_2 GDP_{it} + U_{1it}$$

$$EF_{it} = \beta_0 + \beta_1 CPI_{it} + \beta_2 GDP_{it} + U_{2it}$$

$$GDP_{it} = \delta_0 + \delta_1 CPI_{it} + \delta_2 EF_{it} + U_{3it}$$

Where i refers to a given country and t a given year; α_i, β_i and δ_i are coefficients; and U is the error term.

4. Empirical Results

Having specified the respective models, we conducted a unit root test to ascertain whether the series used in this study are stationary. Standard economic theory requires series to be stationary prior to estimating their relationship to avoid generating spurious results. Fisher augmented Dickey-Fuller (Fisher-ADF) and Fisher Phillips- Perron (Fisher-PP) statistics were employed to test the unit root properties of the series. The results of the unit root test are presented in table 1.

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Table 1. Panel Unit Root Test Results for the Variables

Variables	Fisher-ADF		Fisher Phillips-Perron	
	Level	First difference	Level	First difference
EF	2.2417 (0.2871)	-8.4322* (0.0022)	3.2332 (0.3688)	-11.4112* (0.0051)
CPI	4.4262 (0.9664)	-6.4123* (0.0472)	5.6552 (0.9925)	-7.6235* (0.0010)
GDP	6.3894 (0.9889)	-6.1962* (0.0012)	8.7854 (0.9966)	-3.8985* (0.0008)

Note: EF refers to Economic freedom, CPI refers to corruption, and GDP refers to economic growth. The numbers in parentheses are probability values. * indicate a rejection of the null hypothesis of the unit root at the 1% significance level.

The table clearly indicates that the series have a unit root at level but are stationary at the first difference. This outcome supports the claim that many macroeconomic variables are non-stationary at level but stationary after the first difference (Nelson and Plosser, 1982). Our next task is to investigate if there is a long-term equilibrium relationship between the series using the Pedroni residual cointegration test (Pedroni, 1999). The Pedroni statistics tests were used to investigate whether the error process of the estimated equation is stationary and to test the null hypothesis of no cointegration against the alternative of cointegration. The first four statistics test the null hypothesis of no cointegration for all cross-sectional units, while the other three statistics test the null hypothesis of no cointegration based on pooling between dimensions. The existence of cointegration suggests that the estimated relationship is not spurious. Furthermore, if the tests reveal the presence of cointegration, then causality will exist in at least one direction (Granger, 1986). The results of the cointegration test are presented in table 2.

Table 2. Results of the Pedroni Residual Cointegration Test

Statistics (Within dimension)	**Value**
Panel v-statistic	-2.1454
Panel rho-statistic	3.4721
Panel PP-statistic	-3.1532*
Panel ADF-statistic	-2.3812*
Statistics (Between dimensions)	**Value**
Group rho-statistic	4.3542
Group PP-statistic	-5.1250**
Group ADF-statistic	-3.4336*

Note: EF refers to Economic freedom, CPI refers to corruption, and GDP refers to economic growth. ** and * indicate a rejection of the null hypothesis of no cointegration at the 5% and 1% significance levels, respectively.

Given that the variables are cointegrated, we took another step to determine the direction of causality between them. Granger (1969) proposed that variable X is said to "Granger cause" variable Y if and only if Y is better predicted by past values of X than by using past values of Y in either case. In other words, if X helps in forecasting Y, we can conclude that X Grangercauses Y. Thus, our main objective here is to examine whether current values of the individual dependent variable can be

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predicted by past values of the explanatory variables. To employ the Granger causality test for the variables, we estimated the following multivariate vector error-correction models (VECM):

$$\square CPIit=\square o+ \sum_{\square 1}^{J} \square\square 1\square EFit\text{-}J+ \sum_{\square 1}^{J} \square\square 2\square GDPit\text{-}J+ \sum_{\square 1}^{J} \square\square 3\square CPIit\text{-}J+\square 1ECTt\text{-}1+U4it$$

$$\square EFit=\square o+ \sum_{\square 1}^{J} \square\square 1\square CPIit\text{-}j+ \sum_{\square 1}^{J} \square\square 2\square GDPit\text{-}j+ \sum_{\square 1}^{J} \square\square 3\square EFit\text{-}j+\square 2ECTt\text{-}1+U5it$$

$$\square GDPit=\square o+ \sum_{\square 1}^{J} \square\square 1\square CPIit\text{-}j+ \sum_{\square 1}^{J} \square\square 2\square EFit\text{-}j+ \sum_{\square 1}^{J} \square\square 3\square GDPit\text{-}j+\square 3ECTt\text{-}1+U6it$$

Where CPI_{it} and CPI_{it-j} represent the current and lagged values of corruption, EF_{it} and EF_{it-j} are the current and lagged values of economic freedom, and GDP_{it} and GDP_{it-j} are the current and lagged values of the level of economic growth, respectively. Additionally, Δ is the firstdifference operator, and U_{it} are the residuals. Moreover, ECT_{t-1} is the one period lag of the error-correction term, and the statistical significance of the ECT_{t-1} is used to determine the long-term causality.

Table 3. Results of Granger Causality Test

Dependent variable	ΔCPI_t	ΔEF_t	ΔGDP_t	ECT_{t-1}
ΔCPI_{it}	-	2.2415	3.2545	-1.0121**
ΔEF_{it}	0.4350	-	1.2112	-1.2554
ΔGDP_{it}	0.1012	12.1742*	-	-1.3656

Note: ** and * indicate a rejection of the null hypothesis of no Granger causality at the 5% and 1% significance levels, respectively.

The results of the Granger causality tests reported in table 3 indicate that there is short-term unidirectional causality from economic freedom to economic growth, while there is long-term unidirectional causality from economic freedom and economic growth to corruption. This result implies that economic freedom Granger-causes economic growth in the short term and that both economic growth and economic freedom Granger-cause corruption in the long term in SSA countries.

The Granger causality analysis conducted above is limited to the 1996-2014 period, but it does not consider the dynamic interaction of the variables beyond that period. In an attempt to understand the dynamic relationship among corruption, economic freedom and economic growth outside of the sample period of 1996-2014, we performed a forecast error variance decomposition analysis (FEVD) (Sims, 1980). The FEVD is useful in assessing the amount of variation in a variable caused by its own shock and by shocks to other variables. In the short term, a larger percentage of the variation in a variable results from its own shock, while in the long term, the impact of shocks on other variables increases. Each of the variables in the system is disturbed by one standard deviation.

Table 4. Results of the Variance Decomposition Analysis

	Relative Variance of CPI			Relative Variance of EF			Relative Variance of GDP		
Years	CPI	EF	GDP	CPI	EF	GDP	CPI	EF	GDP
1	99.45	0.14	0.42	1.17	99.78	0.12	2.69	1.57	99.78

2	97.24	2.70	1.27	2.82	97.45	0.84	2.48	1.42	99.62
3	94.10	4.56	2.85	5.20	95.86	1.05	2.35	1.34	99.50
4	90.42	6.82	3.74	8.56	92.36	1.25	1.84	1.16	99.32
5	85.35	9.31	5.36	10.71	90.41	1.65	1.56	0.90	98.78
10	65.38	19.54	17.62	18.45	81.10	1.87	0.97	0.72	98.56
15	50.79	24.68	28.45	23.76	77.26	2.04	0.74	0.60	98.48

Note: Cholesky ordering: CPI, EF and GDP

The results of the variance analysis presented in table 4 indicate that corruption is the most exogenous variable, followed by economic freedom and economic growth. In the second year, for instance, 97.24%, 97.45% and 99.62% of the variations in the forecast error variance for corruption, economic freedom and economic growth, respectively, is explained by its own shock. In explaining the shocks to corruption, economic freedom is more important than economic growth in both the short and long term. Specifically, economic freedom explains 2.70% of the variations in corruption, while economic growth accounts for 1.27% of the variations in corruption in the second year. Moreover, economic freedom explains 9.31% and 19.54% of the variations in corruption in the fifth and tenth years compared with the contributions of economic growth at 5.36% and 17.62% during the same period.

The causality tests conducted earlier provide information only on the direction of causality among the variables; these tests do not indicate whether the sign of the relationship is positive or negative. In addition, causality tests are unable to explain how much time is needed for the impacts to occur in the system. To this end, we conducted impulse response function analysis (IRF) to trace how each variable responded to a shock to the other variables in the system. The IRF results for corruption, economic freedom and economic growth in response to a one-standard-deviation shock in corruption, economic freedom and economic growth over the 15-year period are reported in table 5.

Table 5. Results of the Impulse Response Function Analysis

	Relative Variance of CPI			Relative Variance of EF			Relative Variance of GDP		
Years	CPI	EF	GDP	CPI	EF	GDP	CPI	EF	GDP
1	1.43	1.03	1.07	1.24	3.87	-1.09	-11.77	4.15	90.36
2	1.36	1.07	1.10	1.63	3.51	-1.21	-9.95	3.61	91.90
3	1.31	1.09	1.12	1.89	3.24	-1.28	-8.65	3.40	93.67
4	1.27	1.11	1.13	2.05	3.03	-1.33	-7.71	3.41	95.62
5	1.25	1.12	1.14	2.15	2.88	-1.34	-7.01	3.59	97.72
10	1.20	1.13	1.18	2.19	2.43	-1.30	-5.33	5.52	109.72
15	1.18	1.12	1.21	2.05	2.19	-2.20	-4.64	7.99	123.73

Note: Cholesky ordering: CPI, EF and GDP

The results of the IRF reveal that over a period of fifteen years, a one-standard-deviation shock to economic freedom exerts a positive impact on corruption. A shock to economic freedom has a positive impact on corruption for the first five years, but between the tenth and fifteenth year, the impact declines but remains near the positive region. Similarly, a shock to economic growth has a positive impact on corruption between the first and fifteenth years. Regarding the response of economic freedom to a shock in corruption and economic growth,

the results illustrate that a shock to corruption exerts a positive effect on Economic freedom, but the impact declines continuously over the fifteen-year period and remains near the positive region. A shock to economic growth has a negative impact on Economic freedom, but the effect decreases over the fifteen-year period. Furthermore, the results demonstrate that a shock to corruption exerts a negative impact on economic growth, while a shock to economic freedom exerts a positive impact on economic growth over the fifteen-year period. Although the impact of economic freedom fell between the first and second years, it shows a rising trend from the third to fifteenth years.

In sum, the empirical results indicate that there is positive causality running from Economic freedom to economic growth in the short term and from Economic freedom and economic growth to corruption in the long term in SSA countries.

5. Conclusion and recommendations

Corruption is a morally wrong and economically harmful behaviour. It is a symptom of a poorly functioning state. However, no economy is corruption-free but its preponderance in these transitional economies is high possibly due to level of poverty, economic and political insecurity and weak rule of law. In this paper, it is aimed to investigate the empirical linkage between corruption, economic freedom and economic growth, but this proposed approach is highly applied due by the complexity of concepts addressed. This paper is to review and extend the empirical evidence on the relationship between corruption, economic freedom and economic growth, by responding to these questions: 1) corruption causes economic growth or vice-versa; 2) economic growth causes economic freedom or vice-versa; 3) economic freedom causes corruption or vice-versa?

Given that less developed SSA countries are corrupt and politically unstable, it is important to examine the interaction among economic growth, corruption and economic freedom in these countries. This paper examines the causal relationship among corruption, economic freedom, and economic growth in SSA countries within a multivariate cointegration and error-correction framework. The Pedroni cointegration test reveals that the variables are cointegrated, indicating the existence of a long-term equilibrium relationship among corruption, economic freedom, and economic growth. Having confirmed the existence of cointegration, we investigated the direction of causality between the variables using the VECM. The results illustrate that there is short term unidirectional causality from economic freedom to economic growth, while in the long term, causality runs from economic growth and economic freedom to corruption in SSA countries.

Moreover, we employed the FEVD and IRF to examine the dynamic interaction among corruption, economic freedom and economic growth in SSA outside the sample period of 1996-2014. The FEVD confirmed that corruption, economic freedom and economic growth are endogenous. Economic freedom is the most important variable accounting for shocks in corruption, while corruption is the most important variable accounting for shocks in economic freedom and economic growth. Furthermore, the IRF illustrated that a shock to economic freedom and economic growth has a positive effect on corruption. Additionally, a shock to corruption has a positive impact on Economic freedom, while a shock to economic growth has a negative effect on Economic freedom. In addition, a shock to economic freedom has a positive effect on economic growth, whereas a shock to corruption has a negative impact on economic growth. Thus, there is positive unidirectional causality from economic freedom and economic growth to corruption in the long term and positive unidirectional causality from economic freedom to economic growth in the short term in SSA countries.

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