
Investigating Reasons behind the Lack of Transparency in Sub-Saharan African Countries

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Abstract: *Transparency is a multifaceted issue that encompasses various economic, political, administrative, social, and cultural factors at both national and international levels. Rather than being a fundamental type of behavior, lack of transparency is a symptom of broader societal dynamics. Despite being a persistent problem, lack of transparency remains largely unaddressed, causing harm to society by eroding trust, undermining democracy, hindering economic growth, and exacerbating inequality, poverty, social fragmentation, and environmental disasters.*

This study focuses on transparency in a sample of sub-Saharan African countries, namely Angola, Tanzania, Mali, Cote d'Ivoire, Ghana, and Madagascar, covering a time period of nine years from 2012 to 2020. The study employs both panel least squares and quantile regression models to determine the more accurate model. The findings indicate that the quantile regression model demonstrates a significant relationship between the transparency perception index and all independent variables, except for the unemployment rate, at a 1% significance level.

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Introduction

The absence of transparency is regarded as a persistent issue that has yet to be addressed. The lack of transparency may occur anywhere in business, government, courts, media, civil society, from health and education to infrastructure and sports, and among politicians, government officials, civil employees, business people, and the ordinary public. It has the potential to influence everyone, including residents (Transparency, 2022).

Corruption is a complex phenomenon. It is defined by a variety of national and international economic, political, administrative, social, and cultural aspects. It develops as a result of interactions, opportunities, strengths, and flaws in the socio-political system. Individuals, groups, organizations, and institutions residing in civil society, governments, the public sector, and the corporate sector can open and close areas. It is the consequence of dynamic relationships between several actors, among other things (Menocal et al. 2015). More than 40% of the 176 nations in the globe that are judged to be corrupt are in Sub-Saharan Africa (Adu, 2020). Despite significant anti-corruption measures implemented since the 1990s, corruption in Africa remains widespread.

According to the CPIA (Country Policy and Institutional Assessment) ratings for openness, accountability, and corruption in the public sector in Sub-Saharan Africa were 2.77 in 2006, 2.737 in 2014, and 2.718 in 2020. Africa is often considered as one of the most corrupt regions on the globe, which may lead to stunting and poverty in many African countries. According to Transparency International, the world's largest corruption monitoring organisation, six of the world's 10 most corrupt countries are in Sub-Saharan Africa (Hanson, 2009). As a result, certain Sub-Saharan African nations suffered from mismanagement in the battle against corruption in all aspects. These elements, however, include money laundering and a lack of transparency (Transparency, 2021). Prior studies focused on corruption's impact on economic growth, but they lacked characteristics that promote corruption, particularly in specific regions.

Therefore, this study will basically be focusing on the corruption in a sample of sub-Saharan African countries; Angola, Tanzania, Mali, Cote d'Ivoire, Ghana & Madagascar, and will take a 9-years' time line starting from 2012 to 2020. The paper will focus on examining the impact of several independent variables which include the following: GDP per capita, Tax revenue as % of GDP, Inflation rate %, Unemployment rate & CO₂ emissions on the Corruption perception index in the mentioned countries.

Literature Review:

According to modernization theorists, the colony was founded on the logic of domestic and new homes. The causes, scope, outbreaks, pre-benderism, and domestic system of corruption and corruption in pre-colonial African societies, as well as the primary points shared by all of these joint-choice theories, are all found in Africa (and elsewhere in developing countries). The extraction of corruption in) is based on the belief that it is one of the negative effects of introducing modern political structures and procedures into indigenous civilizations. Workingclass ideals and commitments underpin the political framework (David, 2012).

Regardless of the presumed advantages of blended government, the occurrence of the lack of transparency in Africa is viewed as a result of public officials' behavior that deviates from accepted standards, and which also implies a lack of compelling political standardization that makes it difficult for these authorities to separate their public jobs from private ones (David, 2012).

Huntington's way of demonstrating Adefur's conventional theory of corruption. Simply identifies the source of the threat and for the restricted reasons related with political underdevelopment and traditional civilizations' proclivity to participate. According to scholars, giving presents is a private act that is practically ubiquitous in traditional communities. As strong as the argument of the orthodox theories of patrimonialism, e.g. Huntington, is to explain and spiral the cause of corruption in African states Nigeria, a case study of patrimonialism, that it breeds inequality and political instability as a result of a flawed method of monetary and political development, the concept of patrimonialism failed to inform us significant motive about the true causes and occurrence of corruption (David, 2012). By this failure, Western liberal scholars have turned to another similar idea, the keyword neopatrimonialism, to describe this problem. Researchers identified the following key elements of neopatrimonialism. Civil officials maintain their positions in formally established bureaucratic institutions, which are exercised as a kind of private property rather than public service. Personal subordination distinguishes civil employees from their clients or subordinates. State officials treat their positions as personal fiefdoms, extorting money and appointing relatives. Subordinates are deemed to be in violation of their boss's authority and are unable to make official decisions without consulting with someone higher up.

Some, if not all, of the above features may be observed in many developing nations, and for this reason, Western liberal scholars have discovered that neopatrimonialism is a distinct feature of emerging countries.

New growth theory:

The key tenet of the new growth theory is that information promotes growth (Cortright, 2001). The theory suggests that infinite thoughts may be gathered since they can be freely exchanged and reused. They are not the victims of what economists refer to as "unavoidable losses." Instead, the continuous expansion of information encourages financial progress. The new growth theory aids in understanding the continuing shift from an asset-based to an information-based economy. It highlights the role of the currency cycle in the generation and distribution of fresh knowledge in determining the growth of countries, networks, and individual companies. Increasing income as a result of new growth ideas and information has several consequences for financial development plans. New growth theories emphasize the significance of investing in the generation of new knowledge to promote progress. Strategists must carefully evaluate the elements that drive the generation of information, such as tolerance for creative work, school systems, enterprises, diversity, macroeconomic assumptions, and exchange acceptance (Hosny et al. 2023).

The new growth principle also highlights the need to raise the price of returning to the general ability of economic progress. Increasing yields suggest tremendous development opportunities as well as the need for methods to limit the formation of fantastic business models and market disasters. Better yields have a significant impact on the improvement process. An economic system characterized by essentially regular losses evolves differently from an economic system characterized by essentially improved profits (Cortright, 2001).

Keynesian Theory of Involuntary Unemployment:

In the capitalist economy, Keynes rejected the standard conclusion of full employment. Keynesian economics arose as a result of the 1930s Great Depression. The entire globe of capitalism was suddenly suffering from a severe unemployment issue. Keynes now asserted that the capitalist system could never reach full employment. Full employment, according to Keynes, is an astrological coincidence (Dutta, 2015).

Underemployment is the reality. As a result, Keynes established his theory of underemployment equilibrium rather than the theory of full employment equilibrium. Unemployment happens when a person is unable to find work at a typical salary rate. Keynes referred to such unemployment as "involuntary unemployment" (Dutta, 2015).

In developing his theory of involuntary unemployment, Keynes challenged the traditional premise of wage price flexibility. Money salaries are stiff or inflexible in the downward direction. It is, nevertheless, adaptable upwards. There are two causes for wage rigidity. The first is the money delusion. The second factor is institutional. Wage stagnation is prevented by unions. As a result, any salary decreases are met with opposition. Alternatively, the pay rate must not fall below a particular threshold. However, nothing prohibits salaries from growing. Once full employment is attained, wages can grow (Dutta, 2015). In contrast to the classical system, this Keynesian argument indicates that the labor supply function is a function of money wages rather than real wages.

Empirical Framework:

Corruption and GDP Per Capita:

According to (Gök, 2021), Corruption has been rampant in Africa since the colonial era. Since then, Sub-Saharan Africa's average degree of corruption has climbed. The findings corroborate the idea of self-reinforcing corruption in that previous levels of corruption are major predictors of present levels of corruption for strategic complementarity. As a more corrupt nation remains more corrupt and a less corrupt country remains less corrupt, the difference between the two countries remains the same. It demonstrates the pervasiveness of corruption in Sub-Saharan Africa. In terms of institutional drivers, they discovered that better political stability, higher regulatory quality, and increased levels of democracy reduced corruption in Sub-Saharan Africa. In terms of economic drivers, by using GMM model, they discovered that higher levels of development and better trade integration reduced corruption, but higher levels of government spending and higher levels of natural resources enhanced corruption in Sub-Saharan Africa. The paper also found that per capita GDP has a detrimental influence on corruption. In a weak economy, the money given to authorities for corruption has little monetary worth. Furthermore, government workers in affluent nations are well compensated, as opposed to civil servants in impoverished countries, who are paid low salary in order to promote corrupt conduct. Because larger earnings are the outcome of higher levels of development, our findings corroborate their theory that higher levels of economic development diminish corruption in Sub-Saharan African nations.

Corruption and Tax Revenue:

This article, contributed by (Nguyen & Duong, 2020), investigates the influence of informal economies and corruption on BRICS economic development, along with governmental expenditure, trade openness, foreign direct investment (FDI), inflation, and tax revenues. Between 1991 and 2017, the World Bank, Transparency International, and the Heritage Foundation gathered data. It will be researched using Bayesian Linear Regression if informal economies, corruption, and other factors impact economic development in the nations studied. In this paper, they used the standard priors suggested by previous researchers to simulate the

posterior distribution using the Monte Carlo Markov Chain (MCMC) technique and the Gibbs sampling methodology. The findings reveal that public expenditure and trade liberalization increase BRICS nations' economic growth, with positive effect probabilities of 75.69 percent and 67.11 percent, respectively. Foreign direct investment and tax revenues all have a positive influence on GDP, although the likelihood of a positive effect ranges from 51.13 percent to 56.36 percent. Furthermore, the most crucial outcome of this study was that the shadow economy and corruption control have a favorable influence on the BRICS countries' economic growth. Nonetheless, the following probability of these two elements are 62.23 percent and 65.25 percent, respectively. This finding shows that the likelihood of their having a beneficial effect is low.

Corruption and Inflation:

The paper cited by (Nguyen & Duong, 2020), beside mentioning and examining the relationship between corruption and tax revenues, it also examined the relationship between corruption and inflation in BRICS countries. Over the 1991–2017-time span, data were gathered from the World Bank, Transparency International, and the Heritage Foundation. The Bayesian linear regression approach is used to investigate if the shadow economy, corruption, and other variables have an impact on the economic growth of the countries under study. The findings suggested that inflation had a beneficial influence on economic growth, albeit the likelihood of this effect varying from 51.13 percent to 56.36 percent. Furthermore, the research's main result is that the shadow economy and corruption control have a favorable influence on the BRICS countries' economic growth.

Corruption and unemployment:

The literature on democracy and corruption is not definitive in terms of the influence of democracy on corruption. The research mentioned by (Oueghlissi&Derbali, 2021) attempted to address this gap by proposing that there may be a relationship between democracy and unemployment in the establishment of de facto levels of corruption. In this paper, researchers estimated a linear dynamic panel data model using data from 80 developing nations from 1990 to 2018. As a result, corruption has decreased as a result of democracy. However, growing unemployment undermines democracy's capacity to reduce corruption. The results are consistent and statistically comparable across different empirical parameters. These findings imply that developing nations should prioritize job creation in order to reap the benefits of democratization in the battle against corruption.

Corruption and Carbon Dioxide emissions:

According to a study conducted by Ren et al. (2021), climate and environmental changes are critical policy concerns that are strongly linked to human health. Corruption, however, destroys prosperity and has major consequences in a variety of economic, social, and political arenas. In recent years, China's economic growth process has been influenced by corruption's impact on carbon emissions, despite intense pressure to cut emissions. The extent, significance, and direction of the impact, particularly the link between corruption and carbon emissions, and how this affects China's economic development, are still heavily debated topics. Understanding the link between corruption and carbon emissions is critical for establishing and executing public policies to minimize corruption and carbon emissions. Therefore, the study applies the ARDL model and the panel quantile regression model to analyze the long-term and short-term effects of corruption on per capita CO₂ emissions based on panel data from Chinese states from 1998 to 2016. The research also considers the influence of key factors on per capita CO₂ emissions.

The findings of the study show that corruption raises per capita CO2 emissions in the near term while decreasing per capita CO2 emissions in the long term. Additionally, the panel quantile regression findings reveal that corruption has a substantial positive influence on per capita CO2 emissions at all quantiles, with per capita CO2 emissions increasing as corruption intensity increases. It implies that the quantity has risen. In comparison, the low quantile coefficient is somewhat larger than the high quantile coefficient, implying that corruption contributed to increased carbon emissions in states with lower per capita carbon emissions. These results highlight the need for immediate action to combat corruption and reduce carbon emissions in China.

Methodology

A report mentioned by (Nguyen & Duong, 2020) analyzed the link between corruption and inflation in BRICS nations in addition to noting and investigating the relationship between corruption and tax collections. Data from the World Bank, Transparency International, and the Heritage Foundation were collected between 1991 and 2017. The Bayesian linear regression technique is used to determine if the shadow economy, corruption, and other factors affect the economic growth of the countries under consideration. As a result, this article will further construct a model that will investigate the influence of various variables on corruption. From 2012 through 2020, the research will focus on a specific area of Sub-Saharan African countries. Furthermore, the model's recommended equation will be as follows.

$$CPI = f (GDPCAP, INF, TAXR, UNEMP, CO2)$$

The corruption perception index (CPI) is our dependent variable. GDPCAP is an abbreviation for Gross Domestic Product per Capita. INF is for inflation rate, TAXR stands for tax revenue, UNEMP stands for unemployment rate, and CO2 stands for carbon dioxide emissions.

In this research study, panel data analysis will be employed since it is more persuasive than other studies such as cross-sectional and time series analysis. Panel data analysis exhibits better variances than other kinds; yet, it is more appropriate for our research because there was insufficient data to employ time series. Furthermore, panel data analysis allows for the interpretation of the complex relationships between the dependent and independent variables.

Data Description:

In order to offer enough data for a panel test, the research study will analyze and assess the link between five independent factors and a single dependent variable on six different nations from 2012 to 2020. Angola, Tanzania, Côte d'Ivoire, Mali, Ghana, and Madagascar are the six nations chosen. The Corruption Perception Index is the dependent variable, whereas the independent variables are GDP per capita, tax revenue, inflation rate, unemployment rate, and CO2 emissions. Finally, all of the data utilized is computed on a yearly basis.

The World Bank was the primary source of data for the independent variables, whereas Transparency.org was the primary source for the dependent variable. Some of the variables' data were missing and were filled up using the interpolation approach. Tanzania mostly utilised the interpolation approach to obtain data on tax income in 2019. Table (2), on the other hand, explains dependent and independent variables and their origins.

Several tests will be performed prior to the panel data analysis to check the stationary of the data, including the LLC test performed by Levin, Lin, and Chu (2002) and the IPS test performed by Im, Pearran, and Shin (2003). Also included are the Hausman Specification Test, heteroscedasticity, normalcy, and cross section dependency tests. Finally, different models will

be utilized to estimate our panel regression, including the common constant model, fixed effect model, random effect model, fixed effect model (SUR), and Quintile regression model.

Data Analysis

Descriptive Statistics:

Table 1: Descriptive Statistics of the Variables

	CPI	INF	GDP_CAP	TAXR	UNEMP	CO2
Mean	31.52830	7.790137	1747.287	11.62377	4.604151	12311.66
Median	32.00000	5.452302	1587.561	11.39034	4.220000	10720.00
Maximum	48.00000	54.01291	5408.412	17.95103	7.730000	35410.00
Minimum	15.00000	-3.518386	467.2354	8.368256	0.600000	2740.000
Std. Dev.	7.657585	9.738606	1269.478	2.047145	2.350459	9459.900
Skewness	0.137212	2.525933	1.336562	0.835997	-0.042506	1.162426
Kurtosis	2.712203	11.25928	4.301407	3.544848	1.418414	3.421010

Source: Calculated by the Authors

Table 1 portrays that the average CPI score out of 100, which is the dependent variable, in the Sub-Saharan countries under study was 31.53. The average score was able to reflect the stagnation occurring in countries as a result of governments across Sub-Saharan Africa limiting public information in order to abuse their power and hide corruption from the public eye (Transparency International, 2021). GDPCAP and CO2 have noticeably high means compared to the other variables with values of 1747.29 and 12311.66, respectively due to the high inequality and income gaps across the region. In addition, fragile countries in Sub-Saharan Africa are challenged with responding to significant climate changes due to government failure and corruption. Therefore, the relationship between an increase in GDP per capita leads to an increase in the CO2 emissions has been established (Maino & Emrullahu, 2022). Moreover, the value of inflation rate (see table 1) is considered a high average due to the low levels of domestic activities in the region and sharp increases in commodity prices and fluctuating exchange rates (IMF, 2022). TAXR and UNEMP variables have a mean of 11.62 and 4.60 respectively as seen in table 1. As for the median scores, GDP_CAP and CO2 have the highest medians while UNEMP was recorded the lowest.

All variables have displayed wide gaps between their maximum and minimum values indicating the evident inequalities and disparities between the countries under study. Furthermore, GDP_CAP and CO2 witnessed the highest deviations from the mean, while TAXR had the lowest deviation, indicating the higher accuracy of its estimations.

Skewness measures the asymmetry of the distribution of the values from the mean. INF, GDP_CAP and CO2 are highly skewed due to their values being larger than 1. TAXR is moderately skewed. CPI and UNEMP are fairly symmetrical. Finally, kurtosis measures whether the data is normally distributed or not. INF, GDP_CAP, TAXR and CO2 are not normally distributed as their values are more than 3. CPI and UNEMP.

Correlation Analysis:

Table 2: Correlation Analysis

Correlation	CO2	CPI	GDP_CAP	INF	TAXR	UNEMP
Probability						
CO2	1.000000					
CPI	-0.313814**	1.000000				
GDP_CAP	0.912812***		1.000000			
INF	0.346812**	0.179528	0.218588	1.000000		
TAXR	0.024236	0.303637**	0.133482	-0.248473*	1.000000	
UNEMP	0.463204***	-0.103315	0.485161***	0.205720	0.507419***	1.000000

(* - significant at 10% significance level) (** - significant at 5% significance level) (***) - significant at 1% significance level)

Source: Calculated by the Authors

Table 2 reveals the negative significant relationship between CPI and CO2 as environmental quality is negatively associated with corruption level in countries (Sekrafi&Sghaier, 2018). GDP_CAP and CO2 have a positive significant relationship as an increase in the GDP per capita reflects an increase in CO2 emissions (Maino&Emrullahu, 2022). GDP_CAP and CPI also have a positive significant relationship (as seen in table 2). INF and CO2 also displayed positive significant relationship. TAXR and INF have a negative significant relationship as an increase in inflation decreases the people’s ability to spend; therefore, tax revenues decrease (Muttaqin & Halim, 2020). Finally, CO2, GDP_CAP and TAXR all have a positive significant relationship with UNEMP.

Panel unit root test:

Most of the results at level were non-stationary, accepting the null hypothesis; therefore, the variables were retested again at 1st difference in order to reduce the variations of the variables and to become stationary. After conducting the 1st difference, some results did not have unit root and rejected the null hypothesis, while others still failed to be stationary, so the 2nd difference took place. The majority of the stationary results were in the 1st difference. Most significant unit root tests were LLC and PP, with most of the results being highly significant at 1% significance level. On the other hand, IPS and Breitung had majority insignificant results.

To begin with, CPI variable was significant at 1% at 1st difference when none was added to the test equation in the LLC unit root test and PP unit root test. 2nd difference was taken in the ADF in order to ensure that all variables have reached their stationarity. GDPCAP was significant at 1st difference in all unit root tests except for the IPS test, rejecting H0. CO2 was only stationary in LLC and PP tests. TAXR was significant mainly at 5% significance level after retesting at 1st difference. INF was actually significant at 1% at 1st difference in most of the tests; excluding Breitung test. Finally, UNEMP was stationary at mixed significance levels throughout the testing process, leading to conducting all unit roots tests in order to be able to reach stationarity.

To sum up, the panel unit root test has revealed the opposing results where some are stationary at level, while others at 1st or 2nd difference.

Random & fixed effects model:

Table 3: Estimated Panel Least Squares

Variable	Common constant	Random Effects	Fixed Effects
C	9.691	9.691	34.24
GDP_CAP	0.0002	0.0002	-9.40E-05**
TAXR	2.374***	2.374***	0.62
INF	0.422***	0.422***	0.081*
UNEMP	-1.241***	-1.241***	-0.6858
CO2	-0.0003***	-0.0003***	-0.00059
R-squared	0.4347	0.4347	0.8952
F-statistic	7.2269	7.2269	35.868
Probability F-Statistic	0.000043	0.000043	0.000
Durbin-Watson stat	0.811	0.811	1.267

Source: Calculated by the authors

Table 3 (Common Constant Model) indicates that UNEMP and CO2 have a negative impact on the CPI. Specifically, a 1% increase in UNEMP leads to a 1.24 point decrease in CPI, while a 1 metric ton per capita increase in CO2 results in a 0.0003 point decrease in CPI. In contrast, all other variables have a positive impact on the CPI, with a 1% increase in GDP CAP, TAXR, and INF leading to a 0.0002, 2.374, and 0.422 point increase in CPI, respectively. The R-squared value demonstrates that 43.47% of the variation in CPI can be explained by the independent variables, including GDP per capita, tax revenue, inflation rate, unemployment rate, and CO2 emissions. The F-statistic has a probability of 7.2269 and a probability of 0.000043, indicating that this model is significant at the 1% level. A probability ranging from 0 to 1% signifies that this model is significant at 1%. Finally, the Durbin Watson statistic indicates that autocorrelation may be present in the data as the value is less than one, further from 2.

The Random effects model in the table indicates that UNEMP and CO2 have a negative impact on the CPI. Specifically, a 1% increase in UNEMP led to a 1.24 point decrease in CPI, while a 1 metric ton per capita increase in CO2 resulted in a 0.0003 point decrease in CPI. Conversely, all other variables had a positive impact on CPI, with a 1% increase in GDP_CAP, TAXR, and INF leading to a 0.0002, 2.374, and 0.422 point increase in CPI, respectively. The

R-squared value demonstrates that 43.47% of the variation in CPI can be explained by the independent variables. The F-statistic and its probability indicate that this model is significant at the 1% level. However, the Durbin-Watson statistic suggests that autocorrelation may be present in the data. In the fixed effects model, UNEMP and CO2 continued to negatively impact CPI, while GDP_CAP also had a negative impact on CPI. Specifically, a 1% increase in UNEMP resulted in a 0.6858 point decrease in CPI, a 1 metric ton per capita increase in CO2 led to a 0.000059 point decrease in CPI, and a \$1 increase in GDP_CAP resulted in a 9.40E-0.5 point decrease in CPI. In contrast, TAXR and INF continued to have a positive impact on CPI, with a 1% increase in TAXR and INF leading to a 0.62 and 0.081 point increase in CPI, respectively, as shown in Table 8.

Additionally, the R-squared value has increased slightly from the previous model to 0.8952, indicating that 89.52% of the variation in CPI can be explained by the independent variables, including GDP_CAP, TAXR, UNEMP, INF, and CO2. This is a significantly high variation in the regression model. The fixed effects model has also been found to be significant with a F-statistic probability of 0.00. Finally, the Durbin-Watson test suggests that there is no autocorrelation since the value falls between 1 and 2.

Table 4: Hausman Test

Chi-Square. Statistic	Probability
184.525	0.000

Source: Calculated by the Authors

Table 4 reveals that the Chi-Square is 184.525 with a probability of 0.000, which is lower than 0.5; therefore, we reject the null hypothesis. The Hausman test has concluded that the fixed effects is better than the random effects model, since the R squared is higher in the fixed effects model.

Table 5: Cross-Section Dependence Test

Test	Statistic	Prob.
Breusch-Pagan LM	12.5918	0.6338
Pesaran scaled LM	-0.43968	0.6602
Pesaran CD	-0.83196	0.4044

Source: Conducted by the authors

Table 5 reveals that all the cross-section dependence tests conducted are insignificant; therefore, the null hypothesis is rejected, and the cross sectionals are dependent. This indicates that throughout the tests, the problem of autocorrelation was faced between the cross-section variables.

Table 6: Normality Test

	Statistic	Probability	Mean
Jarque-Bera	1.0108	0.6033	-1.41E-15

Source: Conducted by the authors

According to the above table, the Jarque-Bera probability is more than 5%, so we didn't reject the null hypothesis. The data is normally distributed due to the low variations and fluctuations among the variables used throughout the years of study.

Table 7: Heteroscedasticity Test

Value	Probability
31.077	0.000

Source: Conducted by the authors

The tests have proven that the model has a heteroscedasticity problem due to high correlation in error terms. Table 7 shows that the value is significant at 1%, so we will reject the null hypothesis.

Table 8: Quintile Regression Model

Variable	Coefficient
GDP_CAP	0.00237***
TAXR	0.2384***
INF	-0.04033***
UNEMP	0.14845
CO2	-0.00073***

(* - significant at 10% significance level) (** - significant at 5% significance level) (***) - significant at 1% significance level)

Source: Calculated by the Authors

Table 8 shows that GDP_CAP, TAXR, and UNEMP have a positive impact on CPI. Specifically, a 1% increase in GDP_CAP leads to a 0.00237 point increase in CPI, while a 1% increase in TAXR and UNEMP results in a 0.2384 and 0.148 point increase in CPI, respectively. Both GDP_CAP and TAXR are significant at the 1% level.

In contrast, INF and CO2 have a negative impact on CPI. Specifically, a 1% increase in INF and CO2 results in a 0.0040 and 0.0007 point decrease in CPI, respectively. However, both INF and CO2 are significant at the 1% level.

Results:

The results presented in Table 5 summarize the analysis of the five hypotheses tested in this study. The first hypothesis, which proposed that GDP per capita has a negative impact on corruption, was not supported by the quantile regression model. The second hypothesis, which suggested that tax revenues have a positive effect on corruption, was supported by both the quantile regression and random effects models. Similarly, the third hypothesis, which stated that inflation rates positively influence corruption, was supported by the random effects model. The fourth hypothesis, which asserted that unemployment rates have a negative impact on corruption, was also supported by the random effects model. Finally, the fifth hypothesis, which proposed that CO2 emissions share a unidirectional relationship with corruption, was supported by both the quantile regression and random effects models in the long run. These findings provide important insights into the factors that contribute to the absence of transparency in Sub-Saharan African countries and can inform the development of policies to address this issue.

Table 5: Summary Analysis of the Hypothesis

	Hypothesis	Model	Decision
H1	GDP per capita has a negative impact on corruption.	Quantile Regression	Not Supported
H2	Tax revenues have a positive effect on corruption	Quantile Regression & Random Effects	Supported
H3	Inflation rates positively influence corruption.	Random Effects	Supported
H4	Unemployment rates exerts a negative impact on corruption.	Random Effects	Supported
H5	CO2 emissions share a unidirectional relationship with corruption.	Quantile Regression & Random Effects	Supported (Long-run)

GDP Per Capita:

In the sample of Sub-Saharan African countries studied, the quantile regression model demonstrated a positive relationship between GDP per capita and CPI. This finding is consistent with the results of a study conducted by Forson et al. (2016), which found a positive impact of GDP per capita on the corruption perception index in Sub-Saharan African countries. The study attributed this to the presence of other qualitative factors influencing economic growth and corruption, such as ethnic diversity, political corruption, bureaucratic tradition, and land corruption.

Ethnicity is a contentious political issue in Sub-Saharan Africa, with a significant impact on the workplace. The continent's indigenous political systems were flexible and informal before colonialism, characterized by civil society and traditional culture. However, colonization led to the establishment of spheres of influence by European rulers, which had a profound impact on African societies (Dia, 1996; Parboteeah et al., 2014).

Corruption is a serious challenge to political integrity in African countries, taking many forms, including unresolved conflicts of interest, crooked political financing, embezzlement of funds, patronage networks, abuse of state resources, and state capture. The 2019 GCB survey indicates that many Africans believe there is a high level of political corruption in their countries, particularly by government officials, parliamentarians, and heads of state and governments (Transparency International, 2019).

Land is the foundation of African social, economic, and political life, but it is highly susceptible to corruption. A Transparency International study found that one in every two people in Africa encounters corruption during land administration processes, compared to one in every five people in the rest of the world. Sexual extortion, bribery, fraud, patronage, and kickbacks are common forms of corruption in land administration, according to another Transparency International report on land corruption in Liberia, Zambia, and Sierra Leone (Wadström & Tetka, 2019). The problem of land corruption is exacerbated by structural flaws in land governance laws and administrative frameworks, such as the lack of standardised customary tenure systems, fragmented land policies or regulations, and lack of transparency and accountability in land administrative offices. Women are disproportionately affected by land

corruption due to their reliance on it (Transparency International, 2018a). A baseline survey on women and land corruption conducted by Transparency International's Land and Corruption in Africa programme in collaboration with eight national chapters in Cameroon, Ghana, Kenya, Liberia, Madagascar, Sierra Leone, Uganda, and Zimbabwe, detailed women's experiences and day-to-day difficulties in gaining access to land, as well as their constant exposure to bribery and abuse by community leaders and land officials. The survey found that at least 60% of rural women polled in Zimbabwe were asked for a bribe by a community leader, while 39% of women polled in Kenya reported being asked to pay bribes in land-related matters the previous year, and in Liberia, at least 4% of the women polled had either been subjected to abuse to settle a land dispute or knew other women who had (Transparency International, 2018b).

Tax revenues:

The quantile regression model found a positive relationship between tax revenues and the Corruption Perception Index in Sub-Saharan Africa, which is supported by one of the empirical studies mentioned. The empirical literature by (Nguyen & Duong, 2020) supports those findings by examining the impact of tax revenues on the shadow economy with more variables. Taxation, in contrast to corruption, is a legal way of extracting resources from the economy. However, economists have argued that excessive taxation can have a negative impact on economic activity. While tax increases can help governments provide more public goods, both quantitatively and qualitatively, these benefits may be offset by negative effects on growth caused by higher taxes. A higher tax rate may increase corruption in an economy by incentivizing tax evasion - individuals will have stronger incentives to accept and pay more bribes in order to reduce their tax burden (Nawaz, 2010).

Inflation rate:

Inflation is defined as a financial factor that results in corruption as well as an economic problem that results from corruption. The relationship between inflation and corruption was attempted to be tested one-way in this study. As proven by the above results there is a positive significant relationship between inflation rate and the dependent variable Corruption Perception Index in the Sub-Saharan countries. The result was supported by an empirical study conducted by (Akça et al., 2012) to show the relationship between inflation rate and CPI. The data of inflation and corruption for the period from 2002 to 2010 is used in this study. Due to the tests conducted, the variables were stationary at first difference. Moreover, inflation rate resulted a positive highly significant relationship in the random effects model.

Unemployment rate:

Based on the random effects model, unemployment rate had a negative impact on corruption, which support my hypothesis (H3). However, this results are supported by the empirical literature by (Oueghlissi&Derbali, 2021). They conducted a paper that propose the relationship between democracy and unemployment in the establishment of de facto levels of corruption. They resulted that corruption has decreased as a result of democracy. However, growing unemployment undermines democracy's capacity to reduce corruption.

CO2 Emissions:

Concerning CO2 emissions, my findings resulted that CO2 emission reveals a highly significant negative relationship with CPI. This result is supported only on the long-run, since a paper previously mentioned that was conducted by (Ren et al., 2021) which used panel data from Chinese states from 1998 to 2016. Stated that corruption raises per capita CO2 emissions in the near run while decreasing per capita CO2 emissions in the long term. Since there paper explained that in the long run, foreign direct investment increased carbon emissions per capita. Not only but also, urbanization increased carbon emissions per capita. This means that the

results of the quantile regression model are taken on the long-run only, and this supports my hypothesis (H5).

Conclusion:

The research investigated the reasons behind the lack of transparency in a sample of Sub-Saharan African countries between 2012 to 2020. The study found that corruption was prevalent due to the exploitation of human rights and systematic corruption by high-ranked officials in various countries. The research revealed a positive relationship between GDP per capita and CPI, along with the impact of tax revenues and inflation rate on CPI. The study also found unemployment rate to have a negative impact on CPI, while CO2 emissions had a negative significant impact on CPI in the long-run.

Policy Recommendations:

Based on the research findings, it is recommended that Sub-Saharan African countries increase their efforts to implement stability and equality, which can lead to a reduction in corruption levels and an improvement in living standards. The following policies are recommended:

- 1-Develop anti-corruption policies to lower political and land corruption. These policies should target increasing equality and eliminating the concept of ethnic diversity.
- 2- Use monetary policies to lower inflation rates and contractionary fiscal policies to decrease tax revenues, as both variables have a positive impact on corruption.
- 3- Increase job opportunities to lower the unemployment rate, as growing unemployment undermines democracy's ability to reduce corruption.

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