

Article

Corruption as a barrier to sustainability

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Abstract: This study investigates how corruption impacts sustainability in African countries. Using public databases, the research draws on the African Development Bank's corruption indicators and the World Bank's financial inclusion metrics. The findings reveal that as financial inclusion increases, particularly through the use of digital financial services, perceptions of corruption decrease. However, economic growth paradoxically correlates with an increased perception of corruption due to rising consumption demands. The study concludes that promoting financial literacy, along with robust governance, is essential for combating corruption and fostering sustainable development.

Keywords: corruption; sustainability; financial development

1. Introduction

This paper explores the relationship between corruption and sustainability, focusing on how corruption impacts sustainability efforts and what strategies can mitigate the problem. This study addresses a significant gap in current research by exploring how financial inclusion can mitigate the negative effects of corruption on sustainability, particularly in regions with limited access to modern financial services. While prior research has predominantly focused on developed economies, this study contributes fresh insights from sub-Saharan Africa, where digital financial services play a crucial role. The study focusses on how corruption affects sustainability efforts and what strategies can be proposed to address the problem. Both corruption and sustainability are ancient to humanity. Throughout history, power has always been a privileged status, easy not only to enjoy but also to abuse. Able leaders became rulers and then passed on their power dynastically, whether their successors inherited their ability or not (Berger, 2023). This phenomenon, the favoring of a person regardless of his or her ability, is nepotism, which is one of the forms of corruption still prevalent today. Another root of corruption, besides power, is money. According to Karl Marx's theory, which is less popular nowadays, the enriching social classes wanted to use the growth of their economic influence to gain political influence sooner or later (Szalai, 2007) a good example is the Athenian demos, which grew stronger in the economic boom of the so-called Greek colonialism in the 7th century BC, which created Greek democracy. The bourgeoisie, strengthened by the economic boom that followed the great geographical discoveries, soon took political leadership, often driving monarchies away in revolutions. Today, the situation has changed only in that

economic interest groups fund and control the politicians they want from the background (Kovács, 2012).

Sustainability and environmental protection are among the most popular issues nowadays, and they serve as an extension of a social purpose (Gyurián Nagy and Gyurián, 2023). New technologies, such as 5G technology, also contribute to ensuring economic, social and environmental sustainability (Balassa et al., 2024). Sustainability was a natural behavior of humanity from the beginning of history until the first industrial revolution. Examples include two- and three-pressure farming or the use of organic manure in agriculture (Wellmann, 1979) and pasture rotation in nomadic animal husbandry (Fodor, 2019). However, the advent of the steam engine, the increasing use of fossil fuels, growing pollution, overgrazing, overfishing, deforestation and overtourism are now consuming the resources of future generations (Aman et al, 2023; Brundtland, 1987; Coronel et al., 2022; Dávid, et. al., 2007; Lukács and Papp-Váry, 2024; Szeberényi et al., 2022). The current situation suggests that a very swift change is necessary to be able to protect the remaining natural resources. (Lukács et al., 2023; Szeberényi and Papp-Váry, 2021). This is why to look at sustainability also from a consumer perspective (Vinkóczi et al., 2024) and to focus on the importance of education (Annus, 2017).

Sustainability must therefore be taught and implemented and enforced through political and legal regulation. This fact links corruption to sustainability. Circumvention of the law and rules can lead to illegal pollution, mining, waste production, among other things. Corruption can therefore be seen as an important threat to sustainability, which it is vital to sanction, control and prevent (Dadkhah et al., 2024).

Since in the vast majority of cases corruption involves the uncontrolled, hidden movement of large sums of money, financial literacy can play an important role in prevention. In particular, transparency of transactions that are digital and therefore traceable is important. Such an understanding of financial sophistication is referred to in the literature as financial inclusion (Demirgüç-Kunt et al., 2015). This phenomenon is particularly worth investigating in two types of countries. One group is that of highly developed economies where financial technology is up-to-date. The other group is that of countries where, due to the physical unavailability of banks, the use of digital-online platforms is almost the only modern way to manage finances. This latter group includes, for example, countries in sub-Saharan Africa. These countries are also known to have high levels of corruption and are therefore appropriate for the research question addressed in this paper.

2. Literature review

Corruption has a multifaceted impact on sustainability (Fhima et al., 2023). It hampers economic growth, increases social inequalities and reduces the effectiveness of environmental efforts (Lemke, 2014). The consequence of corruption is a loss of trust. This is also felt by investors, which in turn leads to lower levels of investment. Corruption reduces the rate of GDP growth. This effect reduces economic stability in the long term (Lemke, 2014). Corruption causes some public funds to be diverted from their original purpose, but also reduces the resources that the state can devote to

sustainability. According to (World Bank, 2023), corruption causes losses of billions of dollars per year. This impact is particularly pronounced in developing countries, where waste of resources and financial abuse are common (Pring, 2015).

Corruption's impact on social inequalities is based on the fact that the acquisition of influence linked to money increases the gap between the rich and the poor. It also lowers the quality of public services (e.g., education, health), which further increases disconnection (OECD, 2015). The resulting loss of citizen trust will result in a decline in social cohesion and community participation (OECD, 2013). Higher levels of corruption therefore lead to lower levels of democracy and political instability (Transparency International, 2024).

In the area of environmental sustainability, corruption is a problem mainly because it allows circumvention of environmental regulations (UNEP, 2023). This increases the depletion of natural resources and pollution (Nellemann et al., 2014). It also leads to a lack of investment in sustainability, green development and infrastructure deficits due to wasted or diverted resources (WEF, 2004). As Kálmán, et al. (2024) demonstrate, corruption not only diverts critical funding but also erodes institutional capacity necessary for transitioning to environmentally sustainable economies. There is also a significant link between corruption and financial inclusion. However, corruption is a major obstacle to achieving this goal. Corruption increases the cost of access to financial services, as access is often only possible if a bribe is paid (Folorunsho, 2020; Jungo et al., 2023). (Abdulai and Issahaku, 2024). According to corruption, many small businesses are unable to access the financial services and credit they need because obtaining them is an opaque and bribe-intensive process. In general, it negatively affects the financial security of the state (Cherlenyak and Poyda-Nosyk, 2021).

Corruption undermines trust in financial institutions, which is why they use these services less than possible (Allen et al., 2016) and prefer informal channels. Szőke and Garamvölgyi (2020) discuss how institutional inefficiencies caused by corruption lead to systemic failures in knowledge-sharing mechanisms within financial systems, further inhibiting financial inclusion.

Microfinance institutions aim to enable the poorest to access financial services. However, corruption (opaque processes, need for bribes) can affect even these institutions (Cull et al., 2016; Steffen et al., 2024). Sahay et al. (2015) argue that corruption reduces the effectiveness of microfinance because resources do not reach precisely those who need them most.

Electronic payment systems help financial inclusion, but corruption can hinder their uptake, for example by hindering the development of technological infrastructure. In such cases, people continue to rely on cash, which facilitates corruption. Transparency in electronic payment systems and the fight against corruption are therefore closely linked (World Bank Group, 2014). Szőke et al. (2016) argue that innovative financial practices, such as scorecard-based metrics, can help combat corruption by making processes more transparent and accountable.

While previous studies (Fhima et al., 2023) have explored the impact of corruption on economic growth, this research takes a different approach by examining the relationship between financial inclusion and sustainability in developing countries, an area that has been relatively underexplored.

3. Materials and methods

The aim of this study is to determine whether the evolution of financial inclusion indicators may play a role in the perceived level of corruption in sub-Saharan Africa (SSA). The level of corruption is characterized by the authors using the corruption indicator from the African Development Bank (AfDB) Country Policy and Institutional Assessment reports. According to the AfDB Methodological Guide (AFDB, 2016), the indicator is used to characterize the public sector corruption situation in 54 countries in SSA as part of the governance pillar of the composite index reported. It is an indicator based on peer review and is characterized by a score from 1 to 6, where 1 is a score for a weak sense of corruption and 6 is a score for a very strong sense of corruption. The index is a continuous variable, however, as the authors intended to use it for ranking purposes in this study, the whole number obtained by rounding to the nearest decimal point was used. Accordingly, the theoretical mean (as an integer) was assigned by the authors as a value of 3, so that a value below 3 indicates a mild sense of corruption and a value above 3 indicates a strong sense of corruption. Financial development is characterized by the financial inclusion indicator, which the authors characterize using the World Bank (WB) Global Findex Database (Demirgüç-Kunt et al., 2022a) and the reports published roughly every 3 years based on this database (Demirgüç-Kunt, Oudheusden, et al., 2015, 2018; Demirgüç-Kunt, Ansar, et al., 2022b). Of the 54 countries included in the AfDB survey, 25 are also included in the WB database. From these data, the authors selected indicators to characterize financial inclusion based on the availability and actual use of cashless transactions. The following questions were developed (% of the population aged 15 and over):

- (1) Percentage with an account
- (2) Percentage with an account at a financial institution
- (3) percentage of bank card holders (4) percentage of credit card holders
- (5) percentage of holders of savings deposited with a financial institution
- (6) share of holders of loans from financial institutions
- (7) proportion using digital payment solutions
- (8) share of those receiving their salary in a financial institution account
- (9) proportion receiving their salary in cash only

Using questions (1), (7) and (9), three additional variables were constructed, which were assigned a value of 1 if they were less than 50% prevalent in the respondent population and a value of 2 if they were at least 50% prevalent in the sample. By summing the three scores obtained, the authors created the variable AFDB_Mean. Its value is calculated in a range of 3 to 6, with a higher value indicating higher financial development (inclusion).

The sampling process involved selecting 25 countries from sub-Saharan Africa based on their inclusion in both the African Development Bank (AfDB) and World Bank (WB) databases. The tools used for data collection, such as the AfDB corruption index and the WB financial inclusion indicators, were validated through peer-reviewed reports, ensuring their reliability and relevance for the study's objectives.

Considering that the AfDB publishes its reports annually and the WB every three years on average (2011, 2014, 2017, 2021), the sample used in this research includes data from the 25 countries included in both databases for the four years mentioned

above. They were processed by the authors using the open access statistical software Jamovi version 2.3.21.0.

The first step in the methodology used was the preparation of descriptive statistics, which included checking the normality (Shapiro and Wilk, 1965) and the homogeneity of variance (homoscedasticity) of the sample (Levene et al., 1960), as these two indicators determine the procedure to be followed for further analysis.

The answer to the research question was tested by constructing a regression model. Given the likelihood of significant autocorrelation between the variables of financial inclusion under study using linear regression, the method used by the authors was to construct and analyze an ordinal multinomial logistic regression model. The explained variable is the AFDB corruption perception index.

4. Results and discussion

Data from 25 countries are included each year for the four years under review. There are no missing values, the Shapiro-Wilk test is not significant in any year, i.e., the normality of the sample can be stated. The result of the Levene test ($F(1; 98) = 0.126, p = 0.723$) also indicates homoscedasticity. The authors note that possible heteroskedasticity does not imply error, but rather shows that the sample is “life-like” (Hunyadi, 2006). The minimum (2) and maximum (5) levels of perception of corruption did not change, so the mode and median value is 3 in all four years under study (see **Table 1**).

Table 1. Results and their evaluation.

Year	N	Missing	Mean	Median	Min.	Max.	Shapiro-Wilk	
							W	p
2011	25	1	3,29	3,5	2	5	0.936	0.118
2014	24	1	3,39	3,5	2	5	0.957	0.378
2017	26	1	3,43	3,5	2	5	0.977	0.802
2021	25	1	3,43	3,5	2	5	0.96	0.413

The overall fit of the model ($\chi^2(12) = 36.5, p < 0.001$) is good, with explanatory power of the variables significantly different from the random effect **Table 2**. Due to the type of model, the explanatory power can only be described by “pseudo” R^2 values (Allison, 2014; Cohen et al., 2002; Hardin and Hilbe, 2018). These suggest that the independent variables in the model explain between 8.72%–20.5% of the variation in the corruption index. This implies that, in addition to the variables we examine, other factors play a significant role in the evolution of the corruption score.

Table 2. Fitting indicators for the ordinal logistic regression model.

Model	Deviance	AIC	R^2 McF	R^2 CS	R^2 N	χ^2	df	Overall model test
								p
1	185	215	0.165	0.0872	0.205	36.5	12	<0.001

The authors’ regression model is summarized in **Table 3**.

Table 3. Regression model of the AfDB corruption index.

Predictor	Estimate	SE	Z	p	Odds r.	95% Confidence Interval	
						Lower	Upper
AFDB_Mean	0.198	0.449	0.441	0.659	1.219	0.504	2.974
Account (% age 15+)	0.019	0.073	0.267	0.789	1.020	0.885	1.177
Owns a debit card (% age 15+)	-0.290	0.064	-4.529	<.001	0.748	0.656	0.845
Saved at a financial institution (% age 15+)	0.179	0.097	1.842	0.065	1.196	0.99	1.452
Borrowed from a formal financial institution (% age 15+)	-0.087	0.090	-0.976	0.329	0.916	0.769	1.094
Financial institution account (% age 15+)	0.070	0.089	0.7906	0.429	1.072	0.901	1.277
Made or received a digital payment (% age 15+)	-5.50×10^{-4}						
0,051	-0.011	0.991	0.999	0.903	1.105		
Received wages: in cash only (% of wage recipients, age 15+)	-0.021	0.013	-1.597	0.11	0.98	0.955	1.005
Income group:							
Lower middle income – Low income	1.137	0.526	2.160	0.031	3.118	1.131	8.998
Year:							
2014–2011	0.5294	0.948	0.559	0.576	1.698	0.258	10.99
2017–2011	0.9156	1.116	0.820	0.412	2.498	0.277	22.759
2021–2011	0.3402	1.128	0.302	0.763	1.405	0.151	13.029

Note: The dependent variable 'AFDB_CorrInd_Integ' has the following order: 2 | 3 | 4 | 5.

The explanatory power of the model depends on the year of the survey and the national income of the country. Although their effect is not significant on their own, the inclusion of these two factors in the model increased the explanatory power calculated from the other factors by roughly 3% overall. The factors with a significant effect are:

The % of bank card holders in the population aged 15 and over: this effect is the most significant ($p < 0.001$). The effect is negative, i.e., an increase in the proportion is associated with a decrease in the corruption perception index - this implies a weakening of the perception of corruption, i.e., less perceived corruption. A unit increase in the proportion of credit card holders reduces the perception of corruption by 29%.

Belonging to an income group ($p < 0.05$) has a positive effect, i.e., higher national income indicates a higher index value, i.e., a perception of a worsening corruption situation. More specifically, being in a higher national income group worsens the perceived level of corruption by 113.7%.

The proportion of respondents with savings in financial institutions is almost significant ($p = 0.065$), with a positive effect, i.e., the more respondents have savings in financial institutions, the worse the perception of the presence of corruption. A unit increase in the ratio increases the negative view of corruption by 17.9%.

The results suggest that, among the factors that are significant or close to significant in the model, an increase in the proportion of bank card holders is likely to lead to an increase in the frequency of bank card use, i.e., digital transactions. Digital also means controllability and transparency and therefore reduces the perception of corruption. If a country moves up from the low income group to the lower middle income group due to an increase in national income, the perception of corruption is

perceived to be less favorable. One possible explanation is that a significant increase in national income indicates a growing economy and higher consumption. This in turn increases the propensity to engage in corruption as a possible way of achieving higher living standards and levels of demand among those who do not directly benefit from growth. At the same time, the direct beneficiaries of growth may, as a result of their improved financial opportunities, more often decide to ‘simplify’ their goals by taking a few bribes.

The question arises, however, why the increase in the proportion of people with savings in financial institutions has a significant, almost insignificant, negative impact on the perception of corruption. One likely reason given by the authors is that more personal savings also indicates better personal financial background. However, the mere fact that one has formal, i.e., transparent and verifiable, savings does not mean that one has all one’s financial reserves in this form. So, in addition to bank savings, you may also have additional informal cash reserves, which you can use to make things faster and smoother for the right person. Finally, a few words on the impact of the year of the survey (**Figure 1**).

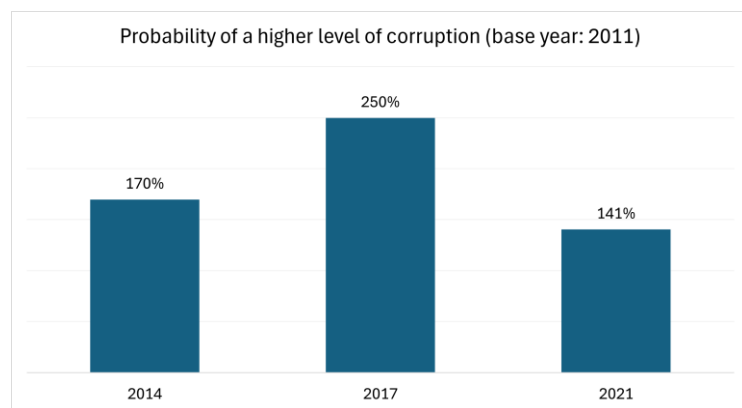


Figure 1. Probability of perceived levels of corruption increasing over the period.

The results confirm the research hypothesis by showing a significant relationship between financial inclusion and reduced perceptions of corruption. These findings directly support the research objectives, indicating that as access to digital financial services increases, perceived corruption decreases, especially in low-income countries.

5. Conclusion

The results show a correlation between the availability and penetration of modern financial services and perceived levels of corruption in African countries. Although the latter is statistically hardly changing, a steady and dynamic evolution has been demonstrated. A further finding of the research is that the country’s GDP growth is associated with an increase in the perceived level of corruption. A possible explanation for this is the drive to meet the growing demands of increasing consumption, which many believe can only be achieved through corruption. The wider availability of modern financial services helps to make the fight against corruption more effective, thus contributing to the pursuit of sustainability.

This study is limited by its focus on sub-Saharan Africa, which may affect the generalizability of the findings to other regions. Future research could expand this

analysis to other developing regions, such as Southeast Asia or Latin America, to explore whether similar patterns between financial inclusion and corruption exist.

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