

Can financial inclusion reduce the presence of corruption? Evidence from selected countries in Africa

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Abstract

Purpose – The purpose of this paper is to evaluate the impact of financial inclusion (FI) on control of corruption in selected African countries.

Design/methodology/approach – The study employs secondary data spanning over a period of 2005–2016. These data are sourced from IMF's International Financial Statistics, World Bank Development Indicators, Global Financial Development Database, Transparency International and International Country Risk Guide. The author uses [Sarima \(2008\)](#) approach to construct the FI index for 13 countries in Africa. The author applies random effect, robust least square and instrumental variable (IV) estimations to examine the impact of FI on control of corruption in Africa.

Findings – The author finds that financial inclusion improves the control of corruption. The author tests for possible FI threshold to avoid the case of extreme FI in Africa. The results show that there is a threshold level if reached, FI would have negative impacts in the control of corruption. This may likely happen mainly due to weak institutions in Africa. The results are robust to alternative proxy for control of corruption and various alternative estimation techniques.

Practical implications – The finding indicates that FI can serve as part of toolkits for reducing corruption in Africa.

Originality/value – This study stresses the important role of FI in the economic system. It is the first paper that empirically suggests the role of FI in controlling corruption in Africa.

Keywords Corruption, Financial inclusion, Random effect, Africa

Paper type Research paper

1. Introduction

Investigating whether financial inclusion (FI) is relevant in the fight against corruption is very important because (1) there are impressive growth rates of financially included households database in Africa, (2) there are growing interests in reducing corruption in Africa and (3) the gaps in the extant literature. These points are further explained in the following sequential orders.

First, the number of financially included people in Africa has been growing over the last decades, and there is a policy interest of understanding how it can be used as a tool to achieve macroeconomic objectives. According to [Demirgüç-Kunt and Klapper \(2012\)](#), there has been a remarkable achievement in granting access to former financially excluded households in Africa. A huge number of households now have access to financial services in area of credit and loan to individual and enterprises, which is made possible due to introduction of new technologies into the financial sectors and adoption of mobile money banking services. In addition, more than 50% of household and enterprises now have access to bank account with commercial banks, while ATM services are being popular in Africa ([World Bank, 2018](#)). Due to this development, it is worthwhile to investigate how financial inclusion policy can be used for the control of corruption in Africa. Simply, because, some economists have argued through their empirical results that corruption affects economic development through its negative effects on employment, poverty and financial system ([Cooray and Schneider, 2018](#)),



but financial inclusion is a policy affording the poor an effective and efficient access to credit, savings and effective payment systems, including easy access to insurance services through formal financial systems (World Bank, 2011; Johnson and Williams, 2016). It is a policy goal in many regions including Africa (Siddik *et al.*, 2019; Ozili, 2020). It is capable of bringing huge amounts of income into individual pulse, which creates different opportunities in the economy. As individuals become financially included, financial inclusion increases individual's tax contributions to the government for public welfare (Oz-Yalaman, 2019). Furthermore, financial inclusion is a designed policy to encourage the use of formal financial networks to facilitate efficient allocation of resources, checkmate inequalities in the society by providing opportunities to the poor (Ajide, 2020). Khan (2012) also notes that the policy aims to ensure that governments achieve efficiency and immense transfer of welfare benefits to target, disadvantaged groups in the society (Abdulmumin *et al.*, 2019).

Second, corruption has always been a global issue for a long period of time, which is seriously affecting business environment and development practices in Africa (Ajide and Olayiwola, 2020). The perpetrators deliberately create loopholes in the economic practices and working framework, which distorts the opportunity for achieve sustainable development goals (Canare, 2017; Ojeka *et al.*, 2019). The Transparency International (2019) rates South Sudan as one of the most perceived corrupt country in Africa due to frequent social and economic crises, ranking on an average score of 13 out of 100 in 2018 follow by Libya and Guinea –Bissau and DR. Congo. Corrupt leaders of most African countries are generally believed to have stolen as exorbitant as US \$ 40 billion every year and deported offshore of their respective countries, particularly by exploiting the loopholes in the international financial system (Money Task Force, 2019). It has also been reported that the political oligarchy in Africa holds between US \$ 700bn and US \$ 800bn in aggregate somewhere offshore financial centers. Corruption in African nations is distorting economic progress, political transition and social development in general. It has been classified as one of the major barriers to growth, good governance practices and economic freedom (Money Task Force, 2019).

Third, there are two groups of studies that examine the relationship between finance and corruption. The first set empirically proves that corruption sands the wheel of financial development (Weill, 2011; Park, 2012; Yaroson, 2013; Cooray and Schneider, 2018). This means that corruption is negatively associated with higher levels of financial sector development. It distorts the efficient allocation of financial resources in the financial system leading to disincentives among the financial actors, which undermines the process of financial decision-making through adverse selection and moral hazard (Barth *et al.*, 2004; Cooray and Schneider, 2018). This distortion in financial resource allocation may cause the volume of nonperforming loan to rise clouded with uncertainties due to lack of transparency and accountability, which reduces investor confidence and increasing volatility in the system (Williams and Beare, 2003). Ahmed and Ali (2010) document that corruption weakens the efficiency in financial sector. However, Shahbaz *et al.* (2011) show that corruption stimulates financial development in Pakistan. The second set of the studies investigate the impact of financial development on corruption. Altunbas and Thorton (2012) show that credit to private sector hinders corruption. In line with the literature, we explore this second aspect. We include polynomial terms in our panel of regression consisting of 13 African countries. We introduce financial inclusion into the discussion and argue that financial inclusion can serve as a veritable tool for controlling corruption in Africa.

In the light of the above, this study contributes to the second strand of the literature by investigating the unexplored role of financial inclusion impact on corruption in Africa. It is essential to articulate this unexplored area within the context of African literature due to the extreme cases of corruption level among most of the African nations that have found themselves among nations in the world. In this case, the novel approach of the paper

distinguishes it from the two groups of studies mentioned earlier. The findings of these group of studies are not too convincing simply because they study both developed and developing countries in a panel data setting without distinguishing them based on regions' peculiarities. It is believed that economic conditions in African region is not similar to that of developed countries, and the level of financial system is different across regions, not to talk of corruption level. Moreover, we examine the nonmonotonic relationship between financial inclusion and corruption. This follows the suggestion of scholars like [Cecchetti and Kharroubi \(2012\)](#) and [Ozili \(2020\)](#), who empirically hint that finance is good only up to a certain point after which it becomes a drag on economic and institutional variables ([Nizam *et al.*, 2020](#)). This means that there could be probably a turning point in the impact of financial inclusion. This paper further contributes to the empirics by providing information on optimal point or minimum turning point to the policy makers in African countries. The presence of potential optimal turning point may provide important policy implications required to effectively strengthen institutional quality and further increase African economic development ([Nizam *et al.*, 2020](#)). This paper is organized into six sections. The next section discusses the stylized facts on corruption and financial inclusion in Africa. In [section 3](#), we discuss the literature review. [Section 4](#) presents the model and methodology of the study. [Section 5](#) presents the findings, while [section 6](#) concludes the paper.

2. Stylized facts on financial inclusion and corruption in Africa

Corruption is the abuse of public office, privileges, authorities and powers for private and selfish gains ([Egger and Hannes, 2005](#); [Yarosan, 2013](#)). The trend of corruption in Africa is reported in [Table 1](#). It shows that the level of corruption is between 31–33 points on a scale of 100 points. It also reveals the trend of corruption in the sub-Saharan Africa (SSA) and Middle East and North Africa (MENA). The level of corruption is very high in the year 2012, especially in MENA region compared to SSA. This implies that much effort is needed to control the corruption. In year 2014, there was a monumental increase in the level of corruption, as it rose by 2%, which also implied that the present control measures being employed by African government could not check the rising rate of corruption in their respective countries ([Transparency International, 2019](#); [Ajide and Olayiwola, 2020](#)).

Furthermore, it is believed that corruption is a prime determinant of economic backwardness of most African states. It also affects the integrity of African nations and so pervasive in occurrence. In addition, the long rule of military era in most African countries serves as one of the bases for reckless looting of public funds, which has become normal features even after adoption of democratic elected government. There are widespread of poverty, inequality and ill-gotten wealth among the African elites. Gratification and the use of

Years	Africa	SSA	MENA
2012	33.32	32.24	34.40
2013	32.13	32.24	34.60
2014	32.85	32.02	32.80
2015	32.31	29.53	32.00
2016	31.51	30.97	32.40
2017	32.09	32.06	34.00
2018	32.46	32.12	32.20
2019	32.44	32.67	33.00

Source(s): Author's Computation, but data from Transparent International. SSA and MENA donate sub-Saharan Africa and Middle East and North Africa

Table 1.
Average corruption
perception index for
Africa

political offices to acquire wealth has become norm in African societies. Tax evasion and ineffective tax collection mechanism couple with weaknesses in the institutional quality and availability of safe havens for corrupt leaders are wide spread in Africa (Jeng, 2018; Oz-Yalaman, 2019).

On financial inclusion, African countries have gone through various initiatives including targeting inclusive finance policy (Abdulumumin *et al.*, 2019). This policy has brought a lot of improvements into African financial system. Financial inclusion is a policy rolled out to ensure that individuals including the less-privilege have access to formal financial services. According to the survey of 31 countries over a period of 2011–2014 reported by Asuming *et al.* (2018), bank accounts ownership has increased from 26% in 2011 to 34% in 2014. This increment is about 30%. The number of persons with saving facilities has increased by 11% due to other savings outlets created by nonbank financial institutions, while those who save within the banking institutions only increases by 1.1% (World Bank, 2018). In Africa, access to formal finance services is being determined by demographic features of individual households including age, gender, education, income, marital status, household size and trust in financial institutions (Soumaré *et al.*, 2016). World Bank (2018) reports that mobile money is one of the most effective technology driven financial inclusion in Africa. The mobile banking facilities have doubled to 21%, while the share of adults with bank accounts in formal financial institutions is growing at approximately constant rate. There is opportunity to further improve the level of bank ownership up to 95m unbanked adults who do receive cash payment for agriculture produce. There are also chances to move people who are currently patronizing semiformal methods of payment into the mainstream of formal financial system.

3. Financial inclusion and corruption: theories and evidences

Theoretically, studies argue that corruption and finance are interrelated (Cooray and Schneider, 2018). The extant literature provides that finance may correlate with the level of corruption which alters efficient allocation of financial resources to the real sector due to the asymmetric information problems, thereby conforming to the sand wheel hypothesis of corruption-finance nexus (Barth *et al.*, 2004; Weill, 2011; Park, 2012). There is theoretical thinking arguing that finance may alter the level of corruption due to its chances in exerting governance system (Tavares, 2003; Levine, 2005; Altunbas and Thornton, 2012). However, it has been well acknowledged that financial intermediation functions of financial system involve transaction cost, which is one of the features of private goods; meaning that consumption is based on affordability. Thanks to the new financial inclusion policy. It is worth of note that before the introduction of inclusive financial policy into most African countries, the costs of delivering and use of formal financial services is very high (Altunbas and Thornton, 2012; Ajide, 2020). Some scholars attribute the high rate of these transaction costs to corruption and over reliance on middlemen due to unreliable nature of weak banking systems in Africa and lack of presence of formal financial institutions in rural settings that exposes less-privileged to higher risk of theft and extortion (Pelletier *et al.*, 2019). However, financial inclusion has made this scenario to be a history to a large extent.

This study derives its theoretical foundation from rational choice theory of corruption that has dominated the explanations of anti-corruption practice and policy approaches in economic literature (Dupuy and Neset, 2018). As a theoretical basis, it proposes that an act of corruption is a calculated strategy and self-interested behavior, which occurs due to the asymmetric power situation where an economic agent hold power over others, in specific, the principals (citizens among others) solely for personal gain (Svensson, 2005; Kolstad and Søreide, 2009). According to Dupuy and Neset (2018), “agents are delegated responsibility for public goods provision on behalf of principals. However, instead of fulfilling their duty to the principal, agents act to realise their own preferences at the expense of the principal”.

Fisman and Golden (2017) and Dupuy and Neset (2018) hint that rational choice theory suggests the means of controlling corruption by reducing monopoly power of the agents (such as governments and other public officials) through efficient and functional transparent mechanisms, accountability participation and broaden authority. Following this prepositions, inclusive financial policy can bring transparency and accountability through its three main dimensions. There are many views on the roles of financial inclusion in fighting corruption in every nation which have not been empirically proved.

The literature reveals three important dimensions of financial inclusion: penetration, availability and usage of financial services (Sarma, 2008; Ajide, 2020). While the number of customers with deposit, loan accounts and mobile money accounts per adults serve as the penetration dimension indicators, the availability dimension indicators include: number of financial institution branches, availability of ATM and mobile money outlets. The usage dimension indicators include: deposit and credit from financial institutions, payment system, remittances and transfers. All these dimensions are useful in the fight against corruption. For instance, Tidiani (2015) states that mobile banking has helped in getting access to formal financial facilities. He further states that the access rate is approximately 49.5%. This innovation has allowed African government in reducing corruption in agricultural sector simply because of its transparency and traceability. In Afghanistan, a mobile banking system namely M-Paisa serves a significant and fundamental instrument of reducing corruption because of its level of accountability in payment systems (Lianju and Luyan, 2011; Maurer *et al.*, 2011). A study by Krolkowski *et al.* (2013) reveals that mobile payment decreases corrupt-related activities in Dar'es Salaam.

Moreover, financial inclusion may affect corruption through the banking activity complaint framework. This is because the financial intermediation functions of financial system are heavily regulated and safeguarded to determine and monitor potential illegal activities including money laundering related activities, which is one of the components of corruption in an economy. To do this, most banks keep records of their customers through a programme termed "Know Your Customers (KYC)". This means that enormous responsibilities are placed on banks to document and report illegal transactions and other crime related activities. However, banks need strong technological supports and good number of experienced staff to do this. Since, financial inclusion includes creation of biometric identifiers, citizens are encouraged to open bank accounts which can be linked to support technologies capable of tracking the records of individual citizens for any illegal deals in the economy. Another channel in which corruption reduces through financial inclusion is the direct transfer of cash in form of salaries and unemployment benefits instead of through corrupt middlemen. This is currently happening in African countries like Nigeria and others that have introduced Integrated Personnel and Payroll Information System (IPPIIS) for the payment of workers, which has reduced to a large extent the incidence of ghost workers. Embezzlements are reduced because every government at different level can now do cash transfers to the less privileged including rural women because most of them have been financially included through access to bank accounts. This means that financial inclusion efficiently promotes government welfare programmes to the citizens by reducing leakages and ensures that welfare packages are enjoyed by the target group in the society. Financial inclusion also reduces corruption through the increase in the level of formality in the economy. Tax collection is now easy and the incidence of tax evasion and avoidance have reduced drastically (Ozili, 2018; Oz-Yalaman, 2019). Through digital technology such as e-government infrastructure, tracking and traceability become easy. This means that inclusive finance has a wider role as an instrument of reducing corruption and terrorisms in Africa.

Empirically, there are few studies that examine the impact of finance on corruption in an economy. However, the role of financial inclusion in the fight against corruption still remains

unexplored. The work of [Johannesson \(2014\)](#) applies survey data on 200 households for the purpose of developing a framework that links the adoption of M-Pesa, and its impact on corruption in Kenya. He suggests that M-pesa is very relevant in controlling the level of corruption in Africa. Furthermore, [Altunbas and Thorton \(2012\)](#) document after using bank credit to private sector as a proxy for financial sector show that finance reduces corruption. [Majeed and MacDonald \(2011\)](#) provide linear and nonmonotonic relationship between financial development and corruption in a panel of countries. The results show that there is a negative and significant effect of financial development on corruption. Their results are robust to control variables and alternative measures of corruption. [Wang and You \(2012\)](#) show that financial development substitutes for corruption, while [Kirch and Terra \(2012\)](#) hint the same results in South America. In the study of [Adams and Klobodu \(2016\)](#), it was documented that the coefficient of interaction between financial development and control of corruption is negative, suggesting that financial development could be correlated with corruption in the economies. The study of [Cooray and Schneider \(2018\)](#) reveals that corruption correlates with financial development in 106 countries. This submission supports the work of [Yarosan \(2013\)](#), suggesting that corruption and the efficacy of financial development are interrelated. This is consistent with the work of [Ahmed and Ali \(2010\)](#), who explore a panel of 38 countries. Using panel of 30 commonwealth countries over a period of 1995–2008, [Batabyal and Chowdhury \(2015\)](#) show that corruption crowd out the financial development. The return on financial development on inequality at higher level of corruption is positive when compared with the countries in lower level of corruption. Their results suggest financial development positively increase corruption. Furthermore, [Wei and Kong \(2016\)](#) examine the role of financial development and corruption in capital structure of firms in China. After controlling for legal environment and other firms' specific factors, they document that corruption and financial development have positive effects on loan portfolio of firms. This means that external factors influence firms' capital structures. [Orkoh et al. \(2017\)](#) reveals that control of corruption and political stability reduces illicit financial outflows in Africa.

4. Data and methodology

4.1 Data, model and variables measurement

The purpose of this study is to evaluate how financial inclusion has impacted control of corruption in selected African countries. Following the econometric models of [Altunbas and Thorton \(2012\)](#), [Majeed \(2014\)](#). Our empirical model is specified as follows,

$$C_{it} = \beta_0 + \beta_1 FII_{it} + \beta_2 GR_{it} + \beta_3 INF_{it} + \beta_4 REM_{it} + \beta_5 UN_{it} + \varepsilon_{i,t} \quad (1)$$

Where C is the Control of corruption, FII is the financial inclusion, GR is the growth rate of GDP per capita, INF is the inflation rate, REM is the remittance as a percentage of GDP, UN is the unemployment rate and ε is disturbance term. [Table 2](#) explains how the variables are measured with sources of the data.

Our choice of choice of control variables is influenced by the extant literature. As specified in [equation \(1\)](#), we use economic growth, remittances, inflation and unemployment as control variables in this study. [Borja \(2020\)](#) states that corruption obstructs economic growth through diversion of some important productivity resources toward inefficient uses, discouraging investment and distorting financial system in an economy ([Delgado et al., 2014](#)). Furthermore, studies show that economic growth correlates with corruption. It has been revealed that poor regions such as Africa may suffer more from corruption, while richer countries may have the financial resources to improve the regulation to curb corruption ([Busse and Steffen, 2011](#); [Abu and Staniewski, 2019](#)). We use unemployment rate as one of the control variables due to the nature of African countries. [Jeng \(2018\)](#) shows that

Variables	Definitions	Sources	Impact of financial inclusion
FII	Financial inclusion index	Computed by author using Sarma (2008) 's formula	
C	The natural log of corruption perception index provided by Transparency International (LTCI) International Country Risk Guide (LICRG)	Transparency International and International Country Risk Guide	
IF	Inflation rate	World Bank Development Indicators	
UN	Unemployment rate	World Bank Development Indicators	
GR	GDP growth rate	World Bank Development Indicators	
ATM	Automated teller machines per 100,000 adults	World Bank Development Indicators and Financial Access Survey of IMF	
BRAN	Commercial bank branches per 1,000 adults	World Bank Development Indicators/ Financial Access Survey of IMF	
DEPO	Depositors with commercial banks per 1,000 adults	World Bank Development Indicators/ Financial Access survey of IMF	
DOME	Domestic credit to GDP ratio	World Bank Development Indicators/ Financial Access Survey of IMF	
BORR	Bank borrower per 1,000 adults	Financial Access Survey of IMF	
ACCT	Number of commercial bank accounts per 1,000 adults	Financial Access Survey of IMF	
Source(s): Author's compilation			Table 2. Sources of data and measurements of variables

unemployment may promote corruption. This is because unemployment rate is very high in the continent. The unemployed may result to do whatever it takes to fetch them money, especially where the government does not make any provision for them. Over the years unemployment has hit Africa so hard. A desperate job seeker may decide to pay bribe in order to secure a job in an organization. Higher unemployment rate has compelled some citizens to indulge in frequency of paying bribe in the process of seeking employment. Inflation rate is included among the control variables because studies show that the corruption may be influenced by inflation in an economy. For instance, the study of [Paldam \(2002\)](#) investigates the relationship and confirms that inflation influences corruption significantly. This means that in order to successfully curb corruption, economic conditions need to be ameliorated for effective results (also see [Ben Ali and Sassi, 2016](#)). In addition, studies like [Ahmed and Ali \(2010\)](#), [Yaroson \(2013\)](#); [Cooray and Schneider \(2018\)](#), [Ajide and Olayiwola \(2020\)](#) confirm that remittance influence control of corruption through cross-border transfer of norms to the home countries of the senders.

Furthermore, we include a nonlinear term for financial inclusion (FII^2) to ensure an evaluation of a potential threshold level of financial inclusion termed “extreme financial inclusion” by [Ozili \(2020\)](#); [Nizam et al. \(2020\)](#). In their explanations, [Nizam et al. \(2020\)](#) hint that it provides the opportunity to assess whether the nexus remains positive or otherwise. It is worthwhile to note that studies on nonmonotonic relationship concerning the level of financial inclusion on institutional or other economic variables have not been adequately addressed in the literature ([Goel and Sharma, 2017](#); [Kim et al., 2018](#); [Nizam et al., 2020](#)). In order to address this issue, we specified [equation \(2\)](#) to capture the nonmonotonic relationship between financial inclusion and corruption in Africa.

$$C_{it} = \beta_0 + \beta_1 FII_{it} + \beta_2 FII_{it}^2 + \beta_3 GR_{it} + \beta_4 INF_{it} + \beta_5 UN_{it} + \varepsilon_{i,t} \quad (2)$$

The subscripts (i, t) denote the cross-sectional and time dimensions of the panel. The dependent variable is corruption perception index provided by Transparency International (LTCI). For robustness check, we also use corruption index provides by the International Country Risk Guide (LICRG). However, in order to use the corruption index provides by the International

The study considers thirteen countries in Africa due to nonavailability of data over the period of 2005–2016 and to ensure balance panel data estimation. We consider the following countries: Tunisia, Botswana, Nigeria, Algeria, Ghana, Gabon, Rwanda, Uganda, Malawi, Zambia, Sierra Leone, Republic of Congo and Ethiopia. We compute the financial inclusion index to follow the methodology of [Sarma \(2008\)](#). We use six financial inclusion dimensions to compute the index. These dimensions include automated teller machines per 100,000 adults, commercial bank per branches 1,000 adults, depositors with commercial banks per 1,000 adults, domestic credit to GDP ratio, bank borrower per 1,000 adults and number of commercial bank accounts per 1,000 adults. All indicators are sourced from World Bank Development Indicators and International Financial Statistics of IMF. The [Sarma \(2008\)](#)'s financial inclusion index is formulated as:

A_i is the actual value of dimension i , m_i represents minimum value of dimension i and M_i is the maximum value of dimension i . The financial inclusion index is measured by normalizing the inverse of Euclidean distance of point d_i , computed in (3) from ideal point I is one. The formula is hereby given as:

The normalization equation (4) makes the index to lie between zero and one.

Table 3 presents the descriptive statistics of the variables, while Table 4 shows the correlation among them. The mean of financial inclusion is about 22.58% with maximum percentage value of 85, while its minimum percentage is two. The corruption index is approximately 3.44 with standard deviation of 0.297. The minimum value is 2.833 and

Source(s): Author's computation

maximum value is approximately 4.17. The mean value of inflation rate is 8.88 with maximum value of 44.35, while the unemployment rate is 8.837. Standard deviation is a measure of degree at which data are spread from its mean value over a period. Table 3 shows that the data are mixed in terms of stability. It means that the actual dataset deviates from their average value. The financial inclusion and remittances are more stable compared to others. Also, the average value of the financial inclusion in Africa is relatively improving, but there is still much disparity in terms of its development. The average economic growth is about 6.03%, while the standard deviation of 3.68% means that there is no much disparity in terms of growth in the selected countries.

The correlation between the variables is presented in Table 4. The correlation between financial inclusion variable and corruption index is positive and the value is around 67%, while other variables display negative association with corruption index. Unemployment rate is positive in association with control of corruption.

In addition, none of the independent variable displays any possible sign of multicollinearity with other independent variables.

4.2 Estimating techniques

For our baseline estimation, we use random effect estimation. This is estimation is chosen based on the Hausman specification test. Panel data are based on two dimensions: time and cross-sectional dimension. It means that it is possible to encounter autocorrelation and heteroscedasticity issues (Tahir *et al.*, 2019). To take care of this, we employ robust least square and generalised linear model estimator. To take care of any potential problem of variables omission and endogeneity issues in our results, we further re-estimate our model using IV-estimating techniques.

5. Results and discussion

5.1 Main results

The estimation process is as follows: we examine the influence of financial inclusion on corruption. Second, we test for possible threshold among the two variables. Third, for robustness check, we re-estimate the baseline model using alternative proxy for corruption perception. Finally, we re-estimate the model using alternative estimation techniques.

Table 5 presents the baseline results of the study, while Table 6 reports test for possible threshold. In both cases, we rely on random effect estimation results as inferred from Hausman test. The coefficients of financial inclusion (FII) are positive and significant. A one-percent change in financial inclusion increases the control of corruption by 1.065%. This implies that financial inclusion as a policy tool can be used to reduce tax evasion and avoidance, money laundering, bribery, embezzlement and drug trafficking among others. Our result is in line with the conclusion of Oz-Yalaman (2019). He states, after considering 137

	LTCI	FII	GR	INF	REM	UN
LTCI	1.000000					
FII	0.672067	1.000000				
GR	-0.100698	-0.324056	1.000000			
INF	-0.140158	-0.315439	0.213249	1.000000		
REM	-0.057554	0.342130	0.002898	0.023393	1.000000	
UN	0.415437	0.453446	-0.322498	-0.313742	-0.232097	1.000000

Source(s): Author's computation

Table 4.
Correlation

Table 5.
Results of financial inclusion and corruption dependent variable: LTCI

Variables	OLS	FE	RE
FII	1.369388*** (0.0000)	1.054241*** (0.0000)	1.065489*** (0.0000)
GR	0.012528** (0.0202)	0.004049 (0.2549)	0.004102 (0.2423)
INF	0.002023 (0.4828)	−0.001512 (0.4735)	−0.001624 (0.4309)
REM	−0.041205*** (0.0000)	0.003753 (0.5994)	−0.000221 (0.9745)
UN	−0.004880 (0.1880)	−0.011095 (0.1134)	−0.006920 (0.2268)
C	3.181113*** (0.0000)	3.302600*** (0.0000)	3.275635*** (0.0000)
Adj. <i>R</i> -Square	0.481240	0.828505	0.213256
<i>F</i> -statistic	29.38683	44.47980	9.294473
Prob. (<i>F</i> -statistic)	0.00000	0.00000	0.00000
Hausman test			6.716689
Prob (Hausman test)			0.2426
No. of countries	13	13	13

Note(s): *, ** and *** means significant at 10%, 5% and 1%, FII donates financial inclusion, GR denotes growth rate of GDP per capita, INF donates unemployment, REM donates remittances. RE and RE means fixed effect and random effect, respectively. Figures in () are *p*-values

Source(s): Author's computation

Table 6.
Results of nonlinear test for financial inclusion and corruption. Dependent variable: LTCI

Variables	OLS	RE	FE
FII	3.001705*** (0.0000)	2.727110*** (0.0000)	2.767338*** (0.0000)
FII^2	−2.233285*** (0.0000)	−2.311266*** (0.0000)	−2.342420*** (0.0000)
GR	0.015861*** (0.0014)	0.003749 (0.2177)	0.003076 (0.3185)
INF	0.004328 (0.1024)	−2.83E-05 (0.9874)	−0.000268 (0.8839)
REM	−0.045071*** (0.0000)	−0.001284 (0.8301)	0.002515 (0.6847)
UN	−0.003544 (0.2913)	0.001045 (0.8365)	0.000939 (0.6847)
C	2.964881*** (0.0000)	3.028262*** (0.0000)	3.020636*** (0.0000)
Adj. <i>R</i> -square	0.575148	0.400452	0.871158
<i>F</i> -statistic	35.52093***	18.03206***	58.47238***
Prob. (<i>F</i> -statistic)	0.000000	0.00000	0.00000
Hausman test		10.255377	
Prob (Hausman test)		0.1143	
No. of countries	13	13	13

Note(s): *, ** and *** means significant at 10%, 5% and 1%, FII donates financial inclusion, GR denotes growth rate of GDP per capita, INF donates unemployment, REM donates remittances. RE and RE means fixed effect and random effect, respectively. Figures in () are *p*-values

Source(s): Author's computation

countries for a period of 2011–2017, that financial inclusion can be used to reduce tax evasion and avoidance. In other words, financial inclusion can improve the tax revenue of the government.

In Table 6, the financial inclusion threshold variable is negative and significant. This means that in Africa, there is a particular level at which optimal financial inclusion is attained. A further increase beyond that level would increase the level of corruption. This means that financial inclusion policy has some downside (Ozili, 2018). Beyond the threshold, it may spread the financial risks to the vulnerable users and may increase the number of middle-end consumers who benefit from financial systems at the expenses of the poor in the society, especially if they are unable to get insurance for themselves (Ozili, 2020). It is further argued that proper institutional quality that can de-risk the financial sector needs to be guaranteed

before incorporating the low-income individuals into the formal financial system (Ozili, 2018). Ozili (2020) and Nizam *et al.* (2020) provide explanation on extreme financial inclusion, which occurs when access to the formal financial sector is granted to all individuals irrespective of their riskiness and income level. This kind of financial inclusion grants financial access to criminals, hackers and fraudsters. Until, the threshold is met, financial inclusion is having positive impact on control of corruption in Africa. However, a further increase in the level of inclusive finance without some level of checks may reduce the effective control of corruption in Africa. Because the extreme inclusive finance can expose the formal financial sector to risky individuals that cannot be identified properly and individuals who wish to defraud others of their money, thereby increasing the level of corruption. In addition to this, the transformational nature of the financial sector may lead to an increase in incidents of cyber hacks among others that may directly increase the level of fraud and corruption making the internal structures no longer reliable.

This implies that the present level of inclusive finance reduces the level of corruption in Africa. This supports the view of Rajan (2014). He stresses that financial inclusion drives individual identifiers which can be linked to bank account opening, in which money transfer can be made directly to subsidies' recipients. Mitchell and Scott (2019) analyze that government can use financial inclusion to generate significant amount of tax by bringing more citizens into the tax nets, thereby improving the public revenue through taxes. They further illustrate how the government of Argentina is using the financial inclusion policy to draw more people into the formal banking system. In this case, citizens and corporate bodies begin to use less cash and increase their usage of credit and debit cards, which make more consumption to occur in formal markets for easy taxability by the government.

It can be further deduced that financial inclusion exerts positive influence on control of corruption, and parameters estimate for inclusive finance is significant at 1% level of significance. This supports the submission of Altunbas and Thorton (2012). They document that finance influences control of corruption. Financial inclusion could serve as a veritable tool for controlling corruption in Africa as presented in Table 4. Practically, inclusive finance enables households to have access to financial services which can be used to buy public goods and service, as opposed to depending exclusively on the government to supply the public resources (Abdih *et al.*, 2012; Berdiev *et al.*, 2012). Financial access smoothen everyday living and assists households and entrepreneurs plan for everything from long-term goals to unforeseen eventualities. As they gain financial access, individuals are likely to use other financial services, such as credit and insurance, to start and expand businesses, invest in education and other public services, which can improve the overall quality of their lives (World Bank, 2018). It follows that individual households would have access to public goods through financial inclusion and there would be little or no inducement to engage in corruptive behavior. In addition, government can then free ride and appropriate more resources for the provision of public goods, rather than channel these resources to the corrupt individual. In other words, a well-developed financial system would contribute and aid financial inclusion in promoting growth process by channeling funds from savers to borrowers (Cooray and Schneider, 2018). However, the absence of a well-developed financial system may pull down the economy specifically from reaching its full potential and making individual household to tolerate rent-seeking behavior.

In Tables 5 and 6, all the control variables are not significant based on the random effects' results in panel setting. However, the effect of financial inclusion is consistently positive and significant in influencing control of corruption. Our benchmark results remain the same, while the level of significance for all parameters improves in Table 6 after considering the nonlinear effect of financial inclusion. The coefficient of income per head growth rate, remittance, unemployment and inflation remain to be insignificant.

5.2 Robustness test

We examine the consistence of our variable of interest by conducting a number of robustness test. First, we use an alternative proxy for corruption perception index released by International Country Risk Guide (ICRG) and re-estimate our model. We exclude Rwanda in these estimations due to nonavailability of data on corruption in ICRG for the country making our sample to be twelve (12). The result is presented in Table 7. The financial inclusion index (FII) still remains positive and significant at 1%. This further supports our results in Table 5. The GDP per capita growth is also associated with higher control of corruption, at the 10% level of significance based on random effect results.

Furthermore, in Table 8, we re-estimate our model using different estimation techniques such as generalised least square (GLS) which correct for heteroscedasticity; we use robust least square (RLS) to correct for possible outlier among the variables, while instrumental variable (IV) estimation technique can correct for possible omission of variables and endogeneity. Nevertheless, our variable of interest still remains positive and significant across all the estimations.

The FII is significant at 1%, and the coefficient of the square is negative and significant. This shows there is a threshold at which financial inclusion should reach. A further increase in inclusive financial growth is dangerous for controlling corruption in Africa. African countries are embedded with weak institutions. Private sector banking system may find it difficult to play a significant role in controlling corruption and may be crowded (La Porta *et al.*, 2002; Cooray and Schneider, 2018). In this condition, public ownership of banks and lack of central bank independent would mean government is in a position to regulate finance and influence the allocation of funds to buy votes, receive bribes and receive insider information or influence supervision (La Porta *et al.*, 2002). This implies that good quality of institutions is necessary when the threshold is reached for better control of corruption in Africa.

In Table 8, the GDP per capita growth rate is positive and significant. A one-percent increases in growth rate leads to 1.2%–18% increase in control of corruption. A possible reason for this as explained by Berdiev *et al.* (2012) is that when households are poverty-stricken, there is nothing much to extract through corruption. When income rises, there is more to gain, through control of corruption (Braun and Di Tella, 2004; Frechette, 2006). Furthermore, remittance is negative and significant. This submission does not support the work of Majeed (2016). He documents that remittance increases the level of corruption.

Variables	OLS	FE	RE
FII	1.457893*** (0.0000)	1.590215*** (0.0000)	1.342475*** (0.0001)
GR	0.045810*** (0.0002)	0.010427*** (0.0000)	0.012916*** (0.0553)
INF	0.020498*** (0.0029)	0.000394 (0.1253)	0.002057 (0.6092)
REM	–0.030129*** (0.0794)	0.057205 (0.9236)	0.053697*** (0.0000)
UN	0.043218*** (0.0000)	0.081432*** (0.0000)	0.070553*** (0.0000)
C	0.992218*** (0.0000)	0.852195*** (0.0000)	0.981014*** (0.0000)
Adj. <i>R</i> -Square	0.390950	0.859328	0.386082
<i>F</i> -statistic	19.35836***	55.59701***	18.98600***
Prob. (<i>F</i> -statistic)	0.00000	0.0000	0.000000
Hausman test			13.196837
Prob (Hausman test)			0.0216
No. of countries	12	12	12

Table 7.
Results of financial inclusion and corruption dependent variable: LICRG (alternative proxy for corruption)

Note(s): *, ** and *** means significant at 10%, 5% and 1%, FII donates financial inclusion, GR denotes growth rate of GDP per capita, INF donates unemployment, REM donates remittances. RE and RE means fixed effect and random effect, respectively. Figures in () are *p*-values

Source(s): Author's computation

Variables	GLS	GLS	RLS	RLS	IV	IV
FII	1.36938*** (0.0000)	3.00170*** (0.0000)	1.411837*** (0.0000)	3.09022*** (0.0000)	6.5263*** (0.0001)	2.25662*** (0.0000)
FII^2		-2.2332*** (0.0000)		-2.30127*** (0.0000)	-6.18109*** (0.0078)	
GR	0.01252*** (0.0189)	0.0158*** (0.0011)	0.012476** (0.0192)	0.01613*** (0.0007)	0.10547** (0.0332)	0.18296*** (0.0039)
INF	0.00202 (0.4817)	0.00432 (0.1002)	0.002624 (0.3610)	0.00560 (0.4118)	0.01574 (0.2480)	-0.000554 (0.7491)
REM	-0.04120*** (0.0000)	-0.0450*** (0.0000)	-0.049049*** (0.0000)	-0.04923*** (0.0000)	-0.07772*** (0.0001)	-0.070555** (0.0183)
UN	-0.00488 (0.1859)	-0.00354 (0.2896)	-0.003603 (0.3281)	-0.00267 (0.4118)	1.83505 (0.4475)	0.01101 (0.4557)
C	3.1811*** (0.0000)	2.9648*** (0.0000)	3.159578*** (0.0000)	2.933531*** (0.0000)	0.00723*** (0.0000)	1.91774*** (0.0000)
	Pearson SSR = 6.964, LR Statistic = 146.93	Pearson SSR = 5.6648, LR Statistic = 213.125	Adj. R- Square = 0.4071, Adj. Rw = 0.591	Adj. R-Square = 0.46959, Adj. Rw = 0.703526	F-statistic = 140.4834 Prob (F-statistic) = 0.000000	F-statistic = 91.04873 Prob (F-statistic) = 0.00000
No. of Countries	13	13	13	13	13	13
Note(s): * ** and *** means significant at 10%, 5% and 1%, FII donates financial inclusion, GR denotes growth rate of GDP per capita, INF donates unemployment, REM donates remittances, RE and LR means fixed effect and random effect, respectively. GLS means generalized least square, RLS means robust least square, IV means Instrumental variable estimation, Figures in () are <i>p</i> -values						
Source(s): Author's computation						

Table 8.
Non-linear (alternative
estimation techniques)
dependent
variable: LTCI

According to him, “one standard deviation” increases the remittance variable in association with an increase in corruption of 0.33 points or 25% of a standard deviation in the corruption index (p. 23). [Berdiev et al. \(2012\)](#) examines the remittances’ effect on corruption in a panel data for 111 countries. They find that remittances increase corruption.

6. Conclusion and policy implications

We examine the impact of FI on control of corruption for a period of 2005–2016 in a panel data setting of thirteen African nations. We find that FI improves the control of corruption in Africa. We also test for possible financial inclusion threshold to avoid the case of extreme financial inclusion in Africa. Our results show that there is a threshold level if reach, FI would have negative impact on the control of corruption. This may likely happen mainly due to weak institutions in Africa. This observation correlates with the submission of [Foellmi and Oechslin \(2007\)](#). They state that underdeveloped financial systems support economic elites. These economic elites may hinder anti-corruption strategies if there is concentration of political power in the hands of elites, especially if they own most economic and political institutions in a country ([Foellmi and Oechslin, 2007](#); [Majeed and MacDonald, 2011](#)). The study of [Boerner and Hainz \(2009\)](#) also supports our analyses, who condition their submissions on different groups’ political weights. They observe that financial system policy reforms may reduce corruption if the political power of some groups dominates that of the political corrupt officials.

Furthermore, our empirical findings also support the view of [Ozili \(2020\)](#). He states that just as too much of a good thing is not good; similarly, “too much financial inclusion” or “extreme financial inclusion” or “financial over-inclusion” is undesirable. Granting financial access to everybody may bring the situation of extreme inclusive finance. Therefore, we recommend that policy makers in African countries need to avoid the situation of extreme financial inclusion in their policy models and consider the potential negative effects of extreme financial inclusion in Africa. Good institutions with higher level of inclusive finance would further reduce the level of corruption in Africa. We therefore, recommend that quality of domestic institutions is very important in improving the corruption control in Africa. Our results are robust after taking care of outliers, heteroscedascity, possible omission of variables and endogeneity in our estimations.

In terms of policy implications, African governments need to implement policies to further strengthen inclusive finance. This can be done through increasing the level of penetration and eradicate transaction costs of financial intermediating functions of commercial and microfinance banks as a way of reducing corruption in the economy and boost economic development. It is also necessary to connect policies with financial technology providers. This would ensure that digital financial services providers offer services at low costs including rural areas. Furthermore, policy makers in African countries should expand the use of fintech which is a component of FI. It has several benefits to users and providers including governments and the economy. It increases access to finance and reduce corruption level in the economy. It has been documented that advanced countries such as Korea, and other developing countries like Malaysia, Norway, Thailand, and Macedonia have higher inclusive financial development in which optimal level has reached ([Nizam et al., 2020](#)). However, African nations, therefore should ensure that they achieve optimal level which is capable of improve economic opportunities for citizens.

While the literature documents the beneficial effects of FI in different economies, our empirical evidence suggests that FI can generate detrimental consequences in relation to corruption after reaching a particular threshold. In addition, it is critically important to further understand the nature and significance of the FI threshold given that this threshold has considerable implications for African countries. Question like “what constitute the

optimal level of financial inclusion in Africa?” needs to be answered. Future studies should identify and clarify what the optimal level of FI taking into consideration the peculiarities of African region. Future studies should shed more light on this.

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