

Institutional quality and social cost of intermediation in Africa: Does the level of financial market development matter?

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Abstract

This article examines the effect of institutional quality on social cost of intermediation in high and low developed financial markets across 29 African countries between 2006 and 2013. Employing bootstrap-quantile and two-step system generalized methods of moments models with bank level data of about 330 banks, the results provide interesting and new insights. The results show that improvement in institutional quality in high or low developed financial markets translates into reduced social cost of intermediation to the society. However, it is evident from the results that improvement in institutional quality is more robust, persistent and weightier in reducing the social cost of intermediation in low developed financial markets which are often characterized with weak regulatory regimes and enforcement. Hence, improvement in institutional quality shores up regulatory supervision, monitoring and enforcement which translates into heavier dampening of social cost of financial intermediation in less developed financial markets. Moreover, bank size, credit shocks, return on equity and liquidity are key drives of social cost of intermediation both in low and high developed financial markets. These findings have policy implications and recommendations for policymakers and regulators of financial institutions. Policymakers and regulators, especially those in less developed financial markets, must endeavour to create, implement and advance mechanisms and enabling environment that enhances the quality of institutions since improved institutional quality reduces social cost of intermediation to the benefit of society.

KEYWORDS

Africa, financial development, institutional quality, social cost of intermediation

1 | INTRODUCTION

Following the financial intermediation theory (or dealership theory; Ho & Saunders, 1981; Kusi, Agbloyor, Gyeke-Dako, & Asongu, 2020), banks are risk averse

economic agents who undertake financial intermediation activities with profit maximization objectives. With the financial intermediation functions of matching deficit spending units with surplus spending units, liquidity creation and asset maturity transformations (Berger &

Bouwman, 2009; Berger & Bouwman, 2017), banks claim the difference between the lending price and deposits price as their spread or interest margins (Allen, 1988; Angbazo, 1997; Carbo & Rodriguez, 2007; Maudos & Guevara, 2004). Interestingly, while a large strand of the empirical literature on bank interest margins have perceived bank interest margins as banking profitability indicator (Dietrich & Wanzenried, 2011; Kusi et al., 2020; Kasman, Tunc, Vardar, & Okan, 2010), the other strand has perceived bank interest margins as either banking competitiveness indicator (Carbó, Humphrey, Maudos, & Molyneux, 2009) or financial cost of intermediation indicator (Gyeke-Dako, Agbloyor, Turkson, & Baffour, 2018; Mensah & Abor, 2014; Naceur, 2003).

Focusing on the strand of literature that perceive bank interest margins as financial intermediation cost to the society, Demircug-Kunt and Huizinga (1999) argue that financial intermediation costs affect the savers, investors and borrowers as the difference between the savings and lending rates is borne by the society (which is made up of investors, savers and borrowers) and banks as financial intermediation cost and bank interest margins, respectively. In addition, Naceur (2003) argue that narrow spreads or interest margins indicates increased deposits rates or reduced lending rate which leads to reduced profit for banks but high benefits of intermediation to the society. Given these, the employment of bank interest margins as proxy for social cost of financial intermediation is arguably less contestable. Interestingly, with very few studies investigating social cost of financial intermediation in Africa (Gyeke-Dako et al., 2018; Mensah & Abor, 2014) and learning from prior studies (see Athanasoglou, Brissimis, & Delis, 2008; Beck & Hesse, 2009; Garr & Kyereboah-Coleman, 2013; Were & Wambua, 2014) that bank interest margins (or social cost of financial intermediation) are wide in Africa, it is imperatively necessary to examine what factors can be used to tame the wide or huge social cost of financial intermediation in Africa.

In an attempt to suggest possible mechanisms through which social cost of financial intermediation can be controlled or tamed, especially in Africa, this study suggests and tests how institutional quality can influence social cost of intermediation. The belief that institutional quality can control social cost of intermediation is stated as follows. That is, the enforcement of regulations that protect public or societal interest is achieved through quality institutional frameworks and setups, as advance by the theory of public interest (Hantke-Domas, 2007). Hence, institutions can help narrow, protect and suppress the opportunistic exploitation of banks by instituting and enforcing regulations which protect the societal interest through reduced cost of financial intermediation. Also, following the literature on institutional theory

(Scott, 2005; Williamson, 1998; Zucker, 1987) which advances that institutions provide the rules of engagement by defining acceptable and unacceptable behaviour are expected from economic agents of a given society. Hence, through institutions, banks opportunistic and profit seeking behaviour which increase the cost of financial intermediation on the society can be reduced. Put differently, institutions are instituted to promote and protect public and societal interest by supervising, monitoring and regulating other economic agents such as banks to ensure that financial market participants; members of the society, are not exploited by banks through huge cost financial intermediation.

Surprisingly, empirical studies that show that institutional quality can help control bank interest margins are non-existent especially in Africa where social cost of financial intermediation is cited to be excessively high (see Athanasoglou et al., 2008; Garr & Kyereboah-Coleman, 2013; Were & Wambua, 2014). In addition, learning from prior studies (Kusi, Nortey, & Dzeha, 2019; Demircug-Kunt and Huizinga (1999) who show that level of financial sector development influences financial outcomes such as social cost of intermediation (or bank interest margins) and for tailored research implications and recommendations, it has become important to study how institutional quality influence social cost of financial intermediation under developed and less developed financial markets in Africa for the first time. Through this present study, pertinent question such as 'how does the quality of institutions relate to the cost of providing financial intermediation services?', 'to what extent may institutional quality affect the social cost of financial intermediation?', 'does the level of development of the financial market vary the effect and magnitude of the link between social cost of intermediation and institutional quality?' are key to development of the financial space in Africa. The rest of the article is organized into the following sections literature review, methodology, empirical results and discussions, robustness and diagnostic checks and conclusions and policy implications.

2 | LITERATURE REVIEW: THEORETICAL AND EMPIRICAL

For the purpose of this study, two main theories including financial intermediation theory (or dealership theory) and institutional theory are relied upon. Most empirical studies of net interest margins or social cost of financial intermediation are granted in the foundations of the financial intermediation theory or dealership theory (Berger & Bouwman, 2009, 2017; Gyeke-Dako et al., 2018; Ho & Saunders, 1981; Kusi et al., 2020). This theory considers

the banks to be a risk-averse dealer in financial markets who maximize the gains by match deficit spending units to surplus spending units. Specifically, bank mobilize deposits and price their deposits below the monetary policy rate and transform those deposits into loans which are priced above the monetary policy rate. Hence, optimizing loan prices and minimizing deposits prices using the monetary policy rate as a gauge enables banks to exploit financial market participants and the society as a whole to increase or maximize their profit seeking objectives. In as much as the difference between the loan and deposit prices translates into banking profits or margins, it is at the same time the cost borne by financial market participants who form part of the entire society.

Given that banks are rational economic agents who pursue their profit maximization objectives to the latter (Drakos, 2002; Ho & Saunders, 1981), the institutional theory framework provides an opportunity through which regulatory institutions can suppress or tame the opportunistic profit-seeking behaviour of banks. Thus, knowing from the institutional theory that public interest protection and promotion is at its heart, it can be induced that quality institutional setups and frameworks tames or mitigates unacceptable behaviours such as increased cost of financial intermediation borne by the society and the general public. Furthermore, through the institution of regulations, supervision and monitoring of economic agents and the enforcement of regulations by regulatory institutions, the excessive profit-seeking behaviour of banks which increases cost of financial intermediation on the society can be reduced. Despite these theoretical evidence, empirical evidence to show how the quality of institutions influence cost of financial intermediation is non-existent particularly in Africa.

From an empirical perspective, few empirical studies have been conducted to explain the cost of financial intermediation with majority of these studies referencing to determinants of net interest margins as social cost of intermediation. For the purpose of this study, the literature review focuses on studies that have particularly studied cost of financial intermediation. In addition, a few studies on bank interest margins that are relevant to this study are discussed.

First, Gyeke-Dako et al. (2018) investigated social cost of financial intermediation while focusing on how financial development influence social cost of financial intermediation under financially developed and not developed economies in Africa using 260 banks across 29 economies. Employing a generalized methods of moments (GMM) and random effect panel data models between 2006 and 2013, they observe that financial development reduces social cost of financial intermediation. In addition, they show that social cost of financial intermediation is lower

for economies with more developed financial systems compared to economies with less developed financial systems. Second, Rahman, Ashraf, Zheng, and Begum (2017) investigated how banking efficiency influences bank capital holdings and cost of financial intermediation across 1,190 banks in five emerging and developing economies between 2000 and 2015. Employing GMM panel models their results show that more efficient banks hold higher capital and charge lower financial intermediation costs. In addition, while they find that cost efficiency has a marginal positive impact on bank capital during the global financial crisis of 2007–2009, they also report that banks on the average increase the cost of financial intermediation during crisis.

Third, Pasiouras (2018) examined how the cost of financial intermediation is influenced by financial consumer protection policies using a dataset of over 3,000 commercial banks across 100 countries. Using random effect panel models, the results show that the presence of internal mechanisms for handling complaints, requirements for fair treatment, supervisory power related to consumer protection and various disclosure requirements reduced cost of financial intermediation in advanced economies. However, in the context of developing economies, it is observed that most of the financial consumer protection policies rather increase the cost of financial intermediation implying that banks in developing economies pass on the regulatory burdens or cost of financial consumer protection to their customers. Fourth, Demirguc-Kunt, Laeven, and Levine (2003) examined the effects of banking regulations, market structure and national institutions on cost of financial intermediation using over 1,400 banks across 72 economies across the global. Employing a random effect panel model between 1995 and 1999, they show that tighter regulations on entry requirements and bank activities increases cost of financial intermediation. Furthermore, inflation and bank concentration promotes cost of financial intermediation while the positive effect of bank concentration breaks down when regulatory impediments to competition and inflation are controlled for. In addition, banking regulations become insignificant when national institutional quality like economic freedom or property right protection is control for while these national institutional quality variables are robust in explaining cost of intermediation.

From the literature review, it is clear that very few studies have studied net interest margins as social cost of intermediation measure. The very few studies that have studied the social cost of financial intermediation have failed to focus on how institutional quality influences social cost of financial intermediation especially in the context of developed and less developed financial markets. Following the financial intermediation theory and

institutional theory, quality of institutions should suppress or reduce the opportunistic and profit-seeking behaviour of banks (Kaufmann, Kraay, & Zoido-Lobaton, 2002) and hence help tame social cost of financial intermediation charged by banks and borne by the society (Poghosyan, 2012). Therefore, we hypothesize that institutional quality should reduce social cost of financial intermediation otherwise called bank net interest margins. In addition, we anticipate that institutional quality should have weightier and greater effect in less developed financial markets because banks in less developed financial markets are prone to excessive exploitation of financial market participants. Hence stronger institutions should be able to mitigate this exploitative nature of banks more in less developed financial markets which have less efficient regulatory regimes to protect the interest of financial market participants and society as a whole. Following the gaps and claims raised from the literature review, the following are the null hypotheses to be tested:

H_1 : There is no relationship between institutional quality and social cost of financial intermediation in Africa.

H_2 : There is no relationship between institutional quality and social cost of financial intermediation under high and low developed financial markets in Africa.

3 | METHODOLOGY

The study makes use of the panel data framework which consists of both time series and cross-sectional data. The panel has the ability to capture both time and firm variations and controls for omitted variable biases. The study employed annual data on 330 banks in 29 African countries (Table A1). The data for this study is gathered from BankScope and World Development Indicators (WDI) databases. Specifically, the banks specific variables are obtained from BankScope database while the macroeconomic variables are obtained from WDI database. The dataset spans from 2006 to 2013. The general panel form is expressed as:

$$Y_{i,t} = \alpha_{ij} + \gamma_{tj} + \beta X_{i,t} + \varepsilon_{i,t}, \quad (1)$$

Where subscript i signifies the cross sectional dimension (bank) $i = 1, \dots, N$ and t signifies the time series dimension (time), $t = 1, \dots, T$; Y_{it} is the dependent variable; α_i is scalar and constant term for all periods (t) and specific to a bank fixed effect (i); γ_t is the time fixed effect t ; β is a $k \times 1$ vector of parameters to be estimated on the independent variables; X_{it} is a $1 \times k$ vector of observations on the independent variables comprising of input variables in the model which includes controlled variables and ε_{it} which is iid is the error term.

3.1 | Estimation technique

This study employs the quantile (conditional median) regression as the main estimation technique and two-step GMM as robustness alternate model. The quantile or conditional median bootstrap regression is employed as the main estimate technique for a number of reasons. First, the quantile regression provides the study the opportunity to estimate the effect of institutional quality on social cost of intermediation at different levels (quantiles) of financial development; hence providing detail characteristics and results from the dataset (see Wei, Pere & Koenker, 2006). Second, the median regression is more robust to outliers and is semiparametric as it avoids assumptions about the parametric distribution of the error process (Cade & Noon, 2003; Koenker, 2004). Third, the quantile regression affords the opportunity for the use of bootstrapping techniques which socks out errors from the coefficients to ensure robust, consistent and efficient results. Again, splitting the sample into high and low financially development markets, the GMM is also employed to guarantee consistent reliability in estimation models and results. Moreover, the GMM has the benefit of controlling endogeneity problems through the generation of instruments from the conditions that exist between the error term and the lagged variable (Arellano & Bond, 1991; Arellano & Bover, 1995). Further, given that the one-step GMM technique does not consider autocorrelation and heteroscedasticity (Blundell & Bond, 1998; Winmeijer, 2005) the two-step GMM estimation is employed to ensure robust findings. Following the quantile bootstrap regression and two step system GMM techniques, the social cost of intermediation model is specified as:

$$\begin{aligned} SCFI_{i,t} = & \beta_0 + \beta_1 INSTI_{i,t} + \beta_2 NONIRATIO_{i,t} \\ & + \beta_3 LOGASIZE_{i,t} + \beta_4 CSHOCK_{i,t} + \beta_5 ROE_{i,t} \\ & + \beta_6 LIQTY_{i,t} + \beta_7 HHI_{i,t} + \beta_8 INFL_{i,t} \\ & + \beta_9 XEFF_{i,t} + \beta_{10} GDPPCG_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (2)$$

$$\begin{aligned} SCFI_{i,t} = & \beta_1 SCFI_{i,t-1} + \beta_2 INSTI_{i,t} + \beta_3 NONIRATIO_{i,t} \\ & + \beta_4 LOGASIZE_{i,t} + \beta_5 CSHOCK_{i,t} \\ & + \beta_6 ROE_{i,t} + \beta_7 LIQTY_{i,t} + \beta_8 HHI_{i,t} \\ & + \beta_9 INFL_{i,t} + \beta_{10} NONIRATIO_{i,t} \\ & + \beta_{11} GDPPCG_{i,t} + \beta_{12} XEFF_{i,t} + \varepsilon_{j,t} \end{aligned} \quad (3)$$

Where SCFI represents net interest margin; noniratio represents non interest ratio; cshock, credit shock; HHI, Herfindahl Hirschmann Index; INFL, inflation; INSTI, institutions; GDPPCG, GDP Per Capita Growth;

Credit to private sector to GDP is used as a proxy for financial development. To define high and low financial markets development, countries with their credit to private sector to GDP above the mean are defined as high financially developed markets while those countries with their credit to private sector to GDP below the mean are defined as low financially developed markets. Hence, this categorization of high and low financially developed markets is employed in estimating the effect of institutional quality on social cost of intermediation used both quantile and two step GMM regression techniques.

3.1.1 | Variable selection and justification

The expectation is that banks that are well diversified will not rely on the intermediation process and hence reduce their margins. This suggests a negative relationship between income diversification and social cost of intermediation. The efficiency of bank management is considered to contribute to the reduction of the cost of financial intermediation to society. Efficient banks will reduce cost of operations and not pass it on seekers and depositors of funds by charging higher and lower rates on loans and deposits respectively. The study expects that large banks to reduce social cost of intermediation as they operate on economies of scale and scope (Berger, 1995); hence a negative relationship between bank size and social cost of intermediation. Banks that hold more loans in their portfolio are expected to have wider social cost of intermediation, hence a positive effect of credit shocks on social cost of intermediation. Also, profit maximization goal of banks should increase the social cost of intermediation. For liquid banks, the study expects a negative effect on social cost of intermediation because shifting more assets into liquid investments reduces the quantum loan the bank can advance as well as the return on the loans which reduces social cost of intermediation. However, a positive relationship may exist between liquidity and social cost of intermediation if liquidity promotes the confidence of both depositors and borrowers of banks. Again, bank concentration, measured with HHI, is expected to have a positive effect on social cost of intermediation as concentration increases the market power of banks to charge higher margins which widens the social cost of intermediation. The study expects a positive effect of inflation on social cost of intermediation (Dumicic & Rizdak, 2013). Interest on loans are more sensitive to inflation and will thus increase the social cost of intermediation as compared to interest on deposits. The study expects growth in the economy to be positively related to social cost of intermediation. A positive

relationship suggests that the demand for loans increases during economic booms and hence widens the social cost of intermediation. Finally, institutional quality which is the variable of interest is expected to be negatively related to social cost of intermediation as improvement in the quality of institutions will result in measures that reduces cost of intermediation or borrowing which closes the social cost of intermediation gap. The study postulates that the effect of institution quality on social cost of intermediation, though negative, will vary in different levels of financial development. However, the study expects the negative effect to be weightier or heavier in lower financially developed market.

The summary and definitions of the variables used in the model and their relationship with social cost of intermediation are in Table 1.

4 | EMPIRICAL RESULTS AND DISCUSSIONS

The study presents the summary statistics, correlation matrix and the main estimation model. Table 2 illustrates the summary statistics which is employed to observe and check for outliers that have the possibility of affecting the accuracy and consistency of the results. However, outliers are not observed within the dataset. Table 2 also presents the normality and Variance Inflation Factor (VIF) of the variables employed. While the Shapiro Wilk's normality test was used to test for the normality of the data, the VIF was used to test for the acceptability of each variable in the model. With the maximum acceptable VIF being 10, all the variables were below the threshold of 10, indicating that all the variables were good to be in the model. Also, the Shapiro Wilk's test with a null hypothesis of no normal distribution was rejected for all the variables indicating that the variables were all normally distributed around their means.

The Pearson's correlation matrix (Table 3) which is used as a mechanism for checking and controlling multicollinearity is shown in Table 3. Following Kennedy (2008), the study sets the multicollinearity threshold to 0.7; hence, the results presented in Table 3 show no evidence of multicollinearity.

Tables 4 and 5 present the results on the effect of institutional quality on social cost of intermediation in Africa using quantile and GMM regression models, respectively. Table 4 contains nine (9) models while Table 5 contains three (3) models. In Table 4, Models 1 to 3 show the effect of institutional quality on social cost of intermediation within the 25th, 50th and 75th quantiles in the full sample respectively. Models 4–6 and 7–9 presents the effect of institutional quality on social cost of

TABLE 1 Variable selection and justification

Variable	Measurement	Indicator	Source	Expected sign
Dependent variable				
SCFI	Interest income – interest expense/total assets	Social cost of intermediation	Computed by authors based on data from Bank Scope	
Independent variables				
Institution	overall Kaufmann indicator of institutional quality	Quality of institutions	World Development indicators database	[–]
XEFF	Total operating expenses/total assets	Management efficiency	Computed by authors based on data from Bank Scope	[–]
Non interest income ratio	Non-interest income/total income	Diversification	Computed by authors based on data from Bank Scope	[–]
Log size	Natural log of total assets	Bank size	Computed by authors based on data from Bank Scope	[±]
HHI	$\frac{1}{(\text{total loan})^2} \sum_{i=1}^N l_i^2$	Concentration	Computed by authors based on data from Bank Scope	[+]
Credit shock	Gross Loans – Total Assets	Lending shocks	Computed by authors based on data from Bank Scope	[+]
ROE	Net income/total equity	Profitability	Computed by authors based on data from Bank Scope	[+]
Liquidity	Total securities /total assets	Liquidity	Computed by authors based on data from Bank Scope	[+]
Inflation	consumer price index	Macroeconomic stability	World Development Indicators database	[±]
GDPPCG	Yearly growth in Gross domestic product	Macroeconomic growth	World Development Indicators database	[–]

intermediation within the 25th, 50th and 75th quantiles in high and low developed financial markets, respectively. Private credit to GDP is used as a financial development variable to categorize banks into developed (high) and less (low) developed financial markets following the study of Kusi et al. (2019). Banks that are located in less developed financial markets have their private credit to GDP below the sample average of private credit to GDP while banks located in developed (high) financial markets have their private credit to GDP above sample average of private credit to GDP. Similarly, in Table 5, Models 10, 11 and 12 show the effect of institutional quality on social cost of financial intermediation in the full sample, economies with developed and less developed financial markets using GMM, respectively.

From Tables 4 and 5, the variable of interest, institutional quality has a negative effect on social cost of intermediation but different significance and magnitudes in all the models within the full sample and across the high and low developed financial markets. Specifically, institutional quality significantly reduces social cost of financial intermediation within the 25th and 75th quantiles of the full sample (Model 1 and 3), 25th quantile in the developed financial market sample (Model 4) and 25th, 50th and 75th quantiles of the less financial market sample (Models 7, 8 and 9), respectively. Using the GMM approach, similar results are obtained indicating that institutional quality helps suppress social cost of financial intermediation in Africa across the full sample, high and low financially developed markets. In addition, the

TABLE 2 Summary statistics

Variable	Obs	Mean	SD	Min	Max	SWILK
SCFI	2,522	0.0607	0.0451	-0.1675	0.3915	13.759***
XEFF	2,496	0.6752	0.5735	0.0000	9.3333	16.981***
NONIIRATIO	1799	0.2961	0.1880	-2.5000	2.0000	12.614***
LOGASIZE	2,585	6.1337	1.7853	0.0000	11.7498	6.529***
HHI	4,248	0.1800	0.1468	0.0000	1.0000	16.255***
CSHOCK	2,521	0.6418	0.2396	0.0000	1.7391	6.586***
ROE	2,573	0.1204	0.4553	-9.0173	9.6574	17.38***
LIQTY	2,448	0.1917	0.1668	0.0000	1.0000	13.202***
INFLATION	3,066	2.0015	21.0731	-0.0105	244.1103	19.12***
INSTIQUA	3,186	-0.4855	0.5592	-1.6269	0.8044	9.397***
GDPPCG	3,674	0.0288	0.0329	-0.1747	0.1242	14.044***
PRECREDIT	4,120	0.2197	0.2178	0.0000	0.7626	12.993***

Note: Significance Level *** (1%), ** (5%), * (10%).

TABLE 3 Pearson's correlation matrix

	1	2	3	4	5	6	7	8	9	10
SCFI (1)	1									
Xeff (2)	-0.017	1								
Noniiratio (3)	-0.084***	0.041*	1							
Logasize (4)	-0.284***	-0.311***	-0.143***	1						
Hhi (5)	0.0382*	-0.006	0.183***	-0.115***	1					
Cshock (6)	0.223***	-0.026	-0.110***	0.009	0.070***	1				
roel (7)	0.063***	-0.366***	-0.031	0.132***	0.0384*	-0.045**	1			
Liqty (8)	-0.077***	-0.030	-0.043*	0.059***	-0.058***	-0.650***	0.050**	1		
Inflation (9)	0.109***	-0.027	-0.039	-0.093***	-0.203***	-0.047**	0.020	0.085***	1	
Instiqua (10)	-0.017	-0.025	-0.193***	0.052**	-0.105***	0.112***	0.008	-0.020	-0.185***	1
Gdppcg (11)	0.035*	-0.074***	0.068***	-0.054***	0.120***	-0.056***	0.025	0.031	-0.204***	0.106***

Note: Significance Level *** (1%), ** (5%), * (10%).

quantile and GMM models provide further information that institutional quality is more effective in reducing the social cost of financial intermediation in low or less developed financial market. Again, the quantiles show clearly that institutional quality is robustly significant in reducing social cost of financial intermediation within all the quantiles in the low developed financial market samples. These results suggest that while institutional quality is superior to dampening social cost of financial intermediation and is consistent with studies that show that improving institutional quality promotes financial and economic outcomes (Butkiewicz & Yanikkaya, 2006; Kusi et al., 2019; Poghosyan, 2012; Klein, 2005), it is evidently clear that the reducing or dampening effect of social cost of intermediation from institutional quality is higher and greater for economies with low developed financial

markets. Less developed financial markets are usually characterized with weak regulatory regimes which lead to excessive and exploitive behaviour of banks and hence improvement in institutional quality improves regulatory enforcements to make the effect of institutional quality more significant on social cost of financial intermediation in less developed financial markets.

In terms of the control variables, management quality shows a significant and negative relationship with social cost of intermediation and consistent with Athanasoglou et al. (2008) who argue that high operational expenses (inefficiency) eats away or erodes the ability of banks to charge high lending rates to increase the spread; hence reducing social cost of intermediation. Likewise, noninterest income negatively and significantly related to social cost of intermediation implying

TABLE 4 Quantile regression: The effect of institutional quality on social cost of intermediation in different levels of financial developments

	Full sample			High developed financial market			Low developed financial market		
	Model 1 Q.25th	Model 2 Q.50th	Model 3 q.75th	Model 4 Q.25th	Model 5 Q.50th	Model 6 Q.75th	Model 7 Q.25th	Model 8 Q.50th	Model 9 Q.75th
instiqua	-0.0056 [0.0014]***	-0.0017 [0.0017]	-0.0070 [0.0029]**	-0.0078 [0.0021]***	-0.0033 [0.0024]	-0.0009 [0.0032]	-0.0169 [0.0028]***	-0.0169 [0.0033]***	-0.0216 [0.0035]***
xeff	-0.0001 [0.0000]***	-0.0001 [0.0000]***	0.0000 [0.0000]	-0.0001 [0.0000]***	-0.0001 [0.0000]***	-0.0001 [0.0000]***	-0.0001 [0.0000]**	0.0000 [0.0000]	0.0000 [0.0000]
noniiratio	-0.0138 [0.0038]***	-0.0104 [0.0045]**	-0.0132 [0.0078]*	-0.0141 [0.0045]***	-0.0066 [0.0050]	-0.0084 [0.0068]	-0.0163 [0.0085]*	-0.0170 [0.0102]*	-0.0203 [0.0108]*
logasize	-0.0055 [0.0004]***	-0.0073 [0.0005]***	-0.0078 [0.0009]***	-0.0043 [0.0005]***	-0.0055 [0.0006]***	-0.0079 [0.0008]***	-0.0037 [0.0009]***	-0.0037 [0.0011]***	-0.0038 [0.0012]***
hhi	0.0388 [0.0114]***	0.0132 [0.0135]	0.0597 [0.0235]**	0.0461 [0.0165]***	0.0163 [0.0184]	0.0286 [0.0250]	0.0282 [0.0212]	0.0720 [0.0255]***	0.0460 [0.0270]*
cshock	0.0362 [0.0039]***	0.0497 [0.0047]***	0.0676 [0.0081]***	0.0439 [0.0053]***	0.0564 [0.0059]***	0.0737 [0.0081]***	0.0517 [0.0070]***	0.0647 [0.0085]***	0.0931 [0.0089]***
roe1	0.0077 [0.0017]***	0.0089 [0.0021]***	0.0139 [0.0036]***	0.0051 [0.0019]***	0.0137 [0.0022]***	0.0080 [0.0030]***	0.0111 [0.0042]***	0.0146 [0.0050]***	0.0213 [0.0053]***
liqty	0.0295 [0.0063]***	0.0447 [0.0075]***	0.0609 [0.0131]***	0.0228 [0.0085]***	0.0373 [0.0094]***	0.0466 [0.0128]***	0.0491 [0.0115]***	0.0747 [0.0138]***	0.1206 [0.0146]***
inflation1	0.0163 [0.0117]	0.0584 [0.0139]***	0.1922 [0.0241]***	0.0056 [0.0150]	0.0381 [0.0167]**	0.0827 [0.0228]***	0.2039 [0.0300]***	0.2629 [0.0360]***	0.3224 [0.0381]***
gdppcg1	0.0418 [0.0245]*	0.0938 [0.0291]***	0.2205 [0.0506]***	-0.0085 [0.0342]	0.0192 [0.0381]	0.0876 [0.0518]*	0.2929 [0.0533]***	0.3287 [0.0640]***	0.2786 [0.0676]***
_cons	0.0439 [0.0054]***	0.0587 [0.0064]***	0.0365 [0.0111]***	0.0333 [0.0074]***	0.0388 [0.0082]***	0.0519 [0.0112]***	0.0065 [0.0109]	-0.0087 [0.0131]	-0.0169 [0.0138]
OBS	1,368	1,368	1,368	738	738	738	588	588	588
Pseudo R^2	0.1453	0.1641	0.1642	0.1752	0.2126	0.2275	0.2235	0.2200	0.2372

Notes: Significance level *** (1%), ** (5%), * (10%).

that investment in other businesses other than core lending function reduces the income that banks earn on rates charged on loans which thus reduces the social cost of intermediation. Moreover, a negative and significant relationship reported between bank size and social cost of intermediation implying that larger banks are characterized by lower spreads leading to lower social cost of intermediation and is consistent with prior studies (Ho & Saunders, 1981; Kasman et al., 2010) that argue that large banks have advance of efficiency gains which enables large banks to charge lower financial intermediation costs. However, banking industry concentration is reported to increase the spread accounting for increased social cost of intermediation and this finding is consistent with prior studies (Ho & Saunders, 1981; Saunders & Schumacher, 2000) that

show that there are monopolistic gains associated with concentrated banking structure.

More so, credit shocks have a positive and significant relationship with social cost of intermediation. This finding is consistent with studies (Kasman et al., 2010; Maudos & Guevara, 2004) that argue that banks pass on their credit shocks to their clients by charging higher financial intermediation cost. Similarly, profitability shows a positive and significant relationship with social cost of intermediation across all the quantiles in the full sample and in high and low developed financial markets. Following the financial intermediation theory (see Ho & Saunders, 1981; Kusi et al., 2020), profit maximization objective of banks increases the financial intermediation price and cost. Also, liquidity is shown to be positively and significantly related to social cost of intermediation

TABLE 5 GMM regression: The effect of institutional quality on social cost of intermediation

	Full sample Model 10	High developed financial market Model 11	Low developed financial market Model 12
Ll.nim	0.5211 [0.1036]***	0.6853 [0.0757]***	0.3767 [0.1203]***
instiqua	-0.0082 [0.0022]***	-0.0060 [0.0018]***	-0.0179 [0.0049]***
Xeff	0.0000 [0.0000]	0.0000 [0.0000]**	0.0000 [0.0000]
noniiratio	-0.0397 [0.0149]***	-0.0247 [0.0119]**	-0.0556 [0.0206]***
logasize	-0.0025 [0.0007]***	-0.0015 [0.0004]***	-0.0028 [0.0008]***
hhi	0.0838 [0.0201]***	0.0476 [0.0167]***	0.0613 [0.0242]**
cshock	0.0374 [0.0087]***	0.0244 [0.0060]***	0.0552 [0.0103]***
roe1	0.0020 [0.0027]	0.0027 [0.0029]	0.0041 [0.0056]
liqty	0.0421 [0.0113]***	0.0208 [0.0070]***	0.0709 [0.0152]***
inflation1	0.0414 [0.0125]***	0.0357 [0.0089]***	0.1600 [0.0331]***
gdppcg1	0.1006 [0.0231]***	0.0679 [0.0168]***	0.1565 [0.0544]***
obs	1,128	626	460
groups	330	192	154
instruments	42	42	42
<i>F</i>	<i>F</i> (11,330) = 263.31	<i>F</i> (11,192) = 522.70	<i>F</i> (11,154) = 232.65
Prob > <i>F</i>	0.0000***	0.0000***	0.0000***
AR (1)	<i>z</i> = -3.41	<i>z</i> = -2.61	<i>z</i> = -2.91
Pr > <i>z</i>	<i>z</i> = 0.001***	<i>z</i> = 0.009***	<i>z</i> = 0.004***
AR (2)	<i>z</i> = 1.09	<i>z</i> = 1.06	<i>z</i> = -0.34
Pr > <i>z</i>	<i>z</i> = 0.274	<i>z</i> = 0.289	<i>z</i> = 0.733
Sargan	chi ² (31) = 150.03	chi ² (31) = 129.53	chi ² (31) = 90.97
Prob>chi ²	0.0000***	0.0000***	0.0000***
Hansen	chi ² (31) = 46.87	chi ² (31) = 32.59	chi ² (31) = 39.83
Prob>chi ²	0.034**	0.389	0.133

Notes: Significance level*** (1%), ** (5%), * (10%).

suggesting that banks that have large portions of liquid assets in their asset mix tend to have higher social cost of intermediation to compensate for gains lost through holding more liquidity assets. Again, inflation is found to be positively and significantly related to social cost of

intermediation. This finding is not surprising given that banks pass on inflation shocks to their clients (Dumicic & Rizdak, 2013; Demircug-Kunt & Huizinga, 1999; Mensah & Abor, 2014). Finally, gross domestic product per capita growth (gdppcg) is positively and significantly

related to social cost of intermediation. Thus, an increase in *gdppcg* signifies improvements in welfare of citizenry and ability to pay off debts (Fofack & Fofack, 2005) and hence higher cost of financial intermediation charged by banks.

5 | ROBUSTNESS AND DIAGNOSTIC CHECKS

To ensure consistent, reliability and efficiency of the models, a number of tests and actions were undertaken. First, outliers were screened for by examining the summary statistics table and no outliers were detected. Second, employing Shapiro Wilk normality test, it proved that all the variables are normally distributed around their mean. Third, Pearson's correlation was also employed to check for multicollinearity. Following Kennedy (2008) who set the threshold of multicollinearity to 0.7, there was no evidence of multicollinearity. Again, given that the quantile regression is robust to the outliers and normality assumptions under the mean conditional regression (OLS), the study employs the quantile regression to deal with unobserved outliers from the summary statistics. Also, employing the quantile regression, bootstrap option is used to further sock out all slacks in the coefficient; hence ensuring consistency and reliability of findings. Four, the use of the two step GMM technique allows the study to control for possible correlation between the explanatory variables and past events and also control for omitted variables which the quantile regression is unable to deal with. Again, the two step system GMM also allows the study to control for autocorrelation and heteroscedasticity which have the potential to affect the reliability and efficiency of the results. To a very large extent, the signs and significance of the variables in the quantile and system GMM are consistent indicating the consistency and how reliable the results are. Finally, the instruments, *F*-probability statistic, Hansen test and the number of observations are all indicators of the reliability, efficiency and consistency of our models. Hence, our models are good and fit for generalization.

6 | CONCLUSION AND POLICY IMPLICATIONS

This study set out with the aim examining the effect of institutional quality on social cost of intermediation in high and low financially developed markets across 29 African economies between 2006 and 2013. The study is motivated by the lack of earlier empirical studies focusing on how institutional quality can be used a tool for

taming high social cost of intermediation under high and low financial development in Africa. Employing quantile as main regression model and two step system GMM as robustness alternative model, the results suggest interesting and new revelations. First, the results show that improvement in institutional quality in translates to reduced social cost of intermediation to the society regardless of whether an economy has a high and low developed financial markets. Second, the results show that although improvement in institutional quality enhances the reduction in social cost of intermediation, its effect is persistent and weightier in low developed financial markets which are often characterized by weak regulatory regimes and enforcement. Hence, improvement in institutional quality shores up regulatory supervision, monitoring and enforcement which translates into dampening of social cost of financial intermediation in less developed financial markets. Moreover, management efficiency, bank size, credit shocks, return on equity and liquidity are key drives of social cost of intermediation both in low and high developed financial markets.

These findings have policy implications and recommendations for policymakers' and regulators of financial institutions. First, the policy implication is that economies in Africa rely on building strong and quality institutions to reduce the social cost of financial intermediation charged by banks especially for economies with low financial development in Africa. For the purpose of policy recommendation, policymakers and regulators especially those in low developed financial markets must endeavour to create, implement, invest and advance mechanisms that promote and deepen the quality of institutions since improved institutional quality reduces social cost of intermediation to the benefit of the society. Future research may have to examine how institutional quality through social cost of intermediation links up with the development of the capital markets and economic growth and development. This will be important to shed more insights on the benefits of institutional quality.

DATA AVAILABILITY STATEMENT

Data Availability Statement The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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APPENDIX A

TABLE A1 List of countries, number of banks per country and period country average of social cost of financial intermediation

Code	Country	Mean social cost of intermediation	Number of banks	Code	Country	Mean social cost of intermediation	Number of banks
1	Algeria	0.047	17	16	Mozambique	0.089	13
2	Benin	0.041	10	17	Namibia	0.064	8
3	Botswana	0.075	13	18	Nigeria	0.067	31
4	Burkina	0.048	9	19	Rwanda	0.087	8
5	Cameroon	0.057	12	20	Senegal	0.046	12
6	Cote D'Ivoire	0.044	19	21	Sierra Leone	0.122	13
7	Egypt	0.028	33	22	South Africa	0.063	34
8	Ethiopia	0.044	24	23	Sudan	0.066	15
9	Ghana	0.094	23	24	Swaziland	0.065	6
10	Kenya	0.072	53	25	Tunisia	0.026	21
11	Malawi	0.078	14	26	Uganda	0.100	17
12	Mali	0.052	10	27	Tanzania	0.072	34
13	Mauritania	0.048	8	28	Zambia	0.083	24
14	Mauritius	0.024	18	29	Zimbabwe	0.075	23
15	Morocco	0.036	20				