

The effect of institutional factors on financial deepening: evidence from 50 African countries

Bahati Sanga and Meshach Aziakpono

*Stellenbosch Business School, Faculty of Economic and Management Sciences,
University of Stellenbosch, Cape Town, South Africa*

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Abstract

Purpose – This paper investigates the impact of institutional factors on financial deepening and its implications on bank credit in Africa.

Design/methodology/approach – The paper employs different panel econometric models to examine the heterogeneity of 50 African countries from 2000 to 2019. The estimators include panel corrected standard errors, system generalized method of moments, quantile and threshold regressions.

Findings – The results show that rule of law, regulatory quality, government effectiveness, voice and accountability, control of corruption and political stability significantly influence financial deepening in Africa. However, government effectiveness has a higher effect on middle- and high-income countries, while other indicators have a high impact on low-income countries. All institutional indicators have stronger effects, almost double, at higher financial depth levels than for countries with lower levels. Government effectiveness and regulatory quality impact financial deepening more for countries with strong institutions than weak ones. Thus, the relationship between institutional qualities and credit provided by banks is non-monotonic.

Practical implications – The findings suggest that strengthening appropriate institutional factors based on country heterogeneity may effectively stimulate debt financing in Africa, the primary source of financing for small and medium-sized enterprises and entrepreneurs.

Originality/value – The novelty of this paper is that previous studies did not sufficiently scrutinize the heterogeneity of the structure of African economies – i.e. differences in institution, credit and income levels.

Keywords Financial deepening, Institutional factors, Bank credit, Private sector, Africa

Paper type Research paper

1. Introduction

Financial deepening has significant effects on attenuating financing constraints for small and medium-sized enterprises (SMEs), enhancing capital and credit-raising services and stimulating entrepreneurship activities in an economy (Beck, 2013; Cao-Alvira and Palacios-Chacón, 2021; Dutta and Meierrieks, 2021; Guiso *et al.*, 2004; King and Levine, 1993). Most private-owned firms, mainly SMEs, depend primarily on debt financing by financial institutions (Berger and Udell, 2006). Thus, whether improving institutional quality enhances financial deepening in Africa is of immense importance for policymakers looking for different interventions to increase domestic credit. In recent years, institutional quality has received considerable attention in development finance as one of the critical determinants of financial sector development, foreign direct investment, public-private partnerships, aid inflows, financial inclusion and economic growth. However, few studies investigated the impact of institutional factors on Africa's financial deepening, and their findings are



inconclusive (Aluko and Ajayi, 2018; Aluko and Ibrahim, 2020; Fowowe, 2014; Kebede *et al.*, 2021; Ntow-Gyamfi *et al.*, 2019). The limited empirical studies analysed a few countries in Africa for a short period using either a few institutional indicators or constructing an institutional index using principal component analysis (PCA), thus were unable to attribute the impact of each institutional indicator. Lastly, previous studies used limited econometric methods, which do not account for the heterogeneity of African countries. Therefore, the effect of institutional factors on financial deepening has not been sufficiently examined in Africa.

The novelty of this paper is due to the following reasons. This paper examines the effects of six institutional indicators, individually and collectively as an index, on financial deepening in 50 out of 54 African countries for two decades. It analyses different scenarios including aggregated countries; comparing low-, middle- and high-income countries, contrasting countries with poor and robust institutional qualities and scrutinizing countries with different levels of financial depth. Finally, this paper employs different econometric methods to account for the heterogeneity of countries in Africa.

The six institutional factors explored in the study are regulatory quality, government effectiveness, control of corruption, voice and accountability, political stability and the rule of law. The empirical results from 50 aggregated African countries show that institutional qualities positively influence financial deepening, individually as six indicators and collectively as an index. However, two institutional indicators, voice and accountability and political stability, have less impact than the other four. Furthermore, government effectiveness has a high effect on middle- and high-income countries, while the other institutional indicators have a high impact on low-income countries. The quantile regression analysis shows that institutional qualities have stronger effects at a higher level of financial depth, almost double for those with lower levels. The threshold regression analysis indicates that government effectiveness, regulatory quality and the institutional index have more impact on financial deepening for countries with strong institutions than weak ones. Factors such as control of corruption, the rule of law, voice and accountability and political stability have mixed results with adverse effects when the institutions are above the threshold parameter. These results show a non-monotonic relationship between institutional factors and bank credit to the private sector. The results suggest that improving relevant institutional factors based on countries' individual situations may effectively stimulate debt financing in Africa.

The rest of the paper is organized as follows: [Section 2](#) presents the underpinning theories and literature review, while [section 3 and 4](#) outline this study's data and methodology. Findings and discussions are presented in [section 5](#). Lastly, policy implications and conclusion are discussed in [section 6](#).

2. Literature review

2.1 Theories on institutional quality and financial deepening

Financial development is a broader concept that encompasses four dimensions: financial deepening (depth), financial access, financial efficiency and financial stability (Čihák *et al.*, 2012). Shaw (1973) defines financial deepening as an increase in the ratio of financial assets to gross domestic product (GDP) of an economy, where the accumulation of financial assets finances real assets. Financial depth is also referred to as the size of the financial sector to total economic output (Čihák *et al.*, 2012). The preferred proxy for financial deepening in the literature is bank credit to the private sector as a percentage of GDP, which measures the allocation of funds to the real sector (Čihák *et al.*, 2012; Dutta and Meierrieks, 2021). Bank credit to the private sector is also commonly used to proxy financial development, especially in Africa, where banks dominate the financial system. Financial intermediaries depend on the

quality of institutions to efficiently allocate financial resources, develop innovative financial services and mitigate risks associated with information asymmetry (Herger *et al.*, 2008). Thus, sound institutional quality contributes to financial sector development and innovations, reduces the cost of funds and intermediation and facilitates access to finance (Marcelin and Mathur, 2014).

Institutions are instruments or constraints determining the interactions between parties in social, political or economic settings (North, 1990). The proponents of neo-institutional theory agree that “institutions matter” because they create a level playing field in financial markets, a structure of economic incentives and efficient mobilization and allocation of resources, and consequently they influence financial market development and economic growth (Acemoglu *et al.*, 2005; North, 1990). The law and finance theory underpins the origins of the legal system as the factor explaining differences in financial sector development and economic growth (La Porta *et al.*, 1998). The authors argue that countries with inherited common-law systems have better development of financial markets and entrepreneurship due to the protection of private property rights than those with civil law systems. Lastly, the endowment theory emphasizes contracting and property rights institutions as necessary ingredients for economic performance (Acemoglu and Johnson, 2005). The former regulates transactions and engagements between private parties such as lenders and borrowers, while the latter protects private parties against the government’s power and expropriation.

The common institutional factors found in the literature are those defined by the World Bank’s World Governance Indicators (WGI) and Political Risk Services’ *International Country Risk Guide* (ICRG). The WGI measures six institutional factors: the rule of law, regulatory quality, government effectiveness, voice and accountability, control of corruption and political stability. The ICRG measures five institutional qualities: bureaucratic quality, risk of expropriation, law and order, corruption and government repudiation of contracts. This paper uses the WGI to develop the hypotheses because of broader coverage with more than 200 countries and broader definitions of institutional quality.

First, the rule of law refers to legal institutions and influences the development of the financial sector (Beck *et al.*, 2005). Countries with a robust legal environment such as the police, courts, quality of contract enforcement and property rights are associated with deeper financial markets in terms of credit (Djankov *et al.*, 2007; Haselmann and Wachtel, 2010; Troilo *et al.*, 2019). Financial intermediaries and entrepreneurs enter into voluntary agreements and rely on institutions or states to protect and enforce the agreed financial transactions (Herger *et al.*, 2008). Legal and judicial institutional factors influence the enforcement of commercial disputes and property rights, consequently increasing financial intermediaries’ confidence. Weak law enforcement of credit contracts reduces bank credit and increases the cost of intermediation due to prolonged and costly litigation to settle business disputes (Shen *et al.*, 2009). Loan pricing is different across countries because of institutional and legal environments, among other factors (Beck *et al.*, 2005, 2011). Cost of funds, lending interest spread and net interest margins are higher in countries with weak institutional settings than in those with strong settings (Marcelin and Mathur, 2014).

Second, in democratic regimes with political stability, voice and accountability allow financial intermediaries to operate freely and efficiently, allocating financial resources to profitable entrepreneurship activities, thus increasing financial access and depth (Dutta and Meierrieks, 2021; Girma and Shortland, 2008). Political stability gives confidence to investors and entrepreneurs to increase investments and create new businesses. This, in turn, creates demand for financial intermediation in an economy. However, political instability and undemocratic governments erode confidence in the financial market and inhibit bank credit to the private sector (Hasan *et al.*, 2009a). Voice and accountability bring checks and balances on political institutions which determine economic policies (Hasan *et al.*, 2009a). Acemoglu and Robinson (2012) distinguish between “inclusive institutions” (with broader distribution

of power) and “extractive institutions” (with power concentrated in elites and few people). Distortive macroeconomic policies and economic and political instabilities are associated with extractive institutions, which most African countries inherited from their colonial powers (Acemoglu *et al.*, 2003). Political institutions, voice and accountability and democracy limit the interventions and repression of the state on financial markets, thus enhancing efficiency, competition and the depth of the banking sector (Ho *et al.*, 2018; Karikari *et al.*, 2021).

Third, corruption is characterized as an “extractive institution” that leads to misallocation of resources and market inefficiencies due to abuse of power by a few for personal benefit (Acemoglu *et al.*, 2003; Acemoglu and Robinson, 2012). Corruption causes inefficiency, limits financial markets access, increases economic costs and deters entrepreneurs from investing (Acemoglu *et al.*, 2003; Khwaja and Mian, 2011). Corruption has a negative effect on the development of the financial sector, investments and economic growth (Hasan *et al.*, 2009b; King and Levine, 1993).

Fourth, effective governments can institute policies geared to reduce information asymmetry and increase the availability of collaterals, which are the critical bottlenecks of debt financing. This can be achieved by instituting policies that increase identity management, registration and tracking of movable and immovable assets as collaterals and defaulters’ registration. Ineffective government crowds out bank credit to the private sector due to public debt and reduces private sector development (Li and Skully, 1991).

Lastly, regulatory quality and good governance promote the development of the private sector and reduce the cost of doing business in an economy (Feng and Yu, 2020). Furthermore, regulatory quality reduces banks’ opportunistic behaviour of profit-seeking through minimizing deposit interest rates and maximizing lending interest rates (Karikari *et al.*, 2021). Ineffective regulatory quality and the rule of law exacerbate the banking sector’s liquidity and, consequently, the availability and accessibility of bank credit.

We, therefore, argue that institutional quality increases financial deepening in Africa by testing the following two hypotheses:

- H1. Institutional quality promotes domestic credit to the private sector from banks in Africa.
- H2. The relationship between institutional factors and bank credit to the private sector is non-monotonic in heterogeneous African countries.

2.2 Empirical reviews

There is a growing body of empirical literature analysing the effects of institutional factors and financial development on economic growth (e.g. Appiah *et al.*, 2020; Hasan *et al.*, 2009a; Kutan *et al.*, 2017). These studies are based on well-established literature on the finance–growth nexus (Levine, 2005), and their empirical findings overwhelmingly show that strong institutional quality and financial development significantly influence economic growth. Recent studies extend their empirical findings to analyse the impact of institutional quality and financial development on poverty reduction (Kaidi *et al.*, 2019), inclusive growth (Ntow-Gyamfi *et al.*, 2019) and natural resources rent (Khan *et al.*, 2019). These authors find that well-developed institutions and financial markets positively impact poverty alleviation, inclusive growth and natural resources rent. This paper relates to studies investigating the direct influence of institutional factors on financial development. We discuss those studies that focus on developing and emerging countries as one strand and those focusing solely on Africa as another cluster.

For the strand of emerging and developing countries, Law and Azman-Saini (2012) analysed the effect of institutions on financial development in 63 countries using a Gaussian

mixture model and data from WGI (1996–2004) and ICRG (1984–2004). They used the stock market and the banking sector development indicators. The authors constructed a single institutional quality by averaging WGI and ICRG factors separately to overcome the inter-correlations of these factors. Their findings demonstrate that the institutional index influences financial development, particularly in the banking sector, which is statistically significant. [Cherif and Dreger \(2016\)](#) examined the institutional determinants for financial development in 15 Middle East and Northern Africa (MENA) countries from 1990 to 2007 using a fixed effects (FE) model and ICRG data. The authors used bank credit to the private sector as a percentage of GDP to proxy financial depth. They also used market capitalization and bank assets as proxies for the development of the stock market and banking sector, respectively. Based on three institutional indicators, the authors showed that institutions are crucial for the banking sector and stock market development in MENA countries. [Le et al. \(2016\)](#) established that the institutional quality and governance index enhanced financial development in developing countries in 26 Asian and Pacific countries from 1995 to 2011 using the generalized method of moments (GMM) method on WGI data. The authors used PCA to develop a financial development index based on liquid liabilities to GDP, commercial bank assets and domestic credit to the private sector. [Gani and Rasul \(2020\)](#) indicated that the strength of legal systems, regulatory quality and the rule of law have a positive and strong influence on bank credit in 46 developing countries worldwide for 2004–2017. Their sample included only 10 African countries for which they employed a panel corrected standard errors (PCSE) and two-stage least squares (2SLS) for analysis. Their study was limited to four institutional indicators, which are not normalized to a standardized scale that would have improved the robustness of their results. [Khan et al. \(2020b\)](#) explored the effect of institutional factors on financial development in 15 emerging countries using 2SLS regression to analyse data from WGI (1996–2016) and ICRG (1984–2017). The authors used PCA to construct composite indexes for institutional quality. They used the banking sector and the stock market developments as proxies of financial development. Their findings show that political stability, government effectiveness and the rule of law positively and significantly impact financial development, whereas voice and accountability have a negative influence. [Khan et al. \(2020a\)](#) is another recent empirical study that uses WGI data and bank credit to the private sector as a proxy of financial development. Their findings show that regulatory quality, control of corruption and political stability positively influence financial development, whereas the rule of law negatively affected 189 countries from 2002 to 2017 using GMM.

The second strand of our empirical review focuses on the African continent. [Fowowe \(2014\)](#) investigated the effects of legal origins and legal effectiveness on the financial development of 39 African countries and concluded that the law and finance theory of [La Porta et al. \(1998\)](#) does not apply in African countries. [Aluko and Ajayi \(2018\)](#) examined different determinants of banking sector development in 25 Sub-Saharan African countries (SSA) from 1997 to 2014 using the GMM. The authors used an arithmetic mean of six WGIs as an index and found that institutional quality increased the credit to the private sector as a proxy of banking sector depth. [Ntow-Gyamfi et al. \(2019\)](#) established that regulatory quality interacting with financial development had a positive and significant effect on inclusive growth in 48 African countries from 1990 to 2016 using GMM, PCSE and FE models. The authors used only regulatory quality as an indicator for institutional quality and domestic credit to the private sector as a proxy for financial development. [Aluko and Ibrahim \(2020\)](#) analysed the impact of financial development on economic growth in 28 SSA countries from 1996 to 2015 using WGI institutional qualities as a regime-switching mechanism through threshold analysis. Their findings indicate that financial development has a significant and positive impact on economic growth irrespective of whether the country has weak or strong institutions. [Kebede et al. \(2021\)](#) explored the interaction of foreign banks and institutional

quality on financial inclusion in 17 African countries for 2004–2018 using FE and GMM. The authors used PCA to construct an institutional index from WGIs. Their results show that the interaction between foreign banks and institutional quality promotes financial inclusion in Africa.

In summary, the literature establishes the effect of institutional factors on the finance–growth nexus and financial development, but some gaps are evident. First, few empirical studies investigate the impact of institutions on financial deepening, focusing on Africa. Second, the reviewed empirical studies in Africa use limited econometric models and do not scrutinize the continent’s heterogeneity sufficiently. Thus, their results are inconclusive. Lastly, most studies either construct an institutional index or use a single institutional indicator and do not explain the impact of individual indicators.

3. Data

We employed panel data from WGI and World Development Indicators (WDI) to analyse the influence of institutions on financial deepening in 50 African countries for the period 2000–2019. Table 1 summarizes all the study’s variables, definitions and descriptive statistics. Only four African countries (Eritrea, Ethiopia, Somalia and South Sudan) are excluded because of incomplete data.

We used PCA not only to construct the institutional quality index but also to analyse the impact of each institutional indicator. The dependent variable, domestic credit to the private sector by banks as a percentage of GDP, is widely used in literature as the proxy for financial deepening. The control variables are GDP per capita, trade openness, inflation and mobile phone subscription for 100 inhabitants. GDP per capita tends to influence the demand and

| Variable | Measures and definitions | Obs | Mean | Std. Dev. | Min | Max |
|----------------------------------|---|-------|----------|-----------|--------|-----------|
| Financial deepening (FD) | Bank credit to the private sector (% of GDP) | 1,000 | 19.97 | 18.14 | 0.40 | 106.26 |
| Control of corruption (COR) | Misuse of public power for personal gain | 1,000 | −0.61 | 0.61 | −1.83 | 1.22 |
| Government effectiveness (GOV) | Credibility and quality of public services | 1,000 | −0.70 | 0.60 | −1.92 | 1.06 |
| Regulatory quality (REG) | Quality of regulations that promote the development of the private sector | 1,000 | −0.64 | 0.57 | −2.35 | 1.13 |
| Rule of law (RUL) | Quality of courts, property rights and contract enforcement | 1,000 | −0.65 | 0.62 | −2.01 | 1.08 |
| Voice and accountability (DEM) | Freedom of elections, expression, association and media | 1,000 | −0.57 | 0.70 | −2.00 | 1.00 |
| Political stability (POL) | Likelihood of political instability, terrorism and violence | 1,000 | −0.49 | 0.87 | −2.70 | 1.28 |
| GDP per capita (GDPPC) | GDP per capita (constant 2010 US\$) | 1,000 | 2,569.41 | 3,211.76 | 208.08 | 20,533.95 |
| Trade openness (TRADE) | Total trade (imports and exports) as % of GDP | 1,000 | 82.13 | 61.29 | 0.09 | 626.13 |
| Inflation (INF) | Inflation: consumer prices (annual %) | 1,000 | 8.43 | 25.51 | −37.20 | 550.00 |
| Mobile phone subscriptions (MOB) | Mobile phone subscriptions per 100 inhabitants | 1,000 | 50.57 | 44.09 | 0.018 | 198.15 |

Source(s): Computed by authors based on data from WGI and WDI

Table 1. Variables measures, definitions and descriptive statistics

supply of deposits and loans in an economy (Boadi *et al.*, 2017). Trade openness enhances the development of the banking sector through increased demand for financial services emanating from imports and exports of goods and services (Menyah *et al.*, 2014). Inflation reduces the real value of the loan and erodes the real interest returns on credit (Boadi *et al.*, 2017). Mobile phone subscriptions significantly increase financial depth (Shamim, 2007).

4. Methodology

This study employed different panel econometric models to analyse the effect of institutions on financial deepening with consideration to the heterogeneity of African countries. First, the Random Prais–Winsten regression with PCSE with panel-specific autoregressive (*PSARI*) option was used to analyse the influence of institutions on financial deepening in an aggregate scenario of 50 countries and disaggregated scenario based on different gross national incomes (GNI). The study used the PCSE with *PSARI* for two reasons: (1) it is more efficient than other static panel data estimators, especially when the number of time series (T) is less than the number of cross-sectional series (N) (Chen *et al.*, 2009) and (2) it can handle the potential presence of cross-sectional dependence and heteroscedasticity (Beck and Katz, 1995). See diagnostics results in Appendix. This method has been used by other empirical studies analysing the relationship between institutional quality and financial development (Gani and Rasul, 2020; Ntow-Gyamfi *et al.*, 2019). However, the shortcoming of the PCSE estimator is the endogeneity problem emanating from the lagged dependent variable. Thus, for robustness check, we employed the system GMM, which removes biases resulting from omitted variables, endogeneity and weak instrument problem and measurement errors (Blundell and Bond, 1998). Second, we used quantile regression to analyse countries with a high financial deepening relative to those with low levels. Quantile regression is considered robust to outliers and manages data heterogeneity (Jenkins *et al.*, 2021; Koenker and Bassett, 1978). Third, we used threshold regression to evaluate and contrast countries with poor and robust institutional qualities. The threshold regression enabled us to analyse the effects of institutional quality below or above a threshold value (Hansen, 1999). Fourth, we used the logarithmic transformation for the variables with high standard deviations, as shown in Table 1. Fifth, the correlation matrix (see Appendix) shows that the explanatory variables are highly correlated with coefficients between 0.6 and 0.9 at a 1% significance level. Thus, we ran individual regressions for each institutional factor to account for its effects on bank credit to the private sector. Lastly, we used the RAWgraphs software to visualize data with bubble graphs and we found a positive correlation between institutional qualities and bank credit to the private sector (see Appendix).

The study adopted the model used by Djankov *et al.* (2007) to investigate the determinants of domestic credit to the private sector:

$$FD_{it} = \beta_0 + \beta_1 INS_{it} + \alpha_i CO_{it} + \mu_{it} \quad (1)$$

where INS_{it} represents vectors of institutional factors that influence financial deepening (FD_{it}); CO_{it} is the vector of control variables; β and α_i are parameters and μ_{it} is errors' vector; $i = 1 \dots n$ is the number of cross-sectional units and $t = 1 \dots T$ is the number of observations for panel i . A lag of financial deepening (FD_{it-1}) is introduced for the dynamic panel data model to make Equation (2).

$$FD_{it} = \beta_0 + \beta_1 FD_{it-1} + \beta_2 INS_{it} + \alpha_i CO_{it} + \mu_{it} \quad (2)$$

This study also adopted a quantile model (see Jenkins *et al.*, 2021 for a description of the method) and a threshold model (see Wang, 2015 for description of the method) to carry out further alternative analysis as expressed in Equations (3) and (4), respectively:

$$FD_{it} = \beta_p INS_{it} + \alpha_i CO_{it} + \mu_{it} \quad (3)$$

where β_p indicates coefficient at the p quantile.

$$FD_{it} = \mu + INS_{it}(q_{it} < \gamma)\beta_1 + INS_{it}(q_{it} \geq \gamma)\beta_2 + \alpha_i CO_{it} + \mu_{it} + e_{it} \quad (4)$$

where q_{it} is the threshold variable and γ is a threshold parameter that divides the equation into the two regimes with coefficients β_1 and β_2 . μ_{it} and e_{it} are individual effects and disturbance, respectively. PCSE, system GMM, quantile and threshold regressions use Equations (1), (2), (3) and (4), respectively.

5. Results and discussions

5.1 Results from aggregated countries

The PCSE results shown in Table 2 (Panel A) demonstrate good explanatory power with R^2 for different regressions ranging from 0.6 to 0.8, which suggests a good fit for our model. The PCSE results are also in line with the system GMM in Table 2 (Panel B), where the Hansen and autoregressive (AR(2)) tests report uncorrelated disturbance terms. The lag of bank credit to the private sector is positive and statistically significant, demonstrating a good fit to our system GMM model. The results of the aggregated scenario for 50 African countries show that institutional qualities have a positive and significant influence on financial deepening in Africa, which is consistent with our expectations. Collectively, the institutional quality index has a positive and significant effect on bank credit to the private sector in Africa using both estimators PCSE and system GMM (column 7 of Table 2) consistent with previous empirical studies (Aluko and Ibrahim, 2020; Le et al., 2016) which employ the WGI institutional quality index. Thus, hypothesis H_1 is accepted.

Control of corruption positively and significantly influences bank credit to the private sector at a 1% significance level for the estimators, PCSE and system GMM. This is in line with Khan et al.'s (2020a) study in developing and emerging countries. It implies that control of corruption encourages banks to provide credit to the private sector without distorting behaviours for private gains. Government effectiveness has a positive and robust effect on bank credit to the private sector, as shown in column 2 of Table 2. This is consistent with the findings of Khan et al. (2020b) and suggests that the government's ability to formulate and implement quality policies and adhere to such policies gives confidence to the banking sector. For example, supporting government policies such as guarantee schemes have demonstrated increased bank lending to SMEs (Riding et al., 2007).

Regulatory quality is statistically significant with a positive impact on bank credit to the private sector (column 3 of Table 2), which is consistent with the findings of Gani and Rasul (2020). This implies that the government's ability to implement sound regulations and policies that promote private sector development is an essential stimulus for the banking sector to continue lending to the private sector.

The rule of law positively and strongly impacts bank credit to the private sector at 1 and 10% significance levels for PCSE and system GMM estimators, respectively. The results are consistent with previous studies (Gani and Rasul, 2020; Shen et al., 2009; Troilo et al., 2019) that the rule of law has a positive and significant effect on bank credit. This shows that property rights, quality of contract enforcement and courts are crucial motivators for banks to extend loans to the private sector.

Voice and accountability have positive and significant effects on bank credit to the private sector at a 1% significance level for both estimators, consistent with the results of Khan et al. (2020a). Freedom and fundamental rights of the society to allow people to express themselves and pursue their social and economic ambitions may increase the demand for credit. In contrast, Khan et al. (2020b) found a negative influence on financial development.

Table 2.
Institutional factors on bank credit to the private sector using PCSE and GMM

| | COR (1) | GOV (2) | REG (3) | RUL (4) | DEM (5) | POL (6) | Institutional quality index (7) |
|--|-------------------|-------------------|-------------------|-------------------|--------------------|-------------------|---------------------------------|
| <i>Panel A: PCSE</i> | | | | | | | |
| Log of bank credit to private sector as % of GDP | 0.321*** (0.0477) | 0.394*** (0.0579) | 0.318*** (0.0603) | 0.309*** (0.0570) | 0.178*** (0.0471) | 0.0644* (0.0257) | 0.106*** (0.018) |
| Institutional factors | 0.167*** (0.0469) | 0.102* (0.0489) | 0.151*** (0.0449) | 0.107* (0.0535) | 0.150*** (0.0504) | 0.165*** (0.0374) | 0.108** (0.050) |
| Log of GDP per capita | 0.0358* (0.0165) | 0.0263 (0.0147) | 0.0272 (0.0157) | 0.0279 (0.0167) | 0.0284 (0.0160) | 0.0279 (0.0152) | 0.026* (0.016) |
| Log of trade openness | -0.0260 (0.139) | -0.0381 (0.135) | -0.0238 (0.138) | -0.0279 (0.139) | -0.0712 (0.138) | -0.0601 (0.140) | -0.016 (0.139) |
| Log of inflation | 0.108*** (0.0166) | 0.113*** (0.0189) | 0.116*** (0.0182) | 0.103*** (0.0191) | 0.0997*** (0.0178) | 0.105*** (0.0171) | 0.107*** (0.019) |
| Log of mobile phone subs | 1.286 (0.702) | 1.969** (0.708) | 1.423* (0.712) | 1.802* (0.751) | 1.580* (0.718) | 1.329 (0.684) | 1.557** (0.732) |
| N | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| R ² | 0.791 | 0.694 | 0.727 | 0.613 | 0.639 | 0.711 | 0.670 |
| Number of countries | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| <i>Panel B: system GMM</i> | | | | | | | |
| Lag of bank credit (log) | 0.879*** (0.036) | 0.857*** (0.049) | 0.892*** (0.046) | 0.898*** (0.038) | 0.897*** (0.039) | 0.894*** (0.046) | 0.865*** (0.051) |
| Institutional factors | 0.255*** (0.092) | 0.384** (0.152) | 0.256* (0.150) | 0.286* (0.164) | 0.233*** (0.071) | 0.053** (0.025) | 0.121** (0.047) |
| Log of GDP per capita | -0.083 (0.052) | -0.173* (0.089) | -0.070 (0.044) | -0.084 (0.060) | -0.055 (0.034) | 0.002 (0.026) | -0.136** (0.066) |
| Log of trade openness | -0.066 (0.091) | -0.042 (0.108) | -0.044 (0.095) | 0.023 (0.100) | 0.011 (0.109) | 0.059 (0.100) | -0.081 (0.100) |
| Log of inflation | -0.162 (0.120) | -0.149 (0.141) | -0.124 (0.118) | -0.168 (0.113) | -0.194* (0.110) | -0.199** (0.082) | -0.093 (0.153) |
| Log of mobile phone subs | 0.046 (0.034) | 0.058 (0.037) | 0.033 (0.037) | 0.010 (0.039) | 0.033 (0.030) | 0.022 (0.037) | 0.031 (0.035) |
| Constant | 1.932** (0.784) | 2.576** (0.982) | 1.600* (0.800) | 1.720** (0.840) | 1.622** (0.686) | 0.942 (0.661) | 2.018* (1.032) |

(continued)

| Log of bank credit to private sector as % of GDP | COR (1) | GOV (2) | REG (3) | RUL (4) | DEM (5) | POL (6) | Institutional quality index (7) |
|---|---------|----------|---------|----------|----------|-----------|------------------------------------|
| Country FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations (N) | 950 | 950 | 950 | 950 | 950 | 950 | 950 |
| F-statistics | 2030.85 | 1,196.02 | 1868.93 | 2,379.67 | 1,441.03 | 14,920.79 | 756.69 |
| Group/ instruments | 50/37 | 50/37 | 50/37 | 50/37 | 50/37 | 50/37 | 50/37 |
| AR2 (ρ -value) | 0.486 | 0.561 | 0.514 | 0.619 | 0.545 | 0.868 | 0.475 |
| Hansen test (ρ - value) | 0.458 | 0.517 | 0.555 | 0.300 | 0.305 | 0.142 | 0.497 |

Source(s): Estimation results by authors. Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; FE, Fixed effects; COR, Control of corruption; DEM, Voice and accountability; GMM, generalized method of moments; GDP, Gross domestic product; GOV, Government effectiveness; PCSE, panel corrected standard errors; REG, Regulatory quality; RUL, Rule of law; POL, Political stability

Table 2.

Political stability and the absence of violence positively and significantly impact bank credit to the private sector at 10 and 5% significance levels for PCSE and GMM estimators, respectively (Table 2, column 6). These findings are in line with Huang (2010) who concluded that well-functioning political systems tend to increase confidence to investors and entrepreneurs to engage in economic activities with a long-term view, thus promoting financial sector development. Nevertheless, Batila and Bongo (2021) have contrasting results that political stability negatively affects financial development in central Africa.

As for the control variables, GDP per capita and mobile phones have positive and significant effects on bank credit to the private sector when regressed with each institutional factors using the PCSE estimator (Table 2). However, the results are different with system GMM, where the control variables did not show significant effects except the negative effect of inflation when regressed with political stability.

5.2 Results from disaggregated countries

Although the results for aggregated countries discussed in section 5.1 show that institutional indicators have a significant and positive effect on bank credit to the private sector, analysing countries with different levels of institution, credit and income provides additional information. The results in Table 3 show that the relationship between institutional qualities and bank credit to the private sector is non-monotonic. Thus, hypothesis H_2 is accepted.

5.2.1 Different levels of bank credits. The quantile regression results in Table 3 (columns 1–4) show that at a higher level of bank credit to the private sector (75th percentile), institutional qualities have more substantial effects on bank credit, almost double compared to lower levels (25th percentile). The coefficients of all explanatory variables increase as the quantiles of bank credit to the private sector increase (that is Q.25, Q.50 and Q.75). For example, the coefficient of government effectiveness is estimated to be around 6.901 for the 25th percentile, increases to 8.375 for the 50th percentile and then triples for the 75th percentile with a coefficient of 20.91. These results are more striking than the earlier analyses discussed in section 5.1 and previous studies on the effects of institutional qualities on financial development (Aluko and Ajayi, 2018; Aluko and Ibrahim, 2020; Cherif and Dreger, 2016; Fowowe, 2014; Kebede *et al.*, 2021; Khan *et al.*, 2020a, b; Law and Azman-Saini, 2012; Le *et al.*, 2016). Furthermore, the interquartile regression confirms that the difference between the 0.25 and 0.75 quantiles is statistically significant (Table 3, column 4). The control variables not reported in Table 3 have mixed results: mobile phone subscriptions have a positive and significant impact on all quantiles, with coefficients increasing from the 25th to 75th percentiles. GDP per capita has only a positive and significant impact for the 75th percentile. Trade openness has a positive and significant effect at the 25th and 75th percentiles only. Inflation has an insignificant effect in all percentiles.

5.2.2 Different level of gross national incomes. The World Bank classifies the world's economies based on GNI per capita in current USD. Our sample of 50 African countries has 19 low-income countries and 31 middle-income countries. The results in Table 3 (columns 5 and 6) show that individual institutional qualities, namely, control of corruption, regulatory quality, the rule of law, voice and accountability and political stability, have more effect on low-income countries than on middle-income countries. Government effectiveness has a higher effect on middle-income countries with a coefficient of 0.41 compared to low-income countries with a coefficient of 0.31. Collectively, the institutional factors using an index have more effect on low-income countries than middle-incomes in Africa. The results of control variables not reported in Table 3 have an insignificant impact except for mobile phone subscriptions, which have a positive and significant impact on bank credit for both low- and middle-income countries.

| Bank credit to the private sector as % of GDP | Quantile regression | | | PCSE regression | | | Threshold regression | | |
|---|---------------------|------------------|------------------|---|--------------------------|---------------------------------------|----------------------------|---|--|
| | 25th (1) | 50th (2) | 75th (3) | <i>I</i> _{avg} (0.75-0.25) (4) | Low-income countries (5) | Middle- and high-income countries (6) | Threshold (γ) (7) | Weak institutions $q_{it} < \gamma$ (8) | Strong institutions $q_{it} \geq \gamma$ (9) |
| Control of corruption | 6.202*** (0.287) | 7.706*** (0.679) | 15.98*** (1.536) | 9.78*** (1.088) | 0.382*** (0.097) | 0.259*** (0.067) | -0.227*** (0.025) | 2.489*** (0.222) | -4.408*** (0.657) |
| Government effectiveness | 6.901*** (0.343) | 8.375*** (0.915) | 20.91*** (1.120) | 14.008*** (1.423) | 0.310*** (0.092) | 0.410*** (0.069) | -0.529*** (0.063) | 2.742*** (0.456) | 4.147*** (1.432) |
| Regulatory quality | 6.847*** (0.343) | 8.261*** (0.722) | 17.18*** (1.225) | 10.328*** (1.360) | 0.443*** (0.102) | 0.238*** (0.075) | -0.345*** (0.029) | 1.873*** (0.259) | 7.125*** (0.826) |
| Rule of law | 5.769*** (0.303) | 7.004*** (0.724) | 17.86*** (1.434) | 12.09*** (1.670) | 0.395*** (0.093) | 0.291*** (0.080) | -0.335*** (0.022) | 0.873*** (0.357) | -0.973 (1.419) |
| Voice and accountability | 4.253*** (0.292) | 4.898*** (0.530) | 12.34*** (1.071) | 8.282*** (1.159) | 0.224*** (0.067) | 0.124* (0.068) | -0.664*** (0.045) | 6.312*** (0.473) | -7.194*** (0.938) |
| Political stability | 1.994*** (0.263) | 2.526*** (0.420) | 3.929*** (0.641) | 1.935*** (0.619) | 0.093*** (0.032) | 0.0676* (0.036) | -0.436*** (0.072) | -1.736*** (0.252) | -0.079 (0.256) |
| Institutional index | 1.689*** (0.090) | 2.058*** (0.210) | 5.012*** (0.355) | 3.323*** (0.45) | 0.149*** (0.029) | 0.091*** (0.026) | 0.966*** (0.194) | 1.051*** (0.097) | 2.304*** (0.415) |
| Observations | 1,000 | 1,000 | 1,000 | 1,000 | 380 | 620 | | 1,026 | 1,026 |
| Number of countries | 50 | 50 | 50 | 50 | 19 | 31 | | 50 | 50 |

Source(s): Estimation results by authors. Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; GDP, Gross domestic product; PCSE, panel corrected standard errors

Table 3. Institutional factors and bank credit to the private sector with a different institution, credit and income levels

5.2.3 *Different level of institutional qualities.* Table 3 (columns 8 and 9) presents threshold regression results for the countries divided into two regimes based on the threshold value. Countries below the threshold value (column 7) have weak institutional qualities, while those above the threshold parameter are classified as countries with strong institutional qualities. Government effectiveness, regulatory quality and the institutional index positively and significantly impact banks where their coefficients double when institutions are above the threshold value, which is consistent with the study of Dutta and Meierrieks (2021). However, control of corruption, the rule of law, voice and accountability and political stability have mixed results with negative effects when the institutions are above the threshold value.

6. Policy implications and conclusion

We empirically demonstrated that institutional qualities promote financial deepening in Africa. We contribute to the literature by examining the effects of institutional indicators on financial deepening in Africa, individually and collectively, and discussing their implications on SME financing; scrutinizing various analysis scenarios to account for different national income levels, levels of financial deepening and institutional qualities and employing different estimation econometric methods to account for the heterogeneity of African countries. Our key findings show that: (1) with homogenous analyses, institutional factors promote financial deepening in Africa, both for six indicators individually and collectively as an institutional index and (2) with heterogeneous analyses, institutional factors have a different effect on financial deepening. Government effectiveness has a high effect on middle- and high-income countries, while control of corruption, regulatory quality, voice and accountability, the rule of law, political stability and institutional quality index have a high impact on low-income countries. At higher levels of bank credit to the private sector, all institutional qualities have stronger effects than those with lower levels. Government effectiveness, regulatory quality and the institutional index impact financial deepening more in countries with sound institutions than those with weak institutions. These results suggest that policymakers and development partners can engender sound institutional quality to stimulate debt financing, the primary source of financing for SMEs and entrepreneurs in Africa, by paying attention to countries' heterogeneity. For example, middle-income countries can focus more on improving government effectiveness than on other institutional qualities to enhance financial deepening. In conclusion, strengthening institutional qualities is necessary but not sufficient to promote financial deepening in Africa. Other factors such as technological innovations macroeconomic policies and financial conditions can be integrated to increase financial deepening in Africa.

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Appendix

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Corresponding author

Bahati Sanga can be contacted at: bahati@usb.ac.za

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