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Diversification and banks' funding costs in Africa: The role of financial regulations

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Background: The banking literature suggests that banks can reduce their funding costs by optimising their deposit mix to prioritise low-cost accounts, managing capital efficiently, and employing diversification strategies to attract more cost-effective funding sources. While the roles of deposit mix optimisation and capital management in lowering funding costs are well-documented, the impact of diversification remains relatively underexplored, particularly in developing countries.

Aim: This study examines the relationship between diversification, financial regulations and banks' funding costs.

Setting: A sample of 563 banks operating across 53 African countries over the period 2007–2021 was selected based on the availability of data.

Method: This study employs fixed effects model as the main estimation approach, along with two-stage least squares (2SLS) and generalised method of moments (GMM) estimation technique for robustness test.

Results: The study's results indicate that diversification significantly lowers banks' cost of funds in Africa. The analysis also reveals that revenue diversification has a more pronounced impact on large and international banks. Furthermore, the study identifies an indirect effect of financial regulations on banks' funding costs through revenue diversification.

Conclusion: The study highlights the need for bank managers, particularly those in large international banks, to proactively adopt diversification strategies to optimise their funding structures and reduce costs effectively.

Contribution: The study provides insights into the broader implications of the interactions between regulatory frameworks, bank diversification, and funding costs in Africa.

Keywords: revenue diversification; assets diversification; financial regulations; banks' funding costs; Africa.

Introduction

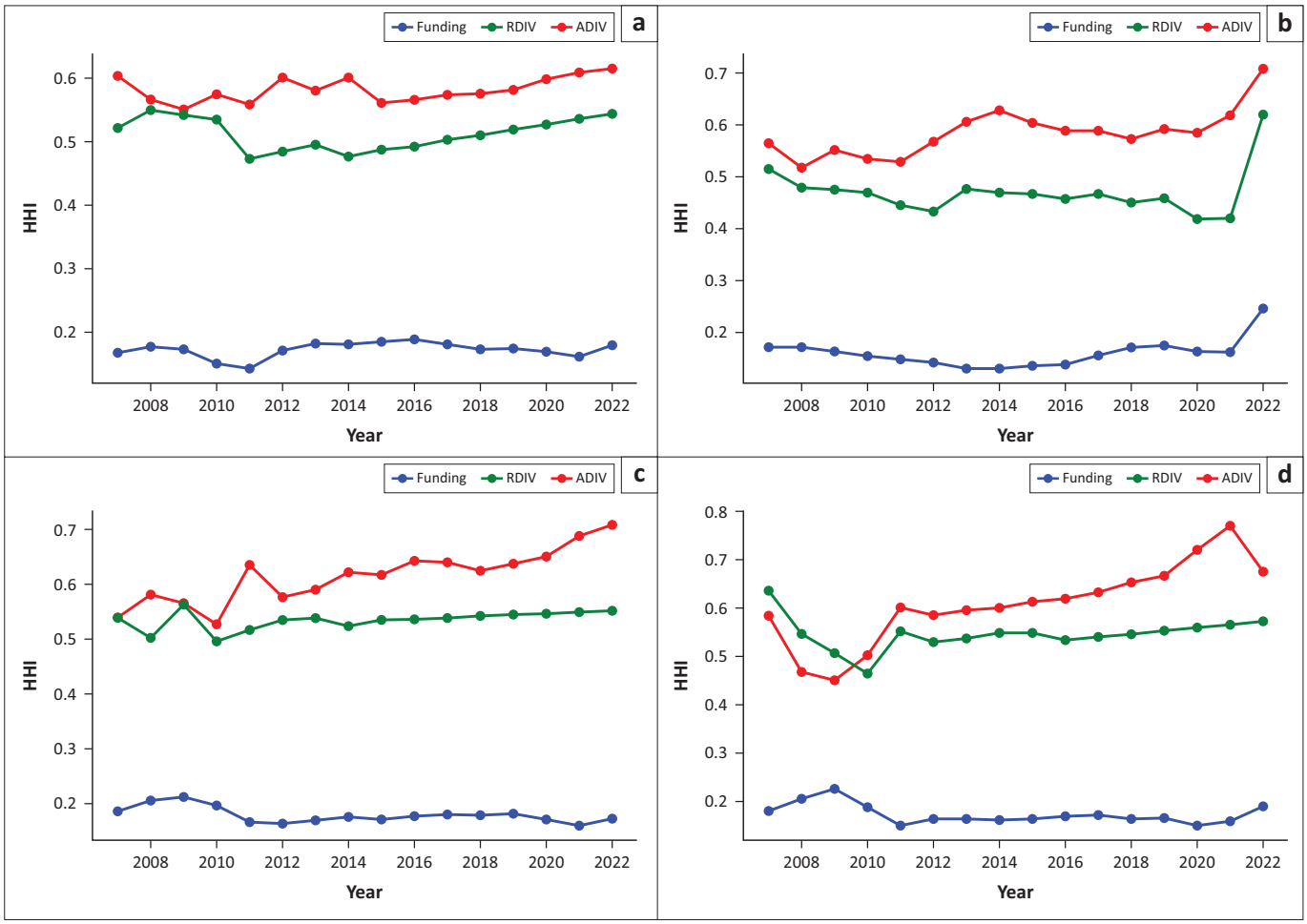
Bank funding costs refer to the expenses incurred by banks to finance their business activities (Nguyen, Tran & Nguyen 2024). Aldasoro, Cho and Park (2022) notice that these costs are critical to bank operations and the overall economy, as they directly influence the lending and borrowing behaviour of market participants. More specifically, higher funding costs can harm the real economy by driving up lending rates, which may suppress loan demand and weaken economic activities. In addition, these increased costs can heighten banks' liquidity risk, which can adversely affect the stability of the financial system (Levine, Lin & Xie 2021). Therefore, reducing funding costs is of utmost importance for ensuring the resilience and functionality of banks in the economy. The literature suggests that banks can lower their funding costs by optimising their deposit mix to prioritise low-cost accounts, managing capital effectively to improve credit ratings, and employing diversification strategies to attract more cost-effective funding sources (Opoku Mensah et al. 2017).

While studies (e.g., Ćehajić & Košak 2021; Opoku Mensah et al. 2017; Tran & Nguyen 2023) have documented the role of deposit mix optimisation and capital management in reducing funding costs, the effect of diversification remains relatively underexplored. In the banking context, diversification refers to a strategy of spreading income and assets over different financial instruments and businesses to reduce risks and enhance profitability (Addai et al. 2022). According

to Levine et al. (2021), diversification can influence bank funding costs in two distinct ways. On the one hand, drawing from modern portfolio theory, engaging in diverse activities is expected to reduce risk, thereby decreasing funding costs for diversified banks. In contrast, Velasco (2022) observes that diversification may increase the complexity of a bank's operations, thereby potentially elevating the perceived risk among investors and creditors. This could lead to higher funding costs, as lenders and investors may demand higher returns to offset the increased risk. Besides, diversification can lead to inefficiencies when banks expand beyond their core competencies, potentially diluting overall returns and increasing the cost of raising funds (Huynh & Dang 2022).

Given the theoretical ambiguity in predicting the relationship between diversification and funding costs, it is essential to explore how diversification specifically affects banks' funding costs. In the literature, a large number of studies have explored the link between income diversification on bank stability (Adem 2022; Shahriar, Mehzabin & Azad 2023; Shabir et al. 2024), performance (Addai et al. 2022; Adesina 2021) and environmental social and governance (ESG) performance (Agnese & Giacomini 2023; Saif-Alyousfi, Saha & Alshammari 2023). Studies have also explored the effect of geographical diversification (Levine et al. 2021), credit ratings (Opoku Mensah et al. 2017), solvency risk, ESG (Agnese & Giacomini 2023; Andrieș & Sprincean 2023) and management quality (Nguyen et al. 2024) on bank funding costs. However, empirical evidence on the relationship between income diversification, asset diversification, and funding costs remains scant. This is particularly important in developing markets, especially in Africa, where banks are increasingly diversifying their assets and income streams while facing growing pressure to manage escalating funding costs (Adesina 2021; Sissy, Amidu & Abor 2017).

For example, funding costs as a percentage of total interest-bearing liabilities increased from an average of 17% to 24% in North Africa between 2007 and 2022 (see Figure 1). In contrast, Southern Africa saw a decline, with funding costs decreasing from an average of 18.6% to 17.3% over the same period. In addition, North Africa recorded the highest growth in revenue diversification, as reflected in the Herfindahl-Hirshman index (HHI), which rose from an average of 0.516 in 2007 to 0.61 in 2022. Similarly, the mean asset diversification among banks in North Africa increased from 0.570 to 0.585 during the same period. Meanwhile, Southern Africa demonstrated the most significant growth in asset



Source: Bureau Van Dijk, 2023, *BankFocus database,* Moody's Analytics, Brussels
HHI, Herfindahl-Hirshman index; RDIV, revenue diversification; ADIV, asset diversification.

FIGURE 1: Trends in funding costs, revenue, and asset diversification across African regions between 2007 and 2022: (a) Eastern Africa; (b) Northern Africa; (c) Southern Africa; (d) Western Africa.

diversification, with its mean HHI index rising from 0.539 to 0.708 (Bureau van Dijk 2023). Furthermore, Addai et al. (2022) observe that the limited demand for credit and savings, coupled with the absence of a robust information framework, hinders the provision of market-based financial services in Africa. Consequently, banks in these markets may not fully realise the benefits of diversification.

Therefore, this study aims to provide empirical evidence on the effect of revenue and asset diversification on banks' funding costs in Africa, utilising data from 563 commercial banks from 2007 to 2021. In addition, it investigates the potential indirect effects of financial regulation on this relationship. Shabir et al. (2024) observe that while financial regulations have been introduced to mitigate banks' default risk and enhance overall financial system stability, these regulations significantly influence banks' decisions to diversify or concentrate their portfolios. Accordingly, by examining the indirect effects of financial regulations, this article aims to offer deeper insights into how regulatory frameworks might influence diversification and funding outcomes.

The article adds to the literature on the consequences of diversification on banks' funding costs. While prior related studies (e.g., Levine et al. 2021) have primarily concentrated on geographical diversification in developed markets, this study takes a distinct approach by focusing on revenue and asset diversification. Moreover, by studying the African banking industry, the study addresses a notable gap in the existing literature (e.g., Ben et al. 2024; Velasco 2022), which typically concentrates on developed economies. This focus offers valuable perspectives into the unique intricacies of diversification and funding costs in emerging markets.

Lastly, by examining the indirect effects of financial regulation, the study provides insights into the broader implications of the interactions between regulatory frameworks, bank diversification, and funding costs. This analysis is conducted across various subsamples, including differences in bank size and distinctions between local and international banks. This approach yields a more comprehensive understanding of the indirect effects of financial regulation across varied banking contexts.

The rest of the article is organised as follows. Section 'Relevant literature and hypothesis development' discusses the relevant literature and develops the study hypothesis. Next, the study methodology, including the data, is described in Section 'Data and methods'. Section 'Results and discussion' presents the empirical evidence, and Section 'Conclusion' concludes the article.

Relevant literature and hypothesis development

Diversification and banks' funding costs

While empirical evidence regarding the relationship between diversification and banks' funding costs is limited, the theoretical literature presents mixed predictions. The modern portfolio theory suggests that diversification can reduce banks' overall risk by lowering the volatility of profits (Ben et al. 2023). This perceived reduction in risk can, in turn, attract more investors and depositors, subsequently leading to lower funding costs for banks. However, the literature on income diversification (e.g., Wang 2023) suggests that diversified firms often face inefficient resource allocation because of agency problems, leading to a discount in their valuation. This decreased valuation, reflecting higher perceived risks and management complexities, can subsequently increase the cost of capital for diversified banks as investors demand higher returns to compensate for the increased risk.

Studies have predominantly focused on the effect of diversification on bank stability. For example, Adem (2022) examines the effect of income diversification on bank stability, providing evidence that diversification of income reduces risk and improves bank stability in Africa. Sissy et al. (2017) analyse the interaction between cross-border banking, revenue diversification and stability across 29 African countries. More recently, Shabir et al. (2024) study the effect of diversification on bank stability in the MENA region. Their findings show that both income and asset diversification improve bank stability. Another strand of literature looks at the impact of diversification on bank performance. Addai et al. (2022), for instance, examine the interaction between income diversification and bank performance in Africa. Similarly, Adesina (2021) analyses the relationship between diversification and bank performance, showing evidence that greater income and asset diversification reduces bank stability, cost efficiency, and profitability.

Furthermore, Githaiga (2021) investigates the moderating effect of income diversification on the relationship between human capital and bank performance in East Africa. Few studies have explored the link between diversification and bank ESG performance. Saif-Alyousfi et al. (2023), for example, analyse whether bank ESG activities affect their income and asset diversification. Their results indicate that environmental and social factors negatively impact bank diversification. A recent study by Kamau and Simo-Kengne (2024) investigates the relationship between legal origin, diversification, and bank lending behaviour in Africa, finding evidence that revenue diversification indirectly mitigates the negative impacts of loan growth in banks with a common-law legal origin. Turning to banks' funding costs, studies have largely examined the effect of bank solvency risk and funding costs. Aldasoro et al. (2022), for instance, examine the interaction between bank solvency risk and funding cost in Korea.

A related study by Levine et al. (2021) analyses the impact of geographical diversification on the costs of interest-bearing liabilities for banks across U.S. A growing body of literature has explored the effects of ESG performance on banks' funding costs. For example, Agnese and Giacomini (2023) assess whether ESG factors affect bank bond pricing. Works have also examined the relationship between credit

ratings and bank funding costs. For instance, Opoku Mensah et al. (2017) studied the effect of sovereign credit ratings on banks' funding costs in Africa, finding evidence of lower funding costs for banks with higher sovereign ratings. A related study by Kusi and Opoku-Mensah (2018) analyses the effect of credit information sharing on banks' funding costs in Africa. They show evidence that the presence of credit information lowers bank funding costs. Most recently, Nguyen et al. (2024) investigated whether banks with more capable managers achieve better funding costs. According to their findings, banks with strong managerial abilities are able to secure funding at reduced costs.

From the reviewed literature, it is clear that no study has specifically explored the impact of diversification on bank funding costs within the African context. Accordingly, this study argues that diversification will likely reduce banks' cost of funds in Africa for two primary reasons. Firstly, diversification can help mitigate risk, especially in Africa, where banks face higher levels of non-performing loans. Secondly, diversification can provide banks in the region with enhanced access to a wider range of funding sources and earnings, leading to improved liquidity and stability. Consequently, this study proposes the following hypothesis:

H1: Diversification is negatively associated with banks' funding costs in Africa.

Financial regulation, diversification and bank funding costs

Financial regulations designed to curtail non-traditional banking activities have become critical tools in the aftermath of financial crises, particularly after the 2008 global financial crisis (Ben et al. 2023). These regulations were largely implemented in response to the realisation that many large financial institutions had failed because of extensive involvement in non-traditional and often risky financial activities. Literature (e.g., Saif-Alyousfi et al. 2023; Velasco 2022) argues that financial regulation indirectly influences banks' cost of funds through diversification. For instance, regulatory capital requirements may encourage banks to diversify their income and assets in order to hold lower capital levels. Furthermore, regulations such as interest rate caps could drive banks to explore alternative income and funding sources (Wang & Lin 2021).

However, regulatory constraints may lead to a suboptimal allocation of resources by steering banks towards investments that are safer but yield lower returns (Ben et al. 2023). This shift can paradoxically result in reduced income and higher funding costs, as banks may be compelled to offer higher interest rates to attract capital. Prior studies (e.g., Hunjra et al. 2021) demonstrate that capital regulations enhance banks' capital, enabling them to pursue greater diversification. This diversification can lead to more stable income streams and reduce the volatility of a bank's overall financial performance, which can lower the risk premium demanded on capital lent to or invested in the bank. Velasco (2022) finds an indirect effect of regulatory capital on bank diversification. Accordingly, this study anticipates that financial regulations will indirectly influence funding costs through diversification. Consequently, the article proposes the following hypothesis:

H2: Financial regulations affect banks' funding costs through diversification.

Data and methods

Sample and data sources

This study investigates the effects of diversification on banks' funding costs using a sample of 563 commercial banks drawn from 53 African countries from 2007 to 2021. The selection of these banks and countries was based on the availability of consistent data over the study period. Bank-level data are sourced from the BankFocus database, while data on financial regulations and macroeconomic variables is obtained from the World Bank's World Development Indicators (WDI) and International Monetary Fund International (IMF) Financial Statistics databases.

Variables and measurement

Measures of banks' funding costs

The dependent variable is banks' funding costs measured as the ratio of interest expense to interest-bearing liabilities following Levine et al. (2021). This measure captures the significance of the effect of financial distress on banks' performance.

Measures of revenue diversification

This study employs two measures of revenue diversification: Revenue diversification (RDIV) and adjusted revenue diversification (ARDIV), consistent with previous related works (e.g., Addai et al., 2022; Kamau & Simo-Kengne, 2024). RDIV considers the interest and non-interest sources of income and is calculated using the HHI index as follows:

$$\mathrm{RDIV}_{ikt} = 1 - \left[\left(\frac{\mathrm{NON}_{ikt}}{\mathrm{TOR}_{ikt}} \right)^2 + \left(\frac{\mathrm{NIR}_{ikt}}{\mathrm{TOR}_{ikt}} \right)^2 \right] \quad \text{[Eqn 1]}$$

where NON is the non-interest income, NIR is the net interest income, and TOR is the total operating revenue for bank i in country k at year t. Adjusted revenue diversification breaks non-interest income into net fee and commission income, net trading income and other operating income. The ARDIV is calculated as follows:

$$\mathrm{ARDIV}_{ikt} = 1 - \left[\begin{array}{l} \left(\frac{\mathrm{NIR}_{ikt}}{\mathrm{TOR}_{ikt}} \right)^2 + \left(\frac{\mathrm{NFC}_{ikt}}{\mathrm{TOR}_{ikt}} \right)^2 \\ + \left(\frac{\mathrm{NGT}_{ikt}}{\mathrm{TOR}_{ikt}} \right)^2 + \left(\frac{\mathrm{OOI}_{ikt}}{\mathrm{T.F.}_{ikt}} \right)^2 \end{array} \right] \quad \text{[Eqn 2]}$$

where NFC is the net fee and commission income, NGT is net gains on trading, and OOI is other operating income.

Measures of asset diversification

This study adopts the asset diversification (ADIV) and the adjusted asset diversification (AADIV) measures of asset diversification following Levine et al. (2021) and Velasco (2022). Asset diversification is calculated using the HHI of asset diversification as follows:

$$ADIV_{ikt} = 1 - \left[\left(\frac{NI_{ikt}}{TA_{ikt}} \right)^2 + \left(\frac{OA_{ikt}}{TA_{ikt}} \right)^2 \right] \quad \text{[Eqn 3]}$$

where NI_{ikt} is the net loans of bank i in country k at year t. OA is other assets, while TA is total assets. Adjusted asset diversification is calculated as follows:

$$AADIV_{ikt} = \frac{\text{Non} - \text{interest bearing assets}}{\text{Total assets}} \quad \text{[Eqn 4]}$$

Measures of financial regulation

Following Hunjra et al. (2021) and Poshakwale, Aghanya and Agarwal (2020), this study employs two commonly used proxies for financial regulation: a dummy value equal to 1 for countries with interest rate caps and 0 otherwise and a dummy variable equal to 1 for banks in countries that have fully adopted Basel II or III capital accords and 0 otherwise. The use of two proxies, interest rate caps and Basel Accord compliance, allows the study to capture key dimensions of financial regulation, thereby enhancing the reliability of the results.

Control variables

This study incorporates both bank-specific and macroeconomic control variables, which have been identified in previous studies (e.g., Andrieș & Sprincean 2023, Levine et al. 2021) to influence bank funding costs. Bank-specific control variables include equity, bank size and return on assets (ROA). According to Saif-Alyousfi et al. (2023), well-capitalised banks are viewed as less risky, making them raise funds at a cheaper cost. Therefore, a negative relationship between equity and banks' funding costs is expected. Equity is measured as a ratio of equity to total assets. Literature provides mixed predictions on the direction of the relationship between bank size and funding costs. On the one hand, Saif-Alyousfi et al. (2023) show that bigger banks enjoy lower funding costs because they are perceived as 'too big to fail'.

Conversely, large banks seek more deposits to lend to borrowers, leading to higher interest expenses and potentially increasing their overall funding costs (Kouzez 2023). Thus, the expected sign for the coefficient of bank size is unclear. Bank size is measured as the log of total assets. ROA is a proxy for bank profitability calculated as net income divided by total assets. The coefficient for ROA is expected to be negative, as highly profitable banks may be seen as efficient by investors and thus rewarded with lower funding costs (Andrieș & Sprincean 2023).

For macroeconomic variables, the study includes controls for the policy rate, inflation, gross domestic product (GDP) growth and financial crisis. The monetary policy rate directly affects the interest rates that banks pay to obtain funds (Ćehajić & Košak 2021). Accordingly, the policy rate is expected to positively affect banks' funding costs. GDP growth improves a country's economic conditions, simultaneously lowering the riskiness of banks and enhancing the conditions for raising loans (Nguyen et al. 2024). This can result in reduced funding costs.

Therefore, the study expects GDP growth, measured percentage change in a country's real GDP, to negatively influence banks' funding costs. Shabir et al. (2024) observe that a rise in inflation rates increases borrowing costs because investors demand higher rates of return on their investments. Thus, inflation is expected to be positively related to the dependent variable. Lastly, crisis is a proxy for the financial crisis, which assumes a dummy value of 1 for the period 2008-2009 and 0 otherwise. Khattak et al. (2023) find that the global financial crisis of 2008 led to increased banks' funding costs because of the deterioration of the money market and a subsequent increase in financial instruments' risk premium. Consequently, this study expects a positive coefficient for the crisis variable. Table 1 provides a summary description of the study variables.

Regression model

The study employs the following baseline model to test hypothesis 1, which examines the effects of diversification on

TABLE 1: Description of the variables.

Variable	Definition	Source
Dependent variable		
Funding costs	Interest expense divided by interest-bearing liabilities	BankFocus, own calculations
Independent variables		
RDIV	HHI based on interest and non-interest income	BankFocus, own calculation
ARDIV	HHI based on net fee and commission income, net gains on trading, and other operating income.	BankFocus, own calculation
ADIV	HHI based on loans and other assets	BankFocus, own calculation
AADIV	Non-interest-bearing assets over total assets	BankFocus, own calculation
Financial regulation variables		
Interest rate controls	A dummy value of 1 for countries with interest rate caps and 0 otherwise.	IMF
Basel	The study employs a dummy variable equal to one for banks in countries that have fully adopted Basel II or III capital accords and 0 otherwise.	IMF
Bank-specific control variables		
Equity	Equity to total assets	BankFocus, own calculation
Size	Logarithm of total assets	BankFocus, own calculation
ROA	Net income to total assets	BankFocus, own calculation
Macroeconomic control variables		
Policy rate	Monetary policy rate	WDI, IMF
Inflation	Inflation rate	WDI
GDP growth	Percentage change in a country's real gross domestic product (GDP)	WDI, own calculations
Crisis	Financial crisis dummy (0–1)	Own calculation

ROA, return on assets; WDI, world development indicators; IMF, international monetary fund; AADIV, adjusted asset diversification; ADIV, asset diversification; ARDIV, adjusted revenue diversification; HHI, Herfindahl-Hirshman index; RDIV, revenue diversification.

banks' funding costs, following prior related studies of Agnese and Giacomini (2023) and Wang and Lin (2021):

$$FC_{ikt} = \alpha + \beta_1 DIV_{ikt} + \sum_{j=1}^{7} \varnothing j \, Controls_{jt} + \alpha_i + \lambda_t + \varepsilon'_{ikt} \quad \text{[Eqn 5]}$$

where FC_{ikt} denotes funding costs of bank i in country k in year t. DIV indicates bank diversification, which can either be revenue or asset diversification. Controls represent the vector of bank-specific (equity, bank size and ROA) and macroeconomic control variables (policy rate, inflation, GDP growth and financial crisis). In addition, the study includes bank (α_i) and year (λ_t) fixed effects to control for bank-specific and time-varying unobserved heterogeneity. The baseline regression model is estimated using the fixed effects model following the results of the Hausman test and Wang and Lin (2021).

As mentioned earlier, given the potential indirect influence of financial regulation on diversification, this study employs the two-stage least square (2SLS) method. The 2SLS approach also controls for endogeneity, which is a common concern in the diversification literature (Levine et al. 2021). Such endogeneity may arise because the decision to diversify is at the bank's discretion; hence the bank-specific factors that influence the revenue diversification strategy may also affect funding costs. Moreover, reverse causality may arise because the decision to diversify a bank's revenue sources may be influenced by past costs of funds (Velasco 2022). In the first stage, the predicted values of diversification are estimated based on the instrumental variables using the following model:

$$DIV_{ikt} = \beta_1 Z_{ikt} + \sum_{j=1}^{7} \varnothing j \, Controls_{jt} + \alpha_i + \lambda_t + \varepsilon'_{ikt} \quad \text{[Eqn 6]}$$

where $\widehat{DIV}_{ikt}$ is the predicted values of diversification and β_1 is the coefficient of the instrumental variable Z_{ikt} The study uses the financial regulation proxies (a dummy variable for interest rate control and a dummy variable for the adoption of Basel II or Basel III capital) as instruments for revenue and asset diversification. This approach is based on the idea that banks will likely diversify their income and assets to increase earnings when faced with interest rate ceilings. Similarly, the adoption of Basel capital accords, particularly Basel II and Basel III frameworks, has been observed to drive more diversification in the banking industry (Velasco 2022).

In the second stage, the predicted values of diversification are used as exogenous variables to estimate the effect of diversification on banks' funding costs as follows:

$$FC_{ikt} = \alpha + \beta_1 \widehat{DIV}_{ikt} + \sum_{j=1}^{7} \varnothing j \, Controls_{jt} + \alpha_i + \lambda_t + \varepsilon'_{ikt} \quad \text{[Eqn 7]}$$

The article employs the Sargan test and the Lagrange Multiplier (LM) test to assess the relevance and validity of the 2SLS instrumental variables. Furthermore, the study utilises the Generalized Method of Moments (GMM) estimator to check the robustness of the baseline results. Unlike the first two estimators, the GMM approach accounts for both endogeneity and the persistence of the dependent variable, whereby the previous year's banks' funding costs are likely to influence the current year's banks' funding costs (Saif-Alyousfi et al. 2023). This study uses the two-step system GMM estimator, which is considered more efficient than the one-step (Khattak et al. 2023). The first step of the two-step GMM is used to generate the instruments for the second-step equation, and it involves estimating the coefficients of the first differenced equation of the endogenous variable. The first step equation can be modelled as follows:

$$DIV_{ikt} = \sum_{i=1}^{k} \rho_1 DIV_{ikt-1} + \sum_{j=1}^{7} \varnothing j \, Controls_{jt} + \alpha_i + \lambda_t + \mu_{ikt} \quad \text{[Eqn 8]}$$

whereby DIV_{ikt} is revenue or asset diversification for bank i in country k at year t. DIV_{ikt-1} is the lagged values of revenue or asset diversification. α_i and λ_t are bank and year-fixed effects, respectively, while μ_{ikt} is the error term. The second-step regression of the two-step system GMM involves estimating the effect of diversification on banks' funding costs by regressing the first-differenced dependent variable on the first differenced predicted values of diversification from the first step, as well as lagged values of the dependent variable and the predicted variable of diversification. The second-step equation can be written as:

$$FC_{ikt} = \alpha + \gamma FC_{ikt-1} + \beta_1 \widehat{DIV}_{ikt} + \sum_{j=1}^{7} \varnothing j \, Controls_{jt} + \alpha_i + \lambda_t + \varepsilon'_{ikt} \quad \text{[Eqn 9]}$$

where FC_{ikt} is banks' funding and FC_{ikt-1} is the lagged value of banks' funding costs. $\widehat{DIV}_{ikt}$ is the predicted value of diversification. In performing the GMM estimation, the study uses the 1st lag of the dependent variable and the 1st lag and deeper of revenue diversification as instruments for revenue diversification. To confirm the consistency of the results, tests for second-order autocorrelation and the validity of the instruments are performed using the Arellano-bond test – AR(2) and the Sargan test, respectively. Finally, to account for the time lag in the relationship between diversification and banks' funding costs, the study includes a lag of the diversification variables in both the baseline and alternative regression models as an additional robustness test.

Ethical considerations

This study used secondary data and does not contain any studies involving human participants performed by any of the authors.

Results and discussion

Descriptive statistics

Table 2 presents the descriptive statistics for the variables under study. The sampled banks exhibit moderate funding costs, with a mean of 16.4%. Furthermore, they display

TABLE 2: Descriptive statistics.

Variable	Obs	Mean	SD	Min	Max
Funding costs	4654	0.16	0.06	0.00	0.39
RDIV	4760	0.49	0.17	0.00	1.00
ARDIV	4753	0.53	0.17	0.00	1.00
ADIV	4444	0.60	0.18	0.20	1.00
AADIV	4001	0.13	0.07	0.00	0.30
Interest rate controls	4865	0.56	0.50	0.00	1.00
Basel	4865	0.51	0.50	0.00	1.00
Equity	4306	0.12	0.05	0.00	0.25
Size	4750	13.42	1.71	8.31	22.31
ROA	4320	0.02	0.02	−0.05	0.10
Policy rate	4418	0.27	0.08	0.12	0.45
Inflation	4323	0.24	0.11	0.04	0.73
GDP growth	4520	0.04	0.03	−0.09	0.15
Crisis	4760	0.02	0.15	0.00	1.00

Source: Adapted from Bureau van Dijk, 2023, *BankFocus database,* Moody's Analytics, Brussels

Note: This table presents descriptive statistics of the study variables. The variables are defined in Table 1. Please see the full reference list of the article for more information: https://doi.org/10.4102/sajems.v28i1.5809.

ROA, return on assets; AADIV, adjusted asset diversification; ADIV, asset diversification; ARDIV, adjusted revenue diversification; GDP, gross domestic product; RDIV, revenue diversification; SD, standard deviation; Min, minimum; Max, maximum; Obs, observations.

relatively high levels of diversification towards non-interest income, as evidenced by the mean RDIV of 49.3% and ARDIV of 52.8%. The HHI for ADIV indicates significant assets-based diversification, with a mean value of 0.601. Conversely, the low value of AADIV (0.134) indicates a higher concentration in diversification towards interest-earning assets. Lastly, the countries studied show significant variation in financial regulations as shown by the standard deviations of interest rate controls and Basel of 0.496 and 0.50, respectively.

The correlation coefficient matrix (available upon request) reveals low correlations between the study variables, with all coefficients below 0.4, suggesting the absence of multicollinearity issues.

The relationship between diversification and banks' funding costs

Table 3 displays the regression results for testing hypothesis 1, which examines the negative effect of diversification on banks' funding costs in Africa using the fixed effects model. The results for RDIV and ADIV are presented in columns (1)–(2) and (3)–(4), respectively. According to the results in Table 3, revenue diversification has a consistently negative and significant effect on banks' funding costs. These results support hypothesis 1 and align with prior related studies of Shabir et al. (2024) and Addai et al. (2022), suggesting that income diversification enhances bank performance, which ultimately leads to reduced risk and, consequently, a lower cost of capital.

Two possible arguments exist for the negative relationship between revenue diversification and banks' funding costs. Firstly, higher revenue diversification can reduce banks' risk by minimising income volatility (Shabir et al. 2024; Shahriar et al. 2023). As a result, lenders may view such banks as less risky, leading to a reduced premium in their funding costs (Tran & Nguyen 2023). Secondly, diversification of revenue sources can enhance banks' profitability and efficiency through economies of scope under the synergy effect as shown by Saif-Alyousfi et al. (2023) and Addai et al. (2022). The increased profitability and efficiency may subsequently reduce banks' funding costs, as investors and lenders perceive them as low-risk borrowers (Nguyen et al. 2024).

TABLE 3: Diversification impact on funding costs using fixed effects model.

Variables	Sub-variable	Revenue diversification		Assets diversification	
		1	2	3	4
RDIV	Coeff	−0.017***	-	-	-
	SE	0.005	-	-	-
ARDIV	Coeff	-	−0.017***	-	-
	SE	-	0.005	-	-
ADIV	Coeff	-	-	−0.027***	-
	SE	-	-	0.005	-
AADIV	Coeff	-	-	-	−0.029***
	SE	-	-	-	0.011
Equity	Coeff	0.147***	0.146***	0.145***	0.140***
	SE	0.020	0.020	0.020	0.021
Size	Coeff	0.001	0.001	0.003*	0.002
	SE	0.002	0.002	0.002	0.002
ROA	Coeff	−0.137***	−0.137***	−0.154***	−0.243***
	SE	0.038	0.038	0.039	0.041
Policy rate	Coeff	0.182***	0.181***	0.185***	0.243***
	SE	0.014	0.014	0.015	0.017
Inflation	Coeff	0.038***	0.037***	0.038***	0.035***
	SE	0.009	0.009	0.009	0.009
GDP growth	Coeff	−0.020	−0.020	−0.014	−0.036*
	SE	0.019	0.019	0.020	0.020
Crisis	Coeff	0.007	0.007	0.007	0.008
	SE	0.006	0.006	0.006	0.006
Constant	Coeff	0.093***	0.097***	0.073***	0.070**
	SE	0.023	0.023	0.024	0.027
Observations	-	3389	3386	3139	2909
Year fixed effects	-	Yes	Yes	Yes	Yes
R-squared	-	0.152	0.153	0.158	0.186

Note: This table presents the regression results between funding costs and HHI of RDIV, ARDIV, ADIV and AADIV in equations 1, 2, 3 and 4, respectively. The estimates are obtained using fixed effects model. The control variables include equity, bank size, ROA, policy rate, inflation, GDP growth and crisis. The variables are defined in Table 1. Please see the full reference list of the article for more information: https://doi.org/10.4102/sajems.v28i1.5809.

ROA, return on assets; AADIV, adjusted asset diversification; ADIV, asset diversification; ARDIV, adjusted revenue diversification; GDP, gross domestic product; LM, Lagrange Multiplier; RDIV, revenue diversification; Coeff, coefficient; SE, standard error.

***, ** and * indicate statistical significance at 1%, 5% and 10%.

The results in Table 3 show a statistically significant negative relationship between asset diversification and banks' funding costs, further supporting Hypothesis 1. These findings align with those of Levine et al. (2021), which show that asset diversification reduces funding costs for banks in the U.S. This is possibly because asset diversification reduces risk by adding assets to banks' portfolios that are imperfectly correlated with existing ones, thereby spreading and minimising potential financial exposure (Ben et al. 2023). Moreover, asset-based diversification enables banks to spread their activities across various industries, potentially reducing the expected costs of financial distress (Shabir et al. 2024). This may result in more stable financial performance for banks, resulting in lower funding costs as the risk to lenders and investors diminishes as shown by Shahriar et al. (2023).

The similarity in results between Africa and the U.S. may be attributed to the shared focus of banks in both African and developed economies on enhancing profitability, managing risks, and reducing funding costs. Accordingly, by diversifying to mitigate risks, banks in both regions align their strategies, resulting in comparable reductions in funding costs (Duho, Onumah & Owodo 2020). Furthermore, the growing integration of African banks into global financial markets exposes them to similar diversification practices, resulting in comparable outcomes on funding costs (Shabir et al. 2024). Looking at the control variables, equity has a positive and significant effect on banks' funding costs, in contrast to earlier expectations and prior studies by Saif-Alyousfi et al. (2023). This outcome may be expected because an increase in equity reduces banks' return on capital, leading to higher funding costs (Aldasoro et al. 2022).

The coefficients for ROA are negative and significant, suggesting that higher profitability lowers banks' funding costs. This result is consistent with Andrieș and Sprincean (2023) finding that profitability lowers funding costs by reducing banks' risk-taking incentives because of increased charter value. As expected, the policy rate has a significant positive effect on banks' cost of funds, consistent with earlier findings by Ćehajić and Košak (2021), indicating that an increase in the policy rate leads to higher interest rates for banks' funding. Lastly, inflation has a positive and significant coefficient, confirming earlier studies by Shabir et al. (2024) that suggest higher inflation rates increase lenders' and investors' required rate of return, resulting in higher banks' funding costs.

Financial regulations, diversification and banks' funding costs

Table 4 presents the second-stage estimation results for testing hypothesis 2, which explores the indirect effects of financial regulations on the relationship between diversification and funding costs, employing the 2SLS method with instrumental variables. The Sargan test and the LM test indicate that the instruments generally meet the relevance and validity conditions, thereby confirming the consistency of the findings. The results in columns (1)–(2) and (5)–(6) of Table 4 reveal a significantly negative coefficient for the predicted values of revenue diversification, suggesting that financial regulation indirectly lowers banks' funding costs. These findings support hypothesis 2 and are consistent with prior studies of Velasco (2022) and Wang and Lin (2021), which provide evidence that financial regulations encourage banks to pursue diversification strategies. This, in turn, can broaden banks' access to diverse funding sources, ultimately leading to reduced funding costs.

TABLE 4: The effect of financial regulations on the relationship between diversification and funding costs.

Variables	Sub-variable	Revenue diversification		Asset diversification	
		1	2	3	4
$\widehat{RDIV}$	Coeff	–0.529*	-	-	-
	SE	0.277	-	-	-
$\widehat{ARDIV}$	Coeff	-	–0.445*	-	-
	SE	-	0.260	-	-
$\widehat{ADIV}$	Coeff	-	-	0.053	-
	SE	-	-	0.078	-
$\widehat{AADIV}$	Coeff	-	-	-	–0.796***
	SE	-	-	-	0.291
Equity	Coeff	0.031	0.070	0.158***	0.109***
	SE	0.074	0.060	0.025	0.039
Size	Coeff	–0.025*	–0.018	0.002	–0.010*
	SE	0.014	0.012	0.002	0.006
ROA	Coeff	–0.087	–0.094	–0.173***	–0.261***
	SE	0.089	0.079	0.045	0.072
Policy rate	Coeff	0.138***	0.104*	0.188***	0.338***
	SE	0.041	0.055	0.016	0.047
Inflation	Coeff	–0.036	–0.023	0.042***	0.035**
	SE	0.043	0.041	0.011	0.017
GDP growth	Coeff	–0.037	–0.063	–0.024	–0.006
	SE	0.045	0.046	0.024	0.037
Crisis	Coeff	0.048**	0.061**	0.025***	0.002
	SE	0.020	0.026	0.009	0.010
Observations	-	3359	3355	3101	2871
Year fixed effects	-	Yes	Yes	Yes	Yes
LM test *p*-value	-	0.118	0.165	0.006	0.006
Sargan test *p*-value	-	0.741	0.133	0.647	0.609

Note: This table presents the second-stage 2SLS regression results, analysing effect of financial regulations on the relationship between banks' funding costs, and RDIV, ARDIV, ADIV and AADIV. The control variables include equity, bank size, ROA, policy rate, inflation, GDP growth and crisis. The variables are defined in Table 1. Please see the full reference list of the article for more information: https://doi.org/10.4102/sajems.v28i1.5809.

ROA, return on assets; AADIV, adjusted asset diversification; ADIV, asset diversification; ARDIV, adjusted revenue diversification; GDP, gross domestic product; LM, Lagrange Multiplier; RDIV, revenue diversification; Coeff, coefficient; SE, standard error.

***, ** and * indicate statistical significance at 1%, 5% and 10%.

TABLE 5: Revenue and asset diversification effect on banks funding costs using GMM.

Variables	Sub-variable	Revenue diversification		Asset diversification	
		1	2	3	4
L. Funding costs	Coeff	0.560***	0.561***	0.601***	0.562***
	SE	0.014	0.014	0.016	0.016
RDIV	Coeff	–0.008**	-	-	-
	SE	0.003	-	-	-
ARDIV	Coeff	-	–0.011***	-	-
	SE	-	0.003	-	-
ADIV	Coeff	-	-	–0.009***	-
	SE	-	-	0.003	-
AADIV	Coeff	-	-	-	–0.028***
	SE	-	-	-	0.007
Equity	Coeff	0.189***	0.181***	0.171***	0.169***
	SE	0.017	0.017	0.016	0.017
Size	Coeff	0.001***	0.001***	0.001*	0.000
	SE	0.000	0.000	0.0003	0.000
ROA	Coeff	–0.044	–0.037	–0.061*	–0.094***
	SE	0.030	0.030	0.031	0.032
Policy rate	Coeff	0.118***	0.104***	0.108***	0.136***
	SE	0.012	0.012	0.013	0.009
Inflation	Coeff	0.036***	0.048***	0.051***	0.055***
	SE	0.004	0.004	0.004	0.005
GDP growth	Coeff	–0.028***	–0.015*	–0.060***	–0.036***
	SE	0.009	0.009	0.011	0.010
Crisis	Coeff	0.006***	0.015***	0.016***	–0.003***
	SE	0.001	0.001	0.002	0.001
Observations	-	2961	2959	2749	2550
Year fixed effects	-	Yes	Yes	Yes	Yes
LM test *p*-value	-	-	-	-	-
AR2	-	0.324	0.346	0.413	0.245
Sargan test *p*-value	-	0.647	0.609	0.921	0.666

Note: This table shows the GMM regression results between banks' funding costs, RDIV, ARDIV, ADIV and AADIV. The control variables include equity, bank size, ROA, policy rate, inflation, GDP growth and crisis. The variables are defined in Table 1. Please see the full reference list of the article for more information: https://doi.org/10.4102/sajems.v28i1.5809.

ROA, return on assets; AADIV, adjusted asset diversification; ADIV, asset diversification; ARDIV, adjusted revenue diversification; GDP, gross domestic product; LM, Lagrange multiplier; AR(2), Arellano–Bond test; RDIV, revenue diversification; Coeff, coefficient; SE, standard error.

***, ** and * indicate statistical significance at 1%, 5% and 10%.

Robustness check

As indicated earlier, this article employs the GMM estimator to verify the robustness of the baseline results. Table 5 presents the GMM results. The insignificant AR(2) test values indicate the absence of second-order autocorrelation. Similarly, the Sagan test provides evidence that the lagged values of revenue and assets diversification are valid instruments across most of the estimation models. The lagged dependent variables are highly significant, confirming the persistence of funding costs, hence, supporting the use of the dynamic model. Overall, the GMM results in Table 5 largely align with the findings from the baseline models, confirming that diversification reduces banks' funding costs. Lastly, the lagged coefficients for revenue and asset diversification (available upon request), consistently remain negative and significant, further confirming that diversification lowers banks' funding costs in Africa.

The effect of bank size

Studies (e.g., Opoku Mensah et al. 2017; Tran, Nguyen & Hoang 2024) suggest that the relationship between diversification, financial regulations, and funding costs can vary significantly across banks of varying sizes. Large banks typically have greater resources and market access, enabling them to diversify risks across a broader range of assets and efficiently navigate complex financial regulations (Shabir et al. 2024). This can enhance the benefits of diversification in lowering funding costs. In contrast, smaller banks often have limited resources and face relatively higher compliance costs, which can reduce the effectiveness of diversification and increase the sensitivity of funding costs to regulatory pressures (Andrieș & Sprincean 2023).

Accordingly, to investigate the possibility that large banks benefit from cheaper funding costs, this study further examines the effect of diversification on banks' funding costs and the indirect role of financial regulations across different levels of bank size by re-estimating equations (1)–(9) for small and large banks. In this article, banks are classified as small if their total assets fall below the 50th percentile of the total assets of banks operating in country j, and as large if their total assets are at or above the 50th percentile following Andrieș and Sprincean (2023). The results are presented in Table 6. For large banks, the coefficient for revenue diversification remains significantly negative as shown in columns (1)–(2). However, this significant effect disappears for small banks as indicated in columns (7)–(8).

TABLE 6: Effects of size on diversification and banks funding costs relationship.

Variable	Sub-variable	Panel A: Small banks						Panel B: Large banks					
		FE		2SLS		GMM		FE		2SLS		GMM	
		1	2	3	4	5	6	7	8	9	10	11	12
Revenue diversification													
L. Funding costs	Coeff	-	-	-	-	0.516***	0.553***	-	-	-	-	0.558***	0.560***
	SE	-	-	-	-	0.029	0.029	-	-	-	-	0.009	0.007
RDIV	Coeff	–0.013*	-	–0.108	-	–0.005	-	–0.022***	-	–0.152	-	–0.030***	-
	SE	0.007	-	0.165	-	0.006	-	0.007	-	0.138	-	0.002	-
ARDIV	Coeff	-	–0.012*	-	–0.031	-	–0.005	-	–0.024***	-	–0.324	-	–0.027***
	SE	-	0.007	-	0.135	-	0.006	-	0.006	-	0.281	-	0.002
Control variables	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	-	1840	1837	1814	1810	1583	1581	1549	1549	1545	1545	1378	1378
R-squared	-	0.088	0.087	-	-	-	-	0.257	0.259	-	-	-	-
Year fixed effects	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LM test *p*-value	-	-	-	0.251	0.162	-	-	-	-	0.132	0.399	-	-
AR2	-	-	-	-	-	0.309	0.361	-	-	-	-	0.417	0.425
Sargan test *p*-value	-	-	-	-	-	0.147	0.236	-	-	-	-	0.999	0.999
Assets diversification													
L. Funding costs	Coeff	-	-	-	-	0.606***	0.521***	-	-	-	-	0.597***	0.578***
	SE	-	-	-	-	0.028	0.029	-	-	-	-	0.005	0.009
ADIV	Coeff	–0.026***	-	0.526	-	–0.011***	-	–0.029***	-	–0.167*	-	–0.004**	-
	SE	0.006	-	0.363	-	0.004	-	0.006	-	0.089	-	0.002	-
AADIV	Coeff		–0.010		–0.460**		–0.024**		–0.048***		–0.178		–0.025***
	SE	-	0.016	-	0.184	-	0.011	-	0.014	-	0.334	-	0.003
Control variables	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	-	1675	1475	1642	1441	1446	1269	1464	1434	1459	1430	1303	1281
R-squared	-	0.091	0.142	-	-	-	-	0.269	0.271	-	-	-	-
Year fixed effects	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LM test *p*-value	-	-	-	0.2546	0.0007	-	-	-	-	0.011	0.304	-	-
AR2	-	-	-	-	-	0.8638	0.1232	-	-	-	-	0.3855	0.4456
Sargan test *p*-value	-	-	-	-	-	0.3275	0.1232	-	-	-	-	0.9988	0.999

Note: This table reports the regression results of the relationship between diversification and banks' funding costs for small and large banks subsamples using the fixed effects model, 2SLS and two-step system GMM. The coefficients of the control variables, which include equity, bank size, ROA, policy rate, inflation, GDP growth and crisis variables, and constants have been removed to save on space. The variables are defined in Table 1. Please see the full reference list of the article for more information: https://doi.org/10.4102/sajems.v28i1.5809.

ROA, return on assets; AADIV, adjusted asset diversification; ADIV, asset diversification; ARDIV, adjusted revenue diversification; RDIV, revenue diversification; GDP, gross domestic product; LM, Lagrange multiplier; AR(2), Arellano-bond test; 2SLS, two-stage least squares; GMM, generalised method of moments; FE, fixed effects model; Coeff, coefficient; SE, standard error.

***, ** and * indicate statistical significance at 1%, 5% and 10%, respectively.

These findings support Huynh and Dang (2022), indicating that large banks are more stable, which can significantly lower their funding costs.

Columns (3)–(4) and (9)–(10) show no significant difference in the indirect effect of financial regulation on banks' funding costs for small and large banks contrary to the results shown in Table 4. A possible argument for this outcome is that banks, regardless of size, are subject to a uniform regulatory framework. Thus, regulations may not provide differential funding cost advantages based on diversification (Velasco 2022). Furthermore, large banks possess a significant advantage in managing operating leverage associated with shifts towards non-interest income, attributed to their access to resources as shown by Shabir et al. (2024). Surprisingly, the results in Table 5 indicate no notable difference between asset diversification and banks' funding costs for the two subsamples. This is possibly because of limited investment options in Africa that may make banks, regardless of their size, to invest in similar asset classes, resulting in a minimal difference in the impact of asset diversification on banks' funding costs (Sissy et al. 2017).

The effect of geographical presence

Lastly, Table 7 displays the results of re-estimating equations (5)–(9) for a sub-sample of local and international banks in the context of revenue and asset diversification. The results reveal that a shift towards non-interest income activities has an insignificant effect on funding costs for local banks, but significantly and negatively influences funding costs for international banks, as shown in columns (1)–(2) and (7)–(8), respectively. These findings are in line with Wang (2023), indicating that banks with broader geographical reach gain from economies of scale and enhanced financial access. Regarding the effects of asset diversification on funding costs, the findings from Panels A and B of Table 7 do not exhibit significant differences between the two groups.

Furthermore, the results in columns (3)–(4) and (9)–(10) of Table 7 show a more significant indirect inverse effect of financial regulation on funding costs for international banks compared to local banks, suggesting that the indirect effect of financial regulation on funding costs varies with banks' geographical coverage. This variation is likely because investors perceive international banks as less risky, given their operation under multiple regulatory environments,

TABLE 7: Effects of geographical presence on diversification and banks funding costs relationship.

Variables	Sub-variable	Panel A: Local banks						Panel B: International banks					
		FE		2SLS		GMM		FE		2SLS		GMM	
		1	2	3	4	5	6	7	8	9	10	11	12
Revenue diversification													
L. Funding costs	Coeff	-	-	-	-	0.534***	0.538***	-	-	-	-	0.510***	0.493***
	SE	-	-	-	-	0.019	0.018	-	-	-	-	0.019	0.019
RDIV	Coeff	–0.006	-	0.194	-	0.001	-	–0.024***	-	–0.262**	-	–0.022***	-
	SE	0.007	-	0.355	-	0.002	-	0.006	-	0.117	-	0.005	-
ARDIV	Coeff	-	–0.008	-	0.989	-	–0.003	-	–0.024***	-	–0.264**	-	–0.019***
	SE	-	0.007	-	1.516	-	0.003	-	0.006	-	0.115	-	0.004
Control variables	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	-	1513	1512	1498	1496	1329	1328	1876	1874	1861	1859	1632	1631
R-squared	-	0.207	0.207	-	-	-	-	0.153	0.154	-	-	-	-
Year fixed effects	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LM test *p*-value	-	-	-	0.6641	0.795	-	-	-	-	0.0127	0.0121	-	-
AR2	-	-	-	-	-	0.2597	0.2623	-	-	-	-	0.5702	0.5827
Sargan test *p*-value	-	-	-	-	-	0.9976	0.9962	-	-	-	-	0.999	0.999
Assets diversification													
L. Funding costs	Coeff	-	-	-	-	0.579***	0.550***	-	-	-	-	0.523***	0.468***
	SE	-	-	-	-	0.015	0.013	-	-	-	-	0.021	0.018
ADIV	Coeff	–0.044***	-	0.204*		–0.007***	-	–0.010*	-	–0.192	-	–0.009***	-
	SE	0.007	-	0.114		0.003	-	0.006	-	0.139	-	0.004	-
AADIV	Coeff	-	–0.032**	-	–0.965	-	–0.032***	-	–0.019	-	–0.725**	-	–0.028***
	SE	-	0.016	-	0.620	-	0.004	-	0.014	-	0.319	-	0.008
Control variables	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	-	1395	1315	1376	1294	1230	1163	1744	1594	1725	1577	1519	1387
R-squared	-	0.229	0.246	-	-	-	-	0.148	0.180	-	-	-	-
Year fixed effects	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LM test *p*-value	-	-	-	0.009	0.225	-	-	-	-	0.1076	0.0235	-	-
AR2	-	-	-	-	-	0.350	0.146	-	-	-	-	0.869	0.588
Sargan test *p*-value	-	-	-	-	-	0.999	0.999	-	-	-	-	0.999	0.999

Note: This table shows the regression results between funding costs and HHI of RDIV, ARDIV, ADIV, and AADIV. Equations (1)–(6) in Panel A have been estimated using a subsample of local banks, while equations (7)–(12) in Panel B have been estimated using a subsample of international banks. The coefficients for the control variables and constants have been eliminated to save on space. The variables are defined as per Table 1. Please see the full reference list of the article for more information: https://doi.org/10.4102/sajems.v28i1.5809.

ROA, return on assets; AADIV, adjusted asset diversification; ADIV, asset diversification; ARDIV, adjusted revenue diversification; GDP, gross domestic product; LM, Lagrange multiplier; AR(2), Arellano-bond test; 2SLS, two-stage least squares; GMM, generalised method of moments; FE, fixed effects model; RDIV, revenue diversification; Coeff, coefficient; SE, standard error.

***, ** and * indicate statistical significance at 1%, 5% and 10%.

which can significantly reduce their funding costs (Poshakwale et al. 2020). Furthermore, banks with higher geographical coverage can take advantage of regulatory arbitrage to access cheaper funding sources (Avdjiev, Aysun & Tseng 2022).

Conclusion

This article examines the effect of revenue and asset diversification on banks funding costs and the potential indirect effect of financial regulations using both static and dynamic panel data techniques on 563 commercial banks in 53 African countries from 2007 to 2021. Using alternative revenue and asset diversification measures, the study results show strong evidence that increased diversification reduces banks' overall funding costs in Africa. Importantly, the study finds that the negative effect is more pronounced for large banks. The results also indicate that financial regulation indirectly reduces banks' funding costs via revenue diversification. Notably, this indirect influence is more significant for international banks than local banks.

The findings of this study provide important implications for policymakers, regulators, bankers and investors. Firstly, policymakers should formulate and implement policies that incentivise banks to strategically diversify their revenue streams and asset portfolios. Such strategic diversification can be instrumental in reducing banks' funding costs. Secondly, regulators should consider increasing minimum capital requirements to stimulate diversification in banking, particularly for banks with international presence. This can be implemented gradually or through a tiered approach to minimise disruptions to credit supply. Bank managers, especially those overseeing large and international banks, should proactively explore diversification strategies to optimise their funding structure cost-efficiently. Lastly, investors should target large international banks in Africa, as increased diversification and stringent financial regulations significantly lower their funding costs, potentially enhancing investment returns.

This study provides important avenues for future research. For instance, future studies can explore the effect of other diversification aspects on banks' cost of funds. Moreover, subdividing the sample based on ownership, regions, and financial development can provide more profound insights into the relationship between diversification and banks' funding costs. Lastly, future works can incorporate

interaction terms between diversification and bank-level and macroeconomic variables in the analysis.

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Competing interests

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Authors' contributions

S.K. contributed to the conceptualisation, methodology, formal analysis, investigation, writing of the original draft, and review and editing of the final draft. B.D.S-K. was instrumental in the conceptualisation, methodology, formal analysis, and writing of the original draft. In addition, B.D.S-K. contributed to validation, review, and editing of the final draft, and secured funding for the research.

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Data availability

Data that support the findings of this study are available upon reasonable request from the corresponding author, S.K.

Disclaimer

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