Research Article

Impact of Diversification on Bank Stability: Evidence from Emerging and Developing Countries

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Received 21 March 2022; Revised 12 May 2022; Accepted 16 May 2022; Published 27 May 2022

Academic Editor: Abdellatif Ben Makhlouf

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As a result of the continual debate between portfolio optimization and the assumption of corporate strategy, it is debatable whether diversification enhances stability. This study examines the effect of diversification on bank stability by employing panel data representing 45 African nations between 2000 and 2020. Based on dynamic panel generalized moments techniques, the results support portfolio theory; diversification reduces risk and improves bank stability in emerging and developing economies during crisis and noncrisis periods. Bank diversification and stability have a quadratic association; overdiversification exposes banks to risk. The results also suggest that banks with a high interest margin, liquidity, and an increased cost-to-income ratio tend to become less stable. On the other hand, banks with higher leverage and operating in a country with country-level solid corporate governance are more stable. GDP growth and inflation have a substantial influence on the financial health of banks. This research has significant repercussions for banks, policymakers, and academics aware of the impact of diversification on a bank’s risk and stability in emerging and developing markets.

1. Introduction

Since financial firms play a significant role in the funding of enterprises, the soundness of the financial system is crucial for emerging and developing economies. The banking system was marked by reform measures, sectoral deregulation, competitive dynamics, technical breakthroughs, and management abilities following the worldwide economic crisis. Hence, the traditional banking sector’s elevated competitive factors lead to a decrease in overall interest revenue. The dependence on the interest generated no longer provides consistent profits [1]. Therefore, institutions need to construct a better business technique that blends traditional and nontraditional activities to ensure financial viability.

To respond to legislative regulations and competition, financial institutions throughout all countries have pushed to participate in noninterest sources of income by lowering the total dependence on interest income to safeguard financial stability [1–3]. Income diversification services encompass securities underwritings, insurance, dealer agencies, real estate, checking account maintenance and residence payment networks, equity fund enterprises, and other operations [4]. Such diversity boosts the performance of firms, strengthens financial sector functioning, and minimizes possible business losses. Additionally, an improvement in bank operating performance might result in profit from the cost savings linked to diversification [5].

However, whether a bank might become stable through diversification in the emerging market setting is uncertain and unpredictable. This recognized the foundation for an ongoing disagreement inside theories and scholarships about whether diversification recovers stability or experiences more risk. From the theoretical context, the conglomeration model assumes that conserving a variation of activities improves business performance by economies of scale and scope. In contrast, strategic focus emphasizes that focusing on the imperative activities is more beneficial, whereas diversifying involves agency outlays, high monitoring costs, and regulatory complications [6]. Assuming this background, there is also an ongoing dispute in the literature.

Accordingly, supporters of diversification research revealed that banks could benefit from income diversification
by lowering corporate exposures. According to some investigations, excessive diversity raises adverse selection and volatility of income and consequently does not offer an improved financially safe operation [7–10].

In addition to the literature’s mixed findings, the research evidence on diversification that has been documented so far is generally concentrated on developed countries, with much less thought and debate on developing markets. To the best of the researcher’s knowledge, so little research has been reported on emerging and developing nations (see, among others, [2, 4–6, 11–16] [17]). However, their conclusions are conflicting about the association between banking diversification and stability.

Based on the theories and literature reviewed above, it has been found that there is still an inconsistency between scholars and policymakers regarding the relationship between banking diversification and stability. Hence, diversifying the overall effect on financial health or bankruptcy risk is unclear. Furthermore, the dedication to diversifying one’s businesses and becoming more diversified depends on whether the benefit of diversification assists in covering its expenditures. Therefore, taking into mind the theories and studies mentioned, this research attempts to address the following questions:

Q1. What impact could income diversification have on the financial stability of African banks?
Q2. How would income diversification impact the income instability of African banks?
Q3. Could there be a proportional or nonlinear connection between diversification and the stability of banking organizations?

The research focuses on the African banking sector to assess the impact of bank diversity on risk-stability divergence. The concentration on Africa presents a sound basis for this sort of study. First, although economic development mainly relies on the banking system’s soundness, African economies’ financial firms are less mature, and their banking sectors are organized differently. Second, numerous nations in the area have initiated banking sector transformation, including deregulation, privatization, and expanding participation in noninterest-generating operations [14]. Deregulation and privatization enable the banking institution to participate in noninterest-generating operations. However, whether diversity contributes to their (in)stability is an unresolved subject that this research aims to address. This will help better comprehend the contradictory correlation between bank diversification and (in)stability. Third, despite the desire for diversification among financial experts, banks, regulators, and academia, there is a paucity of literature in Africa [6].

This study contributes to the existing body of literature in the following manners. Most research analyses the influence of diversification by utilizing bank-level data, particularly from developed markets. In contrast, this study examines the effects of income diversification in African economies using continental aggregated longitudinal data. The study assesses the influence of a quadratic linkage across diversification and (in)stability (which is absent in African literature), based on a concept proposed recently in the research by Abuzayed et al. [18] and Kim et al. [9].

The study was conducted on 45 African economies between 2000 and 2020, utilizing a generalized two-step method of moments (GMM) econometric methodology to examine the link between diversification and bank stability. The findings corroborate the conglomerate management hypothesis by demonstrating that income diversification decreases risks and improves bank financial stability. Moreover, institutions with high deposits, sizable liquidity, and low cost-effectiveness will be less stable. Macroeconomic factors also contribute to the stability of banks. This finding contributes to the continuing conversation regarding diversification. It also has important implications for banking firms, policymakers, and academicians.

The rest of this article is organized as follows: Section 2 introduces the pertinent theoretical and empirical evidence, Section 3 describes the materials and empirical method, and Section 4 discusses the results. Finally, Section 5 summarizes the findings and highlights policy recommendations.

2. Literature Review

2.1. Theoretical Issues. Financial stability is still a controversial subject and a significant issue among policymakers. The banking system’s risk and stability affect the financial company’s long-term financial health. The bankruptcy threat is among the hazards that the institution confronts. Trying to diversify is the initial approach banks employ to limit risks, even though there are several alternatives. On a theoretical basis, considerable enhancements in income diversification would contribute to improved operating profit and substantially lower risks. Nonetheless, there is still a divergence of opinion in the research and ideas regarding whether banking diversification is beneficial.

As per portfolio theory, bankers stand to benefit from decreasing risk whenever noninterest sources of income are not perfectly associated with interest income. Noninterest revenue streams, on the other hand, are risky and highly correlated with interest earned, exposing banking markets to more risks [3]. Moreover, operating a broad range of activities may tend to utilize economies of scale [19], and it is less sensitive to profit fluctuation [14]. On the other hand, the strategic focus assumption states that expanding a traditional financial system results in unexpected encounters, earnings volatility, and operating outside the resources and capabilities, all of which contribute to information asymmetries [6, 7].

2.2. Empirical Literature. The connection between diversification and (in)stability has gained empirical investigation in numerous advanced economies, although there is a disparity across results. There are presently four aspects of the scientific proof diversification literature. The first portion confirms the advantageous properties of commercial bank diversification and the possibilities of mitigating risk. To illustrate, Hunjra et al. [3] employ a dataset of 116 selected
banks in ten emerging Asian regions from 2010 to 2018. The finding suggests that diversifying techniques reduce bank risk-taking.

Using banking industry information from South Asian nations, Nguyen et al. [12] showed that firms become more stable if they diversify into noninterest sources of revenue. In a similar context, Alouane et al. [17] indicated that noninterest income streams assist Tunisian banking in enhancing stability by lowering vulnerabilities. Conducted with a sample of 117 selected banks in 16 European countries from 2011 to 2018, the study of López-Penabad et al. [20] demonstrates that banks with more diversified sources of income tend to be more financially stable. In this category, some portions of the studies indicated that noninterest reduces bankers’ risk in the middle- and low-income regions. At the same time, diversification tends to either heighten bank risk or have no association with stability in high-income areas of the world (see, among others, [2, 11, 21]).

The second perspective demonstrates the negative consequence of a bank’s income diversification upon stability. Employing a panel dataset of commercial banks in 34 African nations over 2005–2015, Adesina [4] reveals that diversification has negative repercussions on financial soundness. In their study, Sarpong-Kumankoma et al. [16] and Williams [22] indicate that increasing noninterest revenues boosts systemic and market risk, leading to banks’ instability. Liang et al. [23] also found that the overall amount of income diversity within the economy still has a significant negative impact on banks’ solvency position. These results are confirmed by Stiroh [24], who indicated that a more considerable dependency on noninterest revenue adds to significant risk on U.S. bank holding corporations. Similarly, Ammar and Boughrara [15] found that diversifying appears to alter the remuneration trade-off, owing to the high risk of bankruptcy in MENA countries.

As per the third line of diversification research, income diversification promotes riskiness. In this line of reasoning, Wu et al. [1] demonstrate that more diversification considerably impacts bank stability while also raising bank instability. DeYoung and Roland [7] and Stiroh and Rumble [8] imply that a move to noninterest earning businesses raises profit variability and frustrates performance. Higher liquidity risk and income diversification might make entities less stable [25].

The fourth set of studies revealed diverse impacts and inconsistent findings. By analyzing the link between banking diversification and banking industry stability, Abuzayed et al. [18] concluded that diversification did not increase bank stability. In a comparable pattern during 2007–2016, a recent study conducted by Paltrinieri et al. [26] revealed no relationship between diversification and stability for Islamic or conventional banks. Kim et al. [9] also indicated that moderate bank diversification enhances bank stability, whereas substantial diversification negatively affects OECD member states. In conclusion, contradictory empirical findings have indicated that diversification’s impacts on (in) stability remain inconclusive. With these points in mind, this research aims to investigate the issue from the context of the developing and emerging banking industry scenario.

3. Data and Methodology

This section covers pertinent data used in the research, explanations of the variables, and the methodology used to examine the impact of diversification on bank stability.

3.1. Data. The research utilized aggregated panel data obtained from 45 African nations at a yearly frequency from 2000 to 2020. Data for all bank-level variables used in this research were gathered from financial development and structural databases. Macroeconomic metrics and country-level corporate governance indicators were obtained from the World Development Indicators Dataset (WDI). The study’s initial sample consists of 55 African states. Nonetheless, nations with inadequate or incomplete data to compute the variables are eliminated from the samples. There should be sufficient records for at least seven consecutive years to be eligible for sample selection during the research period. After screening, the overall model contains 705 observations across 45 states, giving an unbalanced panel. The sampled countries are presented in Table 1.

3.2. Variable Description and Expected Sign

3.2.1. Stability Measures. Three (in)stability metrics were used to analyze the influence of income diversification on bank stability based on past investigations (for example, [19, 24]). These are the (i) Z score, (ii) standard deviation of return on assets (σROA), and (iii) standard deviation of return on equity (σROE). The Z score is a metric of a bank’s risk of insolvency (instability). It is characterized as the reversal of insolvency risk, representing the number of standard deviations that profits must drop before a bank becomes insolvent. The Z score was calculated in the following way:

\[ Z = \frac{ROA + E/TA}{\sigma ROA}, \]

where ROA is the return on assets defined as net profit divided by total assets, E/TA is measured as total equity divided by total assets, and σROA is the standard deviation of ROA. A more significant Z score signifies better stability since the risk of a bank’s bankruptcy is lower, and vice versa. Additionally, bank-specific profit-risk measurements were used: standard deviation of return on assets (σROA) and standard deviation of return on equity (σROE).

3.2.2. Diversification Measures. The primary independent factor is the bank income diversification indicator retrieved from the bank’s revenue portfolio following previous researchers [2, 7, 22]. To this end, a percentage of net noninterest income to net operating income was employed to measure income diversification. Subscription fee income, forex transactions, investment returns, and several other noninterest incomes are all instances of noninterest income. Thus, the difference between noninterest incomes and noninterest expenses creates net noninterest income. A
higher value suggests more engrossment in noninterest revenue streams.

The study employs a Herfindahl–Hirschman Index (HHI) to construct each country bank’s loan-based measure of diversification. Following [27], the study classifies the loan scope of the bank into four major sectors: interbank and other financial corporation loans (IBFCL), loans to the customer (CL), loans to nonfinancial and domestic industries (NFDIL), and loans to the government and public companies (GPL). Loan HHI is calculated by the sum of the squared loan portfolio shares across four types of loans:

\[
HHI = 1 - \frac{(IBFCL)^2}{TL} + \frac{(CL)^2}{TL} + \frac{(NFDIL)^2}{TL} + \frac{(GPL)^2}{TL},
\]

where \(TL\) stands for loan balances and is equivalent to the total of IBFCL, CL, NFDIL, and GPL values. The level of loan diversity ranges from 0 to 1. More significant numbers suggest a greater variety of earning assets in a different line of credit operations. As a result, a positive relationship between diversification and banking system stability and a negative correlation with risk are expected.

### 3.2.3. Control Variables

Based on the previous literature review, various control variables were devised to account for multiple aspects affecting a bank’s stability. Table 2 presents the list of variables with an accompanying description.

#### (1) Corporate Governance

Sound corporate governance standards are generally critical for reducing shareholder risk, attracting investments, and boosting the company’s overall performance. The issue of “good governance” involves creating frameworks that encourage managers to consider the well-being of interested parties, workers, societies, vendors, and clients [28]. Following previous literature studies by Boța-Avrám et al. [29], Abuzayed et al. [18], and Al Maqatari et al. [30], the study utilizes country-level corporate governance parameters produced by the World Bank and widely utilized in the research literature to assess corporate management. Effective country-level governance promotes appropriate institutional arrangements, credibility, market accessibility, public accountability policies, and legal integrity, which all contribute to a healthy market condition, improved financial productivity, and commercial visibility [31].

According to the substitution assumption, weak firm-level corporate governance (FLCG) procedures are substituted by effective country-level corporate governance (CLCG) measures applied uniformly to all corporations in society. As a result, for the FLCG to be successful, the business must establish better shareholder protection than the CLCG [32]. Klapper and Love [33] also argue that corporations originating from countries with poor legal systems experience weaker firm-level governance practices and attain stronger firm-level governance whenever they register in regions with stricter legal systems. As a result, country-level corporate governance (CLCG) is of significant concern to politicians, legislators, academics, and shareholders [30].

The study mainly utilizes the average of the six WGI factors following the work of [18] to measure the impacts of corporate governance. Control of corruption, government effectiveness, political stability and absence of violence/terrorism, regulatory quality, voice and accountability, and the rule of law are all World Governance Indices (WGI) elements. Regarding the impact of country-level corporate

| Table 1: Sampled countries with their average IDV, NIM, and ROA. |
|-----------------|-----------------|-----------------|
| Country         | Mean of IDV     | Mean of NIM     | Mean of ROA     |
| Algeria         | 0.258335        | 0.032812        | 0.009022        |
| Angola          | 0.506414        | 0.145925        | 0.019593        |
| BENIN           | 0.439087        | 0.037022        | 0.008119        |
| Botswana        | 0.341577        | 0.056173        | 0.027898        |
| Burkina Faso    | 0.477289        | 0.042858        | 0.012928        |
| Burundi         | 0.333534        | 0.086208        | 0.025255        |
| Cameroon        | 0.446939        | 0.048705        | 0.012171        |
| Central African Republic | 0.238344 | 0.137557 | 0.009108 |
| Chad            | 0.359742        | 0.077775        | 0.014087        |
| Congo, Dem. rep. | 0.559453      | 0.094292        | 0.008304        |
| Cote d’Ivoire   | 0.513702        | 0.043966        | 0.012865        |
| Djibouti        | 0.296523        | 0.039014        | 0.012218        |
| Egypt, Arab Rep. | 0.381415      | 0.026105        | 0.009863        |
| Equatorial Guinea | 0.448999     | 0.0273          | 0.012231        |
| Ethiopia        | 0.456961        | 0.045279        | 0.025969        |
| Gabon           | 0.432674        | 0.061471        | 0.015639        |
| The Gambia      | 0.452366        | 0.08972         | 0.031549        |
| Ghana           | 0.343201        | 0.11314         | 0.036873        |
| Guinea          | 0.527185        | 0.088862        | 0.024875        |
| Kenya           | 0.358636        | 0.078988        | 0.026903        |
| Lesotho         | 0.401903        | 0.090342        | 0.027827        |
| Liberia         | 0.488689        | 0.015466        | 0.005407        |
| Libya           | 0.494327        | 0.075696        | 0.003568        |
| Madagascar      | 0.347752        | 0.127554        | 0.028389        |
| Malawi          | 0.367153        | 0.050403        | 0.042038        |
| Mali            | 0.433688        | 0.049596        | 0.011595        |
| Mauritania      | 0.541244        | 0.03103         | 0.011352        |
| Mauritius       | 0.434397        | 0.035465        | 0.018623        |
| Morocco         | 0.282841        | 0.076388        | 0.009874        |
| Mozambique      | 0.413518        | 0.066271        | 0.013444        |
| Namibia         | 0.307576        | 0.056289        | 0.032603        |
| Niger           | 0.436832        | 0.077041        | 0.01358         |
| Nigeria         | 0.390667        | 0.100172        | 0.03194         |
| Rwanda          | 0.343401        | 0.052381        | 0.023524        |
| Senegal         | 0.385161        | 0.046265        | 0.015321        |
| Seychelles      | 0.315204        | 0.117188        | 0.019849        |
| Sierra Leone    | 0.450087        | 0.036899        | 0.034395        |
| South Africa    | 0.435106        | 0.058981        | 0.011088        |
| Sudan           | 0.543881        | 0.076453        | 0.008606        |
| Tanzania        | 0.340522        | 0.040039        | 0.021598        |
| Togo            | 0.593936        | 0.029274        | 0.014734        |
| Tunisia         | 0.355928        | 0.106324        | 0.006225        |
| Uganda          | 0.259338        | 0.087501        | 0.032223        |
| Zambia          | 0.419695        | 0.087501        | 0.014048        |
| Zimbabwe        | 0.419096        | 0.224967        | 0.029484        |

Source: author estimates (2022).
The fraction of loans to total deposits (Liquidity) is undetermined. Hence, the impact of this relationship is ambiguous.

(2) Liquidity (LIQ). The fraction of loans to total deposits could be used as a measure to examine the impact of liquidity on bank (in)stability. A bank holding merely a significant share of loans inside deposit balances might not have sufficient resources to fulfill unpredicted financial commitments and may be subject to the possibility of loan defaults. On the other hand, the lesser the proportions appear, the more liquidity the bank’s positions have, and the bank may not be earning as much as it might be subject to danger. Hence, the impact of this relationship is ambiguous.

(3) Cost-to-Income Ratio (CIR). The cost-to-income ratio can be used as a control variable to analyze the influence of operational efficiency on a bank’s (in)stability. It is determined by dividing a bank’s operating expenses by interest income and other operating profits. A relatively low-cost composition implies better efficiency due to boosted administration [23]. According to the “bad management assumption,” inefficient organizations could fail to prevent operational costs or oversee creditors, resulting in heightened risk. As per the “skimping costs concept,” corporations lowered operating expenditures by reducing supervision activities to attract short-term operational efficiencies, resulting in worsened credit line quality and increased risk. Therefore, the cost-to-income ratio has a significant negative relationship with stability and a positive relationship with risks.

(4) Leverage. The deposit-to-assets ratio was used to examine the impact of leverage on (in)stability. Deposits are a low-cost basis of capital that boosts a bank’s revenues when these funds are transferred at a more significant interest rate. Likewise, institutions could become adversely affected when they do not transfer such funds into income-generating businesses. The higher the deposits, the better interests should be offered to the customer, and hence financial revenues might drop. This also extends to instability [13]. Therefore, leverage is projected to positively affect banking (in)stability.

(5) Net Interest Margin. Interest income to gross earning assets (net interest margin) was included to evaluate the financial performance of traditional yields. Profitable firms could expand their resources to maintain their profits, making them stable above enterprises that are not profitable. On the other hand, profitable entities have a higher tendency to take a risk in business operations, which raises the probability of a failure. As a result, the effect on stability and risk proxies is undetermined.

(6) GDP. The gross domestic product was included to assess the effect of macroeconomic factors. Stability might be considerably stimulated by improving economic circumstances. Consequently, a positive effect on stability and a negative impact on the risk indicator were predicted.

(7) Inflation. Inflation was added, and an annual consumer price index determined it. Financial organizations may apply more lending rates during inflationary periods to improve total income, which leads to enhanced profit and financial
health. However, if bankers are unwilling to modify their lending rates, the costs will surpass their anticipated revenues, resulting in greater risk and reduced stability. This is because higher inflation lowers the borrower’s capacity to repay. Consequently, it is fair to assume a positive link between banking sector risk indices and hyperinflation.

(8) Crisis Dummy. The crisis dummy is used to reflect the implications of the international financial crisis. This parameter has one for 2008 and 2009; otherwise, it has a zero value.

3.3. Empirical Model Specification. Diagnostics are undertaken prior to picking the model when one or more independent variables become causative. The Breusch and Pagan/Cook–Weisberg tests and the Wooldridge tests are applied to examine the hypothesis of homoscedasticity and serial correlation hypotheses, respectively. As shown in Table 3, the low probability value implies strong heteroscedasticity and serial correlation, suggesting that the dynamic panel approach is suitable for treating such issues. The ordinary least square corresponding coefficient will also be biased and inaccurate because it will not control for heterogeneity across banking systems or times. In addition, an evaluation of population parameters utilizing a fixed-effect model or a random effect could not give consistent and reasonably high precision [38]. Hence, the generalized methods of moment estimates (GMM) suggested by Arellano and Bover [39] were applied in this study. This is because the GMM estimate considers endogeneity and the persistence of the outcome variables, allowing the employment of additional instruments and leading to reliable, consistent, and efficient estimations [38].

GMM is pertinent for datasets with few periods but several cross-sections, measurement errors, lagged dependent variables as predictors, parameter omission, endogenous outcome variables, heteroskedasticity, and serial correlation inside participants [40]. Furthermore, it controls for the endogeneity biases generated by causality moving from (in) stability to the diversification of banks and perhaps other covariates. For instance, financial stability or volatility might be dynamic. A bank that has shown instability and considerable risk earlier tends to be more sensitive to having financial difficulties in the future [41]. Thus, the use of the dynamic panel model for this investigation is reasonable, and it is defined as follows:

\[ Y_{i,t} = \alpha + \beta Y_{i,t-1} + \beta X_{i,t} + \beta X_{i,t} \times \text{Crisis Dummy} + \text{DV} \times \text{CRD} + \text{ai} + \text{Ui},t, \tag{3} \]

where \( Y_{i,t} \) represents a dependent parameter that indicates the insolvency risk (instability), metrics (Z score), or profitability variability (SDROA/SDROE) of the banking institution in country \( i \) at time \( t \), \( \alpha \) is the constant-term, \( Y_{i,t-1} \) is the one-period lag value of the dependent variable, \( DV_{i,t} \) is the loan or income diversification of banks in a nation \( I \) at period \( t \), \( Xi_{i,t} \) is an explanatory variable vector consisting of bank-specific factors as well as certain macroeconomic factors for banks in a state \( i \) at time \( t \). Crisis dummies is a dummy variable incorporated to cope with the financial crisis, while \( DV \times \text{CRD} \) represents the interaction of diversification and crisis, \( ai \) represents the unobserved bank-specific effects, and \( Ui,t \) is the error term.

One-period lag values of the dependent variables are incorporated as a covariate in the dynamic panel framework (2). This makes it more efficient and convenient than several other estimation methods. Within GMM, there are two parameter estimations: difference GMM and system GMM. Systemic GMM is superior to differential GMM because it uses numerous instruments and yields better outcomes. In contrast, lagged covariate values remained insufficient tools for the differential GMM equations, which might suffer from limited sampling bias [42]. The two-step system method of

| Variable | Obs | Mean | Std. dev. | Min | Max | Unit-root test using ADF At level \( p \) value | VIF | 1/VIF |
|----------|-----|------|-----------|-----|-----|---------------------------------------------|-----|-------|
| Z score  | 945 | 0.136| 0.087     | 0   | 0.566| –4.29 0.00                                  |     |       |
| SDROA    | 945 | 1.10 | 1.06      | –5.23| 5.92 | –12.62 0.00                                 |     |       |
| SDROE    | 945 | 1.30 | 1.053     | –2.47| 6.406| –9.79  0.00                                 |     |       |
| HDY      | 943 | 0.407| 0.167     | 0.00 | 0.969| –4.92  0.00                                 |     |       |
| HHI loan | 678 | 0.302| 0.276     | 0.04 | 1    | –4.99  0.00                                 |     |       |
| CLCG     | 945 | 29.52| 18.74     | 1    | 77.39| –18.57 0.00                                 |     |       |
| NIM      | 894 | 0.070| 0.071     | 0.00 | 1.142| –11.82 0.00                                 |     |       |
| CIR      | 901 | 0.581| 0.165     | 0.089| 2.020| –6.08  0.00                                 |     |       |
| LEV      | 897 | 0.777| 0.208     | 0.009| 1    | –5.06  0.00                                 |     |       |
| LIQ      | 859 | 0.440| 0.295     | 0.030| 2.760| –4.61  0.00                                 |     |       |
| INF      | 897 | 0.374| 8.159     | –0.097| 244.11| –14.97 0.00                                 |     |       |
| GDP      | 938 | 0.041| 0.0721    | –0.620| 1.23 | –13.13 0.00                                 |     |       |

Wald test for groupwise heteroskedasticity chi2 (45) = 13319 Prob > chi2 = 0.0000

Wooldridge test for autocorrelation in panel data F(1, 44) = 12.170 Prob > F = 0.0000

Source: author estimates (2022).
moments is implemented because it is more reliable than the one-step estimate and eliminates "too numerous instrumentations" by limiting lags [40].

Following the studies of Sany and Wolfe [11] and Abuzayed et al. [18], the Kim et al. [9] quadratic term of income diversification (the squared value of income diversification) was added. It is used to account for the likelihood of a nonlinear link between diversification and stability. This would be based on the assumption that an appropriate amount of diversification might be significantly favorable for institutional stability. Finally, the two-step system dynamic panel model estimate may be characterized as follows: Arellano and Bover [39] and Blundell and Bond [42].

\[
Z_{scoreit} = \beta_0 + \beta_1 Z_{scorei,t-1} + \beta_2 \ DV_{i,t} + \beta_3 L I Q i, t + \beta_4 C R D i, t + \beta_5 L E V i, t + \beta_6 N I M i, t +
\]
\[
\beta_7 G \ DV_{i,t} + \beta_8 I N F i, t + \beta_9 C R D i, t + \beta_10 \ DV \ast CR D i, t + \beta_11 \ DV \ast S Q i, t + \beta_12 \ DV \ast S Q x C R D i, t +
\]
\[
\beta_13 C L G C i, t + \beta_14 \ DV \ast C L G C i, t + a_i + U_{it},
\]
\[
S D R \ O A_t = \frac{\beta_0 + \beta_1 S D R \ O A_{i,t-1} + \beta_2 \ DV_{i,t} + \beta_3 L I Q i, t + \beta_4 C R D i, t +}
\]
\[
\beta_5 L E V i, t + \beta_6 N I M i, t + \beta_7 G \ DV_{i,t} + \beta_8 I N F i, t + \beta_9 C R D i, t + \beta_10 \ DV \ast CR D i, t + \beta_11 \ DV \ast S Q i, t +
\]
\[
\beta_12 \ DV \ast S Q x C R D i, t + \beta_13 C L G C i, t + \beta_14 \ DV \ast C L G C i, t + a_i + U_{it},
\]

where Z score states the inverse measure of overall bank risk (stability) at banks in country \(i\) at period \(t\), whereas SDROA/SDROE relates to profit risk metrics, the standards of Z score \(i, t - 1\), and SDROA/SDROEi,t – 1 are one-year lag measurements of bank insolvency and profit risk. \(DV_{i,t}\) denotes banks income diversification metrics of banks in country \(i\) at period \(t\), \(L I Q i, t\) symbolizes the liquidity of banking in country \(i\) at time \(t\), \(C R D i, t\) is the interaction of income/loan diversification and the recent global financial crisis, DVSQ refers to the quadratic terms of banks' income loan diversification in country \(i\) at time \(t\), \(DV \ast CRD i, t\) is the interaction of income/loan diversification and the financial crisis in country \(i\) at time \(t\), \(CLGC i, t\) denotes the interaction term between diversification and metrics of corporate governance for country \(i\) at time \(t\), \(ai\) is the unobserved bank-specific effect, \(Uit\) is the random term, \(ai\) and \(Uit\) are scattered independently and uniformly.

Two diagnostics are provided for system dynamic panel data methodologies. The Arellano–Bond autocorrelation (AR) test assessed whether a second-order correlation exists. To validate the trustworthiness of the calculated model, the result for AR (2) must not reject the null hypothesis. The second qualification test, the Hansen and Sargan test, is sometimes referred to as the test for overidentifying restrictions. The null hypothesis assumes that all of the instruments are exogenous. As a result, a more significant observed value determination coefficient supports the null hypothesis [43].

4. Empirical Results

4.1. Panel Unit Root. While applying an unbalanced cross-country dataset in the multivariate regression, it is crucial to evaluate the data’s univariate attributes. Otherwise, non-stationarity would result in inaccurate inference. Therefore, the Fisher-type (augmented Dickey–Fuller) unit-root test was employed to explore whether the variables remained stationary. Such approaches are more appropriate for unbalanced panel data and to yield credible results. Hence, all covariates are integrated of order zero, \(I(0)\) at a 1 percent significance level, as indicated in Table 3. The results show that the evaluated sets do not have a unit root.

4.2. Descriptive Statistics. Table 3 shows summary statistics for the study's main factors. The (in)stability proxy Z score of banks in developing markets has an average of 1.36 with a standard deviation of 0.087 for the period studied. Z scores have maximum and minimum values of 0.56 and 0.0, respectively. The standard deviation implies a significant difference in the systemic risk of the banking system between countries. The average profit-risk measures for SDROA and SDROE are 1.18 and 1.3, respectively. The average income diversification of banking organizations throughout the chosen sample banking markets is 0.407, meaning that earnings from noninterest-based activities contribute to about half of the profits. This indicates that African banks have been engaged in diversifying their income streams. However, the average interest income is just 0.07, demonstrating that bankers continuing to run primarily on interest-based businesses
generate far less than diversifying. In African banks, loan-based diversification accounts for 30% of revenue source activity, smaller than a noninterest stream of income (40 percent). According to the World Bank's score ranking, the levels of country-level corporate governance range from 1 to 100. For the respective nations, the parameters have values ranging from 1 to 77. The fact that the average score for this parameter (nearly 30%) is lower than the typical median “50” suggests that the total degree of the country-level corporate governance in the selected countries is poor. In addition, African banking institutions’ leverage (deposit-to-assets ratio) accounts for 77 percent of their funding source. This shows that African banks seem to be highly leveraged and rely heavily on deposits for funding. As a result, they might be more vulnerable to insolvency than their less indebted counterparts.

The operational efficiency (cost-to-income) spans between 8.9 percent and 202 percent, with a mean value of 58 percent. According to the descriptive statistics, the average bank has a liquid asset of approximately 44 percent of the overall assets, indicating that African developing and emerging countries have sufficient resources to support their short-term financial requirements. Inflation is 0.37 percentage points higher than the total GDP average of 0.041. This tends to imply that the pace of inflation is higher than the percentage of economic progress. The negative coefficient of minimal inflation indicates that the economy is undergoing deflation, which increases consumer spending power. The lowest GDP figure, −0.62076, indicates an economic recession in the selected nations.

4.3. Regression Results. The baseline panel estimates employing a two-step system method of moments are reported in Table 4. The Hansen test shows insignificant p values, implying that the instruments utilized are collectively reliable; hence, the model does not suffer from overidentification. Likewise, the AR (2) coefficient is statistically insignificant in all models, suggesting no second-order serial correlation. The one-period lagged dependent variable parameter is statistically significant across all empirical models, thus lending credibility that the dynamic panel model is acceptable and that the bank’s stability is persistent in Africa. Furthermore, it demonstrates that the (in)stability in the preceding year directly influences the (in)stability level in the next year. These results corroborate previous studies showing autoregressive patterns in bank stability and volatility (see, among others, [11, 14, 41]).

Table 4 (columns 1, 2) reveals that the income diversification coefficient is significantly positive for stability and negative across profit-risk indicators. This shows that growing income diversity made a significant benefit to the soundness of banks by restraining unfavorable financial difficulties in emerging and developing African economies. The study further supports the hypothesis of economies of scale, scope, and portfolio theory, wherein banks could strengthen their stability and minimize profit volatility by a statistically substantial margin. The bank’s effective management characteristics, operating excellence, or the removal of superfluous tasks may assist with such advantages [14].

Loan-based diversification is also substantially and positively linked with bank stability as defined by the z score (column 4), suggesting that lending diversity efficiently mitigates bankruptcy risk. Thus, bankers could reduce the incidence of their volatility more effectively than institutions that specialize in lending [27]. Moreover, loan diversification has more significant correlation coefficients on the z score than income diversification. This demonstrates how loan diversification benefits emerging and developing nations more. However, income diversity lowers profit volatility (column 2), while loan diversification raises instability risk (column 5). This could be because financial institutions with more diverse loan portfolios may encounter lower risk monitoring in specific industries, increasing the probability of default in the corporation’s entire loan portfolios.

Furthermore, there may be a paucity of high-yielding noninterest-bearing assets; hence, bankers could seek revenue diversification to increase stability and lower volatility. Accordingly, the banking industry is establishing a plausible profit prototype, moving away from lending activities toward noninterest-based businesses. The finding follows those of Alouane et al. [17], López-Penabad et al. [20], and Wang and Lin [21]. However, it is still not coherent with several earlier studies, such as DeYoung and Roland [7], Sanya and Wolfe [11], and Saif-Alyousfi et al. [43], who found that diversification raises the risk by lowering stability.

Concerning the nonlinear association between stability and diversification, IDV-squared and HHI loan square estimates indicate an inverted and considerable association with bank stability. The results demonstrate that a bank’s financial stability increases up to an ideal degree of diversification but decreases as diversification crosses the optimum condition. Banks that aggressively operate in noninterest-bearing activities and highly diversified assets eventually lose the particular emphasis on their core business and decrease productivity.

Beyond this, the dummy variable global financial crisis (GFC) reveals a significant positive connection with bank risk and a significant negative link with stability. The estimated value of the interaction between IDV, HHI loan, and the global financial crisis is negative for volatility metrics. Hence, diversification helps African banks lower volatility and enhance bank stability during the crisis period. This aligns with the initial assumption that higher income variety decreases bank volatility and increases stability. The results align with Kim et al. [9] and Wang and Lin [21].

The World Governance Indicators (WGI) coefficient of country-level corporate governance reveals that corporate governance is positively and significantly related to a bank’s stability. According to the findings, institutions functioning in nations with high country-level corporate governance seem to be more financially stable than those running in countries with poor legal systems and lower levels of corporate governance. Furthermore, the interaction effects of diversity and country-level corporate governance reveal both negative and substantial effects on financial stability. As a result, banks that diversify in countries with low corporate
governance are likely to become less financially secure. This provides evidence that good country-level governance leads to sound economic improvement and increased transparency in the financial system.

This result is consistent with the empirical evidence (e.g., [36, 37]), which found that country-level corporate governance has a positive influence.

The liquidity variable reveals a significant adverse effect on the banking stability metrics’ z score (columns 1 and 4), implying that highly liquid banking firms tend to become more risk-taking. This justified surge in liquid funds gives banks an investment opportunity with possible risk, which offsets the good impact on stabilization. Moreover, holding an excessively high quantity of liquidity may tempt financial institutions to issue a significant loan balance, undermining their profit stability and soundness.

As a result, highly liquid banks are motivated to seek riskier alternatives that impair their performance and

| Table 4: Regression results for the impact of diversification on bank stability and risk. |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Variables                      | (1) Z score     | (2) &ROA        | (3) &ROE        | (4) Z score     | (5) &ROA        | (6) &ROE        |
|--------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| &Dependent                     | 0.460***        | 0.381***        | 0.565***        | 0.571***        | 0.0829***       | 0.438***        |
|                               | (0.0263)        | (0.0238)        | (0.0223)        | (0.0393)        | (0.0307)        | (0.0293)        |
| IDV                            | 0.0567**        | -1.519***       | 0.149           |                 |                 |                 |
|                               | (0.0263)        | (0.382)         | (0.440)         |                 |                 |                 |
| IDVSQ                          | -0.0669***      | 3.300***        | 1.809***        |                 |                 |                 |
|                               | (0.0249)        | (0.691)         | (0.417)         |                 |                 |                 |
| HHI loan                       | 0.165***        | 1.344***        | 0.219           |                 |                 |                 |
|                               | (0.0449)        | (0.487)         | (0.501)         |                 |                 |                 |
| HHI loan SQ                    |                 |                 |                 | -0.00783        | -1.005***       | -0.223          |
|                               |                 |                 |                 | (0.209)         | (0.315)         | (0.248)         |
| LIQ                            | -0.0154***      | -0.0684         | -0.0888         | -0.0160***      | -0.0753         | -0.166          |
|                               | (0.00522)       | (0.0969)        | (0.0542)        | (0.00367)       | (0.0759)        | (0.105)         |
| LEV                            | 0.0103          | 0.232           | 0.0480          | 0.0243***       | -0.219          | -0.128          |
|                               | (0.00787)       | (0.165)         | (0.0882)        | (0.00835)       | (0.165)         | (0.129)         |
| CIR                            | -0.0262**       | -0.930***       | -1.559***       | -0.0277***      | -2.105***       | -1.466**        |
|                               | (0.0113)        | (0.176)         | (0.272)         | (0.00887)       | (0.220)         | (0.227)         |
| NIM                            | -0.0921***      | 3.629***        | 3.324***        | -0.0331*        | 2.117***        | 1.999***        |
|                               | (0.0251)        | (0.635)         | (0.723)         | (0.0200)        | (0.368)         | (0.690)         |
| INF                            | 0.00987         | 0.116           | -0.0930         | 0.07105         | 2.912***        | 1.405***        |
|                               | (0.0103)        | (0.182)         | (0.165)         | (0.0153)        | (0.203)         | (0.288)         |
| GDP                            | -0.0474***      | 1.129***        | 0.232**         | 0.0244***       | 0.505           | 0.250           |
|                               | (0.00716)       | (0.354)         | (0.0962)        | (0.0122)        | (0.436)         | (0.215)         |
| CRD                            | -1.089          | -39.33***       | 66.66***        | -0.116**        | 15.80***        | 10.03***        |
|                               | (0.702)         | (11.61)         | (20.50)         | (0.0460)        | (1.996)         | (4.308)         |
| IDV & CRD                      | 5.630           | 219.3***        | 324.7***        |                 |                 |                 |
|                               | (3.511)         | (57.05)         | (99.68)         |                 |                 |                 |
| IDVSQ & CRD                    | -7.065*         | -295.0***       | 377.9***        |                 |                 |                 |
|                               | (4.146)         | (66.33)         | (116.6)         |                 |                 |                 |
| CLCG                           | 0.00105***      | 0.000981        | 0.00873*        | 0.000468***     | 0.00441         | -0.00108        |
|                               | (0.000307)      | (0.00542)       | (0.00451)       | (0.000163)      | (0.00286)       | (0.00275)       |
| IDV & CLCG                     | -0.00226***     | 0.00307         | 0.0105          |                 |                 |                 |
|                               | (0.000807)      | (0.0128)        | (0.0114)        |                 |                 |                 |
| HHI loan & CRD                 | 0.409           |                 |                 | -142.2***       | -64.91**        |
|                               | (0.254)         |                 |                 | (18.62)         | (29.46)         |
| HHI loan & CLCG               | -0.00168***     |                 |                 | -0.00727        | 0.00361         |
|                               | (0.000469)      |                 |                 | (0.00955)       | (0.00984)       |
| HHI loan SQ & CRD             | 194.3***        |                 |                 | 67.50*          |                 |
|                               | (24.94)         |                 |                 | (36.84)         |                 |
| Observations                   | 702             | 702             | 702             | 519             | 519             | 519             |
| AR (1) (p valued)              | 0.013           | 0.000           | 0.005           | 0.001           | 0.012           | 0.000           |
| AR (2) (p valued)              | 0.528           | 0.56            | 0.729           | 0.374           | 0.443           | 0.742           |
| Hansen p value                 | 0.150           | 0.58            | 0.127           | 0.509           | 0.219           | 0.153           |
| Number of id                   | 45              | 45              | 45              | 45              | 45              | 45              |

Source: author estimates (2022). Note: The terms *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.
considerably raise vulnerabilities [3, 43]. The study complements the earlier results of López-Penabad et al. [20].

Among the predictors, leveraging (the deposit-to-total-asset ratio) has a considerable positive effect on bank financial health but a small effect on volatility risk. The positive influence signifies that African banks have greater customer deposits (higher leverage), which helps firms utilize a low-cost channel of raising capital and encouraging investment, improving stability [4]. Such a benefit may be acquired by making optimum loan structuring, deposit management, portfolio management, and risk control strategies. It still does, however, have a favorable but minor relationship with earnings volatility. This suggests that the interest spread is increasing as bankers experience higher interest expenses yet receive low-interest revenue. This finding is supported by Ammar and Boughrara [15] and Duho et al. [6].

The operational efficiency metrics (cost-to-income ratio) coefficient becomes significantly negative for the stability (z score) and risk indicators (SDROA/SDROE), demonstrating that a relatively more significant cost-to-income percentage is connected to increased financial instability. Thus, ineffective cost management makes financial organizations costly and less stable. When African banks participate in noninterest-generating enterprises, they become cost-inefficient. Then, better banking efficiency increases financial stability by minimizing return volatility and insolvency, thereby strengthening the financial system's stability. The findings support the “bad management” premise, which holds that inefficient managers are poor at handling operational expenditures and overseeing lending activities. This can result in more bad loans and an increased likelihood of bankruptcy [25]. The findings are consistent with previous research by AlKhouri and Arouri [5] and Saif-Alyousfi et al. [43].

Regarding the influence of banks’ conventional profit, there is a positive and significant correlation between net interest income and bank instability (columns 2, 3, 5, and 6), while it is negatively linked with financial stability (columns 1 and 4). It thus entails that relying on limited income sources would not always be sufficient to guarantee financial strength. As a result, the bank needs to diversify towards firms that provide noninterest revenue. This is because diversification helps banks maximize their potential and survive competitive challenges [15].

The macroeconomic circumstances of GDP growth also impacted banking stability. The GDP growth parameters are negative and substantial for bankruptcy risk, whereas they are positive for profitability risk. The detrimental impacts of GDP growth on bankruptcy risk reveal that economic development works as a safeguard for bank stability and benefits the formation of a stable financial system. While the findings for SDROA and SDROE indicate that institutions are becoming less secure in times of increasing GDP development, the results for SDROA and SDROE are surprising. A similar conclusion was obtained by [25]. Economic development pushes institutions to remove restrictions to expand lending, resulting in additional unpredictability and thus less stability [20]. However, the results appear to contradict Wang and Lin [21] and Saif-Alyousfi et al. [43].

Finally, the effect of inflation on bank profit volatility risk is positive and substantial (columns 5 and 6), implying that rising inflation levels are related to an increased degree of instability throughout the African banking industry. Higher inflation may increase loan defaults by lowering borrowers' repayment capacity, leading to more risk. Moreover, banks attract deposits during periods of high inflation and rising interest rates while curtailing loan volume. Returns are declining as a result of the growing disparity between deposit expenditures and interest revenue, while profit unpredictability and instability are increasing. Consequently, banks' earnings may be impeded when inflation is not projected and preventative steps are not taken. This conclusion is consistent with those of AlKhouri and Arouri [5], Paltrinieri et al. [26], and Saif-Alyousfi et al. [43].

4.4. Robustness Checks. Robustness checks were carried out to confirm the primary results. Diagnostic tests were run initially to demonstrate the validity of the model. The nonexistence of a second-order correlation is verified by the Arellano–Bond AR (2) test. Bank (in)stability persists across time, as indicated by the significant levels of lagged dependent variables. Second, the research applied a different approach to stability measurement. The standard deviation of return on assets and equity is used as an additional instability measure to check the stability of banking institutions. Alternate diversification indicators are included in columns 4, 5, and 6 of Table 4. The basic consistent estimate for income diversification metrics from the baseline GMM findings appears reliable. The results reveal that the loan diversification indices are significant, indicating the presence of loan diversification advantages and corroborating the modern diversification hypothesis. The combined effect of bank diversification, diversification squared, and the financial crisis on bank stability is added to investigate whether revenue diversification and loan portfolio diversity have varying impacts on bank soundness during and without a nonfinancial crisis. The estimated results suggest that bank income and loan diversification are perhaps critical stability factors in developing and emerging market settings.

5. Conclusions and Policy Implications

Although many previous studies have explored the relationship between diversification and financial stability, these results fail to gain consensus. This study aims to address a gap in the literature by examining the influence of income diversity on bank stability using panel data from 45 African nations from 2000 to 2020. The general result supports portfolio theory, in which income diversification is a valuable instrument for strengthening financial stability and risk mitigation in emerging and developing countries. The analysis shows that bank diversification does have a quadratic connection with financial stability, and diversification improves financial stability during crisis and noncrisis times. However, overdiversification beyond the estimated optimal
point exposes banks to instability during crisis and noncrisis periods. The results also suggest that banks that maintain more liquidity, higher profit, and a high cost-to-income ratio become less stable (increasing their risk of volatility). On the other hand, banks with higher leverage and those found in countries with country-level solid corporate governance became stable. In macroeconomic terms, GDP’s implications on bank stability are mixed, while inflation negatively affects stability.

The results provide implications for academic settings, administration, legislative frameworks, and macroeconomics. Banks, in particular, shall take part in expanding noninterest income businesses by emphasizing cost-effective diversification approaches and enhancing management competency to assure high stability. Authorities should also encourage reasonable diversification in emerging and developing economies to limit the banks from being over-diversified. Banks should put their efforts into liquidity management to maximize liquidity benefits. Banks must consider and adjust their loan rates and manage their deposits and liquidity to offset their financing costs against their interest revenue. The regulatory agency shall work to promote favorable economic, institutional quality, and fiscal conditions.

Last, the study could not split noninterest income into various components caused by a lack of datasets. As a result, future researchers could consider the effect of revenue diversification in emerging markets by segregating out noninterest income.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

References

[1] J. Wu, L. Chen, M. Chen, and B. N. Jeon, "Diversification, efficiency and risk of banks: evidence from emerging economies," Emerging Markets Review, vol. 45, Article ID 100720, 2020.
[2] S. U. H. Moudud, "Can BRICS and ASEAN-5 emerging economies benefit from bank diversification?" Journal of Financial Regulation and Compliance, vol. 27, no. 1, pp. 43–69, 2019.
[3] A. I. Hunjra, M. Hanif, R. Mehmood, and L. V. Nguyen, "Diversification, corporate governance, regulation and bank risk-taking," Journal of Financial Reporting & Accounting, vol. 19, no. 1, pp. 92–108, 2020.
[4] K. S. Adesina, "How diversification affects bank performance: the role of human capital," Economic Modelling, vol. 94, pp. 303–319, 2021.
[5] R. AlKhouri and H. Arouri, "The effect of diversification on risk and return in banking sector," International Journal of Managerial Finance, vol. 15, no. 1, pp. 100–128, 2019.
[6] K. C. T. Duho, J. M. Onumah, and R. A. Owodo, "Bank diversification and performance in an emerging market," International Journal of Managerial Finance, vol. 16, no. 1, pp. 120–138, 2019.
[7] R. Deyoung and K. P. Roland, "Product mix and earnings volatility at commercial banks: evidence from a degree of total leverage model," Journal of Financial Intermediation, vol. 10, no. 1, pp. 54–84, 2001.
[8] K. J. Stirol and A. Rumble, "The dark side of diversification: the case of US financial holding companies," Journal of Banking & Finance, vol. 30, no. 8, pp. 2131–2161, 2006.
[9] H. Kim, J. A. Batten, and D. Ryu, "Financial crisis, bank diversification, and financial stability; OECD countries," International Review of Economics & Finance, vol. 65, pp. 94–104, 2020.
[10] S. Liang, F. Moreira, and J. Lee, "Diversification and bank stability," Economics Letters, vol. 193, Article ID 109312, 2020.
[11] S. Sanya and S. Wolfe, "Can banks in emerging economies benefit from revenue diversification?" Journal of Financial Services Research, vol. 40, no. 1–2, pp. 79–101, 2011.
[12] M. Nguyen, M. Skully, and S. Perera, "Market power, revenue diversification and bank stability: evidence from selected South Asian countries," Journal of International Financial Markets, Institutions and Money, vol. 22, no. 4, pp. 897–912, 2012.
[13] M. F. Hsieh, P. F. Chen, C. C. Lee, and S. J. Yang, "How does diversification impact bank stability? The role of globalization, regulations, and governance environments," Asia-Pacific Journal of Financial Studies, vol. 42, no. 5, pp. 813–844, 2013.
[14] A. M. Sissy, M. Amidu, and J. Y. Abor, "The effects of revenue diversification and cross border banking on risk and return of banks in Africa," Research in International Business and Finance, vol. 40, pp. 1–18, 2017.
[15] N. Ammar and A. Boughrara, "The impact of revenue diversification on bank profitability and risk: evidence from MENA banking industry," Macroeconomics and Finance in Emerging Market Economies, vol. 12, no. 1, pp. 36–70, 2019.
[16] E. S. Kumankoma, J. Y. Abor, A. Q. Q. Aboaigye, and M. Amidu, "Economic freedom, competition, and bank stability in Sub-Saharan Africa," International Journal of Productivity and Performance Management, vol. 70, 2020.
[17] N. Alouane, I. Kahloul, and J. Girira, "The trilogy of ownership, income diversification, and performance nexus: empirical evidence from Tunisian banks," Finance Research Letters, vol. 45, Article ID 102180, 2022.
[18] B. Abuzayed, N. Al-fayoumi, and P. Molyneux, "Diversification and bank stability in the GCC," Journal of International Financial Markets, Institutions and Money, vol. 57, pp. 17–43, 2018.
[19] P. Edirisuriya, A. Gunasekarage, and M. Dempsey, "Australian specific bank features and the impact of income diversification on bank performance and risk," Australian Economic Papers, vol. 54, no. 2, pp. 63–87, 2015.
[20] M. C. López-Penabad, A. I. Casal, and J. F. S. Neto, "Competition and financial stability in the European listed banks," Sage Open, vol. 11, no. 3, 2021.
[21] C. Wang and Y. Lin, "Income diversification and bank risk in Asia Pacific," The North American Journal of Economics and Finance, vol. 57, Article ID 101448, 2021.
[22] B. Williams, "The impact of non-interest income on bank risk in Australia," Journal of Banking & Finance, vol. 73, pp. 16–37, 2016.
[23] H. Liang, L.-w. Kuo, K. C. Chan, and S. Chen, "Bank diversification, performance, and corporate governance:
evidence from China,” Asia-Pacific Journal of Accounting & Economics, vol. 27, no. 4, pp. 389–405, 2020.
[24] K. J. Stiroh, “Diversification in banking: is noninterest income the answer?” Journal of Money, Credit, and Banking, vol. 36, no. 5, pp. 853–882, 2004.
[25] T. Phan, S. Anwar, W. R. J. Alexander, and H. T. M. Phan, “Competition, efficiency and stability: an empirical study of East Asian commercial banks,” The North American Journal of Economics and Finance, vol. 50, Article ID 100990, 2019.
[26] A. Paletinieri, A. Dreassi, S. Rossi, and A. Khan, “Risk-adjusted profitability and stability of Islamic and conventional banks: does revenue diversification matter?” Global Finance Journal, vol. 50, Article ID 100517, 2021.
[27] J. Shim, “Loan portfolio diversification, market structure and bank stability,” Journal of Banking & Finance, vol. 104, pp. 103–115, 2019.
[28] M. Ayogu, “Corporate governance in Africa: the record and policies for good corporate governance,” African Development Review, vol. 13, no. 2, pp. 308–330, 2001.
[29] B. Avram, A. Grosanu, P. R. Rachisan, and M. D. Gavriletea, “The bidirectional causality between country-level governance, economic growth and sustainable development: a cross-country data analysis,” Sustainability, vol. 10, no. 2, p. 502, 2018.
[30] N. H. Farhan and A. S. D. Khalid, “Impact of country-level corporate governance on entrepreneurial conditions,” Cogent Business & Management, vol. 7, no. 1, Article ID 1797261, 2020.
[31] C. Avram, A. Grosanu, and P. R. Rachisan, “Does country-level governance influence auditing and financial reporting standards? Evidence from a cross-country analysis,” JSTOR, vol. 108, no. 7, 2015.
[32] O. Cohen, “Firm-level and country-level corporate governance: does one substitute or complement the other?” SSRN Electronic Journal, 2020.
[33] L. F. Klapper and I. Love, “Corporate governance, investor protection, and performance in emerging markets,” Journal of Corporate Finance, vol. 10, no. 5, pp. 703–728, 2004.
[34] K. P. Modugu, J. Dempere, and J. Dempere, “Country-level governance quality and stock market performance of GCC countries,” The Journal of Asian Finance, Economics and Business, vol. 7, no. 8, pp. 185–195, 2020.
[35] O. S. Agyemang, M. O. Effah, S. K. Agyei, and J. G. Gatsi, “Country-level corporate governance and protection of minority shareholders’ rights,” Accounting Research Journal, vol. 32, no. 3, pp. 532–552, 2019.
[36] S. Mutarindwa, D. Schuhfer, and S. Andreas, “The impact of institutions on bank governance and stability: evidence from African countries,” SSRN Electronic Journal, 2018.
[37] S. Ghosh, “Corporate governance reforms and bank performance: evidence from the Middle East and North Africa,” Corporate Governance: The International Journal of Business in Society, vol. 17, no. 5, pp. 822–844, 2017.
[38] F. Eshetu and A. Mehare, “Determinants of Ethiopian agricultural exports: a dynamic panel data analysis,” Review of Market Integration, vol. 12, no. 1–2, pp. 70–94, 2020.
[39] M. Arellano and O. Bover, “Another look at the instrumental variable estimation of error-components models,” Journal of Econometrics, vol. 68, no. 1, pp. 29–51, 1995.
[40] D. Roodman, “How to do xtabond2: an introduction to difference and system GMM in Stata,” STATA Journal: Promoting communications on statistics and Stata, vol. 9, no. 1, pp. 86–136, 2009.
[41] C.-C. Lee, S.-J. Yang, and C.-H. Chang, “Non-interest income, profitability, and risk in banking industry: a cross-country analysis,” The North American Journal of Economics and Finance, vol. 27, pp. 48–67, 2014.
[42] R. Blundell and S. Bond, “Initial conditions and moment restrictions in dynamic panel data models,” Journal of Econometrics, vol. 87, no. 1, pp. 115–143, 1998.
[43] A. R. H. S. Alyousfi, A. Saha, and R. M. Rus, “The impact of bank competition and concentration on bank risk-taking behavior and stability: evidence from GCC countries,” The North American Journal of Economics and Finance, vol. 51, Article ID 100867, 2020.
[44] A. N. Berger, I. Hasan, and M. Zhou, “The effects of focus versus diversification on bank performance: evidence from Chinese banks,” Journal of Banking & Finance, vol. 34, no. 7, pp. 1417–1435, 2010.