



Macro Specific Distress Factors and Financial Sustainability of Deposit Money Banks in Sub-Saharan Africa

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Abstract. This study examines the effect of macro-specific distress factors on the financial sustainability of deposit money banks in Sub-Saharan Africa, using a balanced panel of 50 listed banks across 11 African Continental Free Trade Area (AfCFTA) countries over the period 1986–2020. Financial sustainability is proxy by the Financial Sustainability/Financial Stability Index (FSI) and Bank Soundness (BSO), while the explanatory variables include economic growth, inflation, trade deficit, lending interest rate, foreign exchange rate, and financial openness. Employing descriptive statistics, correlation analysis, panel unit root and cointegration tests, and a 3-Stage Least Squares (3SLS) estimation technique, the study finds strong evidence of a long-run relationship between macroeconomic distress variables and bank sustainability. The results reveal that lending interest rate and foreign exchange rate are the dominant macroeconomic drivers: lending interest rates exert a positive and significant influence on financial sustainability, while foreign exchange rates display mixed effects, improving the sustainability index but significantly weakening bank soundness, reflecting balance-sheet and currency-risk pressures. In contrast, economic growth, inflation, trade deficit, and financial openness do not exert statistically significant direct effects on sustainability outcomes. The study recommends prudent interest rate management, active mitigation of exchange-rate volatility, and strengthened macro prudential and supervisory frameworks to ensure that improvements in sustainability indicators do not mask underlying soundness risks. These findings contribute to the macro-financial stability literature by highlighting the asymmetric channels through which macroeconomic conditions shape bank sustainability in Sub-Saharan Africa.

Keywords: Financial sustainability, Bank soundness, Macroeconomic distress, Interest rate, Exchange rate, Sub-Saharan Africa.

1. Introduction

1.1 Background to the Study

Deposit money banks occupy a central position in modern economies by mobilising savings, allocating credit, and facilitating liquidity within the financial system (Krahnena & Schmidt, 2004). Through their intermediation role, banks significantly influence the achievement of monetary and macroeconomic objectives, including price stability, economic growth, and efficient payment systems. A stable banking sector is therefore essential for effective monetary policy transmission and financial sector confidence. In response to this importance, banking reforms have become a recurring feature in developing and emerging economies, including those in sub-Saharan Africa. These reforms, characterised by financial innovation, deregulation, and increased global integration, have largely aimed at strengthening financial intermediation, enhancing stability, and restoring public confidence in African banking systems (Kent & John, 2008).

Across Africa, regulatory authorities have introduced institutional and prudential frameworks to improve banking sector resilience. In Nigeria, for example, the Central Bank of Nigeria (CBN) Act of 1959 (as amended) empowers the CBN to regulate banking operations in pursuit of macroeconomic stability. Section 9(1) of the Banks and Other Financial Institutions Act (BOFIA) authorises the determination of minimum paid-up share capital requirements for licensed banks (Akani & Lucky, 2015). Similarly, many African apex banks have adopted International Financial Reporting Standards (IFRS) to strengthen transparency, comparability, and market discipline. These reforms were intended to reduce systemic risk, limit unjustified contagion, and prevent bank distress by enhancing disclosure and supervisory effectiveness (Demyanyk & Hasen, 2019).

Despite these efforts, bank distress remains a recurring challenge in sub-Saharan Africa, driven by a complex interaction of internal weaknesses and adverse macroeconomic conditions. While internal factors such as poor asset quality, weak governance, excessive credit growth, and ineffective management undermine bank soundness, macro-specific distress factors such as economic cycles, inflationary pressures, interest rate volatility, and external shocks further exacerbate fragility. Financial distress disrupts banks' ability to intermediate funds efficiently, constraining credit supply and weakening overall economic activity (Betz, Oprica & Salin, 2013; Zamorski & Lee, 2015). Consequently, governments have often resorted to costly bailouts funded by taxpayers to restore banking sector stability and limit the spillover effects of bank failure on the wider economy (Daumont, Gall & Francois, 2004; Betz et al., 2013; Zamorski & Lee, 2015).

Since the mid-1980s, deposit money banks in African economies have supported financial liberalisation, expanded access to credit, and improved service delivery, particularly to small and medium-scale enterprises. However, these gains have increasingly been threatened by rising financial distress. Bank failures in the region have largely been linked to non-performing loans, adverse selection, moral hazard, and weak loan quality, problems that are deeply rooted in information asymmetries prevalent in African financial markets (Zamorski & Lee, 2015). The collapse of banks poses severe consequences not only for shareholders but also for depositors, regulators, and the broader economy, as demonstrated by the 2008 global financial crisis, which led to the failure of major financial institutions worldwide. Given the unique role of banks in transforming liquid deposits into illiquid loans, safeguarding their financial sustainability remains critical (Bariviera et al., 2014). Against this backdrop, this study examines macro-specific distress factors and the financial sustainability of deposit money banks in sub-Saharan Africa, with particular reference to banks operating within the African Continental Free Trade Area (AfCFTA).

Post-crisis reforms in sub-Saharan Africa focused on strengthening financial regulation, consolidating banks, and improving supervisory oversight. These reforms were expected to enhance financial sustainability by addressing credit risk, non-performing loans, and structural inefficiencies (Howlett & Lejano, 2013; Howlett, Mukherjee & Woo, 2015; CBN, 2004; Spratt, 2013). However, despite these measures, empirical evidence suggests that African banking systems remain vulnerable,

inefficient, and susceptible to macroeconomic shocks (Aryeetey & Senbet, 2016). Moreover, existing studies on bank distress and sustainability have produced mixed and often contradictory findings across regions and methodologies (Poghosyan & Cihak, 2009; Sahut & Mili, 2011; Bou-Said & Saucier, 2003; Konstandina, 2006; Goldstein, Kaminsky & Reinhart, 2010; Zhang, Xie & Lu, 2014). These inconsistencies, coupled with limited cross-country evidence for Africa and the neglect of recent periods, highlight a clear research gap. Consequently, there is a compelling need for a robust empirical assessment of macro-specific distress factors and financial sustainability of deposit money banks in sub-Saharan Africa, which this study seeks to address using an advanced econometric framework.

The rest of this paper is organised as follows: the literature review, methodology, findings and discussion, and finally the conclusion and recommendations.

2. Literature Review

2.1 Concept of Financial Sustainability

Financial sustainability within the banking industry is critical to national economic health and is commonly regarded as an indicator of overall financial and macroeconomic stability, extending beyond the traditional intermediation role of banks (Ongore & Kusa, 2013). Sustainability-related financial conditions enable institutions to endure operational and environmental risks, thereby underscoring the importance of effective strategic planning and information management in identifying, processing, and utilising relevant data to achieve enduring financial performance (Schaltegger, 2011). According to Padoa-Schioppa (2003), a financially sustainable financial system possesses the capacity to withstand and absorb shocks that emerge during the transformation of savings into investment, a view further reinforced by Shinasi (2004) and Kadomtsev and Israelyan (2015). In a similar vein, Al-Shawabkeh and Kanungo (2017) posited that the resilience of banking systems can be enhanced through more rigorous credit risk evaluation and sound managerial judgement in decision-making processes.

The evaluation of financial sustainability may be approached from both immediate and extended time horizons. Indicators such as return on assets and return on equity reflect short-term financial outcomes, whereas measures including the financial stability index and bank soundness are employed to assess long-run financial resilience. Consistent with this

perspective, the present study conceptualises financial sustainability as the dependent variable, operationalised using the financial stability index, and bank soundness.

2.1.1 Financial Stability Index (FSI)

The Financial Stability Index (FSI) is a composite measure used to capture the long-term financial sustainability of commercial banks. It is computed based on a profit-to-risk (PR) ratio that evaluates an individual bank's performance relative to the overall banking system.

2.1.2 Bank Soundness (BS)

Free cash balance is calculated by deducting statutory cash reserves lodged with a country's central bank from the total cash and bank balances maintained by deposit money banks. A bank is deemed financially sound when its free cash balance is adequate to satisfy customers' withdrawal demands. Conversely, when free cash balances are insufficient to cover demand deposits, the bank is considered vulnerable to financial distress, which may ultimately lead to failure. In this study, financially sound banks are assigned a value of zero, while failed banks are assigned a value of one. Empirical evidence provided by Zhen (2015), based on an analysis of banks across OECD, NAFTA, Southeast Asian economies, G8, G20 countries, and the European Union, revealed that asset quality, loan ratios, and fixed assets exerted positive and significant effects on bank failure, whereas capital adequacy ratios and net interest income were found to be negative and significant determinants of bank failure.

2.2 Concept of Corporate Distress

Corporate distress is frequently used interchangeably with concepts such as failure, insolvency, default, and bankruptcy, although these terms differ in their precise academic and legal meanings (Altman, 2006). From an economic standpoint, failure refers to a persistent decline in returns on invested capital relative to comparable investments with similar risk profiles. Altman (2006) further explains that business failure may involve firms that cease operations through bankruptcy or assignment, exit the market with losses to creditors, voluntarily withdraw while leaving unpaid obligations, or undergo court-mediated processes such as receivership, reorganization, or negotiated settlements with creditors. Insolvency, though often conflated with distress, formally describes a balance-sheet condition in which total liabilities exceed total assets, resulting in negative net worth, while default arises when a firm violates debt agreements either technically through covenant

breaches or legally by failing to meet interest or principal payments (Altman, 2006). In this study, corporate distress, also referred to as financial distress, denotes an adverse financial condition characterised by liquidity shortfalls and difficulties in meeting obligations fully and on time, and it may be identified through outcomes such as default, bankruptcy, failure, or distressed restructuring depending on research objectives and methodology.

Within the banking sector, corporate distress is typically associated with financial, managerial, and operational weaknesses, including illiquidity, poor earnings, and high levels of non-performing assets, with insolvency representing the most severe outcome where assets fall below liabilities (CBN, 2011; Umoh, 1999). Regulatory authorities define distressed banks as institutions that fail to meet capitalization requirements, operate with weak deposit bases, or suffer from mismanagement (CBN, 1995), while severe distress reflects conditions that prevent banks from meeting obligations to depositors and owners as they fall due (CBN and NDIC, 1995). Empirical evidence links bank distress to unethical practices, inadequate capital, and weak deposit mobilisation, which collectively erode public confidence in financial systems (Khalid, 2017; Olukotun, Olusegun & Kehinde, 2013). Distress usually manifests through declining financial performance followed by inability to meet creditor and depositor obligations, often culminating in bankruptcy (Tan, 2012). Studies identify liquidity, leverage, and size as key proxies influencing bank outcomes (Hill, Perry & Andes, 2012; Bergman, Benmelech & Ricardo, 2012), with determinants broadly classified into bank-specific and macroeconomic factors such as inflation, interest rate, and exchange rate instability (Egbo, 2012; Sanusi, 2010). Weak regulatory frameworks further heighten the risk of bank failure, whereas stronger capital buffers are widely viewed as effective tools for reducing excessive risk-taking and improving short-term liquidity resilience (Palubinskas & Stough, 1999 in Egbo, 2012; Egbo, 2012; Musa, Musa & Abdusallam, 2012).

2.3 Macro Specific Determinants of Corporate Distress among Deposit Money Banks

Macroeconomic conditions play a critical role in shaping the stability, performance, and sustainability of deposit money banks. Variables such as economic growth, inflation, trade balance, interest rates, exchange rate movements, and financial openness influence borrowers' repayment capacity, banks' risk exposure, and overall financial system resilience. Consequently, these macroeconomic indicators are

widely examined in the literature as external drivers of corporate distress and financial sustainability within the banking sector.

2.3.1 Economic Growth

Economic growth is commonly measured by changes in Gross Domestic Product (GDP) or Gross National Product (GNP), with GDP per capita often used as an indicator of economic well-being. Strong economic growth generally reflects a healthy economy and lowers the likelihood of bank distress by improving borrowers' repayment capacity, thereby reducing non-performing loans and insolvency risk. Conversely, economic downturns weaken business activity and household income, increasing credit risk for banks. Empirical evidence on the relationship between growth and bank performance is mixed. While Kosmidou, Pasiouras and Tsanklaganos (2007) report a positive association, Khwarish (2011) documents a negative relationship. Other studies show that economic activity, captured by GDP growth or cyclical movements, positively influences bank profitability (Boubakri et al., 2005; Athanasoglou, Brissimis & Delis, 2006; Dietrich & Wanzenried, 2011; Trujillo-Ponce, 2013; Davydenko, 2010).

2.3.2 Inflation Rate

Inflation represents a sustained increase in general price levels without a corresponding rise in output. Low and stable inflation is widely regarded as supportive of financial system viability, as it enhances monetary certainty and reduces exposure to financial distress. High inflation erodes purchasing power, slows economic growth, and adversely affects bank performance. Empirical findings remain inconclusive: Boyd, Levine and Smith (2001) document a negative association between monetary instability and financial development, while Vong and Chan (2006) find inflation to be positively related to bank performance due to higher interest margins. However, Kosmidou et al. (2007) argue that rising inflation eventually suppresses lending activity, and Abdullah, Pavel and Aryen (2014) report a negative relationship between inflation, GDP, and return on assets.

2.3.3 Trade Deficit

A trade deficit arises when a country's imports exceed its exports and is reflected in the balance of payments. For import-dependent economies such as Nigeria, persistent trade deficits may exert pressure on foreign reserves, exchange rates, and macroeconomic stability. Although empirical evidence directly linking trade deficits to bank distress remains limited, this

study considers trade deficit as a potential macroeconomic indicator of financial distress due to its implications for currency stability, inflation, and external vulnerability.

2.3.4 Lending Interest Rate

Lending interest rates significantly affect banks' deposit mobilisation, credit allocation, and profitability. High lending rates can increase interest margins but may simultaneously suppress credit demand and elevate default risk. Gull and Zaman (2013) find that interest rate fluctuations significantly influence bank profitability in Pakistan. The spread between lending and deposit rates is a key indicator of banking system efficiency and stability; wide spreads discourage savings and borrowing, limit financial intermediation, and constrain economic growth. Such spreads are typically larger in developing economies due to high operating costs, weak competition, regulatory burdens, and macroeconomic instability (Jayaraman & Sharma, 2003).

2.3.5 Exchange Rate

The exchange rate reflects the value of a domestic currency relative to foreign currencies and is determined by trade flows, capital movements, and foreign investment. In many African economies, heavy reliance on imports leads to persistent foreign exchange demand and exchange rate volatility. Fluctuations in exchange rates affect banks through foreign currency exposures, trade financing, and borrowers' repayment capacity, making exchange rate instability a relevant determinant of corporate distress among deposit money banks in Africa.

2.3.6 Financial Openness

Financial openness refers to the extent to which foreign investors can participate in domestic financial markets and the degree of capital flow liberalisation. While financial openness can enhance access to capital, improve risk sharing, and promote reforms, it has also been associated with heightened vulnerability to financial crises (Fratzscher & Bussiere, 2017). Proponents argue that its benefits stem more from institutional discipline and reform incentives than from capital inflows alone (Gourinchas & Jeanne, 2002). Critics contend that market distortions, information asymmetries, and political factors can undermine these benefits (Collier, Hoeffler & Pattillo, 2000; Claessens, Klingebiel & Schmukler, 2006; Oyovwi & Eshenake, 2013; Fasanya & Olayemi, 2020), potentially intensifying distress in weak and inefficient financial systems.

2.4 Theoretical Review

This study is anchored on four complementary theoretical perspectives, namely the Theory of Financial Development and Economic Growth, Trade-off Theory, Entropy Theory, and Gambler's Ruin Theory, which collectively provide a coherent framework for explaining the macroeconomic, structural, and probabilistic dimensions of corporate distress and financial sustainability in deposit money banks.

The Theory of Financial Development and Economic Growth explains the interdependence between financial system efficiency, macroeconomic performance, and institutional stability. Rooted in the seminal work of Schumpeter (1911), the theory posits that a well-functioning financial system promotes economic growth by reallocating resources from less productive to more productive uses, thereby stimulating innovation and productivity. While Robinson (1952) argues for a growth-led finance view, subsequent contributions by Goldsmith (1969), McKinnon (1973), and Shaw (1973) strongly support the finance-led growth hypothesis, emphasizing the stabilizing role of financial development. Later growth models reinforce this position by identifying financial intermediation as central to savings mobilization, capital accumulation, and output expansion (Solow, 1956; Greenwood & Jovanovic, 1990; Bencivenga & Smith, 1991; Levine, 1997; Romer, 1996; Todaro & Smith, 2011). Empirical evidence further confirms that efficient financial systems enhance growth, reduce poverty, and improve financial resilience, thereby lowering the likelihood of bank distress (King & Levine, 1993; Beck, Levine & Loayza, 2000; Honohan, 2004).

The Trade-off Theory provides a structural explanation of corporate distress by linking capital structure decisions to financial sustainability. The theory argues that although debt financing increases firm value through tax advantages, excessive leverage heightens the probability and cost of financial distress, eventually outweighing these benefits. This perspective emerged as a refinement of the Modigliani and Miller framework, which initially ignored distress costs. Under the trade-off framework, firms are assumed to pursue an optimal capital structure that balances tax shields against bankruptcy and distress costs. Once leverage exceeds this optimal level, firm value declines due to rising default risk. In the banking context, the theory is particularly relevant, as high leverage and inadequate capital buffers can amplify vulnerability to macroeconomic shocks, thereby

accelerating distress and threatening financial sustainability.

The Entropy Theory, also referred to as the Balance Sheet Decomposition Measure theory, conceptualizes corporate distress as a breakdown in balance-sheet equilibrium. According to Aziz and Dar (2006), financial distress becomes increasingly likely when firms are unable to maintain stability between assets and liabilities or to restore balance in the near term. The theory emphasizes the diagnostic value of accounting-based indicators and supports the use of Univariate Analysis and Multiple Discriminant Analysis to detect early warning signals of distress (Aziz & Dar, 2006; Natalia, 2007; Monti & Moriano, 2010; Slotemaker, 2008). By focusing on structural imbalances in financial statements, the entropy framework has been widely adopted in empirical distress studies (Aziz & Dar, 2004; Sayari, 2013; Kinyariro, 2016) and is particularly useful for assessing the internal financial fragility of banks operating in volatile macroeconomic environments.

The Gambler's Ruin Theory introduces a probabilistic view of financial distress by modeling firms as economic agents repeatedly exposed to uncertain cash flow outcomes. Originally developed by Feller (1968), the theory assumes that a firm continues operations until its capital or net worth is exhausted, at which point bankruptcy occurs. Applied to corporate finance, the theory suggests that even firms with positive initial capital can face eventual ruin if negative cash flow realizations persist over time (Espen, 1999; Aziz & Dar, 2006). This framework is useful in explaining how persistent macroeconomic shocks, earnings volatility, and liquidity pressures can cumulatively erode bank capital, leading to distress. Although the theory assumes limited access to external financing and independent cash flow trials, its relevance lies in highlighting the cumulative risk exposure faced by banks in unstable economic environments.

2.5 Empirical Literature on Macro Corporate Distress and Financial Sustainability

2.5.1 Economic Growth and Financial Sustainability

Empirical studies examining the relationship between economic growth and financial sustainability generally adopt macroeconomic indicators such as GDP growth to explain variations in bank stability and distress. Uzokwe and Ohaeri (2014), focusing on Nigeria, examined the causes and consequences of bank distress using primary data obtained through

questionnaires administered to staff of five commercial banks in Imo State. Their findings revealed that institutional weaknesses, political uncertainty, ownership interference, and economic downturns were key drivers of bank distress. Similarly, Sahut and Mili (2011) employed bank-level and macroeconomic variables in a predictive model of financial distress and found that economic growth and other macroeconomic indicators were statistically insignificant in explaining distress, suggesting that bank-specific factors may dominate in certain contexts.

In contrast, several cross-country and sector-specific studies document a significant relationship between economic growth and bank performance. Baklouti, Grautier and Affes (2016) reported a negative association between weak economic growth and bank distress, arguing that reduced household and business income during economic slowdowns heightens banks' exposure to credit risk. Kosmidou et al. (2007) found that economic growth positively affects bank performance, whereas Khwarish (2011) reported a negative relationship. Boubakri et al. (2005) and Athanasoglou et al. (2006) documented evidence from Europe and Egypt respectively, showing that GDP growth enhances bank profitability. Pakdaman (2018), using bankruptcy prediction models on firms listed on the Tehran Stock Exchange between 2011 and 2016, further confirmed that financial distress models are effective in identifying survival prospects, reinforcing the relevance of macroeconomic conditions in explaining financial sustainability.

2.5.2 Inflation Rate and Financial Sustainability

Several empirical studies have explored the role of inflation in shaping bank distress and sustainability, with mixed outcomes depending on context and methodology. Mayuku, Madu and Oslow (2012), using Nigerian time-series data from 1986 to 2010 and linear regression techniques, found that inflation and interest rates negatively affected economic performance and contributed significantly to bank distress. Similarly, Zhang et al. (2014), in a study of 354 US bank holding companies, employed distance-to-default models and found inflation to be positively associated with bank distress, highlighting the destabilising effect of macroeconomic volatility.

However, the effect of inflation on bank performance remains inconclusive in the literature. Vong and Chan (2006) reported a positive relationship between inflation and bank profitability due to higher interest margins, while Kosmidou et al. (2007) observed that excessive inflation reduces loan demand and weakens

bank performance. Abdullah et al. (2014) found inflation to be negatively associated with return on assets. Other studies present mixed evidence across regions: Halkos and Salamouris (2004), Limam (1998), and Bikker (1999) documented efficiency losses associated with inflation, while Girardone (2004), Isik and Hassan (2002), and Drake and Hall (2003) found weak or insignificant effects. These inconsistencies suggest that inflation influences financial sustainability through both pricing power and macroeconomic instability channels.

2.5.3 Trade Deficit and Financial Sustainability

Empirical research on trade deficits and banking sustainability is relatively limited, but existing studies suggest indirect linkages through macroeconomic fragility. Pesola (2005), examining Nordic countries, used loan loss ratios as a proxy for bank distress and found that adverse macroeconomic shocks, including income fluctuations and interest rate changes, increase borrower vulnerability and loan losses. The study concluded that macroeconomic imbalances such as trade liberalisation shocks and high indebtedness amplify banking fragility, especially during economic downturns.

Further evidence from developing economies highlights the adverse effect of trade deficits on bank profitability. Alkassim (2005) found that trade deficits negatively affected profitability of Jordanian commercial banks, while Alrashdan (2002), using data from 1985 to 1999, reported that trade liberalisation reduced financial leverage and interest income, with insignificant effects on ROA. Although trade deficit is not always explicitly modelled, these findings support its relevance as a macroeconomic stress factor influencing financial sustainability through external sector instability.

2.5.4 Lending Interest Rate and Financial Sustainability

Interest rates are widely recognised as critical determinants of bank distress and performance. Hassan and Koko (2017), employing ARDL techniques on Nigerian data from 1986 to 2015, found that exchange rates and non-performing loans significantly increased bank distress, while interest rates showed a negative but insignificant relationship. Andualem (2011), using panel data from Ethiopian firms, reported that profitability, liquidity, and efficiency significantly reduced distress, while leverage heightened vulnerability.

Other studies reinforce the importance of interest rate dynamics in banking sustainability. Buchhols and Rangvid (2013), using logistic regression on Danish banks between 2008 and 2012, identified excess capital, lending growth, and funding structure as predictors of distress. Daumont et al. (2004) documented widespread banking crises in several African countries during the 1980s and 1990s, largely driven by high non-performing loans. Gull and Zaman (2013) found that interest rate fluctuations significantly influenced profitability in Pakistan. Similarly, Ohwofasa and Mayaku (2012) and Elegbe (2013) showed that interest rates and non-performing loans negatively affected economic development and banking stability in Nigeria.

2.5.5 Foreign Exchange Rate and Financial Sustainability

Exchange rate volatility has been extensively examined as a macroeconomic determinant of bank distress. Aliero and Ache (2017), using ARDL techniques, found a significant long-run relationship between exchange rate movements and bank distress in Nigeria, alongside capital adequacy and liquidity ratios. Their results indicate that exchange rate instability undermines financial sector stability by increasing credit risk and balance-sheet mismatches. Yauri, Musa and Kaoje (2012) also found that recapitalisation policies only provided short-term liquidity relief without addressing long-term distress risks.

Complementary evidence from other regions supports these findings. Naceur (2003) showed that exchange rates positively influenced Tunisian bank profitability, while bank size had a negative effect. Baklouti et al. (2016), analysing EU banks between 2005 and 2011, found that bank size and governance mechanisms significantly influenced distress probability. Studies using bankruptcy prediction models, such as Maija (2017) and Salim and Sudiono (2017), further highlight the usefulness of financial indicators in forecasting distress, particularly in environments exposed to exchange rate shocks.

2.5.6 Financial Openness and Financial Sustainability

The literature presents mixed evidence on the role of financial openness in bank sustainability. Bennaceur and Goaied (2008) argued that macroeconomic factors, including openness, do not significantly affect bank performance, while Owoputi, Kayode and Adeyeta (2014) found that bank-specific factors such as capital adequacy and deposits play a more dominant

role in Nigerian banks. Berger et al. (2010) nonetheless emphasised that GDP growth, interest rates, and financial system structure are critical macroeconomic parameters influencing bank outcomes.

Other studies suggest that financial openness can influence distress dynamics through market discipline and capital flows. Grover (2001) demonstrated that bankruptcy prediction models significantly affect stock prices of Indonesian banks, while Mohammed (2016) found that distress episodes in Omani banks were mitigated through restructuring and liquidity management. Ilahi et al. (2015) observed that despite financial openness, Pakistani banks remained operationally stable, though Z-score models failed to predict distress accurately. Musa et al. (2012) concluded that while capitalisation and openness improve liquidity in the short run, long-term financial sustainability requires stronger governance and institutional reforms.

3. Methodology

This study employs a longitudinal research design, as both the dependent and independent variables relate to historical events that have already occurred and cannot be manipulated by the researcher. The choice of this design is further justified by the study's cross-country and time-series orientation, which allows for the examination of variations across countries and over time. The focus is on quoted deposit money banks operating within member states of the African Continental Free Trade Area (AfCFTA). Although 54 of Africa's 55 countries are AfCFTA members, the study population is constrained by data accessibility to 70 listed deposit money banks drawn from stock exchanges in 11 AfCFTA countries with relatively active capital markets and stronger engagement with voluntary sustainability reporting practices (Proshare Intelligent Investing, 2021). These countries include Nigeria, Ghana, Kenya, South Africa, Namibia, Zambia, Botswana, Malawi, Mauritius, Zimbabwe, and Uganda.

A combination of purposive and stratified sampling techniques was used to select an initial sample of 55 banks from the 70 listed institutions across the 11 countries (Nigeria 12; South Africa 5; Ghana 6; Botswana 4; Malawi 4; Uganda 3; Zambia 4; Mauritius 3; Namibia 3; Kenya 9; Zimbabwe 2). However, further screening for incomplete financial information necessitated the exclusion of two banks each from Namibia and Mauritius and one bank from Zambia, yielding a final sample of 50 deposit money banks. The study adopts a pooled cross-country

analytical framework to enhance statistical robustness, facilitate cross-national comparison, and increase degrees of freedom through a larger panel dataset (Ying et al., 2016). Data are obtained from the audited annual reports of the sampled banks and Bloomberg

for the period 1980–2020, supplemented with macroeconomic and financial indicators from the World Bank Financial Structure Database and the World Bank Development Index (WBDI) covering 1986–2020.

Model Specification

This study requires various models because the study is using both financial stability index and banking soundness as measures of financial sustainability. The model will follow that of Meher and Getaneh (2019):

$$ROA_{it} = f\{\beta_0 + \beta_1 ALR_{it} + \beta_2 LR_{it} + \beta_3 AQ_{it} + \beta_4 NIR_{it} + \beta_5 CR_{it} + \beta_6 SR_{it} + \beta_7 NIG_{it} + \beta_8 INFR_{it} + \beta_9 RGDP_{it} + \beta_{10} TD_{it} + \beta_{11} EER_{it} + \beta_{12} LIR_{it}\} \dots \dots \dots (1)$$

$$ROE_{it} = f\{\beta_0 + \beta_1 ALR_{it} + \beta_2 LR_{it} + \beta_3 AQ_{it} + \beta_4 NIR_{it} + \beta_5 CR_{it} + \beta_6 SR_{it} + \beta_7 NIG_{it} + \beta_8 INFR_{it} + \beta_9 RGDP_{it} + \beta_{10} TD_{it} + \beta_{11} EER_{it} + \beta_{12} LIR_{it}\} \dots \dots \dots (2)$$

$$FSI_{it} = f\{\beta_0 + \beta_1 ALR_{it} + \beta_2 LR_{it} + \beta_3 AQ_{it} + \beta_4 NIR_{it} + \beta_5 CR_{it} + \beta_6 SR_{it} + \beta_7 NIG_{it} + \beta_8 INFR_{it} + \beta_9 RGDP_{it} + \beta_{10} TD_{it} + \beta_{11} EER_{it} + \beta_{12} LIR_{it}\} \dots \dots \dots (3)$$

$$ROA_{it} = f\{\beta_0 + \beta_1 ALR_{it} + \beta_2 LR_{it} + \beta_3 AQ_{it} + \beta_4 NIR_{it} + \beta_5 CR_{it} + \beta_6 SR_{it} + \beta_7 NIG_{it} + \beta_8 INFR_{it} + \beta_9 RGDP_{it} + \beta_{10} TD_{it} + \beta_{11} EER_{it} + \beta_{12} LIR_{it}\} \dots \dots \dots (4)$$

We therefore adopted the above model in this study with slight modification by decomposing corporate distress into various macro-economic components including economic growth, inflation rate, trade deficit, lending interest rate, foreign exchange rate and financial openness to suit our purpose.

Theoretically, the model is stated as

Financial Sustainability = *f{Corporate Distress}*

The functional form of the model is stated below;

$$FSI_{it} = f\{EG, INFR, TD, LIR, FER, FO\} \dots \dots \dots (1)$$

$$BSO_{it} = f\{EG, INFR, TD, LIR, FER, FO\} \dots \dots \dots (2)$$

The econometric form of the model is stated below;

$$FSI_{it} = f\{\beta_0 + \beta_1 EG_{it} + \beta_2 INFR_{it} + \beta_3 TD_{it} + \beta_4 LIR_{it} + \beta_5 FER_{it} + \beta_6 FO_{it}\} \dots \dots \dots (3)$$

$$BSO_{it} = f\{\beta_0 + \beta_1 EG_{it} + \beta_2 INFR_{it} + \beta_3 TD_{it} + \beta_4 LIR_{it} + \beta_5 FER_{it} + \beta_6 FO_{it}\} \dots \dots \dots (4)$$

Where:

EG = Economic growth

INFL = Inflation rate

TD = Trade deficit

LIR = Lending Interest rate

FER = Foreign exchange rate

FO = Financial Openness

FSI = Financial Stability Index

BSO = Bank soundness

i represent countries in all sample and *t* represents the scope or period of study.

$\beta_0 - \beta_5$ are parameters to be estimated and U_t is the error term.

$\beta_1, \beta_5, \beta_6 > 0$; $\beta_2, \beta_3, \beta_4 < 0$

From theory, it is expected that economic growth, foreign exchange rate and financial openness will have positive impact on financial sustainability of deposit money banks. Inflation rate, trade deficit, lending interest rate are expected to impact negatively on financial sustainability of deposit money banks.

3.2 Measurement of Variables

Table 1: Description of Variables

S/N	Variables	Definition	Measurement	Sign	Source
1.	Dependent Financial sustainability index	Symbolizes the long-term sustainability of commercial banks.	Profit before Tax X Total Loan & Advances X Total Assets of the individual bank divided by Total Assets of the banking system; $R = EQ/CAR$, where R = Risk Weighted Assets, CAR = Capital Adequacy Ratio $PR = PBT/R$, where PR = Profit/Risk Indicator of Individual bank, PBT = Profit before Tax; $FSI = PR \cdot A/TA$, where A = Assets of banks in particular year, TA = Total assets of the banking system If free cash flow > demand deposits = 0 (bank soundness) If free cash flow < demand deposits = 1 (bank failure) Free cash flow = total cash & bank balance – reserve with central bank (NBE)		Zheng (2015).
	Bank soundness	A bank is in the way to financial soundness when the free cash balance is sufficient to meet the demand deposits of the customers.			Zheng (2015)
	Independent				
2.	Economic growth	Monetary value of goods and services produced in a country annually	Real GDP	+	Khwarish (2011)
3.	Inflation Rate (INFR)	A consistent and persistent increase in the general price level.	Proxied by annual Consumer Price Index (CPI)	-	Dias (2013)
4.	Trade deficit	A case of imbalance arising from more importing than exporting.	Visible Export less visible import	-	Obadan, 2004
5.	Lending interest rate	Rate of interest that accrues to borrowed fund.	Average lending Interest rate of deposit money banks	–	Gull and Zaman (2013)
6.	Foreign exchange rate	The unit of a country's currency in terms of a foreign currency	Closing Exchange Rate of the year.	+	Gull and Zaman (2013)
7	Financial openness	The degree to which foreign investors are allowed to own equity in the domestic economy as well as the stimulation of foreign capital inflows.	Sum of foreign direct investment and foreign portfolio investment divided by GDP	+	(Fratzscher & Bussiere, 2017)

Source: Researcher's Compilation (2023)

3.3 Method of Data Analyses

This study will begin with the use of descriptive statistics and correlation analysis to summarise the characteristics of the data and explore the degree of association among the study variables. Thereafter, panel unit root tests will be conducted to establish the stationarity properties of the series, employing the Im, Pesaran and Shin (2003) approach as a necessary condition for valid dynamic panel estimation. The analysis will subsequently proceed to panel co-integration testing and multivariate panel regression modelling, with the principal estimation technique based on the system Generalised Method of Moments (system-GMM). This estimator is adopted to effectively control for endogeneity, omitted variable bias, measurement errors, and unobserved heterogeneity that typically characterise cross-country panel datasets. The system-GMM approach enhances estimation efficiency by jointly exploiting

moment conditions in both first-difference and level equations using suitably lagged instruments (Bun & Windmeijer, 2010). All empirical analyses will be performed using EViews version 9.0.

4. Findings and Discussions

This section presents the empirical results and discussion sequentially, beginning with descriptive statistics, followed by correlation analysis, panel unit root testing, cointegration assessment, and finally the estimation results from the Three-Stage Least Squares (3SLS) model.

Table 2: Descriptive Statistics for the Sub-Sahara African Countries Region Panel

	FSI	BSO	EG	INFL	TD	LIR	FER	FO
Mean	11.8	0.89	3.8	9.89	7.17	14.38	147	1.62
Median	2.77	1	4.23	9.38	1.52	15.14	129	1.6
Maximum	94.9	1	8.06	26.2	84.5	19.72	449	5.15
Minimum	0	0	-6.43	2.06	-33	7.25	6.38	-0.6
Std. Dev.	17.7	0.32	2.94	4.46	22.4	3.15	122	1.44
Skewness	2.06	-2.47	-0.8	0.6	1.29	-0.57	0.92	0.49
Kurtosis	7.29	7.1	3.57	3.39	5.55	2.19	3.03	2.59
Jarque-Bera	554	648	45.7	25.1	207	30.6	52.8	17.5
Probability	0	0	0	0	0	0	0	0
Observations	377	377	377	377	377	377	377	377

Source: Author's computation (2023)

Table 2 presents the descriptive statistics for financial sustainability (FSI), bank stability outcome (BSO), economic growth (EG), inflation (INFL), trade deficit (TD), lending interest rate (LIR), foreign exchange rate (FER), and financial openness (FO) across Sub-Saharan African countries. On average, FSI records a mean of 11.8 with substantial dispersion (Std. Dev. = 17.7), indicating wide cross-country variation in financial sustainability, while BSO shows a high mean of 0.89 and limited variability, suggesting relatively stable banking outcomes overall. Economic growth averages 3.8 percent but ranges from contraction (-6.43) to strong expansion (8.06), reflecting heterogeneous macroeconomic conditions. Inflation and lending interest rates are relatively high on average (9.89 and 14.38 respectively), with noticeable volatility, underscoring persistent price and credit market pressures. Trade deficit exhibits the highest dispersion (Std. Dev. = 22.4), indicating pronounced external sector imbalances across countries. The foreign exchange rate shows extreme variability (mean = 147; Std. Dev. = 122), highlighting exchange rate instability in the region, while financial openness averages 1.62 with moderate spread. The skewness and kurtosis statistics reveal non-normal distributions for most variables, which is confirmed by the significant Jarque-Bera statistics ($p < 0.01$) across all series, justifying the use of robust panel estimation techniques.

Table 3: Correlation Analysis of the variables employed for the Sub-Sahara African Countries Region Panel

	FSI	BSO	EG	INFL	TD	LIR	FER	FO
FSI	1.000	-0.130	-0.008	0.302	0.024	0.263	0.350	-0.158
BSO	-0.130	1.000	-0.042	-0.177	-0.072	-0.176	-0.245	0.073
EG	-0.008	-0.042	1.000	-0.042	0.410	0.373	-0.142	0.295
INFL	0.302	-0.177	-0.042	1.000	0.057	0.470	0.606	-0.292
TD	0.024	-0.072	0.410	0.057	1.000	0.236	-0.120	0.365
LIR	0.263	-0.176	0.373	0.470	0.236	1.000	0.337	0.097
FER	0.350	-0.245	-0.142	0.606	-0.120	0.337	1.000	-0.513
FO	-0.158	0.073	0.295	-0.292	0.365	0.097	-0.513	1.000

Source: Author's computation (2023)

Table 3 shows that FSI is moderately positively correlated with INFL (0.302), LIR (0.263) and FER (0.350), weakly related to TD (0.024) and EG (−0.008), and negatively associated with BSO (−0.130) and FO (−0.158). BSO is negatively correlated with most macro variables, strongest with FER (−0.245) and INFL (−0.177). Among the macro factors, INFL co-moves strongly with FER (0.606) and with LIR (0.470), EG aligns with TD (0.410) and LIR (0.373), and FO is strongly inversely related to FER (−0.513) but positively related to TD (0.365) and EG (0.295), suggesting notable inter-linkages especially inflation–exchange rate and openness–exchange rate that may matter for multivariate modelling.

Table 4: Stationarity Test results for the Sub-Sahara African Countries Region Panel

Variables					Tests			
					ADF - Fisher Chi-square			
	Levin, Lin & Chu		Lm, Pesaran and Shin W-stat				PP - Fisher Chi-square	
	I(0)	I(I)	I(0)	I(I)	I(0)	I(I)	I(0)	I(I)
FSI	7.02	-0.50	-0.65	-10.91***	66.29***	195.88***	405.81***	1073.12***
BSO	0.48	-2.14**	-2.25**	-5.53***	28.97***	51.18***	65.29***	706.02***
EG	-6.88***	-15.59***	-4.95***	-12.98***	101.39***	223.27***	156.75***	680.16***
INFL	-10.08***	-13.59***	-9.57***	-14.46***	168.03***	248.27***	138.77***	549.43***
TD	0.27	-2.38**	0.44	-7.10***	35.66	127.58***	43.65	273.78***
LIR	3.10	-10.64***	2.64	-7.22***	19.03	126.32***	19.05	222.89***
FER	9.82	-1.77**	12.04	-3.52***	1.36	76.46***	0.74	234.31***
FO	-1.21	-14.17***	1.13	-10.06***	25.80	173.99***	24.39	433.29***

Source: Author's computation (2023)

Table 4 indicates that the panel series are a mix of I(0) and I(1): EG and INFL are clearly stationary at level across the tests (mostly significant at I(0)), whereas FSI, TD, LIR, FER and FO largely become stationary after first differencing, with strong I(1) evidence particularly under IPS, ADF-Fisher and PP-Fisher (*). BSO shows weaker level stationarity but achieves stationarity at first difference (notably LLC −2.14 and stronger support under IPS/ADF/PP). Overall, the results justify treating the data as predominantly I(1) with some I(0) variables, supporting subsequent cointegration testing and dynamic panel estimation.

Table 5: Panel Cointegration Test results for the Sub-Sahara African Countries Region Panel

Panel Series	ADF	
	T-stats	P[Values]
BSO LIR TD EG INFL FER FO	-4.095	0.000
FSI LIR TD EG INFL FER FO	-9.745	0.000

Source: Author's computation (2023)

Table 5 shows strong evidence of long-run cointegration among the variables, as the panel ADF statistics for both the BSO-based and FSI-based models are highly significant ($t = -4.095$ and -9.745 , $p = 0.000$), indicating a stable long-run equilibrium relationship between financial sustainability/bank stability and the macroeconomic variables (LIR, TD, EG, INFL, FER, and FO) across Sub-Saharan African countries.

Table 6: 3-Stage Least Squares Model Estimates results for the Sub-Sahara African Countries Region Panel

Source: Author's computation (2023)

Independent Variables	Equation (1) Financial Stability Index			Equation (2) Bank Soundness		
	Coe	S. E	z-stats	Coe	S. E	z-stats
Cons.	-6.33	5.76	-1.10	1.38	0.10	13.16
EG	-0.25	0.35	-0.72	0.00	0.01	0.11
INFL	0.26	0.26	1.02	--0.00	0.00	0.19
TD	0.04	0.04	0.86	-0.00	0.00	-0.77
LIR	0.82**	0.36	2.26	-0.00	0.01	-0.50
FER	0.03***	0.01	3.06	-0.0003***	0.00	-1.74
FO	-0.49	0.76	-0.64	-0.00	0.01	-0.28
X2-Statistics	0.17			0.13		
R-Square	75.71			54.37		
Observations	377			377		

Table 6 shows that, in the Financial Sustainability Index (FSI) equation, lending interest rate (LIR) exerts a positive and statistically significant effect on financial sustainability ($\beta = 0.82$, $z = 2.26$), while foreign exchange rate (FER) is also positive and strongly significant ($\beta = 0.03$, $z = 3.06$). By contrast, economic growth (EG), inflation (INFL), trade deficit (TD), and financial openness (FO) are statistically insignificant in explaining FSI within the 3SLS framework, although INFL and TD retain positive signs and FO is negative. In the bank soundness (BSO) equation, most macro variables are again insignificant, but FER is negative and significant ($\beta = -0.0003$, $z = -1.74$), implying that exchange-rate depreciation/instability weakens bank soundness even where it coincides with improved FSI. The overall fit is strong ($R^2 \approx 75.71$ for FSI; 54.37 for BSO), suggesting macro conditions matter more for broad sustainability scoring than for the binary/limited-variation soundness indicator.

In comparison with extant literature, the insignificance of EG aligns with Sahut and Mili (2011), who found macroeconomic variables such as growth to be weak predictors of distress, but it diverges from studies reporting growth–profitability links, including Kosmidou et al. (2007), Boubakri et al. (2005), and Athanasoglou et al. (2006), as well as Baklouti et al. (2016) who documented a growth–distress relationship. The weak inflation effect contrasts with evidence of inflation shaping bank outcomes (Mayuku, Madu & Oslow, 2012; Zhang et al., 2014) and with mixed profitability evidence (Vong & Chan, 2006; Kosmidou et al., 2007; Abdullah et al., 2014). The positive and significant LIR effect is consistent with the margin-based argument that higher rates can raise bank returns (Vong & Chan, 2006) and with evidence that interest-rate conditions influence bank outcomes (Gull & Zaman, 2013), though it differs

from Hassan and Koko (2017) where interest rate effects were negative/insignificant for distress. Finally, the exchange-rate results are notably “two-sided”: FER improves FSI but reduces soundness, which is consistent with literature showing exchange-rate volatility can be destabilising (Aliero & Ache, 2017; Girum, 2020), while also reflecting the possibility that nominal FX movements can inflate certain sustainability/value proxies even as balance-sheet risk and asset quality pressures worsen.

5. Conclusion and Recommendations

This study investigated the impact of macro-specific distress factors on the financial sustainability of deposit money banks in selected Sub-Saharan African countries, using the Financial Sustainability/Financial Stability Index (FSI) and Bank Soundness (BSO) as outcome measures. The macroeconomic variables examined include economic growth (EG), inflation (INFL), trade deficit (TD), lending interest rate (LIR), foreign exchange rate (FER), and financial openness (FO), estimated within a 3-Stage Least Squares (3SLS) framework. The findings indicate that lending interest rates and foreign exchange rates are the most influential macro-level drivers of financial sustainability in the region. Specifically, lending interest rates exert a positive and significant effect on FSI, suggesting that higher lending margins can enhance banks' sustainability positions. Foreign exchange rates show mixed effects: while exchange rate movements significantly improve the FSI, they undermine bank soundness, reflecting balance-sheet pressures and heightened risk exposure associated with currency volatility. Economic growth, inflation, trade deficit, and financial openness do not exert statistically significant direct effects on either FSI or BSO, implying that their influence on bank

sustainability in Sub-Saharan Africa may be indirect, lagged, or mediated through other financial channels.

Based on these findings, the study recommends that:

- Monetary authorities should manage lending interest rate regimes carefully, ensuring that interest margins support bank sustainability without excessively suppressing credit demand or increasing default risk.
- Exchange rate volatility should be actively managed through macroprudential buffers, foreign exchange risk limits, and enhanced supervision of banks' open foreign currency positions to protect bank soundness.
- Banks should strengthen foreign exchange risk management, including stress testing for currency shocks and aligning asset-liability structures to reduce exposure to adverse exchange rate movements.
- Macroeconomic stability policies should be coordinated, as weak growth, inflationary pressures, and trade imbalances though insignificant individually can collectively amplify systemic vulnerability during adverse shocks.
- Regulators should complement interest-rate and exchange-rate policies with strong supervisory oversight, ensuring that gains in financial sustainability indices do not mask underlying weaknesses in bank soundness.
- Cross-country regulatory harmonisation within Sub-Saharan Africa should be enhanced, particularly in monitoring macroeconomic risk transmission, to improve early warning mechanisms and sustain long-term financial stability across the region.

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