

DETERMINANTS OF FINANCIAL STABILITY IN SUB-SAHARAN AFRICA

Meshesha Demie JIMA, PhD Student*

Patricia L. MAKONI, PhD**

Abstract

Several factors determine the stability of a financial system. The main objective of this study is, thus, to empirically examine the key drivers of financial stability in the Sub-Saharan African (SSA) economies for the period of 2000 to 2019 using a dynamic panel Generalised Method of Moments (GMM). As financial inclusion and institutional quality broadly comprise of multiple individual measures, we constructed a composite index to proxy and represent each variable, respectively, which was then used later in the regression model to assess their effect on financial stability in the sampled economies. The findings of the study indicated that the lag effect and financial inclusion are the major positive drivers of financial stability in the SSA economies. Institutional quality, financial technology adoption and global financial crises also reflected a negative impact on the stability of a financial system in the region. Other variables seem to have no impact in the region. These findings underpin the need for policy makers and regulators to formulate and adopt macroeconomic policies that include more people in the financial system and markets, so that risks are spread over a greater populous, thereby sustaining financial stability. In addition, our scholarly contribution is that we highlight the possibilities of a trade-off between financial regulation, inclusion and digitalisation versus financial stability, which is an under-researched phenomena in financial studies.

Keywords: financial stability, financial inclusion, institutional quality, Sub-Saharan Africa (SSA)

JEL Classification: C33; C38; E44

* *Department of Finance, Risk Management and Banking. University of South Africa, Pretoria, South Africa.*

** *Full Professor, Department of Finance, Risk Management and Banking. University of South Africa, Pretoria, South Africa.*

1. Introduction

Stable and inclusive financial system plays important roles in realizing a sustainable economic growth. Financial stability refers to a situation in which the financial system withstands internal and external shocks without disruption in the financial intermediations (European Central Bank, 2012). Financial stability is a condition in which the market mechanisms of pricing, resource allocation, and risk management are functioning well enough to contribute to the smooth performance of an economy. In this case, a financial system is believed to be stable when it circumvents current volatility and systemic risks. A systemic risk is one that disturbs the functioning of a financial system and the economy (Górska and Krzemińska, 2019). Ahmed (2018) averred that a stable financial system was one that manages financial risks, allocates resources efficiently and eliminates undesirable price volatilities of real or financial assets.

Since the global financial crisis of 2008, an inclusive financial system has become a strategic priority and policy direction for stability and sustainable growth (Asongu, 2015). Scholars argue that stability of the banking sector can be realised through financial inclusion, as it affects the composition of financial transactions, the type of customers and the structure of financial institutions in a market (Ngonyani, 2022; Kinyua and Omagwa, 2020). Such market dynamisms may also raise competition, instability, and lead to a risk of financial crises (Mostak and Sushanta, 2015). As a result, there is no consensus between financial access and financial stability, indicating a policy trade-off between financial inclusion and financial stability (Alvi, Rafique and Shehzad, 2020). Instability in the financial system can lead to a sudden collapse of financial institutions, which subsequently causes economic crises and further deterioration of the financial markets (Nxumalo and Makoni, 2021).

Various macroeconomic and microeconomic factors account for financial stability. Scholars identified inflation, economic growth, lending rate, return on equity, capital adequacy and money supply, external debt, liquidity risk, bank size, market concentration, bank capital regulation, and others as a key driver of financial stability (Al-Salamat and Al-Kharouf, 2021; Vo et al., 2019; Pham, Dao and Nguyen, 2021; Temesgen, Wondafarahu and Badassa, 2022). However, there is no consensus among researchers on the key factors that limit financial stability across regions and nations due to country

and sector specific characteristics and variations in methodological approaches, indicating that the topic still needs further research. It is, therefore, necessary to assess the determinants of financial stability in the context of the SSA countries. The overall aim of this paper is, thus, to assess the key determinants of financial stability in the selected SSA countries, and thereby contribute to the ongoing debate on suitable and sustainable strategies and policy directions to adopt that can remedy financial exclusion of vulnerable groups, without causing instability of the financial markets, particularly the banking sector.

2. Literature review

2.1. Theoretical foundation - financial stability

Financial stability is linked to the potential of a financial system to absorb shocks and limit their consequences (Creel, Hubert, and Labondance, 2015). Since the global financial crisis of 2007/08, an inclusive and stable financial system has become a strategic priority and policy direction for a stable economic growth (Asongu, 2015). Financial instability is hence one of the causes of uncertainties and misallocation of resources, which may lead to market failure. Information asymmetry, irrational behavior, psychology, competition and other market imperfections are the main causes of financial instability (Minsky, 1977). Financial instability usually arises due to price fluctuations and investors become greedy for additional return (Minsky, 1977; Kindleberger, 1978). Classical economists did not relate financial instability with resource allocation, and rather gave emphasis on the forces that lead to equilibrium and attributed financial instability to external shock and abnormal behaviour (Kindleberger, 1978; Minsky, 1992).

Unlike the cyclic thought, the monetarists argued that financial instability arises due to disruption in the money supply and linked the main causes of financial instability with mistakes in the monetary policy. Schwartz (1986) expressed the disturbances that are not linked with a decline in the quantity of money as “pseudo-financial crises”. In this case, it is found important to differentiate between monetary and financial stability. Monetary stability refers to stability in the general price level or the absence of inflation or deflation. Financial stability refers to the smooth functioning of the financial system. Financial instability is therefore a situation in which economic performance is weakened due to price fluctuations in the financial assets or inability of

financial intermediaries to meet their contractual obligations (Cukierman, 2013).

Nonetheless, neither cyclic nor monetarist theories are sufficient to address the issues of financial stability (Gertler, 1988). Consequently, other theories have been emerged to complement the above theories and address issues of financial instability. Some of these theories are the theory of competition-fragility and competition-stability. Financial stability manifests itself either in the fragility of financial intermediaries or excessive volatility. High competition erodes the market power of financial institutions, decreases profit margins, and reduces contract value, which encourages firms to take more risk so as to increase their returns (Keeley, 1990; Carletti and Hartmann, 2003). Such an intense competition has a negative influence on market power and profit margins (Hellmann, Murdock, and Stiglitz, 2000; Koetter, Kolari, Spierdijk, 2012). Financial instability demonstrates itself either in financial sector fragility or excessive price volatility of financial assets. Such an incidence may lead financial regulators to develop policies that help preserve stability. However, financial instability is not the same as a crisis, but a number of scholars gave emphasised on the extreme cases of financial markets disruption (Kindleberger, 1978).

The competition-stability theory assumes a positive relationship between bank competition and stability, and argues that less competition results in high interest rates. High interest rates, in turn, lead to adverse selection and a moral hazard problem by increasing the non-performing loan ratio of banks (Koetter et al., 2012). On the basis of this theory, market power may raise financial risk as a rise in interest rates reduces loan repayment and results in adverse selection problems (Boyd and De Nicolo, 2005). However, although market power may lead to a risky loan portfolio, the overall risks of financial institutions may not increase if these institutions protect their market values by raising additional equity and engage in other risk-mitigating techniques.

2.2. Empirical literature

Empirical studies that examined the factors that affect financial stability have shown various results. Over the past two decades, the institutional structure has been evolving as a major factor to alleviate the problem of asymmetric information and financial system difficulties. Norris *et al.* (2015) argued that lowering monitoring costs, relaxing

collateral requirements and increasing access to credit could raise non-performing loans, entailing a trade-off with stability. Ahamed and Mallick (2017) averred that financial inclusion improves bank volatility through reducing the volatility of banks' returns on assets and increasing the z-scores. Han and Malecky (2013) found that financial inclusion through a broader access and use of deposits can significantly mitigate deposit withdrawals during times of financial stress. One of the limitations of this study is that it gave emphasis on the dynamics of bank deposit in the events of financial crisis. In addition, access to finance is broader and financial stability extends beyond deposits. Al-Smadi (2018) confirmed a significant positive impact of financial inclusion on financial stability.

Siddik, Alam and Kabiraj (2018) argued that low-income customers maintain constant depositing and borrowing behavior, even in the period of financial crises, leading to a stable financial transaction. Morgan and Pontines (2014) concurred that financial inclusion has a positive impact on financial stability. Stability of banks can be assessed by profitability and liquidity, which indicates the structure of assets and liabilities (Klaas and Vagizova, 2014). Instability of banks in the medium term arises from insufficient capital, assets and liabilities, and associated credit policy that increases credit risk and probability of losses. Size of a capital determines the ability of banks to maintain stability during a crisis (Klaas and Vagizova, 2014). Gómez (2015), as well as Marozva and Makoni (2021), averred that financial instability arises due to insufficient liquidity and quality of resources, as liquid funds take the vital share in the structure of bank resources, and help to meet the immediate needs of individuals and enterprises. Instability of banks can also be connected with undercapitalization, poor quality credit portfolio, credit policy and insufficiently stable resource base.

Empirical literature related to the determinants of financial stability shows that there are various factors that drive financial stability due to a difference in the nature of the economy, i.e. country and sector specific characteristics, and a difference in the methodology. Although there are indicators that have a strong positive relationship with financial stability, there exists other factors that have a negative effect on financial stability, or which the operations of formal financial institutions.

3. Methodology

3.1. Research approach, data and data sources

A quantitative approach is common to examine and identify the key drivers of financial stability (Al-Smadi, 2018; Ali and Pua, 2019; Vo, et al., 2019; Pham et al., 2021). Consequently, this study applied a quantitative method to assess the key drivers of financial stability in the SSA countries. Consistent with the research approach, secondary data was collected from international organisations such as the World Bank (WB), International Monetary Fund (IMF), and the United Nation (UN) for twenty six (26) selected Sub-Saharan African countries with adequate dataset for the period of 2000 to 2019. In order to capture disparities across the region, the study considered a mix of upper, middle and lower-class economies from all corners of the region.

Several financial stability indicators, including financial soundness, stress testing and financial sector development are used in literatures (Geršl and Heřmánek, 2006; Adusei, 2015; Ali and Tomoe, 2019). However, cross-country data for most of these variables is scarce, and hence this research used a financial distress (bank Z-score) as a proxy indicator of financial stability. In its essence, the bank z-score compares bank capitalisation and returns against the volatility of returns. It is inversely related to solvency, and the higher the bank z-score is, the lower the risk of bankruptcy.

Other control variables that are used to augment the explanatory power of the descriptive variables include financial inclusion index, which is a proxy of financial inclusion constructed from six individual financial inclusion indicators (the number of bank account per 1,000 populations, the number of bank branches and ATMs per 100,000 populations and the number of branches and ATMs per 1000 Km² and the volume of private domestic credit to GDP) are used to develop a composite financial inclusion indicator), using a two stage principal component analysis (PCA). Economic growth (GDP per capita), which is one of the major determinants of financial stability (FS) (Morgan and Pontines, 2014; Siddik et al., 2018; Ozili, 2018). Liquidity position (LP), which is measured by liquid assets to deposits, is important to reduce vulnerability. Real interest rate (RIR), and deposit interest rate (DIR) (Geršl and Heřmánek, 2006; Siddik et al., 2018; Ozili, 2018).

Financial technology adoption such as the number of mobile phone (MU) subscriptions per 100 people is used as a proxy for

technology infrastructure (Geršl and Heřmánek, 2006; Siddik, et al., 2018; Ozili, 2018). Institutional quality (IQI) is a composite index of the six World Bank Governance Indicators (voice and accountability, political instability and violence, government effectiveness, regulatory quality, rule of law, and control of corruption). A net interest margin, which measures profitability (NIM), and bank credit to bank deposit are used in the model.

3.2. Principal Component Analysis

In this study, a financial inclusion index was constructed using a principal component analysis (PCA), which is a parametric approach that minimizes subjectivity, and served as a proxy for financial inclusion. Similar to the financial inclusion, a composite index was constructed for institutional quality using the PCA approach. In order to develop the two indices, the data collected for the individual indicators was first normalised using a min-max approach. The min-max approach helps to smooth-out the variation within the data and make the trend appropriate for index development. Accordingly, the study used the formula stated below.

$$F_{i,t} = \frac{P_{i,t} - Min_{i,t}}{Max_{i,t} - Min_{i,t}} \quad (1)$$

Where: $F_{i,t}$ - represents a normalized indicator i at time t , and $P_{i,t}$ individual financial inclusion indicator, $Max_{i,t}$ is the maximum and $Min_{i,t}$ is the Minimum values of each indicator, respectively.

Subsequently, the study applied a PCA to calculate the Eigen values of the variance matrix for the indicators and develop the composite indices. In this case, the study employed the equations below to construct the composite index for financial inclusion and an institutional quality of the selected SSA economies.

$$FI_i = W_{i1}X_1 + W_{i2}X_2 + W_{i3}X_3 + \dots + W_{in}X_n \quad (2)$$

$$IQI_i = W_{i1}P_1 + W_{i2}P_2 + W_{i3}P_3 + \dots + W_{in}P_n \quad (3)$$

Where: Fli = estimate of the i th factor of financial inclusion; IQI_i = estimate of the i th factor of governance indicators; W_i = weight on the factor of score coefficient; X_i = variable of interest; n = number of variables.

3.3. Panel Unit Root and Serial Correlation Tests

Panel unit root tests ascertain that the variables are stationary and prevent a spurious regression (Levin, Lin and Chu, 2002; Breitung and Pesaran, 2005). There are two generations Panel root tests, i.e. first and second generations. A dynamic panel approach is effective irrespective of the nature of the regressors, exogenous or endogenous, or whether the variables are integrated at I(0) or I(1). However, none of the variables should be a second difference (I(2)) (Pesaran and Smith, 1995). In this study, both the first generation (Levin, Lin and Chu (LLC), Im, Pesaran and Shin (IPS) and Breitung) and a second generation (CIPS, Pesaran (2007)) panel unit root tests were applied to identify the stationarity of the series using the model specified below.

$$\Delta Y_{it} = \alpha_i + \delta Y_{i,t-1} + \sum_{j=1}^n \rho_j \Delta Y_{i,t-j} + z_t^i \gamma + u_{it} \quad (4)$$

Where Δ is the first difference operator is the series of observation for country i for $t=1 \dots, n$ periods. The panel unit root test has the following null hypothesis $H_0: \delta_i = \delta = 0$ for all i , which presumes that all series are stationary.

3.4. Econometric Model Specification

Empirical analysis is used to quantitatively examine and identify the factors that affect financial stability. Specifically, a dynamic panel Generalized Method of Moments (GMM) is applied to assess the key determinants of financial stability in Sub-Saharan African. Some of the empirical models with similar specification include Siddik *et al.*, (2018), Morgan and Pontines, (2014), Han and Malecky (2013). In line with these studies, the model is specified as follow.

$$Y_{it} = \alpha Y_{it-1} + \beta X_{it} + \varepsilon_{it} \quad (5)$$

Where: α denotes a constant term. $Y_{i,t}$ represents financial stability in country i at time t ; $Y_{i,t-1}$ represents the lag of dependent variables; vector $X_{i,t}$ represents a matrix of control variables in country i at time t ; $\varepsilon_{i,t}$ is the random error term.

3.5. Econometric Estimation Techniques

In macro panels, not accounting for country-specific variables can cause misspecifications (Baltagi, 2005). In order to assess the determinants of financial stability, it is possible to use either the difference GMM (Anderson and Hsiao, 1981); Arellano and Bond,

1991) or system GMM (Arellano and Bover, 1995; Blundell and Bond, 1998). However, system GMM is advantageous over difference GMM as it considers the values of lagged dependence and explanatory variables as instruments to attain a robust and consistent result.

A panel dynamic GMM approach addresses country-specific effects, tackles measurement errors and controls for the unobserved heterogeneity. It also takes care of omitted variable biases and removes any correlation between the disturbance term and the explanatory variables, and in the process re-establishes orthogonality of the explanatory variables. By applying the panel dynamic GMM approach, we solve the problems of heteroscedasticity, autocorrelation errors, and simultaneity bias, which are associated with such data. The panel dynamic GMM also remains steady when the instrumental variables are adequately lagged to the model. Therefore, in order to examine the key drivers of financial stability in our selected Sub-Saharan African countries, this research employed the equation below.

$$FS_{it} = \alpha + \beta_1 FS_{i,t-1} + \beta_2 FI_{i,t} + \beta_3 EG_{i,t} + \beta_4 \sum_{n=1}^i X_{i,t} + \varepsilon_{i,t} \quad (6)$$

Where: $FS_{i,t}$ represent the dependent variable of financial stability into country i for time t (proxied by bank z-score), $FI_{i,t}$ represent financial inclusion (proxied by the composite index, six individual financial inclusion indicators). $FS_{i,t-1}$ represents the lag of financial stability; $EG_{i,t}$ represents economic growth; $X_{i,t}$ stands for control variables that have direct and indirect influence financial inclusion and ε_{it} is the error term. In addition, the subscript i refers to country and t refers to the year.

4. Data analysis and discussion

4.1. Summary of the descriptive statistics

As per the earlier reviewed literature, it emerged that there are several macroeconomic and microeconomic factors cited as key drivers of financial stability, depending on the level of development of a country's economy, as well as its financial markets. In this section, descriptive statistical analysis was made on the major factors that are used in the econometric analysis of the study. A summary of the statistical analysis for the major indicators are presented in table 1 below.

Table 1

Summary of the Descriptive Statistics

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|----------|-----|----------|-----------|---------|-----------|
| FI | 520 | 0.200 | 0.234 | 0.014 | 0.824 |
| ZScore | 520 | 11.137 | 6.014 | 2.204 | 47.341 |
| LP | 520 | 40.504 | 22.966 | 5.445 | 240.614 |
| BCBD | 520 | 73.827 | 23.859 | 13.754 | 137.331 |
| GDPPc | 520 | 2317.993 | 3403.413 | 111.927 | 22942.583 |
| DIR | 520 | 9.700 | 7.785 | 2.433 | 56.167 |
| RIR | 520 | 5.552 | 8.969 | -60.781 | 38.976 |
| NIM | 520 | 7.337 | 3.593 | 0.000 | 39.210 |
| IU | 520 | 9.833 | 13.295 | 0.006 | 68.200 |
| MU | 520 | 45.299 | 42.148 | 0.018 | 165.600 |
| GINI | 520 | 0.590 | 0.037 | 0.488 | 0.852 |
| IQI | 520 | -1.416 | 1.509 | -4.680 | 2.132 |

Source: Authors' own computations

Over the past two decades, there was poor performances in the level of financial inclusion across Sub-Saharan Africa (SSA) countries due to various socioeconomic, political and legal reasons (Makoni, 2014; Norris, et al., 2015; Zins and Weill, 2016; Asuming, et al., 2018). The statistical analysis results above show that financial stability, measured by financial distress (ZScore), shows no significant variation, indicating that the financial system of the SSA countries does not show strong volatility. Other macroeconomic indicators, such as GDP per capita, shows quite a significant variation across the observations. However, income inequality between these countries is still low, indicating similarity in the standard of living. In addition, real interest rate and deposit interest rate show variation across the SSA countries. The level of digital financial services expansion is still low in the region. Similarly, the level of institutional quality across the SSA countries shows a slight variation. Other financial sector indicators such as liquidity position (LP), bank credit to bank deposit (BCBD), and profitability (NIM) show a slight variation across the region.

Based on the above descriptive statistical analysis, it is possible to conclude that there are slight variations across observations of the different indicators that affects financial stability across the selected SSA countries. These observations are helpful to provide insight on the determinants of financial stability in the sampled countries and to further confirm the impact of macro-and micro-economic factors on financial stability of the sampled SSA countries in this study.

4.2. Panel Unit Root and Serial Correlation Tests

In a dynamic panel data analysis, a panel unit root test is important to verify that no variables is integrated of order I(2). In order to validate the order of integration, the study conducted both the first- and second-generation panel unit root tests. Consistent with the features of the datasets, the study applied the generic panel root test equation below.

$$\Delta Y_{i,t} = \rho_i Y_{i,t-1} + Z_{i,t} \gamma + U_{i,t} \tag{7}$$

Where: i = 1, 2... N is the individual, for each individual t = 1, 2...T, time series observations are available, Zit is the deterministic component and Uit is a stationary process. Zit could be zero, one, the fixed effects (μi), or fixed effect as well as a time trend (t).

As can be derived from the regression results of the three first generation panel unit root tests, namely LLC, IPS and Breitung, and the second-generation panel unit root test, this study demonstrated the stationarity properties of the secondary data series. The regression results of the panel unit root tests revealed mixed order integration. Table 2 below depicts the various panel unit root test results of the variables used in the study.

Table 2

Results of the various Unit Root Tests

| Variables | Levin Lin Chu (LLC) | | Im Pesaran Shin (IPS) | | Breitung | | Pesaran (2007) (CIPS) | |
|-----------|---------------------|-------|-----------------------|-------|-----------|-------|-----------------------|-------|
| | Statistic | Order | Statistic | Order | Statistic | Order | Statistic | Order |
| Zscore | -3.8917*** | I(0) | -5.4304*** | I(0) | -3.094** | I(0) | -5.902*** | I(0) |
| L.Zscore | -3.9347*** | I(0) | -2.9092*** | I(0) | -2.275*** | I(0) | -4.805*** | I(0) |
| FI | -1.370* | I(0) | -6.465*** | I(1) | -5.123*** | I(1) | -3.980*** | I(1) |
| LP | -3.527*** | I(0) | -2.973*** | I(0) | -1.391* | I(0) | -2.908*** | I(0) |
| BCBD | -5.483*** | I(0) | -7.211*** | I(1) | -2.089** | I(0) | -3.140*** | I(1) |
| LnGDPPc | -7.260*** | I(0) | -8.195*** | I(1) | -5.772*** | I(1) | -4.147*** | I(0) |
| DIR | -4.343*** | I(0) | -9.228*** | I(1) | -4.836*** | I(1) | -2.161*** | I(0) |
| RIR | -7.118*** | I(0) | -8.698*** | I(0) | -3.625*** | I(0) | -3.427*** | I(0) |
| NIM | -6.690*** | I(0) | -8.249*** | I(0) | -1.775** | I(0) | -10.431*** | I(0) |
| GINI | -7.7301*** | I(0) | -2.676*** | I(0) | -5.941* | I(0) | -3.095*** | I(1) |
| MU | -2.044*** | I(0) | -7.179*** | I(1) | -6.767*** | I(1) | -4.327*** | I(0) |
| IQI | -2.787*** | I(0) | -11.204*** | I(1) | -5.663*** | I(1) | -4.212*** | I(1) |

Note: Robust standard errors in parenthesis (***), (**), (*) indicates the level of significance at 1%, 5% and 10%, respectively.

Source: Authors' own computations

Based on the results stated above, it is possible to conclude that the variables are statistically significant at the 1% and 5%, levels of significance, respectively. In addition, the panel unit root test indicated that the variables have a mixed order of integration, and hence the test results are not consistent within and across the various unit root tests. However, the results of the tests show that none of the variables is integrated of order I(2). It is, thus, possible to safely begin the dynamic panel data estimation.

4.3. Determinants of Financial Stability

On the basis of the arguments stated above, and similar to the recent work of Mamadou Asngar, Ongo Nkoa and Wirajing (2022), the Z-Score is considered to be the dependent variable, and the explanatory variables used in the study include twelve macroeconomic and microeconomic variables, including the lag of financial stability (I.ZScore). In order to assess the major drivers of financial stability, the relationship of the variables is specified below.

$$FS_{i,t} = \alpha + \beta_1 FS_{i,t-1} + \beta_2 FI_{i,t} + \beta_3 EG_{i,t} + \beta_4 \sum_{n=1}^i X_{i,t} + \varepsilon_{i,t} \quad (8)$$

Where: $FS_{i,t}$ – financial stability (proxied by ZScore), $FS_{i,t-1}$ – lag of the financial stability, $FI_{i,t}$ – Financial inclusion, $EG_{i,t}$ – Economic growth (represented by GDP per capita), $X_{i,t}$ – explanatory variables stated above.

In this dynamic system GMM estimation, it is found that the lag of financial stability (I.ZScore) has a positive and significant impact on its current financial stability, indicating a catch-up effect. In addition, the lagged coefficient of financial stability is found between zero and one, implying a partial catch-up, suggesting that countries with a stable financial system in the past have the possibility to become a stable in the current and future periods and vice versa. A summary of the regression results of the model is provided in Table 3 below.

Table 3
Major drivers of financial stability in the selected SSA economies

| Variables | (Financial Stability) | (Financial Stability) |
|-------------------------------------|------------------------|------------------------|
| | 1 Step System GMM | 2 Step System GMM |
| L.ZScore | 0.4243** (0.1524) | 0.3937*** (0.1343) |
| FI | 19.0614*** (6.2081) | 18.4573*** (6.5709) |
| LnGDPPc | -1.1370 (1.8117) | -0.6109 (1.4285) |
| GINI | 25.1319 (24.7922) | 19.7795 (25.0367) |
| IQI | -1.5346* (0.8381) | -1.4096* (0.7991) |
| MU | -0.0381** (0.0181) | -0.0358 (0.0229) |
| DIR | -0.0176 (0.1125) | -0.0189 (0.1164) |
| LP | -0.0446 (0.0349) | -0.0324 (0.0318) |
| NIM | 0.1729 (0.3384) | 0.2218 (0.3394) |
| BCBD | 0.0268 (0.0360) | 0.0258 (0.0440) |
| RIR | -0.0102 (0.1071) | -0.0051 (0.0674) |
| GFC | -1.3320* (0.6548) | -1.0312* (0.5280) |
| Constant | -3.0738 (15.5946) | -3.9743 (11.3515) |
| Observations | 494 | 494 |
| Number of countries/ instruments | 26 | 26 |
| AR(1) | 0.0749 | 0.126 |
| AR(2) | 0.557 | 0.652 |
| Hansen | 0.199 | 0.199 |
| Sargan | 0.0147 | 0.0147 |

*Notes: Robust standard errors in parentheses (***) signifies variable significant at 1%; (**) significance at 5%; (*) significance at 10%.*

Source: Authors' own computations

Financial services expansion, low deposit volatility, good monetary policy transmission reduces financial risks and enhances financial stability (Morgan and Pontines, 2014; Dienillah and Anggraeni, 2016; Al-Smadi, 2018; Ahamed and Mallick, 2019; Anarfo, Abor and Osei, 2020; Vo et al., 2021). In contrast, financial inclusion erodes credit quality and institutional standards due to weak financial sector regulation, and hence reduces financial stability unless proper supervision is in place (Cihak, Mare and Melecky, 2016; Khan, 2011). Consistent with the findings of Morgan and Pontines (2014), Ahamed and Mallick (2019) and Anarfo, Abor and Osei (2020), this study found a significant positive impact of financial inclusion on financial stability, indicating that the more the inclusiveness of the financial system, the higher its stability. Despite the low supervisory capacity, weak regulation, low per-capita and low literacy rate of the region, financial inclusion significantly improves resilience of the overall financial system and thus financial stability in the SSA economies.

Although strict financial regulation may adversely impact credit growth, and it forces banks to reduce their lending; likewise, stringent supervision may improve financial system stability, while negatively affecting financial inclusion (Fratzschler, Lo Duca and Straub, 2016). Consistent with the above argument, the regression results of this study confirmed that institutional quality has a significant negative effect on financial stability, implying that high institutional quality enhances financial stability in the SSA countries. In addition, mobile subscriptions and credit expansion through technology may lead to credit default, and hence affects financial system stability unless proper regulation is in place. Consistent with the above views, this study found that expansion in mobile subscriptions has a negative and significant effect on financial stability, implying that financial service expansion through technology needs proper supervision and regulation so as to ensure stability in the sector. While the adoption and use of fintech can expand the financial services sectors' reach and thereby enhance financial inclusion, it can also expose the financial institutions to criminal activity such as the hacking of bank systems, fraud and money laundering.

In this study, the impact of the global financial crisis of 2007 and 2008 was analysed to identify its impact on stability. Accordingly, the study found that the global financial crises have a significant negative effect on financial stability in the SSA economies. The result is in line with the empirical findings of other scholars that concluded a significant

negative relationship between the global financial crisis and financial stability (Noman, Gee and Isa, 2017; Siddik et. al., 2018). In addition, the financial crisis of the 2007/2008 was a good indicator that financial regulation alone is not sufficient to promote financial stability and therefore, it is necessary to cumulatively use measures such as financial inclusion to address similar problems (Atellu, Muriu and Sule, 2021).

Other explanatory variables such as economic growth, deposit interest rate, liquidity position, profitability, credit to deposit ratio and the real interest rate seem less significant in impacting financial stability in the region. However, different scholars advocate the importance of these indicators in affecting the level of financial stability (Han and Malecky, 2013; Morgan and Pontines, 2014; Siddik et al., 2018). Some of these argued that greater liquidity contributes to a low probability of default and leads to a stable financial system (Han and Malecky 2013). Sanogo and Moussa (2017) found that interest rate has a positive impact on financial stability. However, this study found that interest rates did not seem to have an effect on financial stability, indicating the importance of country specific research on the areas.

5. Conclusion and recommendations

Since the global financial crisis of 2007/ 2008, financial stability has become increasingly important to realise sustainable economic growth by ensuring that countries remain in control of the efficient functioning of their financial markets and institutions. However, there remains great variation across scholars on the key drivers of financial stability. Given this, our study examined the key determinants of financial stability across the selected SSA countries using secondary panel data collected for the period of 2000 to 2019. A composite index was developed to capture the multidimensional nature of both financial inclusion and institutional quality using the principal component analysis (PCA) technique.

From our results, it is possible to conclude that there are various factors that influence financial stability. Specifically, the regression results indicated that the one-year lag of financial stability and financial inclusion are the major positive drivers of financial stability in the SSA countries. However, institutional quality, technology adoption and global financial crises exert a negative impact on financial stability of the region. Our study contributes to the scholarly debate on the

sustenance of financial stability, as a complementary enhancement to financial inclusion in developing countries. In addition, the adoption of financial technologies and regulations should not trade-off with financial stability in the region, but rather serve a complementary purpose in enhancement of financial inclusivity, in pursuit of the attainment of the United Nations' SDGs. It is, therefore, critical for policy makers and financial sector regulators to consider the expansion of financial products and services as one important factor to ensure financial stability. Macroeconomic policies which govern the functioning and regulation of financial systems should embrace the good that technology brings about insofar as a bigger footprint of financial services to include the poor and low income earners is concerned, while also protecting the integrity and stability of financial markets and institutions. A limitation of our study is that the scope was restricted to one geographical location due to our personal interest in this cluster of developing countries. Future studies should undertake a comparative analysis of the nexus between financial stability and financial inclusion across different economic blocs such as BRICS, SSA, SADC and MENA countries, to ascertain whether there are any commonalities with regard to these variables.

Disclosure statement: *The author(s) declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.*

References

1. Adusei, M. (2015). The impact of bank size and funding risk on bank stability, *Cogent Economics and Finance*, 3(1), 1-19. <http://dx.doi.org/10.1080/23322039.2015.1111489>
2. Ahamed, M., and Mallick, S. (2019). Is financial inclusion good for bank stability? International evidence. *Journal of Economic Behavior and Organization*, 157, 403-427. <http://sro.sussex.ac.uk/id/eprint/69913/>
3. Ahmed, D. (2018). Financial inclusion and financial stability: survey of the Nigeria's financial system. *International Journal of Research in Finance and Management*, 1(2), 47-54. Available at: <https://www.researchgate.net/publication/330684916>
4. Ali, M., and Puaah, C.H. (2019). The internal determinants of bank profitability and stability: An insight from banking sector of Pakistan. *Management Research Review*, 42(1) 49-67.

5. Ali, S., and Tomoe, M. (2019). Investigation of the effects of financial regulation and supervision on bank stability: The application of CAMELS-DEA to quantile regressions. *Journal of International Financial Markets, Institutions and Money*, 58(C), 96-116.
6. Al-Salamat, W.A., and Al-Kharouf, S. (2021). The Determinants of Financial Stability: Evidence from Jordan, *International Journal of Business and Social Science*, 12(1). <https://doi:10.30845/ijbss.v12n1p5>
7. Al-Smadi, M.O., (2018). The role of financial inclusion in financial stability: lesson from Jordan. *Banks and Bank Systems*, 13(4), 31-39. [https://doi:10.21511/bbs.13\(4\).2018.03](https://doi:10.21511/bbs.13(4).2018.03)
8. Alvi, M.A., Rafique, A., and Shehzad, K. (2020). Financial inclusion and bank stability controversy: Evidence from South Asian region. *International Journal of Financial Engineering*, 7(04), 2050038. <https://doi.org/10.1142/S2424786320500383>
9. Anarfo, E.B., Abor, J.Y., and Osei, K.A. (2020). Financial regulation and financial inclusion in Sub-Saharan Africa: Does financial stability play a moderating role? *Research in International Business and Finance*, 51, 101070. <https://doi.org/10.1016/j.ribaf.2019.101070>
10. Anderson, T.W., and Hsiao, C. (1981). Estimation of Dynamic Models with Error Components. *Journal of the American Statistical Society*, 76, 598-606.
11. Arellano, M., and Bond S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Rev Econ Stud*, 58, 277–297.
12. Arellano, M., and Bover, O. (1995). Another Look at the Instrumental Variable Estimation of Error-Component Models. *Journal of Econometrics*, 68, 29-52.
13. Asongu, S., (2015). The impact of mobile phone penetration on African inequality. *International Journal of Social Economics*, 42(8), 706 – 716.
14. Asuming, P.O., Osei-Agyei, L.G., and Mohammed, J.I. (2018). Financial inclusion in sub-Saharan Africa: Recent trends and determinants. *Journal of African Business*, 20(1), 1–23.
15. Atellu, A.R., Muriu, P., and Sule, O. (2021). Do bank regulations matter for financial stability? Evidence from a developing economy. *Journal of Financial Regulation and Compliance*, 29(5), 514-532.
16. Baltagi, B.H. (2005). *Econometric Analysis of Panel Data*. John Wiley, Chichester. Available at: <https://library.wbi.ac.id/repository/27.pdf>
17. Blundell, R., and Bond, S. (1998). Initial condition and moment restriction in dynamic panel data models. *Journal of Econometrics*, 87(1), 115–143.

18. Boyd, J.H., and De Nicoló, G. (2005). The Theory of Bank Risk-Taking and Competition Revisited. *The Journal of Finance*, 60, 1329-1343.
19. Breitung, J., and Pesaran, M.H., (2005). Unit Roots and Cointegration in Panels. *IEPR Working Paper*, 05.32, *CESifo Working Paper Series*, 1565, Available at SSRN: <https://ssrn.com/abstract=796190> or <http://dx.doi.org/10.2139/ssrn.796190>
20. Carletti E, and Hartmann P. (2002). Competition and stability: what's special about banking? *ECB Working Paper*, 146. Retrieved from <https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp146.pdf>
21. Cihak, M., Mare, D.S., and Melecky, M. (2021). The Nexus of financial inclusion and financial stability: a study of trade-offs and synergies (English). *Policy Research Working Paper*, WPS 7722. <http://documents.worldbank.org/curated/en/138991467994676130/The-Nexus-of-financial-inclusion-and-financial-stability-a-study-of-trade-offs-and-synergies>
22. Creel, J., Hubert, P., and Labondance, F. (2015). Financial stability and economic performance. *Economic Modelling*, 48, 25-40.
23. Cukierman, A. (2013). Monetary Policy and Institutions before, during, and after the Global Financial Crisis. *Journal of Financial Stability*, 9, 373-384.
24. Dienillah, A., and Anggraeni, L. (2016). Dampak Inklusi Keuangan Terhadap Stabilitas Sistem Keuangan Di Asia. *Buletin Ekonomi Moneter Dan Perbankan*, 18(4), 409-430.
25. European Central Bank (2012). Financial Stability Review, June.
26. Fratzscher, M., Lo Duca, M., and Straub, R. (2016). ECB Unconventional Monetary Policy: Market Impact and International Spillovers. *IMF Econ Rev*, 64, 36–74.
27. Geršl, A., and Heřmánek, J. (2006). Financial Stability Indicators: Advantages and Disadvantages of Their Use in the Assessment of the Financial System Stability. *Financial Stability Report, Czech National Bank*. Retrieved from: https://www.cnb.cz/export/sites/cnb/en/financial-stability/.galleries/fs_reports/fsr_2006/FSR_2006_article_2.pdf
28. Gertler, M. (1988). Financial Structure and Aggregate Economic Activity: An Overview. *NBER Working Paper* w2559. Available at SSRN: <https://ssrn.com/abstract=341844>
29. Gómez, F. (2015). Failed bank takeovers and financial stability. *Journal of Financial Stability*, 16, 45-58.
30. Górska, K. and Krzemińska, K. (2019). Determinants of Polish financial stability in 2017-2018. *Central European Review of Economics and Finance*, 30(2), April, 5-19.

31. Han, R., and Malecky, M. (2013). Financial Inclusion for Financial Stability: Access to Bank Deposits and the Growth of Deposits in the Global Financial Crisis. *World Bank Policy Research Working Paper* 6577.
32. Hellmann, T.F., Murdock, K.C. and Stiglitz, J.E. (2000). Liberalization, Moral Hazard in Banking, and Prudential Regulation: Are Capital Requirements Enough? *American Economic Review*, 90, 147-165.
33. Keeley, M.C. (1990). Deposit Insurance, Risk, and Market Power in Banking. *The American Economic Review*, 80(5), 1183–1200. <http://www.jstor.org/stable/2006769>
34. Khan, H.R. (2011). Financial inclusion and financial stability: are they two sides of the same coin? Address at BANCON 2011, organized by the Indian bankers association and Indian overseas bank, Chennai 4 November 2011.
35. Kindleberger, C.P. (1978). *Manias, Panics, and Crashes: A History of Financial Crises*, New York: Basic Books, 3rd ed. 1996.
36. Kinyua, D., and Omagwa, J. (2020). Financial Inclusion and Bank Stability of Commercial Banks Listed in Nairobi Securities Exchange, Kenya. *International Journal of Current Aspects in Finance, Banking and Accounting*, 2(1), 64-81.
37. Klaas, J., and Vagizova, V. (2014). Tools for assessing and forecasting financial stability of the commercial bank under conditions of instability. *Investment Management and Financial Innovations*, 5(4), 157-163.
38. Koetter, M., Kolari, J., and Spierdijk, L. (2012). Enjoying the quiet life under deregulation? Evidence from adjusted Lerner indices for U.S. Banks. *Review of Economics and Statistics*, 94, 462-480.
39. Levin A, Lin, C.F, Chu, C.S.J (2002). Unit root tests in panel data: asymptotic and finite-sample properties. *J. Econometrics*, 108(1), 1–24.
40. Makoni, P.L. (2014). From financial exclusion to financial inclusion through microfinance: The case of rural Zimbabwe. *Journal of Corporate Ownership and Control*, 11(4), 447-455.
41. Mamadou Asngar, T., Ongo Nkoa, B.E. and Wirajing, M.A.K. (2022). The Effect of Banking Competition on Financial Stability in Central African Economic and Monetary Community Zone. *Studii Financiare (Financial Studies)*, 26(1), 23-53.
42. Marozva, G. and Makoni, P.L. (2021). The nexus between bond liquidity, stock liquidity and foreign portfolio investment. *International Journal of Finance & Banking Studies (2147-4486)*, 10(3), 92-103.
43. Minsky, H.P. (1977). A Theory of Systemic Fragility. Hyman P. *Minsky Archive*. 231. https://digitalcommons.bard.edu/hm_archive/231

44. Minsky, H.P. (1992). The Financial Instability Hypothesis. *The Jerome Levy Economics Institute, Working Paper 74*. <http://dx.doi.org/10.2139/ssrn.161024>
45. Morgan, P., and Pontines, V. (2014). Financial Stability and Financial Inclusion. *ADB Working Paper 488*. Available: <http://www.adbi.org/working-paper/2014/07/07/6353.financial.stability.inclusion/>
46. Mostak, M., and Sushanta, M. (2015). Is financial inclusion good for bank stability? International evidence. University of London, U.K. <https://doi.org/10.1016/j.jebo.2017.07.027>
47. Noman, A.H.M., Gee C.S., and Isa C.R. (2017). Does competition improve financial stability of the banking sector in ASEAN countries? An empirical analysis. *PLoS ONE*, 12(5), e0176546.
48. Norris, E.D., Ji, Y., Townsend, R., and Unsal, D.F. (2015). Identifying Constraints to Financial Inclusion and Their Impact on GDP and Inequality: A Structural Framework for Policy. *IMF Working Paper 22*.
49. Ngonyani, D. (2022). Financial Inclusion in Developing Countries. A Review of the Literature on the Costs and Implications. *Studii Financiare (Financial Studies)*, 26(1), 54-77.
50. Nxumalo, I.S. and Makoni, P.L. (2021). Analysis of International Capital Inflows and Institutional Quality in Emerging Markets. *Economies*, 9(4), 179.
51. Ozili P.K. (2018). Impact of digital finance on financial inclusion and stability. *Borsa Istanbul Review*, 18(4), 329-340.
52. Pesaran, H., and Smith, R. (1995). Estimating Long-Run Relationships from Dynamic Heterogeneous Panels. *Journal of Econometrics*, 68, 79-113.
53. Pesaran, M. H. (2007). A Simple Panel Unit Root Test in the Presence of Cross Section Dependence. *Journal of Applied Econometrics*, 22, 265-312.
54. Pham, T.T., Dao, L.K.O. and Nguyen, V.C., (2021). The determinants of bank's stability: a system GMM panel analysis, *Cogent Business and Management*, 8(1), 1963390.
55. Sanogo, V., and Moussa, R.K. (2017). Financial Reforms, Financial Development, and Economic Growth in the Ivory Coast. *Economies*, 5(1), 1-23.
56. Schwartz, A. J. (1986). Real and Pseudo-Financial Crises. in Forrest Capie and Geoffrey E. Wood, eds., *Financial Crises and the World Banking System*, Basingstoke, Macmillan, 11–31. <https://www.nber.org/system/files/chapters/c7506/c7506.pdf>

57. Siddik, M., Alam, N., and Kabiraj, S. (2018). Does Financial Inclusion Induce Financial Stability? Evidence from Cross-Country Analysis; *Australasian Accounting, Business and Finance Journal*, 12(1), 34-46.
58. Temesgen, F., Wondafarahu, M., and Badassa, W.C. (2022). Determinants of Financial Instability in Selected East and Southern African Countries. *International Journal of Economics, Finance and Management Sciences*, 10(2), 37-44.
59. Vo, D.H., Nguyen, N.T., and Van, L.T. (2021). Financial inclusion and stability in the Asian region using bank-level data. *Borsa Istanbul Review*, 21(1), 36–43.
60. Vo, H.D., Nguyen, V.M., Le, P.Q., and Pham, T.N. (2019). The determinants of financial instability in emerging countries. *Annals of Financial Economics*, 14(2), 1-9.
61. Zins, A., and Weill, L. (2016). The determinants of financial inclusion in Africa. *Review of Development Finance*, 6(1), 46-57.