FINANCIAL INCLUSION AND FINANCIAL STABILITY IN SUB-SAHARAN AFRICA

by

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ABSTRACT

This study empirically investigates the impact of financial inclusion on financial stability of the banking sector across 37 Sub-Saharan African (SSA) countries using country level data from 2005 to 2019. The financial sector plays a crucial role in allocating financial resources to the economy of every nation, and financial stability is a crucial macroeconomic requirement for this function of allocating financial resources to be carried out in a sustainable manner. Therefore, empirical research that tries to understand the link between financial inclusion and financial stability is essential, particularly in SSA, a developing region where few of such studies were conducted. This study uses the Dynamic Common Correlated Effects, the Augmented Mean Group, and the Quantile Regression estimators to estimate the underlying link. The study finds evidence of a positive and statistically significant impact on financial stability of the banking sector in the 37 SSA countries. In line with the institutional theory, financial inclusion has a positive and statistically significant impact on financial stability of the banking sector in SSA countries with low levels of financial stability and economic development. In addition, an increase in banking sector financial stability in the previous period has a positive and statistically significant impact on banking sector financial stability in the current period, *ceteris paribus*. It is recommended that policymakers should strengthen coordination among regulatory and supervisory institutions to promote financial inclusion in SSA countries and the region in a safe and sustainable way. They should cross-fertilize skills and competencies, target financially excluded populations and increase financial literacy among low-income households.

KEY TERMS:

Sub-Saharan Africa; Financial inclusion; Financial stability; National financial inclusion strategies; Cross-sectional dependence; Dynamic common correlated effects estimator; Augmented mean group estimator; Quantile regression estimator; Low-income economies; Middle-income economies.

DEDICATION

To my beloved mother, Mamoeti Damane, and Likeleko Damane, my cherished sister.

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Notwithstanding the contribution of the aforementioned parties, the views expressed in this study, as well as any errors or omissions, are entirely mine, and none of the aforementioned parties should be held responsible.

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ACRONYMS

Alliance for Financial Inclusion	AFI
Association of Southeast Asian Nations	ASEAN
Augmented Mean Group	AMG
Automatic Teller Machines	ATMs
Bank of International Settlements	BIS
Basel Committee on Banking Supervision	BCBS
Basel Core Principles for Effective Banking Supervision	BCPs
Committee of Central Bank Governors	CCBG
Common Correlated Effects	CCE
Cross-sectional Dependence	CD
Digital Financial Services	DFS
Dynamic Common Correlated Effects Mean Group	DCCE-MG
Dynamic Common Correlated Effects	DCCE
Early Warning Systems	EWS
Error Correction Model	ECM
European Central Bank	ECB
Extreme Financial Inclusion	EFI
Factor Analysis	FA
Feasible Generalized Least Squares	FGLS
Federal Reserve Bank	FED
Financial Access Survey	FAS
Financial Education	FinEd
Financial Sector Assessment Program	FSAP
financial sector indicators/Indices	FSIs
Financial Stability Board	FSB
Financial Stability Forum	FSF

Financial Stability Mandate	FSM
Forcibly Displaced Persons	FDPs
Framework for Strong, Sustainable, and Balanced Growth	FSSBG
Fully Modified Least Squares	FMOLS
Gender Inclusive Finance	GIF
Generalized Least Squares	GLS
Generalized Method of Moments	GMM
Global Financial Crisis	GFC
Global Financial Development Database	GFDD
Global Financial Stability Report	GFSR
Gross Domestic Product	GDP
Group of Seven	G-7
Group of Twenty	G-20
Inclusive Green Finance	IGF
Independently and Identically Distributed	IID
International Bank for Reconstruction and Development	IBRD
International Centre for Settlement of Investment Disputes	ICSID
International Development Association	IDA
International Finance Corporation	IFC
International Financial Reporting Standards	IFRS
International Monetary and Financial Committee	IMFC
International Monetary Fund	IMF
International Network on Financial Education	INFE
Know Your Client	KYC
Latin American Caribbean	LAC
Low-Income Countries	LICs
Macro-stress Testing	MST

Mean Group	MG
Memorandums of Understanding	MoUs
Micro Finance Institutions	MFIs
Micro, Small, and Medium-sized Enterprises	MSMEs
Middle East and North Africa	MENA
Multilateral Investment Guarantee Agency	MIGA
National Financial Inclusion Strategies	NFISs
Non-Bank Financial Institutions	NBFIs
Non-Performing Loans	NPLs
Organization for Economic Co-operation and Development	OECD
Organization of Islamic Corporations	OIC
Pooled Mean Group	PMG
Principal Composite Analysis	PCA
Quantile Regression	QREG
Regional Consultative Groups	RCGs
Regional Financial Integration	RFI
Return on Assets	ROA
Small and Medium-sized Enterprises	SMEs
Southern African Development Cooperation	SADC
Standard-Setting Bodies	SSBs
Sub-Saharan Africa	SSA
Sustainable Development Goals	SDGs
United Nations	UN
Universal Financial Access by 2020	UFA 2020
Vector Auto-Regression	VAR
World Bank Group	WBG

Chapter 1: Introduction and Background of the Study

1.1 Background

The banking sector makes up the bulk of the financial system in Africa. The sector has experienced significant changes during the last 20 years. State-owned banks, for example, used to dominate the banking sector with strict restrictions. But considering that the entry restrictions have been drastically lowered recently by country authorities, both domestic private banks and foreign banks have been allowed to enter the sector. This has encouraged innovations and a more global perspective on banking in Africa. Hence, the formal financial system in Africa still has significant room for improvement (Anarfo *et al.,* 2022; Abor & Adjasi, 2022; Abugre *et al.,* 2022; Beck & Cull, 2014). Based on statistics from the World Bank's Global Findex Database, there is wide variety across the sub-regions of Africa's financial system, particularly in terms of the development of the banking industry (Asuming *et al.,* 2019; Beck *et al.,* 2013). Banks continue to play a significant role in financial intermediation despite the continent's less developed financial sector. When financial intermediation is considered, along with its significance as a vehicle for the transmission of monetary policy, bank regulators are more interested in the stability of banks as well as their role in boosting financial inclusion, particularly in the wake of the 2007 - 2009 financial crisis. This is possible because it is believed that the stability of the banking sector is a key part of the stability of the financial system (Dwumfour, 2017).

As a result, in recent years, authorities in Africa and around the world have paid more attention to the goal of both financial inclusion and stability. By way of the Maya Declaration and the Global Partnership for Financial Inclusion, for instance, the G-20 has called for a global commitment to enhance financial inclusion. The G-20 also supports regulatory reforms, updated international standards for banks, and financial stability through these channels (Jungo *et al.,* 2022; Čihák *et al.,* 2021; Asuming *et al.,* 2019). The question is whether policies intended to improve financial stability go hand in hand with policies aimed at increasing the unbanked and financially underserved's access to formal financial services and products, or if they endanger financial stability.

Low financial literacy, fewer bank and other financial institution branches, comparatively higher costs of servicing small deposits and loans, a lack of credit information and collateralizable assets are some of the obstacles to financial inclusion that households and businesses in low-income countries must overcome. On the one hand, more financial inclusion for individuals and small and medium-sized businesses (SMEs) restricts the growth of large and unregulated banking sectors, which are characterized by excessively high interest rates for borrowers and weaken prospects for economic expansion (Amatus & Alireza, 2015; Vo *et al.,* 2019). Conversely, it has been suggested that lending to low-income groups of people and SMEs could pose dangers to the financial system due to greater transaction and information costs brought on by the lack of a credit history and collateral (Vo *et al.,* 2021). Given these two opposing viewpoints on the connection between financial stability and inclusion, it is crucial for policymakers to comprehend the synergies and trade-offs that define this relationship. Ignoring these connections could result in undesirable effects, such as increased financial exclusion or catastrophic financial crises (Čihák *et al.,* 2021). As a result, research emphasizing the connection between financial inclusion and financial stability has gained momentum in recent years.

1.1.1 Problem Statement

The Sustainable Development Goals (SDGs) of the United Nations (UN) and the African Union's Agenda 2063 are both acknowledged as being achievable with the help of financial inclusion. Financial inclusion can foster economic growth and general macroeconomic and financial sector stability by assisting in the extension of formal financial services and products to financially underserved economic agents (i.e., households and businesses) and thereby promoting consumption, investment, job creation, and poverty alleviation (Park & Mercado, 2015; Kim 2016; Nanda & Kuar, 2016; Jima & Makoni, 2023a). Adults in the SSA region make up a large number of those who are financially excluded and without access to financial services. For instance, only 43 percent of them have bank accounts, which is far less than what the UN's SDGs call for (Demirgüç-Kunt *et al.,* 2018). Due to this, a number of SSA economies have developed and implemented national financial inclusion strategies (NFISs) in an effort to enhance financial inclusion at the national level (and, consequently, the regional level) (Zins &

Weill, 2016; Demirgüç-Kunt *et al.,* 2018). For instance, as of 2022, 87 percent of SSA member countries of the Alliance for Financial Inclusion (AFI) launched their NFISs, compared to 16 percent after 2018. Additionally, only AFI member countries in SSA and those from Asia and the Pacific will have introduced their third NFISs as of 2022 (AFI, 2022a).

It has been suggested that financial inclusion might facilitate the growth of financial sector stability. For instance, when more economic agents are included in the formal financial sector and their payments information is incorporated into credit files, this reduces the information gap between lenders and borrowers, enables financial institutions to assess credit risks more accurately, and helps them avoid potential increases in their portfolio of non-performing loans (NPLs), which would otherwise endanger financial stability (Demirgüç-Kunt *et al.,* 2017; Kulu *et al.,* 2022). Though the rapid growth of financial inclusion, for instance through credit extension, may result in lowered lending criteria that run the risk of undermining financial stability, experience from the global financial crisis of 2007–2009 has shown that this is not necessarily the case. Additionally, banks may outsource their credit assessment function in order to widen the pool of potential borrowers, thus increasing their reputational risks and undermining financial stability in the process (Khan, 2011; Petersen & Rajan, 1995; Ahamed & Mallick, 2019; Morgan & Pontines, 2018). Clearly, there is evidence that financial inclusion may have an effect on financial stability in positive as well as negative ways. A challenge is that, despite numerous attempts, scholars have not yet agreed on how financial inclusion affects financial stability (Jima & Makoni, 2023b).

Inconsistent conclusions about the effects of financial inclusion on financial stability necessitate further investigation. This lack of agreement among academics has motivated this research, in the case of the SSA region. The SSA region was chosen because, while financial policy reforms in the region have been successful in increasing financial depth and stabilizing macroeconomic indicators including exchange rate, economic growth, inflation, and financial stability, they have been less successful in increasing financial inclusion since the 1980s. This is also despite the impressive launching of NFISs in most

of the region’s economies. As a result, the SSA region is among the bottom regions in the world, in terms of actual account ownership and usage. For instance, Nigeria, the SSA region's most populous country is one of seven economies that jointly house more than half of the world's unbanked people (World Bank, 2022). Additionally, the gender disparity in bank account ownership in SSA grew from 5 percent in 2011 to 12 percent in 2021, which is three times the global average and double that of comparable developing countries (Sarpong & Nketiah-Amponsah, 2022; World Bank, 2022).

Empirical research that aims to understand the connection between financial inclusion and financial stability is crucial given the financial sector's essential function in directing financial resources into the economy. This is especially true in the context of a developing region like SSA, where there are not many studies of this kind. Five general gaps can be identified in the literature. First, the link between financial inclusion and financial stability has been largely discussed in case studies or institutional papers, lacking a concrete conceptual framework or empirical evidence. This gap suggests that the posited linkages are often not grounded in concrete theory or supported by empirical evidence. Second, the current panel data-based multi-country studies do not consider cross-sectional dependence, potentially leading to erroneous regression results due to the failure to consider the potential spillover effects of national and regional policies. Third, most studies use one metric for financial inclusion and stability, and when using composite indicators, they use non-uniform proxies or country-specific indices, which can lead to misleading outcomes and difficulty in comparing results across studies. Fourth, most studies review financial inclusion's impact on financial stability across countries, neglecting its effects at low or high levels of financial stability, thereby providing a narrow perspective on the effects of financial inclusion. Fifth, of the few studies that examine the relationship between financial inclusion and financial stability in SSA countries, they often fail to account for the economic development context, highlighting the need for more comprehensive analysis. These points will be fleshed out further in the significance of the study and in the paper’s review of empirical literature.

The current study aims to look into how financial inclusion affects financial stability in the SSA area and fill the identified gaps in the literature. Given the importance of the banking sector in SSA, financial stability is framed in the context of banks – therefore, financial stability and bank level stability or financial stability of the banking sector are used interchangeably in our study.

1.1.2 Research Objectives

The primary objective of this thesis is to investigate the effect of financial inclusion on financial stability of the banking sector in SSA countries.

1.1.2.1 Specific Objectives:

i. To investigate the impact of financial inclusion on financial stability of the banking sector in 37 SSA countries with possible cross-sectional dependence.

ii. To investigate whether financial inclusion affects financial stability of the banking sector differently in 37 SSA countries when different indicators of financial inclusion are used.

iii. To investigate whether financial inclusion affects financial stability of the banking sector differently when levels of banking sector financial stability change in 37 SSA countries.

iv. To analyze whether financial inclusion affects financial stability of the banking sector differently across 37 SSA countries based on their level of economic development.

1.1.3 Hypotheses

Using different dimensions and measurements of inclusion and stability, we examine how financial inclusion affects financial stability of the banking sector in SSA. The following hypotheses serve as the foundation for our analysis and will be put to the test using the

primary research model, supplementary panel regression approaches, and a number of robustness tests. The hypotheses include:

(i) H0: Financial inclusion has no impact on financial stability in the study's 37 SSA countries when cross sectional dependence is considered and controlled for.
H1: Financial inclusion has a positive and statistically significant impact on financial stability in the study's 37 SSA countries when cross sectional dependence is considered and controlled for.

(ii) H0: Financial inclusion has no impact on financial stability in the study's 37 SSA countries, irrespective of the type of financial inclusion indicator used.
H1: Financial inclusion has a positive and statistically significant impact on financial stability in the study's 37 SSA countries, irrespective of the type of financial inclusion indicator used.

(iii) H0: Financial inclusion has no impact on financial stability in SSA countries with low levels of financial stability.
H1: Financial inclusion has a positive and statistically significant impact on financial stability in SSA countries with low levels of financial stability.

(iv) H0: Financial inclusion has no impact on financial stability in SSA countries with low levels of economic development.
H1: Financial inclusion has a positive and statistically significant impact on financial stability in SSA countries with low levels of economic development.

To support our study, we use country specific data collected from the most recent vintages (i.e., 2022) of the World Bank Global Financial Development Database (GFDD) and World Bank Development Indicators (WDI), on which we applied the the Dynamic Common Correlated Effects Mean Group (DCCE-MG) technique by Chudik and Pesaran (2015), the Augmented Mean Group (AMG) estimator pioneered by Eberhardt and Teal (2010) and Bond and Eberhardt (2009), and the Quantile Regression (QREG) model with fixed

effects of Koenker and Bassett (1978) as well as Machado and Santos Silva (2019). The DCCE-MG controls for possible cross-sectional dependence in the data. Further, by employing the Jackknife correction approach, it can be used with small sample sizes (Chudik & Pesaran, 2015). In addition, the method can still deliver accurate results even in the presence of structural breaks or unbalanced panel data (Kapetanios *et al.,* 2011; Ditzen, 2016). Similarly, the AMG is resilient to possible endogeneity and cross-sectional dependency. Along with being resistant to serial correlation, missing data, and probable causes of non-stationarity in the series, it also accounts for diverse slope coefficients (Voumik et al., 2023; Shi et al., 2021). The QREG model allows for investigating the impact of financial inclusion across the entire conditional distribution of banking sector financial stability in the SSA region. The technique gives weights to the observations and uses the entire sample to estimate each quantile using the information that is available. Therefore, the weighted data of the whole sample is utilized to estimate the coefficients for each quantile regression, rather than only the portion of the sample at that quantile (Oliveira et al., 2013; Machado and Santos Silva, 2019).

1.1.4 Significance of the Study

By exploring the impact of financial inclusion on banking sector financial stability in SSA, this study enriches the literature in various ways. While several studies in the literature examine the impact of financial inclusion (or development) on economic growth, income inequality, and poverty reduction (see World Bank, 2008; Levine, 2005; Demirgüç-Kunt & Levine, 2008; Amatus & Alireza, 2015; Ahamed & Mallick, 2019; Khan *et al.,* 2022; Jungo *et al.,* 2022), the link between financial stability and financial inclusion is often purported and seldom investigated, especially in developing countries. There is currently a scarcity of literature to formally verify the statistical significance and nature of the link in developing countries. This is because the analysis into the link between financial inclusion and financial stability is still relatively in its nascent stage of development and practice around the globe (Schinasi, 2004; Ozili, 2021a, 2021b). For instance, cross-country evidence mostly focuses on financial depth benefits, not broad financial inclusion. In this regard, deep financial sectors may not be inclusive if access is geared towards the wealthy and not the unbanked or underserved. Furthermore, notwithstanding the gains that have been

made with financial sector databases such as the International Monetary Fund (IMF) financial access survey (FAS) and the financial stability indicators (FSI) or the World Bank World Bank Global Financial Development Database (GFDD), there are significant data gaps, especially in the case of low-income countries. As such, macro-level effects of financial inclusion are challenging to measure consistently across countries. Conversely, the effects of financial depth have been extensively studied due to the availability of data from financial service suppliers (Cull et al., 2012; Demirguc-Kunt & Klapper 2012a). In the current study, we assess the impact of financial inclusion on financial stability in 37 SSA countries and contribute to the literature on financial stability (see, Berger *et al.,*2009; Laeven & Levine, 2009; Houston *et al.,* 2010; Beck *et al.,* 2013; Dwumfour, 2017) with a focus on the effect of financial inclusion.

We note that existing empirical research on the relationship between financial stability and financial inclusion can generally be divided into two strands. The first strand of research supports the view that financial inclusion has a positive impact on financial stability (see Amatus & Alireza, 2015; Morgan & Pontines, 2018). The second strand takes the view that financial inclusion can have a negative impact on financial stability (see Čihák *et al.,* 2016; Mendoza *et al.,* 2009; Al-Smadi, 2018). Seemingly, divergent views exist in the empirical research conducted thus far into the relationship between financial inclusion and financial stability. Some studies provide evidence of a negative relationship between financial inclusion and financial stability (see Petersen & Rajan, 1995; Ahamed & Mallick, 2019) while others purport a positive relationship (see Cull, *et al.,* 2012; Ahamed & Mallick, 2019; Frączek, 2019; Danisman & Tarazi, 2020; Feghali *et al.,* 2021). This divergence in findings presents inconclusiveness on the actual effects of financial inclusion on financial stability and motivates the need for further investigation into the nature of the impact, especially in less developed economies, where the evidence is most limited. In this regard, the current study puts the focus on less developed economies in the sub-Saharan Africa (SSA) region to provide empirical evidence on the channels through which financial inclusion affects financial stability.

Furthermore, although the few studies that have researched the link between financial stability and financial inclusion along these two strands offer insightful results, important shortcomings exist. First, until recently, most papers on the link between financial inclusion and financial stability have been either country or regional case studies put together in speeches or institutional working documents (see, Rahman, 2014; Čihák et. al., 2016; Chen et al., 2018; Cull et al., 2012; Čihák et al., 2021; Khan, 2011; Hannig & Jansen, 2010) lacking a concrete conceptual framework or empirical evidence. This gap emphasizes the need for clearly defined theoretical linkages between financial inclusion and financial stability and a comprehensive articulation of relevant conceptual frameworks through which to conduct rigorous empirical analysis of the purported relationship. Our study fills this gap by providing a detailed account of the multiplicity of frameworks and approaches used in the conceptualization of financial inclusion and financial stability, coupled with different policy and government initiatives pursued to promote financial inclusion and financial stability globally and in the SSA region. This is complemented with an outline of a clear conceptual framework through which to inform the empirical analysis of the relationship between financial inclusion and financial stability. This will help to facilitate credible and evidence-based policy formulation aimed at balancing financial stability with the safe and secure promotion of financial inclusion.

Second, recent cross-country studies on the impact of financial inclusion on financial stability do not always account for the possible existence of cross-sectional dependence between panels (see Brei *et al.,* 2020; Al-Smadi, 2018; Čihák *et al.,* 2016; Morgan & Pontines, 2018; Ahamed & Mallick, 2019; Jima & Makoni, 2023b). In the recent past, countries in the SSA region have embarked on political agreements to facilitate regional financial integration (RFI) on financial market development and access to finance in SSA. These RFI initiatives are set to culminate in an opening up of capital accounts among countries of geographical proximity as well as the liberalization of cross-border activities of financial institutions within the integrating area. The process is two-pronged. Firstly, it is facilitated through the penetration of foreign banks between countries. Secondly, it involves the harmonization of financial regulation, payment systems and regional institutional development (Lovegrove *et al.,* 2007; Bhatia *et al.,* 2009; Frey & Volz, 2013).

These spillovers suggest the possibility of cross-sectional dependence between countries. There is evidence to suggest that if unobserved cross-sectional dependence is not accounted for in panel data analysis, spurious results can arise (Pesaran, 2006; Chudik & Pesaran, 2015; Ditzen, 2018a). Our study fills this research gap by using dynamic panel data regression models that can detect and model for cross-sectional dependence in the data while still allowing for heterogenous coefficients. This will allow policy makers avoid sub-optimal policy design that would otherwise prevail if the empirical analysis and subsequent research results ignored the possible existence of cross-sectional dependence.

Third, past studies that estimate the impact of financial inclusion on financial stability usually use traditional regression techniques that focus on the mean effects of financial inclusion on financial stability (see Matsebula & Sheefeni, 2022; Anthony-Orji *et al.,* 2019; Al-Smadi, 2018; Neaime & Gaysset, 2018; Jungo *et al.,* 2022; Jima & Makoni, 2023b). Consequently, important relationships may be missed or under- or overestimated (Binder & Coad, 2011). In the current study, we complement linear dynamic panel regression techniques with a fixed effect panel quantile regression model to investigate the impact of financial inclusion, on financial stability in SSA. This allows us to examine the impact of financial inclusion on financial stability throughout the conditional distribution, while controlling for unobserved individual country heterogeneity. For policy makers, this is useful because it enables a nonlinear analysis of the relationship between financial inclusion and financial stability with a focus on how policy can be formulated across different levels of financial stability, and not just the mean.

Fourth, recent studies that analyze the financial inclusion and financial stability nexus in the SSA region usually focus on either a single country case, a subgroup within the regional group, or a single income group within the regional group (see Aduda & Kalunda, 2012; Amatus & Alireza, 2015; Leigh & Mansoor, 2016; Arora, 2019; Jungo, *et al.,* 2022). Furthermore, such studies provide mixed conclusions of the impact of financial inclusion on financial stability across country income groups. In this regard, our study aims to provide a holistic empirical understanding of how financial inclusion affects financial

stability at the regional level and across in low income, lower-middle income and upper middle-income SSA country groups, respectively. For policy makers, the granularity brought about by income classification is beneficial for analytical and operational reasons. Analytically, income classification helps in understanding and identifying differences in developmental achievements and processes within countries. Operationally, the classification of countries by income informs better tailoring of policies to country specific circumstances on the basis of evidence.

Fifth, most studies on the relationship between financial inclusion and financial stability show non-uniformity in the use of inclusion and stability proxies across studies, mainly because of lack of common data across countries or lack of consensus on a specific definition in each case (see Al-Smadi, 2018; Čihák *et al.,* 2016; Morgan & Pontines, 2018, Neaime & Gaysset, 2018). Due to this, it is difficult to draw comparisons and generalize the results of the studies. To overcome this challenge, the present study provides a comprehensive and multi-dimensional view of inclusion and stability in SSA by employing various proxies of inclusion and stability in conjunction with composite indicators developed using the method of principal composite analysis (PCA), in a similar way to Jungo *et al.,* (2022). Alongside a composite indicator, financial inclusion is proxied by two indicators, namely, bank branches per 100,000 adults and ATMs per 100,000 adults, respectively. The same financial inclusion indicators have been used by Neaime and Gaysset (2018), Khan *et al.* (2022), Saha and Dutta (2021), and Matsebula and Sheefeni (2022). Together with a composite indicator, financial stability is proxied by bank credit to bank deposits (%), bank Z-scores or distance to default, and liquid assets to deposits and short-term funding (%), respectively. The same financial stability indicators have been used by Pal and Bandyopadhyay (2022), Jungo *et al.* (2022), Hakimi *et al. (*2022), Abdulkarim and Ali (2019), as well as Saha and Dutta (2021).

Last, most studies that investigate the nexus of financial stability and financial inclusion tend to focus on advanced and emerging market economies (see Brei *et al.,* 2020; Morgan and Pontines, 2018; Vo *et al.,* 2021; Jungo *et al.,* 2022). In this respect, there is limited evidence from developing countries, especially those in the SSA region, where the

financial system is dominated by banks and is relatively still underdeveloped compared to its counterparts in the rest of the world (World Bank, 2018a; Jungo *et al.,* 2022). The current study fills this gap by investigating how financial inclusion affects financial stability in the SSA region. By presenting empirical evidence on the relationship between financial inclusion and financial stability as well as deeper insights into the complementarity of macroeconomic factors that affect financial stability in the SSA region. This study therefore provides helpful inputs to policy makers, bankers, and financial sector regulators to make informed decisions on how best to promote financial inclusion in the region while ensuring financial stability. This is valuable given the current low levels of financial inclusion in most countries in SSA.

1.1.5 Chapter Outline of the Thesis

This thesis is divided into eight chapters. Chapter 1 presents the introduction and background of the study. Chapter 2 provides detailed discussions on various definitions of financial inclusion and financial stability. Chapter 3 offers an overview of the contemporary trends and developments in financial inclusion in SSA. Chapter 4 discusses common ways to measure financial stability, coupled with initiatives undertaken to promote financial stability around the globe, as well as some challenges to financial stability in the SSA region. Chapter 5 offers a discussion on the theoretical framework underpinning the study, as well as the empirical evidence from past studies around financial stability, financial inclusion, and the relationship between the two. Chapter 6 describes the data and methodology used in the research. Chapter 7 presents the empirical results of the study's evaluation of the relationship between financial stability and financial inclusion in SSA countries. Chapter 8 presents the summary of findings, conclusions, and policy recommendations.

Chapter 2: Defining Financial Inclusion and Financial Stability

2.1 Introduction

This chapter contributes to the financial inclusion and financial stability literature in two major ways. First, it provides a systematic review of common definitions and measures of financial inclusion and financial stability, respectively, while also identifying the overlaps in each case. In this way, it complements earlier studies such as Cull, *et al.* (2014), Demirgüç-Kunt *et al.* (2017) as well as Duvendack and Mader (2018) that have focused more on the positive socio-economic and macroeconomic spill overs of financial inclusion, as opposed to how it is defined and/or measured. Second, by presenting a detailed understanding of how financial inclusion and financial stability are respectively defined and measured, this chapter provides a synthesised and holistic view that SSA policy makers can use to balance the trade-offs between inclusion and stability while developing effective policies aimed at promoting inclusion and stability. This will ensure that previously underbanked and underserved economic agents in the SSA region have greater access to financial products and services in a sustainable and safe manner.

2.2 Defining Financial Inclusion

There is no one standard measure of financial inclusion. It is a concept that differs across countries and can be viewed from the perspective of both users and suppliers of financial products and services as well as from the lens of regulators and policymakers. In this regard, given the focus and scope from which it is being analyzed, it can be viewed from a unidimensional perspective or from a multidimensional one (Pesqué-Cela *et al.,* 2021). Working definitions of financial inclusion have usually been grouped into two types. The first type constitutes early definitions that are more one-dimensional and focus on the *access* to formal financial services and products by economic agents' (i.e., households and firms) (see Carbó *et al.,* 2005; Leyshon & Thrift, 1995). The second type, which can be considered as the more recent definitions, take a broader or multidimensional view of the concept, combining the focus on access to financial services and products by economic agents with their *use*, *cost,* and *quality* (see Allen *et al.,* 2016; Demirgüç-Kunt & Klapper, 2013; Demirgüç-Kunt *et al.,* 2017). Our discussion of the definitions of financial inclusion under this section will focus mainly on the multidimensional view. Table 2.2.1

presents an overview of how access, use, cost, and quality are understood in the multidimensional view of financial inclusion.

Table 2.2.1: Access, Use, Cost and Quality in Financial Inclusion

Access	Use	Cost	Quality
• The ready availability or opportunity to use formal financial services and products. • The physical ability of economic agents to reach financial services easily.	• Economic agents' actual use of formal financial services and products.	• Costs associated with accessing and using formal financial services and products, both monetary and non-monetary.	• Whether the financial services and products meet the needs of the consumers and how well the consumers are informed and knowledgeable about them and use them in a safe, formal, and well-regulated space.

Source: Author's own compilation based on Espinosa-Vega, *et al.,* (2020); Pesqué-Cela *et al.,* 2021; Beck *et al.,* (2007); Amidži *et al.,* (2014); Queralt, (2016)

From Table 2.2.1, the financial inclusion concept is best understood from the perspective of its four dimensions, namely access, use, cost, and quality. For instance, one of the main reasons consumers, especially those in the rural areas, are often excluded from formal financial services and products such as bank accounts is their inability to physically reach or access the formal financial institution, as it is usually located far from them in the urban areas (Amidži *et al.,* 2014). Therefore, households and firms located far from the physical reach of formal financial services and products are less likely to make actual use of them. In this regard, the distance from physical financial services and products can constitute both a monetary and non-monetary cost of financial inclusion. The higher the cost, the more likely are economic agents to source alternative and relatively lower quality financial services and products in the informal and unregulated financial sector (Espinosa-Vega, *et al.,* 2020; Pesqué-Cela *et al.,* 2021; Beck *et al.,* 2007; Amidži *et al.,* 2014; Queralt, 2016).

The type of indicators used to measure each of the four dimensions of financial inclusion need to be internationally recognized to allow for cross-country comparability. Nonetheless, their universal use is usually a function of data availability across countries. Table 2.2.2 presents some of the most commonly used proxies of access, use, cost, and

quality dimensions of financial inclusion. Evaluating the access, use, cost and quality of formal financial services and products over time using these proxies can provide policy makers with a sense of the trajectory of financial inclusion at a country, regional or global level, and thus inform relevant policy development.

Table 2.2.2 Access, Use, Cost and Quality Proxies of Financial Inclusion

Access	Use	Cost	Quality
• Number of automatic teller machines (ATMs) per 100,000 adults or per 1,000km square. • Number of bank branches per 100,000 adults or per 1,000 km square.	• Percentage of adults with at least one type of regulated deposit account • Percentage of adults with at least one type of regulated loan account. • Number of household depositors per 1,000 adults. • Number of household borrowers per 1,000 adults.	• Average cost of opening a basic bank account • Average cost of maintaining a basic bank account • Average cost of credit transfers.	• Financial literacy / financial knowledge score. • Disclosure requirements. • Formal internal and external dispute resolution frameworks / mechanisms.

Source: Author's own compilation based on Espinosa-Vega *et al.* (2020); Pesqué-Cela *et al.* (2021), Beck *et al.* (2007), Amidži *et al.* (2014), and Queralt (2016).

Table 2.2.2 shows that proxies of access usually comprise geographic or demographic penetration indicators such as the number of automatic teller machines (ATMs) and bank branches rescaled by land mass or adult population. In this case, the number of ATMs and bank branches per 1,000 km satisfy the access dimension of financial inclusion since they measure the availability or opportunity of physical financial services and products as a function of the physical distance to readily access them (Espinosa-Vega *et al.,* 2020; Pesqué-Cela *et al.,* 2021; Beck *et al.,* 2007; Amidži *et al.,* 2014; Queralt, 2016).

Proxies of the use of formal financial services and products usually entail the possession by households, of at least one deposit account with a formal financial institution. In this regard, all types of deposit accounts are considered, including transferable, sight, savings, and fixed-term deposits, respectively. Common use proxies also include the number of household borrowers who possess at least one loan account with a formal financial institution. In the same way as deposit accounts, all kinds of loan accounts are

considered, including mortgage loans, consumer loans, financial leases, and hire-purchase credit, to name a few (Espinosa-Vega *et al.,* 2020; Pesqué-Cela *et al.,* 2021; Beck *et al.,* 2007; Amidži *et al.,* 2014; Queralt, 2016).

The cost dimension of financial inclusion is usually proxied by the average cost of opening a basic bank account, the average cost of maintaining a basic bank account as well as the average cost of credit transfers. The lower the cost in each of these cases, the better. Often, a well-developed financial sector, that is, one characterized by a high level of competition among financial service and product providers, can boast a lower cost of financial inclusion (Espinosa-Vega *et al.,* 2020; Pesqué-Cela *et al.,* 2021; Beck *et al.,* 2007; Amidži *et al.,* 2014; Queralt, 2016).

The quality dimension of formal financial services and products is usually proxied by a variety of indicators that include the financial literacy or financial knowledge score, disclosure requirements, and formal internal and external dispute resolution frameworks or mechanisms, at the country level (Espinosa-Vega *et al.,* 2020; Pesqué-Cela *et al.,* 2021; Beck *et al.,* 2007; Amidži *et al.,* 2014; Queralt, 2016).

Internationally, the indicators in Table 2.2.2 are compiled by institutions such as the International Monetary Fund (IMF) and World Bank using multinational survey data gathered from financial institutions and statistics agencies at the country level. For instance, in 2009, the IMF launched the Financial Access Survey (FAS). It is defined as supply-side database on access to and use of financial services that include digital financial services and gender-disaggregated data. The latest vintage of the FAS covers 189 jurisdictions, with more than 100 data series and historical data from 2004. Noteworthy, nine FAS indicators have been endorsed as the G20 financial inclusion indicators (van Oudheusden, 2018). These include:

1. Number of ATMs per 100,000 adults
2. Number of commercial bank branches per 100,000 adults
3. Number of mobile money transactions per 100,000 adults

4. Number of deposit accounts at commercial banks per 1,000 adults
5. (a) Number of line insurance policy holders per 1,000 adults; (b) Number of non-life insurance policy holders per 1,000 adults
6. Deposit accounts of SMEs at commercial banks (as % of non-financial corporations)
7. Loan accounts of SMEs at commercial banks (as % of non-financial corporations)
8. Number of registered mobile money agent outlets per 100,000 adults
9. Number of loan accounts with commercial banks per 1,000 adults

Similarly, in 2012, the World Bank introduced the Global Financial Development Database (GFDD) which is a comprehensive dataset of characteristics of the financial system (i.e., financial institutions and financial markets) for 214 economies (Čihák *et al.,* 2012; World Bank, 2012). The latest vintage of the database, by the time of our study was last updated in September 2022 and contains annual data spanning from 1960 to 2021 for 108 indicators. The indicators provide measures of financial systems' depth, access, efficiency, and stability, respectively. Much like the IMF's FAS, the World Bank's GFDD offers an invaluable opportunity for researchers and policy makers to analyze and understand the multifaceted nature of financial inclusion, as well as its relationship with other concepts, such as financial stability. For instance, with the use of the financial data from the country, regional and global level housed in the GFDD, one can empirically characterize different characteristics of financial systems and also compare financial systems across countries and regions over time ((Čihák *et al.,* 2012; World Bank, 2012). As far as financial inclusion is concerned, the GFDD covers the *access* dimension with a handful of financial institution indicators. These include:

1. Accounts per thousand adults (commercial banks)
2. Branches per 100,000 adults (commercial banks)
3. Percentage of people with a bank account
4. Percentage of firms with line of credit (all firms)
5. Percentage of firms with line of credit (small firms)

The discussion that follows provides a systematic review of a few definitions of financial inclusion from international standard-setting bodies (SSBs), including the International Monetary Fund (IMF), the World Bank, the Alliance for Financial Inclusion (AFI), the Bank of International Settlements (BIS), and the Organization for Economic Co-operation and Development (OECD), respectively. The selection of the SSBs was made in light of their innovative and persistently influential work in the field of financial inclusion around the world.

2.2.1 The International Monetary Fund (IMF) Definition

Financial inclusion, as defined by the IMF, is the ability of as many individuals and businesses as possible to have access to and use formal financial services. These services may include receiving income, safely and prudently storing money, borrowing for personal or professional needs, and having access to insurance to hedge against risk. This implies that financially integrated economic agents benefit from the economic state of having access to fundamental financial services and products (Amidži *et al.,* 2014; Sahay *et al.,* 2015).

2.2.2 The World Bank Definition

Financial inclusion, according to the World Bank, is the process of guaranteeing and providing individuals and businesses with equal opportunities to access basic financial products and services, including transactions, payments, savings, credit, and insurance, in a responsible and sustainable manner (World Bank, 2018b).

2.2.3 The Alliance for Financial Inclusion (AFI) Definition

Financial inclusion, according to AFI (2017), is the regular use of high-quality financial products and services by households and businesses that are provided by authorized providers through payment infrastructures to manage cashflows and mitigate shocks in a timely, practical, informed, and reasonably priced manner with dignity and fairness.

2.2.4 The Bank of International Settlements (BIS) Definition

Financial inclusion, according to the BIS, is the process by which businesses and households can access and use formal financial products and services that are accessible, affordable, and available in a way that is secure, effective, informed, transparent, and that also supports the efficient operation of the financial system by way of a sound financial infrastructure. The goods and services must be of a high caliber and meet the needs of the customers (Gadanecz & Tissot, 2017).

2.2.5 The Organization for Economic Co-operation and Development (OECD) Definition

The OECD International Network on Financial Education (INFE) explains that financial inclusion is the process of promoting affordable, timely, and adequate access to financial products and services, as well as their use by all segments of society. This is done by implementing tailored, existing, and innovative approaches, including financial awareness and education with a view to promoting financial wellbeing and economic and social inclusion (OECD, 2013).

Given limitations like time and distance, the definitions of financial inclusion presented above, as per a few SSBs, emphasize the importance of access to and effective use of formal financial products and services while keeping in mind the necessity of minimizing associated costs and ensuring the necessary quality. According to the IMF and AFI definitions, financial inclusion is a tool that helps businesses and families to better manage risks and protect against macroeconomic shocks. In this way, it gives enterprises the resources to expand, start new businesses, and support the expansion of the economy while simultaneously giving people the ability to gradually increase their wealth. By increasing the effectiveness, safety, and transparency of savings and investments through the operation of a strong financial infrastructure, it can enhance economic sustainability and help maintain monetary and financial stability. In addition, the definitions provided by the World Bank, BIS, and OECD underline the need for safe, secure, and sustainable financial inclusion for all societal sectors. The consequence is that, if financial services and products should be made available to all economic actors, sufficient precautions must be taken to guarantee that this is done in a responsible and sustainable

way, as unchecked development of financial access can cause instability. Accordingly, the pursuit of financial inclusion by policymakers should aim to establish an ideal balance between its four main components, namely access, use, cost, and quality.

2.3 Defining Financial Stability

Similar to financial inclusion, there is not a single, widely used definition of what constitutes financial stability. However, it is essential to have a functioning definition that is best suited to direct the creation of helpful analytical frameworks for analyzing policy challenges in the context of the expanding financial stability landscape (Schinasi, 2004; Allen & Wood, 2006; Rosengren, 2011; Morgan & Pontines, 2018). In this regard, a useful way to think about financial stability is to consider the qualities that an ideal financial system possesses and work to maintain them at the national, regional, and global levels while preventing the occurrence of the alternative state, which is a situation of financial instability.

Efficient resource allocation and risk assessment and management are both attributes of a sound and stable financial system. It can also keep employment levels at or near an economy's natural rate and reduce relative price levels of real or financial assets that could affect monetary stability or employment levels (Schinasi, 2004; Allen & Wood, 2006). This is because self-corrective processes function effectively, making it resistant to endogenous or exogenous shocks (Schinasi, 2004; Allen & Wood, 2006; Rosengren, 2011; Morgan & Pontines, 2018).

Banks are hesitant to fulfill their intermediary function in an unstable financial system. In other words, they are less eager to tap into household surplus savings to fund successful business investment projects. Additionally, asset prices that stray too much from their fundamental values can have negative consequences, including bank runs, stock market collapses, abnormally high levels of non-performing loans, and hyperinflation (Gadanecz & Jayaram, 2008).

Financial stability can typically be assessed and characterized at the institutional level (i.e., the level of a single firm) or at the systemic level. Through their financial stability reports (FSRs), national central banks typically evaluate institutional and/or systemic financial stability at the national level. The central banks examine several important Financial Soundness Indicators (FSIs) at the institutional level and aggregate them to the systemic level in these publications. The FSIs, which were launched by the IMF in the late 1990s, evaluate the nation's risks to financial stability (Gadanecz & Jayaram, 2008). They offer an overall assessment of the financial stability and health of a nation's financial institutions, as well as that of its businesses and households counterparties (San Jose & Georgiou, 2008). Table 2.3.1 presents the set of core FSIs recognized internationally.

Table 2.3.1 Core Financial Soundness Indicators for Deposit Takers

• Capital Adequacy	• Regulatory capital to risk-weighted assets • Tier 1 capital to risk-weighted assets • Nonperforming loans net of provisions to capital • Common Equity Tier 1 capital to risk-weighted assets • Tier 1 capital to assets
• Asset Quality	• Nonperforming loans to total gross loans • Loan concentration by economic activity • Provisions to nonperforming loans
• Earnings and Profitability	• Return on assets • Return on equity • Interest margin to gross income • Noninterest expenses to gross income
• Liquidity	• Liquid assets to total assets (liquid asset ratio) for all Deposit Takers (DTs) • Liquid assets to short term liabilities for all DTs • Liquidity Coverage Ratio for the DTs that have implemented Basel III liquidity standards • Net Stable Funding Ratio for the DTs that have implemented Basel III liquidity standards
• Sensitivity to market Risk	• Net open position in foreign exchange to capital

Source: Authors on compilation based on San Jose and Georgiou (2008) and IMF (2008).

According to Table 2.3.1, the primary collection of financial sector indicators (FSIs) is based on the CAMELS grading system, which stands for capital sufficiency, asset quality, earnings, liquidity, and market risk sensitivity. The IMF releases the Global Financial Stability Report (GFSR) every two years for the worldwide market. It is a survey-based report that evaluates the main risks to the global financial system using FSI data at the country level. By identifying policies that may reduce systemic risks, the IMF hopes to

play a supportive role in preventing global financial crises, contributing to financial stability worldwide and sustained economic growth in its 190-member nations.

The z-score is another widely used indicator to evaluate financial stability, similar to FSIs. By comparing a bank's buffers to its risk, it can assess its solvency risk (Boyd & Runkle, 1993; Beck *et al.,* 2007). Due to its capacity to calculate the likelihood of a financial institution's insolvency as a function of its assets and debt's value, the z-score is a widely used indicator of financial stability in the literature. In this aspect, a rise in the z-score indicates a decreased likelihood of insolvency (Demirgüç-Kunt *et al.,* 2008; Laeven & Levine, 2009; Čihák & Hesse, 2010).

It is noteworthy that, the FSIs and the z-score evaluate a financial institution's ability to withstand shocks and absorb unexpected loses. For instance, an evaluation of a deposit taker's liquid assets to total assets ratio assesses its ability to withstand global market disruptions and funding shocks that are more idiosyncratic. Similarly, a bank's regulatory capital to risk-weighted assets is able to measure the strength of its capital to withstand and absorb loses of an unexpected nature (San Jose & Georgiou, 2008; IMF, 2008). From the discussion so far, financial stability can thus be understood as resilience of the financial sector to perform its functions efficiency and effectively.

To offer more nuance to the understanding of financial stability outline so far, the remainder of this section offers a discussion of a handful of definitions of financial stability according to international standard setting bodies (SSBs) that comprise of the International Monetary Fund (IMF), the World Bank, the Bank of International Settlements (BIS), and the European Central Bank (ECB), respectively. In the same way as in the previous discussion on financial inclusion, the SSBs are chosen on the basis of their ongoing and impactful work in the global financial stability landscape.

2.3.1 The International Monetary Fund (IMF) Definition

As defined by the IMF, financial stability includes risk management, shock absorption, and the facilitation and enhancement of economic processes. Thus, a financial system is

said to be stable when it does not hinder an economy's performance and can eliminate both endogenous and external financial imbalances that result from large adverse and unforeseen events (Schinasi, 2004).

2.3.2 The World Bank Definition

A stable financial system allocates resources efficiently, assesses and manages financial risks, maintains employment levels close to the natural rate of the economy, and eliminates relative price movements of real and financial assets that would adversely affect monetary stability or employment levels. If the system is stable, adverse events will not disrupt the real economy or other financial systems due to its self-corrective capabilities (World Bank, 2015).

2.3.3 The Bank of International Settlements (BIS) Definition

A stable financial system must be able to survive shocks and unraveling of financial imbalances, which in turn prevents disruptions of financial intermediation severe enough to affect the allocation of savings to profit-generating investments (Gadanecz & Jayaram, 2008; Jeanneau, 2014).

2.3.4 The European Central Bank (ECB) Definition

For the ECB, financial stability refers to a situation in which financial intermediation and investment are effective despite shocks, and in which the financial system can withstand shocks without major disruptions (ECB, 2012).

When it comes to highlighting the significance of financial system stability as supported by the capacity to withstand shocks and the unraveling of financial imbalances utilizing efficient risk management instruments, all of the definitions offered above have something in common. This feature of a financial system is crucial because it guarantees the efficient operation of financial intermediation without impeding economic growth. As a result, the financial system should be resilient and capable of absorbing shocks. If the financial system were unstable, negative shocks would spread throughout it until they reached a point where they caused a financial crisis that upset the system's financial intermediation

process. Therefore, the idea of financial stability is complex and encompasses many facets of money and the financial system. Even in the face of external shocks or a buildup of imbalances, a stable financial system ensures that the role of finance in resource and risk allocation, savings mobilization, development, growth, and wealth accumulation facilitation is adequately fulfilled alongside the smooth operation of the economy.

Chapter 3: Financial Inclusion in SSA

3.1 Introduction

The idea of financial inclusion is multifaceted, and different countries and regions have different definitions of it. Typically, it is characterized from the viewpoints of those who supply and utilize financial services and products, as well as those who formulate legislation and regulate the industry. It is not advantageous to have only one measure in this regard. However, in broad terms, financial inclusion is the widespread availability and utilization of fundamental formal financial services and products, such as payments, transactions, credit, savings, and insurance, by households and businesses in a fair, effective, efficient, secure, long-lasting, and cost-effective manner (Sahay *et al.,* 2015; World Bank, 2018b).

The international development community and policymakers have increased their efforts over the past ten years to provide individuals and businesses that are not now part of the formal financial sector with affordable financial services. Several governments have created national policies to fight financial exclusion in their individual nations and made public commitments to specific financial inclusion objectives (Asuming *et al.,* 2019; Adedokun & Ağa, 2021). Additionally, the World Bank and the International Finance Corporation (IFC) set achieving universal financial access by 2020 as one of their goals to promote global financial inclusion (Cruz *et al.,* 2015; Voica, 2017). Recent advances in economic production methods and the liberalization of economies have sparked these policy initiatives.

The core of the financial system in Africa is the banking system. Over the past two decades, significant changes have been made to Africa's financial industry, which was traditionally dominated by state-owned banks. Particularly, entry hurdles for foreign and local private banks have been significantly lowered. The banking sector on the continent now has a more global perspective, which has inspired new entrants to innovate (Beck & Cull, 2014). Additionally, the region has lately implemented significant financial sector interventions and reforms, including electronic banking, financial literacy campaigns,

cashless policy efforts, and country-specific National Financial Inclusion Strategies (NFIS). Most of the countries in the region have benefited from these measures, enabling them to develop their financial sectors and expand access to financial services and products to those who were previously unbanked (Asuming *et al.,* 2019; Adedokun & Ağa, 2021). However, compared to other developing economies, the financial systems in SSA countries continue to be underdeveloped and access to formal financial services and products by different groups of households and businesses remains limited (Beck *et al.,* 2009, 2015).

This chapter's main goal is to provide a summary of recent trends and advancements in financial inclusion in the SSA area. In this regard, the remaining seven sections of this chapter are organized as follows. A general contrast between using financial services and products and having access to them is made in section two. The measurement of financial inclusion is covered in section three. The fourth section describes multinational programs intended to advance financial inclusion on a global scale. The topic of government interventions and policy initiatives to increase financial inclusion in SSA is covered in section five. An overview of the trends and advancements in SSA's financial inclusion is provided in section six. The key issues preventing financial inclusion in SSA are highlighted in Section seven. Section eight then brings the chapter to a close.

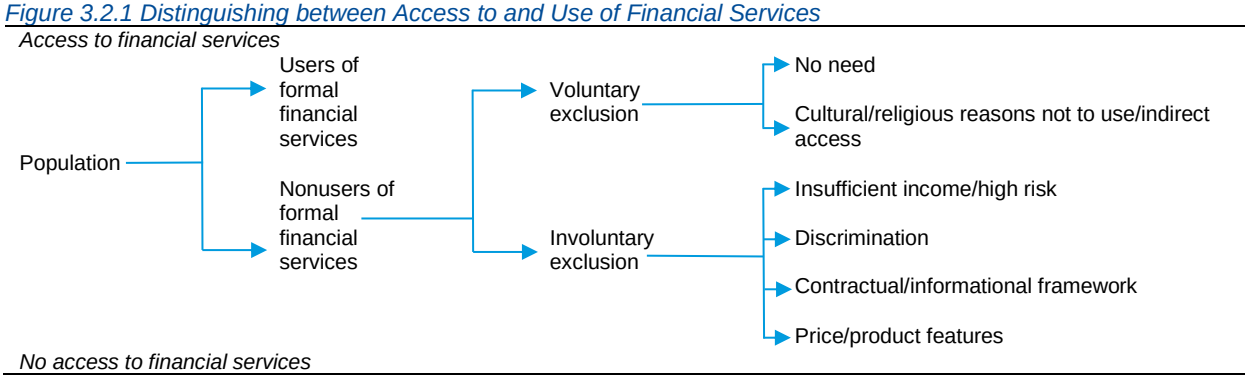
3.2 Distinguishing between Access to and Use of Financial Services

It is crucial to emphasize the distinctions between access to finance and the usage of financial services to provide a relevant assessment of the trends and advances in financial inclusion in SSA. Financial access is the capacity to obtain a variety of high-quality, affordably priced financial services and products. In this situation, both financial and nonfinancial costs are considered when determining if quality and cost are appropriate (Demirgüç-Kunt & Klapper, 2012a). The actual consumption of financial services and goods by both public and private economic agents is referred to as their use. As a result, access is more focused on the availability of financial services and products, whereas use refers to the point at which supply and demand meet. Furthermore, having

access to financial services is a requirement but not a sufficient factor in determining whether one will use them (Claessens, 2006; Beck *et al.,* 2009).

The distinction between access to and usage of financial services is shown in Figure 3.2.1. From the figure, people categorized as not using formal financial services are either willingly or involuntarily excluded. When people are excluded voluntarily, there is a lack of demand for financial services. The exclusion criteria in this category include not needing financial services, refraining from using them for cultural or religious reasons, or using non-financial methods of exchange like barter.

Figure 3.2.1 Distinguishing between Access to and Use of Financial Services



Source: Author's compilation based on Claessens (2006) and Beck *et al.,* (2009).

Four categories comprise the population when it comes to involuntary exclusion. Members of the population who are not deemed bankable because of their low income or high loan risk make up the first group. They are therefore not eligible for official lending processes. The remaining three groups that are involuntarily excluded must contend with issues like (a) discriminating rules, (b) flaws in the legal and informational frameworks, or (c) cost and product features. No policy action is required to address voluntary exclusion. Involuntary exclusion, on the other hand, can be addressed by deliberate policies of financial inclusion (Claessens, 2006; Beck *et al.,* 2009).

The distinction between access to and use of financial services and products should take into consideration the financial service or product being supplied and demanded, for instance, savings, loanable funds (credit), payment facilities or insurance (Claessens, 2006). In this scenario, the population may have access to payment facilities but not to

credit. To simplify the analysis of access and indeed its measurement, it helps to appreciate the various dimensions of access as follows:

(a) Availability / reliability – if financial services are available, in what quantity are they available?
(b) Cost / continuity – what is the total price at which financial services are available?
(c) Flexibility / what is the type, range, and quality of offered financial services?

3.3 Measuring Access to and Use of Financial Services and Products

The concept of measuring financial inclusion is a crucial factor in the distinction between using financial services and products and having access to them. The term "financial inclusion measurement" in this sense refers to the use of pertinent data to identify who (among enterprises and people) uses financial services and the degree to which small businesses and low-income households are directly served by various countries' financial systems. How to quantify financial service use and access is not always straightforward. This is primarily because comparable cross-country data on access and use at the micro and macro level are less widely available (Beck *et al.,* 2009; Claessens, 2006). Despite the difficulty in evaluating the usage and access to financial services, three methods have been highlighted in the literature. The number of people using basic financial services is the first indicator. The second metric evaluates the financial services' quality based on businesses' individual opinions. The third measure is concerned with the price and actual obstacles to access. Two crucial elements of these three indicators are underscoring the causes of financial exclusion and identifying initiatives that could lower barriers and increase access (Beck *et al.,* 2009; Claessens, 2006).

Despite being helpful, each of the three measures has some drawbacks. In the first strategy, many formal or semi-formal financial service providers might offer account holders varying levels of service quality and cost. Similarly, the interpretability or robustness of subjective evaluations of service quality can be questioned in the second approach. In the third approach, some barriers (such as the distance to a bank branch or

the paperwork required to open an account) may be simpler to collect data on than others (Beck *et al.,* 2009; Claessens, 2006; Demirgüç-Kunt & Klapper, 2013).

From the discussion so far, it can be inferred that indicators of access and indicators of usage are necessary to measure financial inclusion. However, it is clear from the discussion in Section 3.2 that there are two other crucial factors for financial inclusion, including the quality of the services and products as well as how they affect the recipient's performance and outcomes. Table 3.3.1 lists four metrics that can be used to gauge financial inclusion along with a brief explanation for each one.

Table 3.3.1 Financial Inclusion Indicators

Access indicators	Usage indicators	Quality indicators	Performance indicators
• They record the breadth of the financial services and products' reach. • Examples of this could be the penetration of bank branches or point-of-sale equipment in rural areas, or demand-side obstacles that clients encounter when attempting to access financial institutions, such as price or knowledge.	• They document consumer usage of financial products and services. • The frequency and longevity of the financial service or product over time (e.g., average savings balances, number of transactions per account, number of electronic payments made) might be included in this.	• They discuss whether financial services and products meet the needs of customers. • They also talk about the variety of choices that customers have and how well-informed and knowledgeable they are about financial products.	• They evaluate and comprehend how use of financial services and products impacts results for households and businesses, such as performance at the firm level or investments in human capital.

Source: World Bank (2015c).

Given each indicator, the availability of data to make a comprehensive conclusion in each case is critical. Country-level data gathered from specific surveys on financial inclusion are essential when looking to measure financial inclusion as per the four indicators in Table 3.3.1. Such data surveys can be from both the supply and demand side, as shown in Table 3.3.2.

Table 3.3.2 Type of Financial Inclusion Data Surveys

Demand-Side Data Surveys	Supply-Side Data Surveys
They offer data gleaned from household and business surveys regarding consumers of financial services (individuals, households, and businesses). With the aid of this information, we can understand users': • financial needs that are both unmet and addressed, • obstacles to accessing formal financial services and products, • socioeconomic and demographic factors (such as the degree of financial inclusion by income, occupation, age, or gender groupings)	They offer details about formally recognized and supervised financial institutions. The data includes: • geographical accessibility (branch location), • product and service cost, and • product and service penetration or usage.

Source: World Bank (2015c).

The World Bank's "Global Findex" survey, a cross-country and nationally representative study of households' finances, is one of the more well-known demand-side data studies on financial inclusion. It is carried out every three years, with occasional annual rounds for questions. The survey covers over 140 countries and is open to the public. The "Enterprise Survey" of the World Bank, a firm-level survey that includes more than 125 countries, is another well-known demand-side data survey. To shed light on dynamics in a country's private sector, it covers a wide range of business climate problems, such as access to finance measures. Furthermore, it is freely accessible.

The more well-known supply-side data surveys on financial inclusion include the IMF's "Financial Access Survey," which is conducted annually and is open to the public. It provides information on the prevalence and use of financial services, has global coverage, and is cross-national in character. Similarly, the supply-side survey conducted by the IMF for its "International Financial Statistics" is equally worldwide in scope and open to the public. It provides data on eight financial inclusion measures from the nearly 190 member nations of the organization. Supply-side information comprises a set of broadly applicable indicators of formally recognized and regulated financial service providers that may be acquired with high frequency. Supply-side surveys provide a viable

and affordable alternative to demand-side surveys, which are less common and expensive.

3.4 International Initiatives to Promote Financial Inclusion

Global account ownership among adults climbed from 51 percent in 2011 to 76 percent of in 2021. 76 percent of adults worldwide have an account at a bank or another type of regulated financial institution, like a credit union, a mobile money service provider, or a microfinance institution. Developing economies saw an 8 percentage points rise in the average rate of account ownership between 2017 and 2021, going from 63 percent to 71 percent of adults. The extensive use of mobile money in the SSA area served as a catalyst for this expansion (World Bank, 2022).

Initiatives undertaken by international organizations to encourage greater global financial inclusion are briefly discussed in this section. The focus is on efforts by the Alliance for Financial Inclusion (AFI) and the World Bank Group, since they are the two most well-known organizations in this field.

3.4.1 The Alliance for Financial Inclusion (AFI)

With the aim of advancing financial inclusion at the country, regional and international levels, and with a membership that spans 89 countries and 101 institutions, the AFI is an alliance of central banks and financial regulators that is also owned and led by them. The organization's model to promote financial inclusion is based on two key priorities, namely, country-led approaches and peer-to-peer engagement (AFI, 2022b, 2022d; Voica, 2017). Through this cooperative model, the AFI partners with private sector leaders, regulators, and international organizations to develop appropriate financial products and services and introduce them to the market to enhance financial inclusion to underbanked and unbanked populations. The efficacy of the policy changes necessary to engender greater financial inclusion is anchored on peer learning, knowledge exchange, peer transformation and practical solutions (AFI, 2022b, 2022d). Subsequent sections discuss a series of declarations and accords by AFI members to promote global financial inclusion.

3.4.1.1 The Maya Declaration

The primary tool used by the AFI to advance sustainable financial inclusion globally is the Maya Declaration, which was introduced in 2011 during the AFI Global Policy Forum in Riviera Maya, Mexico. It offers the first comprehensive and quantifiable set of financial inclusion commitments made by the AFI membership. It presents a platform upon which members outline targets of financial inclusion, while also being able to develop relevant country-level policies and share progress on achieving the set targets. The financial inclusion targets, which to date are close to 900, follow specific thematic areas, some of which have sub-thematic areas, as outlined in Table 3.4.1.

Table 3.4.1: Maya Declaration Financial Inclusion Thematic Areas

No.	Thematic Area	Sub-Thematic Area
1	Consumer empowerment and market conduct	• Consumer protection • Financial literacy and financial education
2	Digital financial services	• Agent banking • E-money • National payments system • Mobile financial services
3	Financial inclusion data	
4	National strategy on financial inclusion	
5	SME finance	
6	Global standards	• Financial integrity • Financial identity • Financial stability
7	Gender and women's financial inclusion	
8	Financial inclusion for climate change and green finance	
9	Overarching national goal	
10	Credit information system	
11	Financial inclusion of youth	
12	Microcredit and microsavings	
13	Microinsurance	
14	Financial inclusion of forcibly displaced persons (FDPs)	

Source: AFI (2022e, 2022f)

A decade ago, 2.5 billion people around the world were financially excluded. Since then, the number of unbanked has declined to 1.7 billion, as 800 million people became financially included (AFI, 2022e, 2022f). A major driver in this change has been the Maya declaration, which has seen over 42 percent of the financial inclusion targets achieved since its inception. Since its inception, AFI members have also created and adopted

several additional accords, action plans, and statements that set forth objectives and touch on various facets of financial inclusion. This allows for the addition of new thematic areas to complement the Maya Declaration, as the global financial inclusion agenda evolves.

The AFI agreements assist in promoting and directing actual policy solutions in particular theme areas, like inclusive green finance (IGF), gender inclusive finance (GIF), small and medium-sized enterprise (SME) finance, FinTechs, youth, and forcibly displaced persons (FDPs) (AFI, 2022f). Table 3.4.2 outlines the most recent AFI Accords following the introduction of the Maya Declaration.

Table 3.4.2: AFI Accords

No.	Name of Accord	Year
1	Denarau Action Plan: The AFI Network Commitment to Gender and Women's Financial Inclusion	2016
2	Sharm El Sheikh Accord on Financial Inclusion, Climate Change & Green Finance	2017
3	Sochi Accord: FinTech for Financial Inclusion	2018
4	Kigali Statement: Accelerating Financial Inclusion for Disadvantaged Groups	2019
5	Maputo Accord. SME Finance: Path to Greater Financial Inclusion.	2021

Source: AFI (2022g).

3.4.1.2 Denarau Action Plan: The AFI Network Commitment to Gender and Women's Financial Inclusion

Women continue to be disproportionately excluded from the financial system despite advancements in global financial inclusion. Recognizing this, the AFI membership redoubled their efforts to close the gender gap in financial inclusion and reaffirmed their dedication to doing so by introducing the Denarau Action Plan for Gender and Women's Financial Inclusion at the 2016 AFI Global Policy Forum in Nadi, Fiji. The strategy outlines actions that AFI members may take to promote financial inclusion for women, with a focus on global access to high-quality, reasonably priced financial services. It also acknowledges that concurrent, responsible, and sustainable efforts should be made to achieve these goals of access, utilization, and quality (AFI, 2019b).

3.4.1.3 Sharm El Sheikh Accord on Financial Inclusion, Climate Change & Green Finance

The AFI membership recognised the links between green finance, financial inclusion, and climate change during the AFI Global Policy Forum, which took place in Sharm El Sheikh, Egypt, on September 14–15, 2017. They discussed the different ways they may improve information sharing and peer learning in the field of policy creation, given these interconnected domains, to support adaptation and mitigation to climate change within the AFI network. The membership decided to create and implement regulatory reforms and financial inclusion policies in accordance with prior discussions on the topic, the Paris Agreement on Climate Change, and the 2030 Agenda for Sustainable Development to contribute to an inclusive, sustainable, and environmentally sound future (AFI, 2019c).

3.4.1.4 Sochi Accord: FinTech for Financial Inclusion

The AFI membership renewed its resolve and commitment to utilizing digital financial services and FinTech to promote their financial inclusion goals during the 2018 AFI Global Policy Forum in Sochi, Russia. This followed the recognition that FinTech had great promise for achieving financial inclusion, particularly among disadvantaged groups in society and micro, small, and medium-sized businesses (MSMEs) (AFI, 2018).

3.4.1.5 Kigali Statement: Accelerating Financial Inclusion for Disadvantaged Groups

The AFI membership gathered in Kigali, Rwanda from September 11–13 for their Global Policy Forum to renew and affirm their pledges to advancing financial inclusion for underserved populations and come to resolutions on concrete initiatives to further that cause. The membership made a commitment during the forum to utilizing women's, young people's, disadvantaged groups', and other unfairly excluded groups' capacities to promote inclusive growth while acknowledging that these groups may play catalytic roles in creating a sustainable society for future generations (AFI, 2019a).

3.4.1.6 Maputo Accord. SME Finance: Path to Greater Financial Inclusion

The AFI membership virtually met in Kuala Lumpur, Malaysia, on September 8, 2021, to update the Maputo Accord and formalize their commitment to promoting SME finance as a key policy pillar and pathway to greater financial inclusion. Recognizing that small and medium-sized enterprises (SMEs) are responsible for driving economic growth,

development, innovation, employment creation, and the reduction of poverty and inequality in developing countries (AFI, 2021).

3.4.2 The World Bank Group

The International Bank for Reconstruction and Development (IBRD) and the International Development Association (IDA), which together make up the World Bank, are members of the World Bank Group (WBG), along with the Multilateral Investment Guarantee Agency (MIGA), the International Finance Corporation (IFC), and the International Centre for Settlement of Investment Disputes (ICSID) (World Bank, 2013). The WBG's aim to combat poverty and raise living standards in developing nations places a special emphasis on these five interconnected institutions. The WBG is also a hub for development knowledge and one of the main funding sources for underdeveloped nations.

At a significant World Bank forum in 2013, world leaders presented a vision for universal financial access by 2020 (UFA 2020), acknowledging that close to 200 million small- and medium-sized enterprises (SMEs) and 2.5 billion adults worldwide lack access to credit and financial services (World Bank, 2013). The UFA 2020 objective acknowledges financial access as a fundamental component of managing the financial lives of individuals and businesses. It intends to make it easier for adults around the world to access an electronic instrument, or transaction account, to hold money and receive and send payments. In this sense, increasing financial inclusion can give low-income households the ability to pay for basic social services like housing, water, energy, education, and healthcare as well as the resources to escape poverty. Greater access to financial services and products can assist SMEs in expanding operations, lowering risks, and growing (World Bank, 2013, 2015a).

During the WBG-IMF Spring Meetings in 2015, the WBG and partners from the public and private sectors (such as credit unions, multilateral agencies, card networks, banks, telecommunications companies, and microfinance institutions) signed concrete commitments to advance and facilitate financial inclusion and realize the UFA 202. More

than 50 nations around the world committed to these financial inclusion goals (Demirgüç-Kunt & Klapper, 2013; Voica, 2017; World Bank, 2015a, 2018b). Using tools like the Global SME Finance Facility, the IFC's network of 900 financial institutions and funds, the new Financial Inclusion Support Framework, the Global Financial Consumer Protection and Financial Literacy program, the open datasets including the Global Financial Inclusion database, and other methods, the WBG has continued to carry out financial inclusion projects in more than 70 countries after the articulation of the UFA 2020 in 2013 and the numerical commitments in 2015 (World Bank, 2013, 2015a).

The Global Findex Database offers information on how adults around the world use financial services, including contributions to savings and borrowing, as well as how they handle unforeseen financial occurrences, such a loss of income or significant expense. Surveys are used to inform the database, and the year 2011 saw the publication of the first round of survey findings. In the years since, surveys were carried out in 2014 and 2017, respectively. The most recent revision to the Global Findex Database was made in 2021. It benefited from surveys of approximately 125,000 adults in 123 economies that were nationally representative.

The World Bank Enterprise Survey from 2017 provides evidence that the SSA region's banking sector development is much behind that of other regions worldwide, even though financial deepening in the region has lasted for more than 15 years. The extreme structural variability in the region's financial market growth stages and market trends is one factor contributing to this set back. For instance, South Africa and Mauritius can be categorized as having the financial stability typical of upper-middle-income nations, and Cabo Verde and Namibia also have these characteristics. Others can be categorized as having the financial stability of a lower-middle-income country to a lower-income economy, such as Kenya and Côte d'Ivoire. On the farther extreme, the DRC, Guinea-Bissau, Sierra Leone, and Sudan have some of the shallowest banking sectors in the world. Cameroon and Gabon, which are lower-middle-income and upper-middle-income countries, respectively, have financial depths below the global lower-income economy average, despite having experienced financial deepening over the last decade

(Revoltella, 2018). Relative to other regions, this obviously affects SSA's ability to offer access to finance to traditionally underserved and unbanked members of the population.

The empirical work by the World Bank Group has been crucial in identifying and quantifying the magnitude of the micro, small, and medium (MSME) enterprise credit gap in developing countries, in addition to the nationally representative surveys. In this respect, IFC, (2017) reveals that globally, there are around 162 million formally registered MSMEs, of which 67 percent of them are in Brazil, China, and Nigeria. The SSA region accounts for around 44 million MSMEs, and around 37 million of them are in Nigeria.

On average, 19 percent, 60 percent, and 21 percent of developing countries' microenterprises are fully financially partially constrained, unconstrained, and constrained, respectively (IFC, 2017). In this respect, South Asia has the largest proportion of both partially and fully constrained microenterprises, at approximately 54 percent. It is followed by SSA, at roughly 52 percent. In addition, in all developing countries, 30 percent of SMEs are on average fully constrained, 56 percent are unconstrained, and 14 percent are partially constrained. At around 54 percent, the SSA region has the largest proportion of financially constrained SMEs, followed by South Asia, at approximately 50 percent. From this information, access to finance continues to be a real challenge in SSA.

3.4.3 The AFI, World Bank Group and National Financial Inclusion Strategies

In the drive towards greater global financial inclusion, both the AFI and World Bank Group play a pivotal role in supporting countries to develop and implement what are known as National Financial Inclusion Strategies (NFISs). A NFIS is a roadmap of actions based on national or subnational agreements, determined by stakeholders to achieve financial inclusion objectives (World Bank, 2015b).

The rapid growth of inclusive financial systems can be facilitated when a nation has a well-coordinated and established NFIS with clearly defined objectives and targets, supported by an implementation strategy and a rigorous and efficient monitoring and

evaluation structure. Successful NFISs coordinate the efforts of main stakeholders, define their collective responsibilities, and clearly state resources planning by prioritizing targets (World Bank, 2015b; AFI, 2018, 2022a). Therefore, clear, and intentional policies that strategically aim to promote financial inclusion enable for the development of platforms that give public and private players the chance to coordinate their separate efforts in a cogent and focused manner. Additionally, it enables the effective allocation of scarce resources to high-impact policy priority areas that will improve financial inclusion over time.

Table 3.4.3 offers a snapshot of the global state of practice in 2022 on NFISs. From the table, most of AFI's membership is in the SSA region, and 86 percent (i.e., 26 countries) of them have NFIS. Out of this percentage, 68 percent are on their first NFIS, while 28 percent and 4 percent are on their second and third NFIS, respectively. In comparison with Asia, a region with the second highest number of AFI members, 92 percent of AFI membership in Asia have NFIS, with 75 percent, 8 percent, and 17 percent of them on their first, second and third NFIS, respectively.

Table 3.4.3: National Financial Inclusion Strategies: State of Practice in 2022

Region	No. of Member Countries in Region	% of Countries with NFIS in Region	% of Countries Formulating NFIS	% of 1st NFIS	% of 2nd NFIS	% of 3rd NFIS
Middle East and North Africa (MENA)	4	57	29	100	n/a	n/a
Eastern Europe and Central Asia (EECA)	4	57	29	100	n/a	n/a
ASIA	12	92	8	75	8	17
Latin America and Caribbean (LAC)	9	69	15	56	44	n/a
Sub-Saharan Africa (SSA)	26	87	13	68	28	4
Pacific (PAC)	7	88	13	57	29	14

Source: AFI (2022a).

Mindful of the financial inclusion thematic areas in the Maya Declaration, as articulated in previous discussion, almost all AFI members with NFIS in 2022 have included financial education (FinEd), consumer protection and digital financial services (DFS) as key policy

areas. Even though these were mentioned in the NFISs of only a few AFI members, other top priorities were closing the gender gap in financial inclusion, financing micro, small, and medium-sized enterprises (MSME), (micro) insurance, and youth financial inclusion. As a result of nation-specific issues of an economic, political, environmental, or health-related nature, a minority of AFI members also addressed the financial needs of forcibly displaced persons (FDPs) and the incorporation of green finance.

3.5 Government Policy Initiatives to Promote Financial Inclusion in SSA

This section discusses nation-specific national financial inclusion strategies and related policies used to promote financial inclusion in SSA, considering the relatively low level of financial inclusion in SSA relative to other regions and the fact that increasing financial access and use of financial services remains a major challenge in the region.

3.5.1 National Financial Inclusion Strategies in SSA

Out of the 37[1] SSA countries that comprise our study countries in the investigation of the nexus between financial inclusion and bank level stability, 25 have NFIS, as per information gathered from the AFI[2] and World Bank[3], respectively. In this respect, the discussion that follows focuses on the 25 SSA economies and provides an overview of their respective NFISs[4].

Tables 3.5.1, 3.5.2 and 3.5.3 are author compiled tables that present a summary of NFISs in low-income, lower-middle-income, and upper-middle-income economies of SSA, respectively. Each NFIS summary is divided into five sections that are critical building blocks of a NFIS. These are, (i) target clientele, (ii) vision (i.e., overall objective), (iii) leadership and coordination, (iv) strategy implementation, and (v) monitoring and

[1] A list of the 37 countries is presented in Appendix A3.
[2] NFIS country related information from the AFI was obtained from: https://www.afi-global.org/library/?thematic_filter=Financial%20Inclusion%20Strategy
[3] NFIS country related information from the World Bank was obtained from: https://www.worldbank.org/en/topic/financialinclusion/brief/financial-inclusion-strategies-resource-center
[4] The list of the 25 SSA countries with NFISs is presented in Appendix A1.

evaluation. The main cross cutting themes in each building block and across each economic class for the NFIS in the SSA region are discussed below.

3.5.1.1 Target Clientele

Each SSA country's NFIS benefited from surveys intended to give an overview of the status of the country's financial inclusion in order to determine the target audience. The NFIS focuses on these underbanked and underserved financial segments of the population across low-income, lower-middle-income, and upper-middle-income economies of SSA. This includes rural residents, women, young people, and micro- and small-scale business owners. This is evidence that addressing the financing of small and medium-sized firms (MSMEs), the gender financial inclusion gap, and youth financial inclusion are significant priority areas for nations.

3.5.1.2 Vision / Overall Objective

Based on the existing financial inclusion statistics, specific, quantifiable, and verifiable goals can be established. Using this as a baseline, regulators can track the NFIS' development. The overall goal of the NFIS, as seen in Tables 3.5.1 to 3.5.3, is to achieve permanent universal access and usage of a wide variety of high-quality and reasonably priced financial services that are diversified, affordable, governed by adequate regulations, and tailored to meet the needs of all demographic groups as well as MSMEs in order to improve their socioeconomic conditions.

3.5.1.3 Leadership and Coordination

Countries require internal coordination efforts during the development and implementation of the NFIS. The creation of a governing structure with a distinct mission and devoted resources is required to formalize these efforts (World Bank, 2015b; AFI, 2022a). The NFISs acknowledge that policy actions required to achieve broad financial inclusion are a function of numerous governmental and private sector stakeholders at the national level throughout low-income, lower-middle-income, and upper-middle-income economies of SSA. To this purpose, every nation creates an NFIS steering council, frequently headed by the Ministry of Finance, with the Central Bank as a key partner, to offer national leadership and coordination.

3.5.1.4 Strategy Implementation

The NFIS's actions and reforms benefit from having a clear understanding of each implementing institution's duties and responsibilities (World Bank, 2015b). The multi-stakeholder NFIS steering committee or equivalent body, which frequently consists of the Ministry of Finance, the Central Bank, the insurance regulatory authority, the microfinance authority, etc., provides the strategic vision, support, and resources for the collaborative and coordinated implementation of the NFIS across low-income, lower-middle-income, and upper-middle-income economies of SSA. Similarly, it takes strong political will and leadership in each of the countries under consideration to advance financial inclusion.

3.5.1.5 Monitoring and Evaluation

To make sure that the implementation is on track and to provide real-time information for policy adjustments and other measures, if needed, monitoring and evaluation of the NFIS are essential. The NFIS steering group typically has custody of the monitoring and evaluation mechanisms for all of the SSA nations under consideration. The baseline data targets and the timetable for achieving them are included in the monitoring and evaluation frameworks.

Table 3.5.1 Summary of National Financial Inclusion Strategies in Low-Income Economies of SSA

Country	Target Clientele	Vision	Leadership and Coordination	Strategy Implementation	Monitoring and Evaluation
Burundi	• Rural residents, • Women and young people, • Micro- and small-business owners	• Permanent access by the adult population to a set of formal financial products and services.	• Implemented by a Coordination and Monitoring Committee (CMC-NFIS). • The CMC-NFIS is supported by an Executive Unit in charge of executive duties.	• The relevant parties—in particular, the regulators, the financial service providers, the ministries, and the development partners engaged in financial inclusion—will be responsible for implementation.	• High-level key performance indicators are provided in the M&E framework in order to quantify and track the realization of the goals of the national financial inclusion program. • Targets for baseline data are included in the framework, along with a timetable for achieving them. • Permanent oversight of the NFIS execution is provided by the CMC-NFIS' Executive Unit.
Burkina Faso	• Rural residents, • Women and young people, • Micro- and small-business owners • Farmers	• Ensure that more people will have access to and use a variety of inexpensive, specialized financial products and services during a five-year period [2018-2022].	• To maintain continuity from the study phase, a committee will be established up to supervise and coordinate the Strategy Implementation. • The Implementation Committee may establish technical working groups as part of its activities.	• The implementation will fall under the purview of the relevant parties, primarily the regulators, financial service providers, Ministries, and development partners engaged in financial inclusion. • The Ministry of Economy, Finance and Development's SP- PMF (Secretariat for Micro Finance) department will help.	• It will fall within the purview of the Secretariat to assist the Implementation Committee with daily coordination of activities, reporting, and Monitoring and Evaluation (M&E).
Madagascar	• Rural residents, • Women and young people,	• Raising the proportion of adults with access to formal financial services	• National Coordinator of Inclusive Finance (CNFI)	• CNFI will communicate with several stakeholder types.	• High-level key performance indicators are provided in the M&E framework in order to quantify and track the realization of the goals of the

Country	Target Clientele	Vision	Leadership and Coordination	Strategy Implementation	Monitoring and Evaluation
	• Micro- and small-business owners	will improve the Malagasy population's access to financial services.		• Repositioning the CNFI as a General Directorate of the Treasury within the Ministry of Finance and Budget • CNFI's institutional capacity should be strengthened on a technical, financial, and human level so that the many issues that arise during the implementation of the financial inclusion policy may be addressed.	national financial inclusion program. • Targets for baseline data are included in the framework, along with a timetable for achieving them. • CNFI oversees the coordination and the monitoring & evaluation of the implementation of the NFIS.
Mozambique	• Rural residents, • Women and young people, • Micro- and small-business owners	• Ensure that both enterprises and individuals may access, use, and benefit from a sufficient range of financial services in both urban and rural regions.	• Financial sector development steering committee.	• The Technical Implementation Unit, which is in charge of day-to-day coordination, was established by the Bank of Mozambique as the Financial Inclusion Service in 2017. • 2019 saw the expansion of the Financial Inclusion Service into an office (cabinet), which is now run by a director who answers to the relevant board member at the Bank of Mozambique.	• High-level key performance indicators are provided in the M&E framework in order to quantify and track the realization of the goals of the national financial inclusion program. • Targets for baseline data are included in the framework, along with a timetable for achieving them.
Malawi	• Rural residents, • Women and young people, •	• To develop an inclusive financial system in Malawi and align it with the wider financial sector development	• Leadership and coordination of the NFIS is provided by the Ministry of Finance (MOF), Reserve Bank of Malawi (RBM), Micro-finance network of	• The Ministry of Finance is the lead institution responsible for guiding and monitoring implementation of the strategy.	• High-level key performance indicators are provided in the M&E framework in order to quantify and track the realization of the goals of the national financial inclusion program.

Country	Target Clientele	Vision	Leadership and Coordination	Strategy Implementation	Monitoring and Evaluation
	• Micro- and small-business owners	strategy and other development pro-outreach of quality financial services offered by diverse providers to low-income people.	Malawi (MAMN), Financial Inclusion in Malawi (FIMA) project.		• Targets for baseline data are included in the framework, along with a timetable for achieving them.
Niger	• Rural residents, • Women and young people, • Micro- and small-business owners	• Ensure an inclusive, adapted, and sustainable financial sector, driven by a diversity of financial service providers technically able to offer sustainable financial products and services to all categories of the population.	• The Executive Secretariat of Inclusive Finance oversees the coordination, the planning, the realization of the technical, economic, and financial studies, and the mobilization of the financing.	• The Executive Secretariat of Inclusive Finance oversees the mobilization of the actors (public, private and PTF) for the implementation of the NFIS.	• Executive Secretariat of Inclusive Finance oversees the monitoring and Evaluation. • High-level key performance indicators are provided in the M&E framework in order to quantify and track the realization of the goals of the national financial inclusion program. • Targets for baseline data are included in the framework, along with a timetable for achieving them.
Sierra Leone	• Rural residents, • Women and young people, • Micro- and small-business owners	• A focused approach to increase access to, enhance quality and increase usage of financial products and services.	• The Financial Inclusion Secretariat (FIS) at the Bank of Sierra Leone (BSL). • The governance structure to which the FIS was to report also included a Financial Inclusion Technical Committee and a Financial Inclusion Steering Committee.	• The Bank of Sierra Leone (BSL) formed the Financial Inclusion Secretariat (FIS) with the duty of carrying out the plan. • The NSFI's implementation is intended to be a collaborative process managed by technical working groups. • The Governor of the Bank of Sierra Leone will	• High-level key performance indicators are provided in the M&E framework in order to quantify and track the realization of the goals of the national financial inclusion program. • Targets for baseline data are included in the framework, along with a timetable for achieving them.

Country	Target Clientele	Vision	Leadership and Coordination	Strategy Implementation	Monitoring and Evaluation
				serve as the chairman of the Financial Inclusion Executive Committee, which will be in charge of making decisions and providing direct control of the Strategy's execution.	
Uganda	• Rural residents, • Women and young people, • Micro- and small-business owners	• By establishing an inclusive financial system that strengthens the financial sector, funds the economy, and aids families of all socioeconomic backgrounds in building wealth, the NFIS principally supports goals one and two of the National Development Plan.	• The Ministry of Finance, Planning, and Economic Development (MoFPED) and the Bank of Uganda (BoU) are the primary drivers of the National Financial Inclusion Strategy (NFIS).	• Financial Inclusion National Steering Committee • The Steering Committee, which will convene at least once a year, will be responsible for carrying out the plan and updating other departments on its development. •	• High-level key performance indicators are provided in the M&E framework in order to quantify and track the realization of the goals of the national financial inclusion program. • Targets for baseline data are included in the framework, along with a timetable for achieving them.

Note: Author's compilation based on country specific NFIS information as sourced from AFI, respective countries, and the World Bank Financial Inclusion Strategies Resource Center (2022).

Table 3.5.2: Summary of National Financial Inclusion Strategies in Lower-Middle-Income Economies of SSA

Country	Target Clientele	Vision	Leadership and Coordination	Strategy Implementation	Monitoring and Evaluation
Cote d'Ivoire	• Rural residents, • Women and young people, • Micro- and small-business owners	• To encourage the development of a financially literate population that has easier access to a variety of flexible, diverse, and cost-effective financial services.	• Agency for the Promotion of Financial Inclusion of Côte d'Ivoire (APIF-CI) whose mission is the implementation and multi-party coordination actions to take	• APIF-CI to ensure the coordination and supervision of the intervention of national actors as well as the coordination the action of technical and financial partners in favor of financial inclusion	• High-level key performance indicators are provided in the M&E framework in order to quantify and track the realization of the goals of the national financial inclusion program. • Targets for baseline data are included in the framework, along with a timetable for achieving them.
Eswatini	• Rural residents, • Women and young people, • Micro- and small-business owners	• To afford appropriate and quality financial services and products accessible to all categories of the population. • To remove constraints preventing some strata of the population from having access to and use of these services and products.	• The Financial Inclusion Coordination Agency (FICA) is in charge of overseeing coordination and making sure that all parties listed in the NFIS carry out their obligations. • The FICA will take part in initiatives aimed at educating the public, spreading awareness, and protecting those who use financial services and products.	• Together with the appropriate parties, the FICA is in charge of coordinating the NFIS's implementation. • The policy direction is given by a Financial Inclusion Council, which is presided over by the Minister of Finance. • The Financial Inclusion Technical Committee, which meets every three months, advises the FICA on technical matters. • Working groups are available at the FICA to assist with the major tasks based on demand and need.	• High-level key performance indicators are provided in the M&E framework in order to quantify and track the realization of the goals of the national financial inclusion program. • Targets for baseline data are included in the framework, along with a timetable for achieving them.
Lesotho	• Rural residents,	• To enable Basotho who are not included	• The Ministry of Finance and Development	• Ministry of Finance and Development Planning to oversee and monitor the	• High-level key performance indicators are provided in the M&E framework in order to

Country	Target Clientele	Vision	Leadership and Coordination	Strategy Implementation	Monitoring and Evaluation
	• Women and young people, • Micro- and small-business owners • Farmers	in or have no access to the mainstream formal banking system to become economically empowered. • Through sustainable growth, inclusive finance will open up chances to boost wealth and empower Basotho.	Planning (MoFDP); Central Bank of Lesotho (CBL); Support to Financial Inclusion in Lesotho (SUFIL) Programme; Rural Financial Intermediation Programme (RUFIP); and Micro Finance Forum (MFF)	implementation of the strategy.	quantify and track the realization of the goals of the national financial inclusion program. • Targets for baseline data are included in the framework, along with a timetable for achieving them.
Nigeria	• Rural residents, • Women and young people, • Micro- and small-business owners	• Make sure a precise plan is in place for boosting financial service usage and access significantly by 2020.	• Within the CBN, a Financial Inclusion Secretariat will be established to handle the daily reporting, coordination, and implementation tasks.	• The Financial Services Regulation Coordinating Committee (FSRCC) will oversee the work of the Financial Inclusion Secretariat and report any changes to the National Economic Council (NEC).	• High-level key performance indicators are provided in the M&E framework in order to quantify and track the realization of the goals of the national financial inclusion program. • Targets for baseline data are included in the framework, along with a timetable for achieving them.
Senegal	• Rural residents, • Women and young people, • Micro- and small-business owners	• To ensure permanent and equitable access and use are provided by formal financial institutions to all segments of the Senegalese population with a diversified	• A Coordination and Monitoring Committee (CCS) for the implementation of the plan actions, coordination, and monitoring of the execution of the works.	• The DGSFC will take care of the coordination, monitoring and implementation of the NFIS.	• NFIS monitoring is carried out by the DGSFC and consists of the collection, data processing and analysis resulting from the implementation of activities planned. • High-level key performance indicators are provided in the M&E framework in order to

Country	Target Clientele	Vision	Leadership and Coordination	Strategy Implementation	Monitoring and Evaluation
		range of products and services adapted to their needs and means			quantify and track the realization of the goals of the national financial inclusion program.
Tanzania	• Rural residents, • Women and young people, • Micro- and small-business owners	• To support livelihood, household resilience, and job growth, financial goods and services must be tailored to the needs of both individuals and businesses.	• the National Technical Committee (NTC), National Steering Committee (NSC), and National Council (NC). • The Bank of Tanzania serves as the Committees' secretariat.	• The main governing body for the national agenda promoting financial inclusion in the nation is the National Council (NC). • On a daily basis, the National Secretariat (NS) will manage the NC's coordination of the Framework's implementation.	• High-level key performance indicators are provided in the M&E framework in order to quantify and track the realization of the goals of the national financial inclusion program. • Targets for baseline data are included in the framework, along with a timetable for achieving them.
Zambia	• Rural residents, • Women and young people, • Micro- and small-business owners	• To ensure that a wide array of high-quality, reasonably priced financial services are available to everyone and are used by both individuals and businesses.	• The National Financial Inclusion Strategy of Zambia will be governed and coordinated by the NFIS Steering Committee.	• The NFIS Steering Committee will offer general policy direction for the creation and execution of the plan.	• High-level key performance indicators are provided in the M&E framework in order to quantify and track the realization of the goals of the national financial inclusion program. • Targets for baseline data are included in the framework, along with a timetable for achieving them.
Zimbabwe	• Rural residents, • Women and young people, • Micro- and small-business owners	• To build a financial system that is responsive to all Zimbabweans' needs and inclusive.	• The Reserve Bank of Zimbabwe, the Ministries of Lands & Rural Resettlement, Agriculture, Mechanization and Irrigation	• Financial institutions, government departments and offices, regulatory agencies, organizations that support development, mobile network operators, and corporate organizations.	• High-level key performance indicators are provided in the M&E framework in order to quantify and track the realization of the goals of the national financial inclusion program.

Country	Target Clientele	Vision	Leadership and Coordination	Strategy Implementation	Monitoring and Evaluation
		• To make it easier for all Zimbabweans to obtain and use high-quality, reasonably priced financial services.	Development, and the Environment.		• Targets for baseline data are included in the framework, along with a timetable for achieving them.

Note: Author's compilation based on country specific NFIS information as sourced from AFI, respective countries, and the World Bank Financial Inclusion Strategies Resource Center (2022).

Table 3.5.3: Summary of National Financial Inclusion Strategies in Upper-Middle-Income Economies of SSA

Country	Target Clientele	Vision	Leadership and Coordination	Strategy Implementation	Monitoring and Evaluation
Botswana	• Rural residents, • Women and young people, • Micro- and small-business owners	• By 2021, the percentage of adults who lack access to more than one formal financial instrument will rise from 46% to 57%, which will enhance household welfare, boost economic efficiency, and support growth.	• A steering group has been established by the Ministry of Finance and Development Planning to direct the making Access Possible (MAP) project.	• The Steering Committee, presided over by MFDP, will continue to be in charge of the MAP procedure, promoting and providing leadership and coordination throughout the roadmap's implementation phase. • The relevant stakeholders, primarily the regulators, financial service providers, ministries, and financial inclusion-focused development partners, will be in charge of actual implementation.	• High-level key performance indicators are provided in the M&E framework in order to quantify and track the realization of the goals of the national financial inclusion program. • Targets for baseline data are included in the framework, along with a timetable for achieving them.
Namibia	• Rural residents, • Women and young people, • Micro- and small-business owners	• To ensure that vulnerable groups, such as weaker parts (i.e., micro-, and small firms) and low-income groups, have inexpensive access to financial services and timely, enough credit when needed.	• Creating an inter-ministerial Financial Inclusion Council to direct policy and oversee the use of tactics to improve financial inclusion in Namibia	• Inter-ministerial Financial Inclusion Council that will oversee the implementation of policies to improve financial inclusion in Namibia and provide policy direction.	• High-level key performance indicators are provided in the M&E framework in order to quantify and track the realization of the goals of the national financial inclusion program. • Targets for baseline data are included in the framework, along with a timetable for achieving them.
South Africa	• Rural residents, • Women and young people,	• To guarantee the affordable delivery of financial	• A sub-working committee on intra-government financial inclusion established under the FSR	• The sub-working group on financial inclusion is	• High-level key performance indicators are provided in the

Country	Target Clientele	Vision	Leadership and Coordination	Strategy Implementation	Monitoring and Evaluation
	• Micro- and small-business owners	services to sizable populations that have previously been underserved or excluded from the formal financial sector.	Act's Council of Financial Regulators • A conference for financial inclusion (FI) that brings together business and other non-governmental players to discuss strategic priorities with policymakers and regulators.	presided over by the National Treasury.	M&E framework in order to quantify and track the realization of the goals of the national financial inclusion program. • Targets for baseline data are included in the framework, along with a timetable for achieving them.

Note: Author's compilation based on country specific NFIS information as sourced from AFI, respective countries, and the World Bank Financial Inclusion Strategies Resource Center (2022).

3.6 Financial Inclusion Trends and Developments in SSA

This section presents the trends and developments in financial inclusion in SSA from 2005 to 2019. The timeline is aligned with the thesis' study period. The discussion is based on 37 economies that comprise the thesis' study countries. The nations are separated into low-income, lower-middle-income, and upper-middle-income economies, respectively, to make analysis easier. The World Bank's classification of countries and lending groups serves as the basis for these classifications[5]. Two indicators—*number of depositors with commercial banks per 1,000 adults* and *number of commercial bank branches per 1,000 km²*—are used to assess the availability of and use of financial services in SSA. The two indicators were selected based on the data availability across the 37 SSA economies.

3.6.1 Low-income economies

3.6.1.1 Indicator 1: Number of commercial bank branches per 1,000 KM²

Based on information from the IMF's Financial Access Survey database (2022), Table 3.6.1 shows the number of commercial bank branches per 1,000 km² in SSA low-income countries from 2005 to 2019. A complete set of data for the number of commercial bank branches per 1,000 km² in low-income economies from 2005 to 2019 is only available for Burkina Faso, Chad, Guinea, The Gambia, Madagascar, Mali, Mozambique, Malawi, Niger, Rwanda, Togo, and Uganda, respectively. Over the review period, Rwanda had the highest average number of commercial bank branches per 1,000 km² at 12.36, followed by The Gambia at 7.67. During the same period, Chad had the lowest average number of commercial bank branches per 1,000 km² at 0.04, followed by Niger with 0.1.

[5] World Bank Country and Lending Groups information can be accessed at https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups.

Table 3.6.1 Number of commercial bank branches per 1,000 km^2 from 2005 to 2019 in SSA low-income economies

Years	Burkina Faso	Chad	Guinea	The Gambia	Madagascar	Mali	Mozambique	Malawi	Niger	Rwanda	Togo	Uganda
2005	0.34	0.02	0.15	3.46	0.19	0.14	0.29	0.69	0.04	1.62	0.72	0.84
2006	0.33	0.02	0.17	4.15	0.20	0.15	0.31	0.70	0.04	1.58	0.97	0.88
2007	0.42	0.02	0.19	5.04	0.24	0.18	0.36	1.51	0.05	2.39	1.82	1.05
2008	0.48	0.02	0.24	6.23	0.26	0.17	0.40	1.74	0.06	10.50	2.46	1.61
2009	0.54	0.03	0.29	6.72	0.28	0.20	0.47	1.88	0.07	11.55	2.65	1.93
2010	0.60	0.03	0.33	8.50	0.30	0.24	0.55	2.44	0.08	11.88	2.85	2.07
2011	0.67	0.03	0.37	8.50	0.32	0.28	0.60	0.93	0.08	13.58	3.09	2.09
2012	0.71	0.03	0.42	8.40	0.35	0.33	0.66	2.96	0.11	14.39	3.20	2.44
2013	0.79	0.05	0.45	9.09	0.38	0.35	0.68	3.04	0.12	15.69	3.36	2.72
2014	0.97	0.05	0.62	9.19	0.45	0.41	0.75	3.13	0.13	15.81	3.71	2.91
2015	1.05	0.06	0.71	9.58	0.50	0.45	0.80	3.29	0.13	17.02	4.12	3.01
2016	1.07	0.06	0.73	8.89	0.55	0.47	0.85	3.02	0.14	17.71	4.54	2.98
2017	1.10	0.06	0.76	8.40	0.60	0.41	0.86	2.31	0.14	17.96	4.61	2.88
2018	1.13	0.06	0.79	9.68	0.64	0.41	0.88	2.47	0.14	17.27	4.41	2.92
2019	1.26	0.06	0.80	9.19	0.68	0.42	0.88	2.54	0.15	16.42	4.78	3.04
Average	**0.76**	**0.04**	**0.47**	**7.67**	**0.40**	**0.31**	**0.62**	**2.18**	**0.10**	**12.36**	**3.15**	**2.22**

Source: Author's compilation based on data from IMF Financial Access Survey (FAS) (2022).

3.6.1.2 Indicator 2: Number of depositors with commercial banks per 1,000 adults

Table 3.6.2 shows the number of commercial bank depositors per 1,000 adults in SSA low-income economies from 2005 to 2019. Only Guinea, Madagascar, Mali, Niger, Rwanda, Togo, and Uganda have complete data on the depositors with commercial banks per 1,000 individuals in low-income economies from 2005 to 2019. Uganda had the greatest average of commercial bank depositors per 1,000 adults during the research period at 202.99, followed by Togo at 175.27. Niger had the lowest average number of commercial bank depositors per 1,000 adults during that time, at 36.20, followed by Guinea with 58.67.

Table 3.6.2: Number of depositors with commercial banks per 1,000 adults from 2005 to 2019 in SSA low-income economies

Year	Guinea	Madagascar	Mali	Niger	Rwanda	Togo	Uganda
2005	19.89	20.03	57.12	11.33	8.93	58.34	100.71
2006	28.76	21.79	84.04	13.49	10.73	64.04	115.97
2007	33.57	26.39	71.25	18.45	24.31	72.99	113.09
2008	36.29	36.85	90.43	21.76	192.63	213.34	156.69
2009	43.15	39.65	86.64	23.64	221.01	197.27	175.43
2010	50.04	106.32	97.40	26.20	272.12	158.83	194.34
2011	55.87	52.26	124.58	30.40	173.26	157.23	181.49
2012	64.56	53.90	154.72	34.94	212.99	156.92	205.21
2013	67.29	59.32	144.18	40.95	216.87	168.00	190.70
2014	75.29	60.12	146.01	50.31	169.75	248.41	201.23
2015	71.86	73.39	137.85	49.88	148.02	235.80	210.23
2016	69.95	72.22	142.98	59.00	191.87	219.65	252.85
2017	82.94	79.76	163.98	50.97	206.57	230.96	364.25
2018	86.20	86.14	173.66	53.38	266.29	216.34	292.26
2019	94.47	98.42	174.70	58.33	261.18	230.93	290.40
Average	**58.67**	**59.11**	**123.30**	**36.20**	**171.77**	**175.27**	**202.99**

Source: IMF Financial Access Survey (FAS) (2022).

3.6.2 Lower-middle income economies

3.6.2.1 Indicator 1: Number of commercial bank branches per 1,000 KM^2

Table 3.6.3 presents the number of commercial bank branches per 1,000 km^2 in SSA lower-middle-income economies from 2005 to 2019. A complete set of data for the number of commercial bank branches per 1,000 km^2 in lower-middle-income economies from 2005 to 2019 is only available for Angola, Benin, Cote d'Ivoire, Cameroon, Cabo Verde, Eswatini, Kenya, Lesotho, Mauritius, Nigeria, Senegal, Zambia, and Zimbabwe.

Over the review period, Mauritius had the highest average number of commercial bank branches per 1,000 km^2 at 97.67, followed by Cabo Verde at 25.36. During the same period, Zambia had the lowest average number of commercial bank branches per 1,000 km^2 at 0.43, followed by Cameroon with 0.45.

3.6.2.2 Indicator 2: Number of depositors with commercial banks per 1,000 adults

Table 3.6.4 shows the number of depositors with commercial banks per 1,000 individuals in SSA lower-middle-income economies from 2005 to 2019. Only the following SSA lower-middle-income economies have comprehensive data for the number of depositors with commercial banks per 1,000 adults from 2005 to 2019: Benin, Cote d'Ivoire, Cabo Verde, Eswatini, Lesotho, Senegal, Zambia, and Zimbabwe. Cabo Verde had the largest average number of commercial bank depositors per 1,000 adults during the review period (1625.73), followed by Eswatini (482.70). Benin had the lowest average number of commercial bank depositors per 1,000 adults during that time, with 140.49, followed by Senegal with 142.04.

Table 3.6.3 Number of commercial bank branches per 1,000 km^2 from 2005 to 2019 in SSA lower-middle-income economies

Years	Angola	Benin	Cote d'Ivoire	Cameroon	Cabo Verde	Eswatini	Kenya	Lesotho	Mauritius	Nigeria	Senegal	Zambia	Zimbabwe
2005	0.19	0.43	0.47	0.21	11.91	2.21	0.93	0.96	83.25	3.59	0.83	0.25	0.72
2006	0.29	0.67	0.52	0.23	13.65	2.27	1.00	0.79	85.71	3.33	0.99	0.26	0.68
2007	0.34	0.85	0.62	0.25	16.38	2.27	1.34	0.86	88.18	4.70	1.08	0.29	0.76
2008	0.43	1.06	0.85	0.28	20.35	2.33	1.60	0.92	92.12	5.80	1.34	0.33	0.64
2009	0.50	1.26	0.96	0.31	22.83	2.33	1.77	0.96	100.49	6.15	1.44	0.36	0.86
2010	0.74	1.40	1.56	0.41	25.81	2.38	1.94	1.42	102.46	6.39	1.58	0.38	0.92
2011	0.86	1.55	1.61	0.43	25.81	2.73	2.12	1.45	104.93	6.40	1.74	0.41	1.21
2012	0.96	1.60	1.74	0.47	29.53	2.73	2.31	1.45	107.39	5.96	1.88	0.45	2.55
2013	1.12	1.68	1.76	0.52	30.02	2.67	2.43	1.58	109.85	6.21	1.90	0.49	2.73
2014	1.16	1.79	1.89	0.54	30.27	2.67	2.61	1.58	111.82	6.06	1.98	0.54	2.99
2015	1.23	1.95	2.06	0.58	30.77	3.14	2.75	1.68	108.87	5.53	2.18	0.55	1.23
2016	1.26	2.00	2.18	0.59	31.02	2.91	2.73	1.75	102.96	5.41	2.26	0.57	1.21
2017	1.31	1.92	2.31	0.56	29.53	2.62	2.74	1.75	94.58	5.21	2.62	0.57	1.19
2018	1.25	1.92	2.31	0.67	31.27	2.85	2.72	1.75	87.68	5.19	2.63	0.50	1.18
2019	1.29	2.39	2.36	0.68	31.27	2.73	2.69	1.78	84.73	5.94	2.79	0.44	0.82
Average	**0.86**	**1.50**	**1.55**	**0.45**	**25.36**	**2.59**	**2.11**	**1.38**	**97.67**	**5.46**	**1.82**	**0.43**	**1.31**

Source: IMF Financial Access Survey (FAS) (2022).

Table 3.6.4: Number of depositors with commercial banks per 1,000 adults from 2005 to 2019 in SSA lower-middle-income economies

Years	Benin	Cote d'Ivoire	Cabo Verde	Eswatini	Lesotho	Senegal	Zambia	Zimbabwe
2005	60.25	78.33	1103.22	380.54	258.24	79.69	16.43	518.35
2006	59.99	71.03	1178.00	396.87	340.86	87.09	21.98	514.22
2007	52.51	72.50	1271.75	400.37	210.08	92.50	24.63	200.65
2008	77.37	80.00	1398.97	473.47	212.08	107.95	27.32	218.14
2009	95.19	101.87	1234.88	515.91	223.39	95.42	26.87	93.98
2010	110.92	127.11	1457.43	513.81	283.51	104.29	133.07	167.40
2011	124.02	213.78	1554.47	525.38	354.85	135.45	150.84	83.82
2012	134.04	178.79	1643.61	572.80	286.48	134.91	189.04	90.27
2013	148.54	181.87	1704.89	507.97	316.10	153.24	258.21	89.04
2014	162.25	198.63	1770.80	553.04	326.29	168.36	288.98	100.24
2015	168.26	188.55	1856.75	584.67	348.97	165.31	305.90	93.02
2016	182.62	211.68	1847.25	556.74	363.51	188.12	317.85	287.25
2017	205.05	262.77	2054.48	611.92	385.39	193.00	331.94	466.68
2018	237.05	259.95	2122.37	472.41	413.83	201.34	297.14	517.12
2019	289.32	262.31	2187.07	174.56	391.91	223.99	233.05	641.01
Average	140.49	165.95	1625.73	482.70	314.37	142.04	174.88	272.08

Source: IMF Financial Access Survey (FAS) (2022).

3.6.3 Upper-middle income economies

3.6.3.1 Indicator 1: Number of commercial bank branches per 1,000 KM^2

Table 3.6.5 shows the number of commercial bank branches per 1,000 km^2 in upper-middle-income economies for SSA from 2005 to 2019. Only Botswana, Namibia, and South Africa have complete data for the number of commercial bank branches per 1,000 km^{2}in upper-middle-income nations from 2005 to 2019. Namibia came in second with 0.21 commercial bank branches per 1,000 km^2, while South Africa had the highest average number at 2.66. Botswana had the fewest commercial bank branches on average per 1,000 km^2 for the same time period, at 0.20.

Table 3.6.5: Number of commercial bank branches per 1,000 km^2 from 2005 to 2019 in SSA upper-middle-income economies

Years	Botswana	Namibia	South Africa
2005	0.13	0.16	1.91
2006	0.14	0.18	2.01
2007	0.17	0.19	1.66
2008	0.19	0.20	2.21
2009	0.20	0.20	2.65
2010	0.21	0.21	2.90
2011	0.20	0.21	3.09
2012	0.21	0.21	3.05
2013	0.22	0.22	3.15
2014	0.23	0.24	3.44
2015	0.22	0.24	3.36
2016	0.23	0.28	3.32
2017	0.21	0.19	3.46
2018	0.24	0.21	3.43
2019	0.25	0.21	3.29
Average	**0.20**	**0.21**	**2.86**

Source: IMF Financial Access Survey (FAS) (2022).

3.6.3.2 Indicator 2: Number of depositors with commercial banks per 1,000 adults

Table 3.6.6 shows the number of depositors with commercial banks per 1,000 adults in upper-middle-income economies for SSA from 2005 to 2019. It is only for Botswana and Namibia is a comprehensive set of data available for the number of depositors with commercial banks per 1,000 adults from 2005 to 2019. Namibia had the largest average number of commercial bank depositors per 1,000 adults during the assessment period (577.34), followed by Botswana (565.66).

Table 3.6.6 Number of depositors with commercial banks per 1,000 adults from 2005 to 2012 in SSA upper-middle-income economies

Years	Botswana	Namibia
2005	360.27	99.54
2006	353.65	144.48
2007	395.40	154.82
2008	442.09	156.64
2009	509.52	170.09
2010	510.30	169.81
2011	478.81	455.68
2012	591.97	670.65
2013	645.92	747.53
2014	671.53	881.12
2015	664.68	934.50
2016	636.29	913.03
2017	696.34	937.02
2018	750.35	1,070.66
2019	777.72	1,154.46
Average	**565.66**	**577.34**

Source: IMF Financial Access Survey (FAS) (2022).

3.6.4 Global Comparison of Financial Inclusion Trends and Developments

In 2021, 76 percent of individuals worldwide had an account with a bank or another regulated financial institution. In the ten years between 2011 and 2021, the percentage of adults globally with accounts in formal financial institutions rose by 50 percent, from 51 to 76 percent. In emerging economies, the average percentage of adults who own an account rose by 8 percentage points between 2017 and 2021, from 63 to 71 percent of adults. In the SSA region, this growth is mostly due to the use of mobile money services. Additionally, the gender difference in account ownership across emerging economies has shrunk from 9 percentage points, where it had been for many years, to 6 percentage points (Bryan *et al.,* 2024; Batista & Vicente, 2023; World Bank. 2022).

The percentage of individuals in developing economies that send or receive digital payments increased from 35 percent in 2014 to 57 percent in 2021. The percentage of adults in high-income economies that send or receive digital payments is 95 percent. Direct deposit into an account provides access to additional financial services. In fact, 83 percent of persons in developing economies who received digital payments also made payments digitally, a rise from 66 percent in 2014 and 70 percent in 2017. About 40 percent of digital payment users saved money in their account, almost two-thirds utilized

their account to hold money for financial management, and 40 percent of payment recipients took out formal loans (Bryan *et al.,* 2024; Batista & Vicente, 2023; *World* Bank. 2022).

In 2021 mobile money account ownership around the globe was highest in the SSA region, with 33 percent of adults holding a mobile money account, three times larger than the 10 percent global average. In the same year, 55 percent of adults in SSA held an account in a formal financial institution (including mobile money accounts). Using their mobile money account, almost three out of every four SSA mobile account holders sent or received at least one non-person-to-person payment in 2021. Additionally, 39 percent of mobile money account holders utilized it for saving. This proportion is the same as that of those who utilized a traditional bank or other financial institution account. Furthermore, 7 percent of people in SSA utilized their mobile money accounts to apply for a loan (Mapanje *et al.,* 2023; Batista & Vicente, 2023; World Bank. 2022).

In 2021, 18 percent of adults in developing economies paid their power bills straight from their bank accounts. Following the start of the COVID-19 pandemic, approximately one-third of these people conducted such transactions in this manner, for the first time. Following the COVID-19 outbreak, an uptick was also observed in the percentage of adults who made digital merchant payments. For instance, during the pandemic, over 80 million adults in India made their first purchase from a digital retailer. In China, 82 percent of consumers made a digital merchant payment in 2021, with over 100 million adults (11 percent) making their first purchase following the beginning of the pandemic. In 2021, 20 percent of adults in developing economies—aside from China—made a digital merchant payment. The 20 percent includes 8 percent of adults who, on average, made their first digital merchant payment shortly after the COVID-19 pandemic began, or almost 40 percent of those who did so overall. In this regard the pandemic and social distance restrictions contributed to the rapid uptake of digital payments (Bryan *et al.,* 2024; Batista & Vicente, 2023; World Bank. 2022).

3.7 Challenges to Financial Inclusion in SSA and Possible Solutions

Countries in the SSA area have achieved commendable progress in the expansion of financial inclusion. For example, as of 2022, 87 percent of SSA AFI member countries had launched their NFISs, compared to 16 percent after 2018. The only AFI member countries that have operationalized their third NFISs as of 2022 are those in the SSA, Asia, and Pacific regions (AFI, 2022a). Nonetheless, there are still some important obstacles to overcome. The absence of coordination at the national level is cited as the most difficult barrier by nations that have not yet developed and implemented NFISs (AFI, 2022a). There is a risk of duplication of effort and underrepresentation of stakeholder interests in the absence of strong national coordination. To overcome the challenges, effective NFIS governance frameworks are essential as they serve as a mechanism for coordinating the interests of many stakeholders, clearly defining their roles, and ensuring robust implementation support as well as monitoring and evaluation of the NFIS. The nations that have been successful in this regard are those whose governments have set up a separate Financial Inclusion Task Force to provide guidance and oversee the NFIS' implementation. Others have opted for a multi-tiered coordination structure with a steering committee at the top, a multi-agency implementation committee below it, and a secretariat shared by the central bank and the ministry of finance.

Other challenges inhibiting progress to financial inclusion in SSA include the persistent gap between financial deepening and financial inclusion (Demirgüç-Kunt & Klapper, 2013; World Bank, 2022). Despite most of the SSA countries having deeper and more stable financial institutions; high costs, inadequate competition and low concentration often lead to limited financial inclusion. This is compounded by a high preponderance of political and economic volatility, coupled with challenges of governance in private and public sectors as well as a high incidence of informality. Instead of holding an account with a traditional financial institution, the majority of the adult population in SSA saves and borrows money through informal ways. Compared to individuals with at least a secondary education, adults with only a primary education (i.e., less educated adults) have a lower rate of formal bank account ownership (Demirgüç-Kunt & Klapper, 2013). Similarly, most adults in developing economies are often vulnerable to bad information since they need help using an account and navigating the usually complex services and products (World Bank,

2022). A direct solution to this challenge could lie in deliberate policies that support greater financial literacy through the design and implementation of formal financial education programs. Such programs could be rolled out to the youth, women, and other traditionally unbanked and underserved members of the population.

Financial illiteracy is a significant barrier to financial inclusion in SSA. Financial exclusion's side effect of financial illiteracy might result in the establishment of an unregulated, exploitative financial industry. The lack of transparency in the terms of service, identity theft, and poor dispute resolution, to mention a few, are concerns that are made worse by the speed at which technology and digital banking are evolving. As a result, the financial system's stability, and safety face regulatory problems. Sharing responsibility for the financial well-being of consumers, regulators, and financial institutions is one possible solution in this regard. The onus is on financial regulators and supervisory agencies to develop better supervisory frameworks and monitoring systems to timeously identify risks to financial safety and stability, as consumers transitions to digital financial services. As mentioned earlier, financial education programs are also key tools to consider and could be structured in ways that promote peer-to-peer learning to be more effective, a point supported by Demirgüç-Kunt and Klapper (2013), World Bank (2022), AFI (2022) as well as Asuming *et al.* (2019).

The gender gap in access to money has decreased in SSA, but it still is a problem. Poor people, young people, and women are still more likely to lack access to mobile phones, be without forms of identification, live far from the closest bank branch, and require help to open and effectively manage a financial account. Deliberate steps should be taken to strengthen the ability and coordinate the activities of important stakeholders in both the public and private sectors to fully address these and other major obstacles to financial inclusion in the region. As a result, the NFIS, which has strong coordination and monitoring and evaluation frameworks, continues to be a vital tool for assisting authorities, financiers, technical service providers, funders, and other important players in the development and expansion of the region's financial inclusion programs (AFI, 2022a, 2022c).

3.8 Conclusions

Chapter two examined financial inclusion trends in Sub-Saharan Africa, focusing on the difference between using financial services and having access to them. It highlights three metrics for monitoring financial inclusion: the number of people using basic services, the quality of financial services based on individual opinions, and material and financial access barriers. The chapter also discussed global efforts to enhance global financial inclusion, focusing on the AFI and the World Bank Group. The AFI partners with regulators and private sector leaders to develop financial products and services for underbanked and unbanked populations. The World Bank Group, combats poverty and raises living standards in developing nations, serving as a hub for development knowledge and a primary source of finance.

The chapter highlighted government interventions and policy initiatives in SSA countries to enhance financial inclusion, underscoring the benefits of such national financial inclusion strategies, which are often supported by development partners like the World Bank and Alliance for Financial Inclusion. Our analysis discovered that the AFI's SSA membership has NFIS in 86 percent of cases, with 28 percent and 4 percent of the membership on their second and third NFIS, respectively. Furthermore, in the period from 2005 to 2019 access to financial services and products varied across low-income, lower-middle-income, and upper-middle-income economies, with lower-middle-income countries having higher commercial bank branches and depositors. Financial inclusion in SSA nations has improved over time, partly due to legislative initiatives. However, challenges remain, including lack of coordination, gaps between financial deepening and inclusion, low financial literacy, and gender discrimination. To address these, stakeholder-focused National Financial Inclusion Strategies (NFISs) and policy reforms based on peer learning and transformation are needed.

Appendix

A1. SSA countries with National Financial Inclusion Strategies

#	Name of Country	NFIS (Y/N)	Link to NFIS	Income Classification
1	Angola	Y	Not available[6]	Lower-Middle-Income
2	Burundi	Y	https://www.afi-global.org/publications/republic-of-burundi-national-financial-inclusion-strategy/	Low-Income
3	Benin	N	Not applicable[7]	Lower-Middle-Income
4	Burkina Faso	Y	https://finmark.org.za/system/documents/files/000/000/198/original/Burkina-Faso_Roadmap_English.pdf?1601973604	Low-Income
5	Botswana	Y	https://www.worldbank.org/en/topic/financialinclusion/brief/financial-inclusion-strategies-resource-center	Upper-Middle-Income
6	Cote d'Ivoire	Y	https://www.worldbank.org/en/topic/financialinclusion/brief/financial-inclusion-strategies-resource-center	Lower-Middle-Income
7	Cameroon	N	Not applicable	Lower-Middle-Income
8	Cabo Verde	N	Not applicable	Lower-Middle-Income
9	Chad	N	Not applicable	Low-Income
10	Eswatini	Y	https://www.afi-global.org/sites/default/files/publications/2018-01/Swaziland%20National%20Financial%20Inclusion%20Strategy%202017%20-2022.pdf	Lower-Middle-Income
11	Gabon	N	Not applicable	Upper-Middle-Income
12	Guinea	N	Not applicable	Low-Income
13	The Gambia	N	Not applicable	Low-Income
14	Kenya	Y	Not available	Lower-Middle-Income
15	Lesotho	Y	https://www.centralbank.org.ls/images/Financial_Stability/Financial_Inclusion/Inclusive_Finance_strategy_Final_201.pdf	Lower-Middle-Income
16	Madagascar	Y	https://www.findevgateway.org/fr/etude-de-cas/2012/12/strategie-nationale-de-la-finance-inclusive-snfi-2013-2017	Low-Income

[6] Not available relates to economies with NFIS but it is not publicly available.

[7] Not applicable relates to economies without NFIS.

#	Name of Country	NFIS (Y/N)	Link to NFIS	Income Classification
17	Mali	N	Not applicable	Low-Income
18	Mozambique	Y	https://www.worldbank.org/en/topic/financialinclusion/brief/financial-inclusion-strategies-resource-center	Low-Income
19	Mauritania	Y	https://www.worldbank.org/en/topic/financialinclusion/brief/financial-inclusion-strategies-resource-center	Lower-Middle-Income
20	Mauritius	N	Not applicable	Lower-Middle-Income
21	Malawi	Y	https://www.worldbank.org/en/topic/financialinclusion/brief/financial-inclusion-strategies-resource-center	Low-Income
22	Namibia	Y	https://www.bon.com.na/CMSTemplates/Bon/Files/bon.com.na/e7/e7e69c6d-b02b-4109-8d3d-5b41a79f9d89.pdf	Upper-Middle-Income
23	Niger	Y	https://www.worldbank.org/en/topic/financialinclusion/brief/financial-inclusion-strategies-resource-center	Low-Income
24	Nigeria	Y	https://www.worldbank.org/en/topic/financialinclusion/brief/financial-inclusion-strategies-resource-center	Lower-Middle-Income
25	Rwanda	Y	Not available	Low-Income
26	Sudan	N	Not applicable	Low-Income
27	Republic of Congo	N	Not applicable	Low-Income
28	Senegal	Y	https://www.afi-global.org/publications/senegals-2022-2026-national-financial-inclusion-strategy/	Lower-Middle-Income
29	Seychelles	N	Not applicable	High-Income
30	Sierra Leone	Y	https://bsl.gov.sl/SL%20FI%20Strategy%202017%20-%202020.pdf	Low-Income
31	South Africa	Y	https://www.worldbank.org/en/topic/financialinclusion/brief/financial-inclusion-strategies-resource-center	Upper-Middle-Income
32	South Sudan	N	Not applicable	Low-Income
33	Togo	N	Not applicable	Low-Income
34	Tanzania	Y	https://www.afi-global.org/sites/default/files/publications/2017-12/NFIF%202018-2022.pdf	Lower-Middle-Income
35	Uganda	Y	https://www.bou.or.ug/bou/bouwebsite/bouwebsitecontent/publications/special_pubs/2017/National-Financial-Inclusion-Strategy.pdf	Low-Income
36	Zambia	Y	https://www.boz.zm/National-Financial-Inclusion-Strategy-2017-2022.pdf	Lower-Middle-Income
37	Zimbabwe	Y	https://www.rbz.co.zw/documents/BLSS/FinancialInclusion/National-Financial-Inclusion-Strategy.pdf	Lower-Middle-Income

Note: Country classifications informed by World Bank country and lending groups classification (2022 - 2023). Available at: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups.

Chapter 4: Financial Stability in SSA

4.1 Introduction

The banking sector is a rather substantial component of the financial system, particularly in the developing countries of the sub-Saharan Africa (SAA) region. It is essential to the allocation and mobilization of resources in SSA economies. In addition to making up the majority of financial transactions and assets in the area, it is also continuously and quickly diversifying into new business ventures including fund management, the securities industry, and insurance, among others (Anarfo *et al.,* 2022; Abor & Adjasi, 2022; Abugre *et al.,* 2022; Beck & Cull, 2014). The consequence is that the lines separating banks from other financial markets are becoming less apparent. Banks can be a potential source of efficiency and financial innovation due to this evolution and the increased rate of new entrants (i.e., increased competition), or they can be a source of systemic risk to the financial structure through contagion, which would slow investment and growth and increase macroeconomic instability.

Thus, maintaining the general stability of the larger financial system depends on the SSA region's banking sector. An unstable financial system stifles economic performance in a number of ways, while one that is stable fosters it. In a secure financial system, businesses and households can store value and move assets more easily without worrying about losing them. As a result, society advances, and the economy expands. Thus, in order to prevent a crisis in an economy's activities, a stable financial system is required (Schinasi, 2004; Kulu & Appiah-Kubi, 2021; Kulu *et al.,* 2022).

From a historical viewpoint, the phrase "financial stability" first appeared when the Bank of England (BoE) adopted it in 1994 to describe a set of goals not directly related to price stability or the smooth operation of the financial system. During the Great Moderation, which spanned from 1984 to 2007, the financial stability mandate (FSM) was a secondary concern for the majority of advanced economy central banks, such as the BoE or Federal Reserve Bank (FED) of the United States (Allen and Wood, 2006; Toniolo and White,

2015). This was partly due to the widely held belief that long-term price stability maintained by central banks would ensure financial stability. The FSM gained popularity among central banks worldwide, including those in the SSA area, especially in the wake of the global financial crisis of 2007–2009, with the primary objective being to avert another or even worse financial disaster. Despite the FSM's recent surge in popularity, there is still a lot of international variation in the terms and metrics used to describe and quantify financial stability. Furthermore, there is limited consensus among financial institution supervisors and regulators regarding the choice and application of appropriate financial stability policy measures.

Therefore, the purpose of this chapter is to address the following questions: (i) What are some popular approaches to gauge financial stability? (ii) What steps have been made to encourage monetary stability globally and within the SSA region? (iii) What are the most recent trends in the SSA region's financial stability in comparison to other regions? And (iv) what are some of the issues this stability faces? In this sense, the remainder of this chapter is divided into the following six sections. A summary of popular metrics for gauging financial stability is presented in Section Two. Initiatives to promote global financial stability are highlighted in Section Three. A summary of the programs to support regional financial stability in SSA is provided in Section Four. The trends and developments relating to financial stability in SSA, and other regions are covered in Section Five. The difficulties with SSA's financial stability are described in Section Six, along with proposed solutions. Section Seven concludes.

4.2 Measuring Financial Stability

The global financial crisis of 2007–2009 underlined how crucial it is to have systems in place that are both effective and efficient at identifying potential threats to financial stability and capable of mitigating those threats or taking the necessary actions to address them and their consequences, to contain their negative effects. Together with the accelerating pace of financial innovations and technology, the ever-increasing interconnection of the world's financial systems has created many transmission routes as well as novel and complex hazards. This has made it increasingly difficult to gauge

financial soundness. As a result, macro-prudential rather than micro-prudential aspects of financial stability are now the main focus. As a consequence, financial system regulators and supervisors have tried to accurately assess financial stability by attempting to capture the complex conditions of financial stability using a variety of financial stability measurement approaches and by monitoring a wide range of indicators. Macro-stress testing, early warning systems, and financial stability indexes are some of the most popular ways to monitor financial stability. Each approach is discussed in this section along with some of its most significant benefits and drawbacks.

4.2.1 Early Warning Systems (EWS)

The primary theoretical and empirical research on financial crisis early warning systems (EWS) dates to Kaminsky and Reinhart's (1999) work. To determine the root causes of twin crises—the simultaneous failure of the banking and monetary systems in developing nations—they devised a signal extraction-based methodology. Given the existing risk profile of a financial institution, financial system, or a country, EWS are intended by design to identify episodes of financial crisis ex-ante, or in advance, that may arise in the future. As a result, they extrapolate potential leading indications to estimate the likelihood of a financial catastrophe. In terms of methodology, EWS typically employ a five-step process. They start by identifying previous crises situations. Second, they select leading indicators to serve as crisis episode predictions. Thirdly, they determine the leading indicators' threshold levels. They build composite leading indicators as their fourth step. Finally, they monitor for threshold breaches and utilize the information to guide the implementation of the necessary steps (Kaminski, 1999; Borio & Drehmann, 2009; Aldasoro *et al.,* 2018; Klopotan, *et al.,* 2018; Yavari, 2012). Statistical models that link a certain collection of explanatory variables to a dependent variable—typically an index of financial (in)stability—and minimize either the noise-to-signal ratio or a given loss function are used by EWS to forecast the likelihood of financial (in)stability.

EWS often vary from one another in terms of how the dependent variable is defined, how long the prediction horizon is, which independent variables are chosen, and how the econometric technique is applied. For instance, researchers have used binary categorical

variables with binary logit models, binary logit models with binary categorical variables, or even multinomial logit models to increase forecasting efficiency (Allaj & Sanfelici, 2022; Yıldırım & Sanyal, 2022). Regardless of these technical decisions, the objective of each EWS is to forecast the possible onset of a financial catastrophe. They are particularly helpful in this regard for forming a preliminary evaluation or as supplemental tools to more in-depth analyses of financial stability and an economy's capability to absorb risk (Jakubík & Slačík, 2013).

The ability to analyze the upside pressures of vulnerabilities at the micro and macro level and with lags in policy transmission is one of the main benefits of EWS. By doing this, they offer decision-makers enough time to implement measures to reduce financial overheating and change their policies. They can also be applied for systemic risk analysis in the cross-sectional and time dimensions, identifying vulnerabilities for institutions that are systemically important at a specific period. They are helpful in analysing how banking sector vulnerabilities develop over time at the national or regional level (Kaminsky & Reinhart, 1999; Yavari, 2012; Borio & Drehmann, 2009).

A short forecast horizon window, which often lasts a year or as little as a month, is a significant drawback of EWS. As a result, there are issues with information being unavailable while forecasts are being made. EWS are also criticized for having an abnormally high false positive rate, which causes them to forecast catastrophes that never materialize (Borio & Drehmann, 2009). Furthermore, the usage of the financial or banking crisis variable in EWS is frequently inconsistent. This is due to the lack of a specific quantitative variable for banking or financial crises. The root of this issue is that financial or banking crises are unique occurrences. As a result, there might not be a perfect correlation between the crises' proxies and the actual crises (Yavari, 2012; Kaminsky & Reinhart, 1999).

4.2.2 Macro-stress Testing (MST)

The macro-stress tests (MST) for the financial system are comparable to the portfolio stress tests conducted by individual businesses (like banks). They are made to consider

the entire system while formulating an opinion of how the system might react to a negative shock. In times of market stress, MST can be used to conduct contingent planning as they examine the consequences of severe volatility and assess the impact of uncommon but probable market conditions. The MST-based analysis follows one of two different methodologies, as follows: (i) by looking backwards at a number of past stressful occurrences, or (ii) by examining a prepared list of stressful situations (Beyani & Kasonde, 2009; Howard 2008). Both times, the balance sheets of commercial banks are subjected to sensitivity analyses that compare them to macroeconomic fundamentals. The effects of potential stress situations on the financial system are then simulated using the estimated coefficients.

MST draw much of their foundations from the “negative exogenous shock-amplification” approach to financial instability assessment (Borio & Drehmann, 2009). They may include a macro model related to a group of market risk factors, a typical macro model, or a model of the vector auto-regression (VAR) kind. Several chosen macroeconomic variables are then employed to construct a shock and/or sketch out a shock scenario using the appropriate model. The factors are then used to "shock" the balance sheets of a specific financial sector, enabling a more focused and exact identification of the source of risks and vulnerabilities and, consequently, the impact on that sector's or the larger financial sector's financial strength (Čihák, 2007; Jakubík & Slačík, 2013).

MST is openly prospective and has the flexibility to address a variety of scenarios without being restricted by the probability distributions obtained by estimation. They give a mechanism to effectively express the source, impact, and necessary action for policy makers by tracing the journey from shock to outcome (Borio & Drehmann, 2009). They are more specific than earlier methods and can link shock scenarios to specific financial sector balance sheets. For example, the assessment of the ripple effects from losses at individual institutions is made possible using banking sector interlinkages in the measurement of the systemic risk associated with interbank contagion through MST (Gersl & Hermanek, 2007).

Most of the time, financial factors are not always sufficiently included in the macroeconomic modules used in MST. They often focus more on analysing macroeconomic risks such exchange rate, country, interest rate, credit, liquidity, and interbank, rarely expanding beyond this kind of variable set. These biases are in favour of financial stress episodes that are entirely caused by macroeconomic issues. (Borio & Drehmann, 2009). Again, regardless of the type of econometric technique used in MST, they are highly data heavy if the goal is to evaluate financial system risks. Regulators and supervisors who want to use this strategy are typically met with either insufficient data or inaccurate data. Due to this, data quality is often compromised, which weakens the validity of the measurement results (Howard, 2008).

4.2.3 Financial Stability Indices (FSI)

Financial stability indices (FSI) are an additional quantitative tool for assessing financial stability that complements EWS and MST. In terms of methodology, FSI are typically built as composite indicators that use a weighted approach for each of the indicator's components. The simplest form of an FSI for the banking sector, which is typically the most significant segment of the financial system in terms of financial stability, might be a banking stability aggregate indicator created as the weighted average of partial indicators of banks' financial soundness (Jakubík & Slačík, 2013; Petrovska & Mihajlovska, 2013). The sub-indices on foreign currency risk liquidity, asset quality, interest rate risk, capital adequacy, and profitability, for instance, might be included in the financial soundness indicators. The relative weights of each sub-index can be determined using a technique like principal component analysis. Indeed, more sophisticated FSI models can be created to account for various data kinds, extensive sectoral interconnections, and a wide range of financial system actors.

The FSI can act as a first step toward better operationalizing the financial stability assessment idea when the goal is to construct a more thorough framework for financial stability assessment in an economy. It is possible to build quantitative indicators in this way that more accurately capture the characteristics of the financial system, its relationship to the local economy, and its cross-border connections with other nations.

Additionally, composite quantitative indicators of financial stability enable more effective communication of the effects of such circumstances by anticipating the origins and causes of financial stress on the system (Gersl & Hermanek, 2007; Gadanecz & Jayaram, 2008). As a result, FSI offer an aggregated measure that may be assigned benchmark or threshold values of financial stability to monitor important economic sectors, determine the development of imbalances in a system, and serve as early warning indicators of crises as opposed to individual indicators.

Due to the numerous and frequently very complicated interlinkages between various financial and non-financial market sectors, the creation of a single composite indicator for financial stability is a difficult task. Because of this, evaluating financial stability becomes less valuable if it is not accompanied by the understanding and application of other qualitative or quantitative measuring methodologies and indicators (Gersl & Hermanek, 2007; Gadanecz & Jayaram, 2008). Additionally, there is a lack of consistency and harmonization in the development, use, and weighting of important indicators in the majority of FSI computations (Petrovska & Mihajlovska, 2013). This makes cross-border country comparisons less thorough and effective.

This section covered three of the most popular methods for determining a system's financial soundness, or for detecting or anticipating the beginning of a financial crisis. Although each strategy has benefits that make it appealing, it also has drawbacks that render it less effective if additional techniques are not used to balance it out. The overall conclusion is that no single method, when applied alone, is a reliable indicator of financial soundness. Once more, the best financial stability measures attempt to consider both qualitative and quantitative risk variables. They also aggregate the data to give a more complete picture of how the many important indicators interact. However, in order to credibly inform domestic policy and successfully conduct thorough cross-border comparisons, a universally accepted template or methodology for financial stability measures must be developed. This is because country-specific circumstances and overall country heterogeneity (as well as differences in the variables used in indicators and the availability of data) make it difficult to compare one country to another.

4.3 Initiatives to Promote Global Financial Stability

The interconnection of nations, including those with varying degrees of financial and economic development, has been a growing concern for the international financial system in recent decades. In the best-case scenario, such an international system should be characterized by a stable environment, required to facilitate the global flow of payments, while also accommodating international financial intermediation and providing liquidity to countries to meet their international obligations and support sustainable growth and development via the effective, safe, and transparent flows of funds and investment. Taking all of this into account, financial instability has the potential to have negative macroeconomic effects on economic agents and undermine the stability of the global financial system. Therefore, it is crucial for policies to take measures to prevent financial instability or, at least, to limit its effects if it does occur or threaten to do so. The most recent efforts to encourage financial stability on a global scale are discussed in this section. The subject is broken down into four sub-sections: (i) international attempts to improve the international financial architecture; (ii) improving multilateral monitoring; (iii) crisis prevention and resolution methods; and (iv) improving global governance.

4.3.1 International Financial Architecture Strengthening Initiatives

4.3.1.1 The Financial Stability Forum (FSF)

On the strength of the Tietmeyer Report's conclusions and recommendations, in February 1999 [8], the Financial Stability Forum (FSF) was set up by finance officials from the Group of Seven (G-7) nations, was tasked with coordinating international efforts to improve the efficiency, financial stability, and reduction of systemic risks in the global financial architecture. The World Bank, the Committee on the Global Financial System, Central

[8] The coordination and collaboration in financial market surveillance and supervision, at the international level, were the main topics of Hans Tietmeyer's report to the G7 Ministers and Governors in February 1999. It emphasizes the significance of global financial integration but also makes clear that no organization has the depth or capability to bring together important national authorities and major international financial institutions to address financial sector stability, integrate emerging economies into an assessment of changing financial risks, and harmonize the handling of macroprudential and micro prudential issues (Tietmeyer, 1999; Lombardi, 2011).

Banks, Finance Ministries, the Organization for Economic Cooperation and Development (OECD), regulatory and supervisory authorities from the G-7 countries, the European Central Bank (ECB), and most of the international financial standard setting bodies (SSBs) participated in this effort[9] (FSB, 2021; Gadinis, 2012; Lombardi, 2011).

Despite the FSF's goal, several nations were not granted membership, which gave rise to questions about the legitimacy of the organization's founding (Gadinis, 2012; Lombardi, 2011). For instance, the majority of the SSBs that made up the FSF membership had little representation from poor nations. During the first summit of the Group of Twenty (G-20) Leaders' Forum in November 2008, the issue of extending FSF membership was considered. The G-20 was created with the goal of allowing for wide regional representation and expanding the list of systemically important economies beyond those represented by the G-7. While acknowledging the FSF's pioneering role in global regulatory reform, G-20 leaders demanded an urgent membership extension to include emerging market economies. This would make it possible for the Financial Stability Board (FSB) to be set up.

4.3.1.2 The Financial Stability Board (FSB)

At the height of the 2007–2009 global financial crisis, the G-20 leaders convened in London for their summit in April 2009 and decided to strengthen the FSF. They decided to give it a wider mandate of supporting financial stability and re-establish it as the Financial Stability Board (FSB) with improved capabilities and a stronger institutional foundation. Thus, the FSB was created as the FSF's replacement (FSB, 2021; Lombardi, 2011). The goal of the FSB is to coordinate the efforts of international SSBs and national financial authorities at the global level to create and support the adoption of efficient supervisory, regulatory, and other financial sector policies. Its duties and mandates include:

[9] The SSBs were made up of the Basel Committee on Banking Supervision, the International Organization of Securities Commissions, the International Association of Insurance Supervisors, and the International Accounting Standards Board (Lombardi, 2011).

1. Evaluate the global financial system's vulnerabilities, as well as the regulatory, supervisory, and related activities that must be taken to address them, as well as the results of those actions, on a prompt and ongoing basis from a macroprudential perspective.
2. Encourage cooperation and information sharing between agencies in charge of financial stability.
3. Keep track of market developments and their effects on regulatory policy and offer advice.
4. Offer advice and keep track of the best practices for following regulations.
5. Conduct joint strategic reviews of the international SSBs' work on developing policy and coordinate it to make sure it is prompt, coordinated, prioritized, and addresses any gaps.
6. Establish rules and encourage the creation of supervisory colleges.
7. Encourage emergency preparation for international crisis management, especially regarding systemically significant enterprises.
8. Work together with the IMF to conduct early warning drills.
9. Encourage the implementation of agreed-upon commitments, standards, and policy recommendations by member jurisdictions through monitoring, peer review, and disclosure.
10. Conduct any added tasks that the group's members decide upon while working together and in accordance with this Charter.

The FSB's wide mandate is to improve global financial supervision and regulation through the formulation and management of pertinent regulatory, supervisory, and other financial sector policies. In this way, the FSB aims to promote financial stability worldwide. Its agenda is decided by the G-20, and it serves as an implementation and monitoring body in this regard. The first FSF members, along with the remaining G-20 nations, the European Commission, and Spain, are all members of the FSB (Gadinis, 2012). As a result, the FSB is better able to represent a larger range of international interests.

4.3.2 Enhancing Multilateral Surveillance

Given the growing interdependence of the world economy, worldwide multilateral monitoring is essential. Following the global financial crisis of 2007–2009, efforts have been undertaken to improve multilateral monitoring by bolstering current measures as well as creating and putting into place new ones. For instance, groups like the IMF, the G-20, and the FSB have been striving to increase the global economy's and the international financial system's resilience to support stability and sustainable growth. The Framework for Strong, Sustainable, and Balanced Growth (FSSBG) of the G-20, which was unveiled in September 2009 at the G-20 Pittsburgh Summit, is a significant advance in this field.

By evaluating and coordinating the mutual compatibility of national policies, the FSSBG seeks to achieve shared financial stability objectives at the international level (ECB, 2011). The G-20 countries are expected to implement the proposals that have been mutually agreed upon once the leaders have agreed on the harmonized policy. In terms of issues involving multilateral monitoring, the FSB's job is equally crucial. It undertakes early warning exercises and finds global vulnerabilities resulting from cross-sector and cross-border interlinkages through partnership with other institutions, such as the IMF and the BIS, particularly in macro-prudential surveillance. The International Monetary and Financial Committee (IMFC) gets updated on the FSB's efforts in this regard on a semi-annual basis. (ECB, 2011).

It is difficult to understate the crucial role played by the IMF in the administration of global multilateral surveillance, aside from the technical support it provides to the FSB and the G-20's FSSBG. Connecting the qualitative examination of country-specific circumstances with indicators of vulnerability and other quantitative techniques has proven to be a successful strategy for the organization. In this regard, the IMF's assessments draw on a wide range of inputs, including in-depth analyses of the financing requirements for borrowing countries, the most recent global forecasts, capital market indicators, EWS models, assessments of the financial sector's vulnerability, and the staff's ability in particular countries and regions (Sugisaki, 2002). In the end, the IMF releases flagship

reports on a semi-annual basis, such as the Global Financial Stability Report (GFSR), which summarizes events in the global financial markets and evaluates their stability as well as financing for emerging markets.

Additionally, the work done by the IMF and the World Bank and documented in their joint project, the Financial Sector Assessment Program (FSAP), is also quite significant. The FSAP was created in 1999 to serve as a thorough and in-depth evaluation of a nation's financial sector. Along with a financial development evaluation, they evaluate the crisis management abilities, regulation and supervision, and resilience of the financial system. FSAPs give suggestions on micro- and macroprudential issues, as well as the developmental requirements in emerging and developing economies, adapted to country-specific circumstances. They assist in creating a Financial System Stability Assessment (FSSA) (IMF, 2022a).

4.3.3 Crisis Prevention and Resolution Mechanisms

4.3.3.1 The Basel Committee on Banking Supervision and the Basel Accords

The Basel Committee on Banking Supervision (BCBS) was established at the end of 1974 by central bank governors of the Group of Ten (G-10) nations in response to the Bretton Woods Accord's collapse in 1971, the stock market crash in 1973, and the shock of the oil price in 1974, which disrupted the global currency and banking markets. The Committee has its headquarters at the Bank for International Settlements in Basel and serves as a platform for consistent cooperation among member nations on banking supervision issues. Its principal goal is to increase financial stability by raising the standard of global banking supervision. The Committee initially met in February 1975, and it currently meets regularly three or four times a year.

Since its founding, the BCBS has added 45 institutions from 28 different jurisdictions, in addition to the G-10. Australia, Argentina, Belgium, Canada, Brazil, China, France, Germany, Hong Kong, Italy, Japan, Mexico, Russia, Saudi Arabia, Switzerland, Sweden, the Netherlands, Singapore, South Africa, Turkey, and Spain are members (BIS, 2023a, 2023b). Beginning with the Basel Concordat, the Basel Committee has created several

global rules to govern banks since 1975. These include the Capital Adequacy Accords, also referred to as Basel I, Basel II, and Basel III, respectively.

Table 4.3.1 presents a snapshot of the history of the Basel accords, while Table 4.3.2 offers a synopsis of each of them.

Table 4.3.1: History of Basel Accords: A Snapshot

Time	Event
July 1988	Basel I is published
December 1992	Official deadline for Basel I compliance
December 1996	Basel I amendment for market risk
June 2004	Basel II is published
December 2006	Official deadline for Basel II compliance
May 2009	Basel Committee publishes principles for sound stress testing practices
July 2009	Basel II adjustments for securitisation and trading book instruments (also called Basel 2.5)
Dec 2009	Proposed Basel II adjustments for enhanced capital adequacy rules, liquidity risk management and systemic risk monitoring (also called Basel III)
November 2010	G-20 endorses BCBS Basel III proposals
December 2010	Basel III is published
January 2011	Basel III observation period begins
December 2011	Official deadline for Basel 2.5
January 2013:	Current official date for Basel III implementation
Jan 2019	Current official deadline for Basel III compliance

Source: Author's own compilation based on information from Moody's Analytics (2011).

Table 4.3.2: Synopsis of Basel Accords

Basel I	Basel II	Basel III
• Basel I, sometimes known as the Basel Capital Accords, was published in 1988. • It was established as a reaction to the American debt crisis. • Its main concern was the capital sufficiency of financial institutions. In other words, it enacted higher adequacy and capital rules. • In order to protect themselves against a financial crisis, multinational banks operating under Basel I were required to retain and maintain capital (Tier 1 and Tier 2) equal to at least 8% of their risk-weighted assets.	• 2004 saw the release of Basel II. • By adding more specifics and details, it updated the original Basel I treaty. • It improved market discipline through the use of disclosure and intensified quality banking procedures by analyzing the internal assessment process of banks. • It focused on capital requirements regulation by highlighting three key areas (known as the three pillars): (i) minimum capital requirements, (ii) supervisory review of an institution's capital adequacy and	• Basel III became effective in 2010. • The BCBS resolved to amend and reinforce the Basel Accords prior to the fall of Lehman Brothers in September 2008, primarily in reaction to the global financial crisis of 2007–2009. • The G-20 countries came to an agreement on the overall framework of the capital and liquidity reform package in November 2010. • The three pillars of Basel II continue in Basel III. • It adds new specifications and safety measures. Basel III, for

Basel I	Basel II	Basel III
	internal assessment process, and (iii) the efficient use of disclosure as a lever to strengthen market discipline and encourage sound banking practices, including supervisory review. • Basel II also changed the two categories (as in Basel I) into three tiers for a bank's qualifying regulatory capital. A bank is permitted to include fewer subordinated securities in tiers that are higher than it. • Each tier serves as a numerator in the calculation of regulatory capital ratios and must represent a specific minimum percentage of the overall regulatory capital.	instance, mandates that banks maintain a minimum level of common ownership and a minimum liquidity ratio. • It includes additional requirements for what the Accord refers to as "systemically important banks", or those financial institutions that are viewed as "too big to fail". • It increased requirements on common equity from 2% to 4.5%, with an additional capital buffer of 2.5% (meaning banks had to hold 10.5% of risk weighted assets). As a result, Tier 3 capital considerations were eliminated.

Source: Author's own compilation based on BIS (2023a, 2023b) and Ferreira *et al.* (2019).

The evolution of the Basel Accords is showed in Tables 4.3.1 and 4.3.2, respectively, illustrating that they are not a static prudential framework for financial sector regulation and crisis management. Instead, considering new financial threats around the world, they are continuously enhanced and developed. For instance, Basel I, which was first launched in 1988, was changed in December 1998, which served as the model for Basel II. Similar modifications were made to Basel II in July 2009 for trading book and securitization instruments to create Basel 2.5. Additionally, Basel III was released in 2010 because of Basel II modifications made in December 2009 for improved capital adequacy standards, liquidity risk management, and systemic risk monitoring.

4.3.3.2 The IMF and the Global Financial Safety Net

The global financial crisis of 2007–2009 highlighted the need for stronger strategies to assist nations that experienced financial difficulties as a direct or indirect outcome of the crisis. The IMF's assistance to member nations in developing necessary crisis-resolution tools meant to strengthen the international financial architecture or the global financial safety net has been a key focus of these activities. The IMF expanded its lending capacity and updated its lending toolbox during the GFC. This was done to meet the increased demand for financing by its membership, given the financial distress challenges they faced, because of the GFC. Following agreements made by G-20 leaders during their

summit in London in April 2009, the IMF resources were tripled to USD 750 billion to support the increase in lending capacity (IMF, 2009; ECB, 2011).

The reform of the lending toolbox included the March 2009 introduction of the Flexible Credit Line (FCL), as well as increased lending limits and a sharper focus on ex-ante conditionality. To satisfy the funding needs of nations with strong fundamentals, policies, and institutional frameworks, the FCL was created with a high qualification criterion. The Precautionary Credit Line (PCL) was set up in August 2010. This lending facility was created to fulfil the financial needs of IMF members that have good macroeconomic policies but fall short of the FCL's stringent qualifications. The PCL would therefore be more accessible than the FCL as a result. The PCL also signalled a change in the IMF's financing strategy from one that was predicated mostly on actual balance of payment (BoP) issues to one that was predicated on prospective BoP challenges (IMF, 2010; ECB, 2011).

The necessity for strong international financial safety nets and improved global cooperation to effectively safeguard nations with sound policies from volatility and spill overs was highlighted during the GFC debate on how to best strengthen IMF crisis resolution tools. Policymakers typically argue on whether the IMF should establish a mechanism that can be triggered on demand and how it should be built in this regard and in response to global systemic shocks. Additionally, there is frequently controversy about whether such a method will lessen the negative connotations associated with IMF funding in developing countries, limiting the accumulation of moral hazard and precautionary reserves (ECB, 2011). Despite this, it is nevertheless obvious that the ongoing improvement of IMF crisis-resolution tools will support the IMF's conventional missions for crisis prevention and contagion mitigation and support the maintenance of global financial stability. When performing bilateral surveillance, this may entail paying closer attention to the systemic effects of the policies of the major economies (Sugisaki, 2002). Furthermore, vulnerability assessments must be strengthened, exchange rate and arrangement assessments must be made with greater candour, financial sector coverage

must be uniformly rigorous, and coverage of pertinent structural and institutional issues must be in-depth.

4.3.3.3 Enhancing Global Governance

Global governance includes the coordination and collaboration of several stakeholders, including both public and commercial interest groups, to achieve goals that are widely acknowledged. Global frameworks and institutions aid in this endeavour by directing collective resources and efforts toward tackling global issues (Boughton & Bradford, 2007). Global governance systems must therefore be inclusive, constantly changing to manage new challenges, and crossing national, sectoral, and regional boundaries as well as interests to be effective. Furthermore, democratic, political, and integrative principles should characterize global governance.

It becomes extremely difficult for individual nations to guarantee sustainable growth in ways that foster systemic financial sector stability without having improved global collaboration and collective action, given the fast-growing interconnection of the global financial system. This was made obvious in Section 3.3.1 as the G-20's role as the principal global governance forum (beyond the G-7) and the FSF's transformation into the FSB came to the fore. For instance, more international cooperation can be promoted through institutions like the G-20's FSSBG. The G-20 and FSSBG successfully give recommendations aimed at promoting better financial stability around the world high-level political impetus. They accomplish this by holding participants responsible for achieving set goals. But more must be done to guarantee that global concerns are represented in groups like the G-20. Therefore, there are three main ways that global governance can be strengthened: by streamlining relationships between sovereign states, by regularly upgrading existing multilateral institutions to make them more inclusive, and by establishing strong oversight organizations (Boughton & Bradford, 2007; ECB, 2011).

4.4 Initiatives to Promote Regional Financial Stability in SSA

To encourage the development and implementation of effective and efficient policies aimed at promoting financial stability, it is crucial for globally applicable financial sector

reforms to consider country-specific heterogeneities that span legal systems, financial sophistication, and capacity, as well as the diversity of national experiences and vulnerabilities. The FSB announced plans to create six Regional Consultative Groups (RCGs) in November 2010 to formalize outreach efforts beyond its G-20 membership and reflect the global nature of the financial system, one for each of the following regions: the Americas, Asia, Commonwealth of Independent States, Europe, Middle East and North Africa, and Sub-Saharan Africa (SSA).

2011 saw the establishment of the six RCGs. The RCGs' primary goal is to bring together financial authorities from FSB members and non-member countries to discuss vulnerabilities affecting financial systems and initiatives planned and under way to promote global financial stability, with an emphasis on these initiatives' implementation (FSB, 2012; 2018). This section focuses on the Regional Consultative Group for sub-Saharan Africa[10] (RCG-SSA), its interactions with the FSB and its policy initiatives to promote financial stability in SSA. The section next includes a discussion on the type of financial sector regulation in SSA following the global financial crisis of 2007–2009.

4.4.1 Regional Consultative Group for Sub Saharan Africa (RCG-SSA)

4.4.1.1 Operational Framework

Operationally, it is easier for the FSB and an RCG to communicate when the RCG is co-chaired by a member of the FSB and a non-member from the same region. The group's FSB members will elect one co-chair, and the group's non-members will elect the other. The two-year terms of each co-chair are set. Similar to the FSB, the RCG has members from central banks, finance ministries, and regulatory bodies that oversee the financial sector.

[10] Angola, Botswana, Ghana, Kenya, Mauritius, Namibia, Nigeria, South Africa (which is also a member of FSB), Tanzania, Uganda, Zambia, Bank of Central African States, and Central Bank of West African States are among the countries that are members of the RCG-SSA.

The degree of representation within an RCG is equivalent to that of the FSB Plenary. It therefore comprises the governor of the central bank or his or her immediate deputy, the head or his or her immediate deputy of the primary supervisory or regulatory authority, and the deputy finance minister or deputy head of the finance ministry. The RCG is responsible for deciding which international financial institutions, including regional ones, and other international organizations to invite, as well as the number of participants from each country, for regional meetings (FSB, 2012; 2018).

The operational framework of an RCG offers a structured mechanism for (i) discussions between FSB members and non-members regarding various FSB initiatives; (ii) encouraging the implementation of international financial policy initiatives within the region; and (iii) sharing opinions on potential solutions for financial stability among RCG members and with the FSB. It is anticipated that the RCG will maintain the openness and transparency of the financial sector, follow international financial norms, and submit to recurring evaluations from international organizations, such as the FSAP conducted by the IMF and the World Bank (FSB, 2012).

4.4.1.2 Information Sharing, Policy Formulation and Coordination

A Working Group on Home-Host Cooperation and Information Sharing was established by the RCG-SSA in October 2013 during its fourth meeting, which was held in Mauritius. The Working Group was looking for measures to tighten and improve the oversight of financial groups operating in various jurisdictions across the region, as well as the state of and difficulties with home-host collaboration and information exchange. It accomplished this by researching and analysing supervisors' information sharing and home-host collaboration in the SSA region.

The Working Group's survey and analysis revealed significant legislative support for information sharing among most jurisdictions, but not all of them, which was mostly encouraged via memorandums of understanding (MoUs). When information is exchanged, its efficacy in terms of timeliness, usability, consistency, frequency, completeness, appropriateness, and adequacy varies. Furthermore, it is crucial to

communicate information on market share, issues of supervisory concern, and noncompliance with rules and regulations to create a more thorough assessment of the risk factors in the financial sector (FSB, 2018).

Since central banks, banking commissioners, and ministries of finance all share capabilities, smooth information sharing is often made easier between nations that are members of monetary unions. These kinds of arrangements are supplemented by the creation of supervisory colleges between nations. However, with the requirement to provide greater inclusion more frequent meetings, quicker information sharing, as well as attempts to increase staff retention and capacity growth. To sum up, the Working Group's efforts—at least as far as their 2013 study—benefited the financial authorities in the area and served as a valuable source of information for the FSB's work.

4.4.2 Financial Sector Regulation after the 2007/09 Global Financial Crisis

Between countries that are members of monetary unions, smooth information sharing is frequently made easier because central banks, banking commissioners, and ministries of finance all share capabilities. The establishment of supervisory colleges between nations is a supplement to these kinds of agreements, but it comes with requirements for more inclusion, more regular meetings, quicker information sharing, as well as initiatives to improve staff retention and capacity building. In conclusion, the Working Group's efforts—at least as far as its 2013 study—benefited the local financial authorities and provided an important source of knowledge for the FSB's work (Gottschalk, 2014).

Since the global financial crisis of 2007–2009, the approval and implementation of the Basel III banking and supervisory framework has moved macro-prudential regulation to the forefront of the regulatory reform debate. Basel III, which was described in Section 4.3.3, is a collection of globally accepted guidelines or minimum standards created by the Basel Committee on Banking Supervision with the intention of strengthening the regulation, oversight, and risk management of globally active banks. The successful acceptance and implementation of Basel III and, consequently, addressing the connection between the macroeconomy and financial systems, remain challenges in the

case of SSA's low-income economies. Lack of resources and technological capability are the main causes of this. To recognize and manage risks resulting from macro-financial connections, regulatory authorities must first build the technical competence needed to do so (Gottschalk, 2014). The same goes for learning how to convert macroprudential analysis into macroprudential policy. The relationship between macro and micro-prudential supervision is equally important. Specifically, identifying any potential differences, overlaps, or conflicts between the two financial stability-promoting policies is critical. Table 4.4.1 provides an overview of the key differences, tensions and complementarities between micro and macro prudential policies.

Table 4.4.1: Key Differences, Tensions and Complementarities between Micro and Macro-Prudential Polices

Differences	Tensions	Complementarities
• Micro and macro-prudential policies have difference focuses. Microprudential policy works to safeguard the stability of specific financial institutions, whereas macroprudential policy aims to reduce systemic risks in the entire financial system. • The timing of policy actions under macro- and micro-prudential supervision may vary over credit or economic cycles due to their distinct- albeit related- areas of policy focus.	• Downtowns in the credit or business cycles typically see a greater emergence of tensions in micro- and macroprudential policies. During these times, microprudential policies could unintentionally have a negative impact on the entire financial system. For example, they could force a group of banks to raise their capital buffers, which they can do by deleveraging or by selling their assets at fire sale prices or reducing their demand for them. This would in turn cause a capital erosion for another set of banks.	• Macroprudential policies are sometimes less successful than microprudential ones. This implies that rather than relying solely on a uniform and system-wide general approach, micro-prudential policies can be used to supplement macro-prudential policies in circumstances when a particular refinement in policy action is required to drill down to the micro level. • Due to banks' ex-ante expectation of regulatory conduct along the credit or business cycle, macroprudential measures may be susceptible to "collective moral hazard" issues. To account for the

Differences	Tensions	Complementarities
		possibility of such issues and provide the best possible policy combination, micro-prudential measures might be applied complimentarily in this context.

Source: Author's own compilation based on Boissay and Cappiello, (2014); Cerutti, *et al.* (2016).

From Table 4.4.1, both macro- and microprudential supervision are complementary and play a significant role in maintaining financial stability. However, there may occasionally be tensions between them, given the differences in their respective -albeit related- areas of policy focus and timing of policy actions. To optimize the synergies between the two policy domains, reduce obstacles, and guarantee effective use of policy instruments, constructive collaboration and sufficient information exchange between micro- and macro-supervision are necessary. Such cooperation might be predicated on a sound and mutually agreed-upon diagnosis of the elements defining a crisis. Although frequent coordination between the two policy domains is crucial, the advantages could be greatest in periods of recessions when tensions between macro- and micro-prudential measures are more likely (Boissay & Cappiello, 2014; Cerutti, *et al.* 2016).

4.5 Financial Stability Trends and Developments in SSA

In order to highlight how it has been regulated in the past and to explain how regulatory priorities can be formed in the future, it is crucial to understand the structure and development of the SSA financial system. Different countries' financial sectors in the SSA region have varying degrees of depth and development. The growth of alternate sources of capital, including stock markets, non-bank financial organizations, and mobile banking, indicate some encouraging, though gradual, advancements. On a broad scale, state- or foreign-owned banks and informal finance continue to hold a significant amount of control over the larger financial system. Since the early 1990s, African governments have promoted reforms, pushing for more restructuring and private sector involvement in the management of quasi-government banks, to help the industry improve and become more

efficient (Allen *et al.,* 2011; EIB, 2013). Similar to this, numerous nations have tried to strengthen the operating environment for the financial sector by supporting the modernization of central banks and banking legislation through judicial modifications that also permit improved market-based interactions. These adjustments have included revisions to company laws, especially bankruptcy rules, which are crucial for the operation of the financial markets (Pattillo *et al.,* 2006; EIB, 2013).

Early 1990s restructuring initiatives have been accompanied by an increase in interest in financial sector regulatory reforms, particularly in middle income nations where the financial systems are comparatively more advanced. Given their growing importance and largely unregulated status, the early reformers' primary focus in this area has been to strengthen NBFI supervision. They have also worked with regional organizations like the Southern African Development Cooperation (SADC) to harmonize national financial sector laws (Quintyn & Taylor, 2007). Across nations, reforms have had varying degrees of effectiveness, particularly in terms of promoting financial sector stability.

The general trends and developments of financial stability in SSA are explored and discussed in this part in two different methods. First, compare the financial soundness indicators (FSIs) of the region to those of other regions. Second, to contrast the development of FSIs between countries and within regions according to income group classifications. Key macro-financial indicators known as FSIs can be used to monitor the macroeconomy and evaluate the overall soundness of the financial system (Sundararajan *et al.,* 2002; Sugiyarto, 2015). The detection of any potential issues that could result in financial sector vulnerabilities and financial crisis is made possible by using FSIs to evaluate the financial sector's strengths and weaknesses. Financial regulators can design suitable strategic policies, rules, and measures based on the assessment's findings to avert a financial catastrophe.

The basic indicators used to assess the possible vulnerabilities of deposit-taking institutions make up the FSIs taken into consideration in this section. Three categories—capital adequacy, asset quality, and earnings and profitability—are used to categorise

them. The period being considered runs from 2010 to 2019. It is selected based on the availability of data and how well the region is covered. Starting in 2010, regional data have been gathered and supplied from the World Bank's World Development Indicators and the IMF's Global Financial Stability Report (GFSR) database. By the time of our study, the most current vintage of the data used in the analysis was 2022.

4.5.1 Capital Adequacy

A financial soundness indicator called capital adequacy measures how much capital banks have on hand to cover expected or unforeseen losses in the case of a disruption to the economy. The capital adequacy ratio was first implemented as part of the Basel I international banking regulations, which the BCBS first enacted in 1988. Following the global financial crisis of 2007–2009, the Basel accords underwent several changes throughout the years, including Basel II in 2004, Basel 2.5 in 2009, and Basel III in 2010 (see Section 4.3.3).

Regulatory capital to risk-weighted assets and Tier 1 capital to assets are the capital adequacy metrics considered under this sub-section, respectively. In the first instance, risk-weighted assets serve as the denominator and total regulatory capital as the numerator when calculating the ratio. In the second scenario, risk-weighted assets serve as the denominator while only Tier 1 capital, sometimes referred to as core capital, serves as the numerator. It offers protection from market risk exposures brought on by changes in the market value of held assets. It is significant to remember that capital adequacy ratios are frequently not directly comparable between nations due to the variety inherent in national accounting, taxes, and supervisory regimes. Due to this, our analysis compares each region to the minimal capital adequacy threshold established by the BCBS under Basel III for both capital adequacy indicators.

From 2010 to 2019, Table 4.5.1 shows the regulatory capital to risk-weighted assets for seven areas, including SSA. To withstand economic shocks, Basel III obliges banks to hold regulated capital that is greater than or equal to 10.5 percent of a specified measure of their assets weighted by their projected risk. In this approach, noticeably low capital

adequacy ratios can serve as early warning signs of a banking crisis by signalling impending defaults.

Table 4.5.1: Regulatory capital to risk-weighted assets (%) 2010 - 2019

	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	Average
Advanced Economies	14.6	14.1	15.0	16.1	17.3	18.5	19.0	19.2	19.0	19.3	**17.2**
Central and Eastern Europe	16.3	16.1	16.8	17.2	17.9	18.3	18.1	18.5	18.7	19.3	**17.7**
Commonwealth of Independent States	21.9	21.1	19.2	18.0	15.9	16.4	17.5	19.5	18.7	20.0	**18.8**
Developing Asia	18.5	16.8	18.9	19.7	20.0	19.7	19.7	19.4	19.4	20.1	**19.2**
Middle East and North Africa	18.3	18.2	17.2	16.9	16.4	16.9	17.3	17.2	17.4	16.3	**17.2**
Sub-Saharan Africa	17.3	17.6	18.3	19.3	19.0	18.8	19.1	19.7	19.4	18.0	**18.6**
Western Hemisphere	16.6	16.5	16.8	16.0	16.1	15.9	16.7	17.0	16.6	16.3	**16.4**
Minimum Capital Adequacy Requirement (10.5%)	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	**10.5**

Source: Author's Compilation based on data from IMF Financial Soundness Indicators (2022).

All regions have regulated capital to risk-weighted asset ratios above 10.5 percent from 2010 to 2019. Developing Asia came first, with an average regulatory capital to risk weighted asset ratio of 19.2 percent. The Commonwealth of Independent States and the SSA region came in second and third, with an average regulatory capital to risk weighted asset ratio of 18.8 percent and 18.6 percent, respectively. The analysis reveals that each of the regions under consideration has complied with the 10.5 percent minimum level of regulatory capital required under Basel III by the BCBS, even though they each have different financial risks and economies. The regulatory capital to risk-weighted assets ratio in the SSA area reached its greatest level in 2017, making it the region with the highest ratio among the other six.

Table 4.5.2 makes it easier to explore in more detail the trends of regulatory capital to risk-weighted assets in the SSA area from 2010 to 2019. The region's countries are listed in the table and divided into three income groups depending on the availability of data: low-income, lower-middle-income, and upper-middle-income, respectively. The average regulatory capital to risk-weighted assets in low-income economies was 20.38 percent between 2010 and 2019. Lower-middle income economies and upper-middle income economies, with averages of 17.76 percent and 17.14 percent, respectively, quickly followed them. The Gambia had the highest average regulatory capital to risk-weighted assets ratio among low-income nations from 2010 to 2019, at 30.56 percent, followed by

Rwanda at 23.74 percent, when seen from a country-average viewpoint. Between 2010 and 2019, Comoros and Eswatini had the highest average regulatory capital to risk-weighted assets ratios among lower-middle income nations, both at 24.09 percent. Equatorial Guinea had the highest average regulatory capital to risk-weighted assets ratio in the upper-middle income economies during the assessment period, at 22.03 percent, followed by Botswana at 19.56 percent.

Table 4.5.2 SSA Average Regulatory Capital to Risk-Weighted Assets, Percent (2010 – 2019)

Country	Income Group	Country Average	Income Group Average
Burundi	Low-Income	20.36	
Chad	Low-Income	15.55	
Ethiopia, The Federal Dem. Rep. of	Low-Income	20.62	
Gambia, The	Low-Income	30.56	
Guinea	Low-Income	16.55	
Madagascar, Rep. of	Low-Income	14.44	
Malawi	Low-Income	18.78	
Mozambique, Rep. of	Low-Income	18.85	
Rwanda	Low-Income	23.74	
Uganda	Low-Income	21.33	
Zambia	Low-Income	23.43	**20.38**
Angola	Lower-Middle Income	17.39	
Cameroon	Lower-Middle Income	8.96	
Congo, Rep. of	Lower-Middle Income	17.97	
Comoros, Union of the	Lower-Middle Income	24.09	
Eswatini, Kingdom of	Lower-Middle Income	23.01	
Kenya	Lower-Middle Income	19.95	
Lesotho, Kingdom of	Lower-Middle Income	16.02	
Nigeria	Lower-Middle Income	14.5	
Tanzania, United Rep. of	Lower-Middle Income	17.97	**17.76**
Botswana	Upper-Middle Income	19.56	
Equatorial Guinea, Rep. of	Upper-Middle Income	22.03	
Gabon	Upper-Middle Income	13.01	
Mauritius	Upper-Middle Income	17.73	
Namibia	Upper-Middle Income	14.96	**17.14**

Country	Income Group	Country Average	Income Group Average
South Africa	Upper-Middle Income	15.54	

Source: Author's Compilation based on data from IMF Financial Soundness Indicators (2022)
Note: Income group classification provided by World Bank. [11]

From 2010 to 2019, the Tier 1 capital to assets ratio for seven areas, including SSA, is shown in Table 4.5.3. According to Basel III, banks must have Tier 1 capital adequacy levels of at least 6 percent of their risk-weighted assets. According to the table, the average capital to asset ratio for deposit-taking banks during the review period was 12 percent in the Commonwealth of Independent States and 7.2 percent in the Advanced Economies. The average Tier 1 capital to asset ratio for the SSA region from 2010 to 2019 was 9.7 percent, ranking fifth out of the seven regions. The findings demonstrate that all regions taken into consideration were capitalized, with consistent increases in their capital ratios over the Basel III minimum level of 6 percent throughout the course of the ten-year period. 2016 saw the greatest Tier 1 capital to assets ratio in the SSA area. Of the seven areas, this one has the third-highest Tier 1 to capital assets ratio, behind only Developing Asia and the Commonwealth of Independent States.

Table 4.5.3: Tier 1 capital to assets (%) 2010 - 2019

Region	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	Average
Advanced Economies	6.2	6.2	6.5	7.1	7.1	7.8	7.7	7.9	7.8	7.8	**7.2**
Central and Eastern Europe	9.9	9.7	10.1	10.0	10.0	10.0	10.1	10.3	10.3	10.4	**10.1**
Commonwealth of Independent States	13.1	12.4	12.0	11.6	10.6	10.1	11.7	12.5	12.4	13.5	**12.0**
Developing Asia	9.5	10.0	10.2	10.4	10.2	10.2	10.7	10.2	10.3	10.6	**10.2**
Middle East and North Africa	11.8	11.6	10.7	9.1	9.3	9.8	10.3	10.2	10.2	10.2	**10.3**
Sub-Saharan Africa	8.5	9.1	9.4	9.8	9.9	10.3	10.4	10.3	10.4	9.0	**9.7**
Western Hemisphere	9.2	9.4	9.4	9.4	9.4	9.1	9.4	9.8	9.7	9.8	**9.5**
Minimum Capital Adequacy Requirement (6%)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	**6.0**

Source: Author's Compilation based on data from IMF Financial Soundness Indicators (2022).

[11] The World Bank income classification can be found here: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups.

A more thorough analysis of the trends in the average Tier 1 capital to assets ratio in the SSA region from 2010 to 2019 can be found in Table 4.5.4. According to the table, the average Tier 1 capital to assets ratio for low-income economies throughout the assessment period was 10.59 percent. Lower-middle income countries and upper-middle income countries came in second and third, with 9.98 percent and 8.22 percent, respectively. Rwanda had the highest country average Tier 1 capital to assets ratio among low-income nations between 2010 and 2019 at 14.46 percent, followed by Burundi at 13.32 percent. Kenya had the highest country average Tier 1 capital to assets ratio among lower-middle income nations during the review period, at 12.25 percent, followed by Comoros at 12.21 percent. In upper-middle income economies from 2010 to 2019, Equatorial Guinea had the highest average country Tier 1 capital to assets ratio, followed by Namibia (9.14 percent).

Table 4.5.4: SSA Average Tier 1 capital to assets (%) 2010 - 2019

Country	Income Group	Country Average	Income Group Average
Burundi	Low-Income	13.32	
Chad	Low-Income	4.25	
Ethiopia, The Federal Dem. Rep. of	Low-Income	8.42	
Gambia, The	Low-Income	14.5	
Guinea	Low-Income	10.39	
Madagascar, Rep. of	Low-Income	7.83	
Malawi	Low-Income	9.53	
Mozambique, Rep. of	Low-Income	9.73	
Rwanda	Low-Income	14.46	
Uganda	Low-Income	12.78	
Zambia	Low-Income	11.33	**10.59**
Angola	Lower-Middle Income	10.41	
Cameroon	Lower-Middle Income	7.39	
Congo, Rep. of	Lower-Middle Income	8.12	
Comoros, Union of the	Lower-Middle Income	12.21	
Eswatini, Kingdom of	Lower-Middle Income	11.86	
Kenya	Lower-Middle Income	12.25	
Lesotho, Kingdom of	Lower-Middle Income	7.53	
Nigeria	Lower-Middle Income	8.94	
Tanzania, United Rep. of	Lower-Middle Income	11.08	**9.98**

Country	Income Group	Country Average	Income Group Average
Botswana	Upper-Middle Income	8.51	
Equatorial Guinea, Rep. of	Upper-Middle Income	9.33	
Gabon	Upper-Middle Income	6.8	
Mauritius	Upper-Middle Income	8.06	
Namibia	Upper-Middle Income	9.14	
South Africa	Upper-Middle Income	7.47	**8.22**

Source: Author's Compilation based on data from IMF Financial Soundness Indicators (2022).
Note: Income group classification provided by World Bank.

4.5.2 Asset quality

The biggest source of solvency risk for a financial organization is usually asset impairment. Credit granting is a bank's primary activity. Thus, their primary asset base consists of loans. The nonperforming loans to total gross loans and provisions of non-performing loans are two financial soundness indicators that are used in this sub-section to evaluate the quality of banks' assets. From 2010 to 2019, Table 4.5.5 displays the ratio of nonperforming loans to total gross loans for seven areas, including SSA.

Table 4.5.5: Nonperforming loans to total gross loans (%) 2010 - 2019

Region	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	Average
Advanced Economies	4.6	5.5	5.6	7.4	7.8	8.1	7.1	6.9	5.6	5.3	**6.4**
Central and Eastern Europe	10.4	11.4	12.6	13.3	12.1	10.5	8.5	6.7	5.6	4.6	**9.6**
Commonwealth of Independent States	8.6	7.8	9.1	8.5	10.1	11.9	15.8	16.8	14.3	12.9	**11.6**
Developing Asia	3.8	3.3	5.0	5.1	4.9	4.6	4.3	4.6	4.6	4.3	**4.4**
Middle East and North Africa	8.9	7.6	6.3	6.1	6.0	5.9	6.0	5.7	6.5	6.4	**6.5**
Sub-Saharan Africa	7.8	6.1	6.2	7.7	7.7	8.7	10.8	11.0	10.8	10.5	**8.7**
Western Hemisphere	2.8	2.6	2.6	2.4	2.4	2.4	2.8	2.9	2.8	2.8	**2.7**

Source: Author's Compilation based on data from IMF Financial Soundness Indicators (2022).

In the study, the ratio of nonperforming loans to total gross loans is determined using the total loan portfolio value (i.e., loans before the deduction of loan-loss provisions) as the denominator and the value of NPLs as the numerator. According to Table 4.5.5, the Commonwealth of Independent States had the highest average ratio of nonperforming loans to total gross loans (11.6 percent), followed by Central and Eastern Europe and

SSA (9.6 percent and 8.7 percent, respectively). The ratio of nonperforming loans to total gross loans for the Commonwealth of Independent States peaked throughout the course of the ten-year period in 2017, while it peaked for the region of Central and Eastern Europe in 2013. In 2017, the SSA region's nonperforming loan to total gross loan ratio reached a ten-year high. After the Commonwealth of Independent States, it was the second highest among the seven areas at the time. In the SSA region, nations that export commodities, members of currency unions, and fragile governments typically have higher NPL rates (Eyraud *et al.,* 2021).

From 2012 to 2019, Table 4.5.6 presents the ratio of average bank nonperforming loans to total gross loans in SSA by nation and socioeconomic category. The timing is influenced by the availability of data at the national level. According to the table, the average percentage of bank nonperforming loans to total gross loans in upper-middle income nations was 8.16 percent throughout the assessment period. Low-income and upper-middle-income economies came in second and third, with averages of 8.85 and 10.59 percent, respectively. With a country average of 2.24 percent, Namibia had the lowest percentage of bank nonperforming loans to total gross loans among upper-middle income nations, followed by South Africa at 3.42 percent. With a ratio of 3.22 percent, Ethiopia had the lowest country average in low-income economies for bank nonperforming loans to total gross loans, followed by Uganda with a ratio of 5.4 percent. Lesotho and Botswana were the two countries with the lowest country averages of nonperforming loans to total gross loans among lower-middle income countries during the assessment period, both at 3.7 percent.

Table 4.5.6: SSA Average Bank nonperforming loans to total gross loans (%) (2012 – 2019)

Country	Income Group	Country Average	Income Group Average
Burundi	Low-Income	13.67	
Chad	Low-Income	19.43	
Ethiopia	Low-Income	3.22	
Gambia, The	Low-Income	8.65	
Madagascar	Low-Income	9.41	
Malawi	Low-Income	6.8	
Mozambique	Low-Income	7.12	
Rwanda	Low-Income	6.04	
Uganda	Low-Income	5.4	
Zambia	Low-Income	8.74	

Country	Income Group	Country Average	Income Group Average
			8.85
Angola	Lower-Middle Income	14.58	
Cameroon	Lower-Middle Income	12.42	
Comoros	Lower-Middle Income	21.6	
Eswatini	Lower-Middle Income	8.41	
Kenya	Lower-Middle Income	7.96	
Lesotho	Lower-Middle Income	3.7	
Nigeria	Lower-Middle Income	7.53	
Tanzania	Lower-Middle Income	8.54	**10.59**
Botswana	Upper-Middle Income	4.23	
Equatorial Guinea	Upper-Middle Income	25.24	
Gabon	Upper-Middle Income	8.04	
Mauritius	Upper-Middle Income	5.77	
Namibia	Upper-Middle Income	2.24	
South Africa	Upper-Middle Income	3.42	**8.16**

Source: Author's Compilation based on data from World Bank Development Indicators (2023).
Note: Income group classification provided by World Bank.

From 2010 to 2019, the provisions of nonperforming loans for seven areas, including SSA, are shown in Table 4.5.7. The denominator of the financial stability indicator is the amount of nonperforming loans held by the bank, and the numerator is the provisions for loan losses. The percentage of defaulted loans for which monies have already been set aside is what this statistic in this situation captures. It serves as a safeguard against losses on loans that banks are unable to recoup. It is designed to take on losses from bad loans. In general, a higher ratio shows that banks will be better able to manage future loan losses.

Table 4.5.7: Provisions of nonperforming loans (%) 2010 - 2019

Region	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	Average
Advanced Economies	42.0	41.9	43.5	41.7	43.7	45.8	45.3	47.4	48.6	50.1	**45.0**
Central and Eastern Europe	56.2	60.7	61.1	62.6	64.7	69.2	72.2	73.9	72.3	74.6	**66.8**
Commonwealth of Independent States	54.1	53.1	52.3	54.5	53.3	52.4	56.5	60.4	62.4	62.9	**56.2**
Developing Asia	58.8	71.9	60.3	68.4	58.6	59.6	59.0	57.8	62.9	60.4	**61.8**
Middle East and North Africa	69.7	68.2	124.4	90.6	85.0	81.1	86.0	95.0	91.9	111.0	**90.3**
Sub-Saharan Africa	65.0	70.3	67.3	60.1	59.5	57.2	55.4	53.6	53.6	54.6	**59.7**
Western Hemisphere	117.0	120.8	114.9	120.9	119.4	117.2	110.8	109.3	109.6	116.9	**115.7**

Source: Author's Compilation based on data from IMF Financial Soundness Indicators (2022).

According to Table 4.5.7, the provisions for nonperforming loans have been steady across the seven regions. Over the period from 2010 to 2019, the average provision for non-

performing loans was highest in the Western Hemisphere at 115.7 percent. The Middle East and North Africa region came in second with 90.3 percent. The SSA region for the assessment period had the fifth highest average ratio of provision for loan losses to the total amount of nonperforming loans among the seven regions taken into consideration, at 59.7 percent. In comparison to the Middle East and North Africa area, where the ten-year high for nonperforming loan provisions was reached in 2012, the Western Hemisphere's nonperforming loan provisions reached a ten-year high in 2013. 2011 was the highest provision for non-performing loans in the SSA area in ten years. Among the seven regions considered at the time, it was sixth highest.

The average provisions of non-performing loans in the SSA area from 2010 to 2019 are shown in Table 4.5.8 by nation and income category. According to the table, low-income nations and upper-middle income economies had the lowest average provisions of nonperforming loans during the review period, at 59.15 percent and 50.11 percent, respectively. Lower-middle income economies had the highest average provisions, at 69.97 percent. Angola had the highest country average for provisions for non-performing loans in lower-middle income nations, at 109.83 percent, followed by Eswatini at 82.16 percent. Burundi had the highest country average for non-performing loans among low-income nations, at 84.09 percent, followed by Mozambique with 80.41 percent. In upper-middle income economies, Equatorial Guinea and Mauritius had the highest country averages for provisions of non-performing loans, at 67.23 percent and 61.28 percent, respectively.

Table 4.5.8: SSA Average Provisions of nonperforming loans (%) 2010 - 2019

Country	Income Group	Country Average	Income Group Average
Burundi	Low-Income	84.09	
Chad	Low-Income	63.59	
Ethiopia, The Federal Dem. Rep. of	Low-Income	42.99	
Gambia, The	Low-Income	56.38	
Guinea	Low-Income	63.81	
Madagascar, Rep. of	Low-Income	45.74	
Malawi	Low-Income	38.18	
Mozambique, Rep. of	Low-Income	80.41	
Rwanda	Low-Income	44.88	
Uganda	Low-Income	52.92	

Country	Income Group	Country Average	Income Group Average
Zambia	Low-Income	77.66	**59.15**
Angola	Lower-Middle Income	109.83	
Cameroon	Lower-Middle Income	81.85	
Congo, Rep. of	Lower-Middle Income	63.5	
Comoros, Union of the	Lower-Middle Income	64.83	
Eswatini, Kingdom of	Lower-Middle Income	82.16	
Kenya	Lower-Middle Income	55.25	
Lesotho, Kingdom of	Lower-Middle Income	59.5	
Nigeria	Lower-Middle Income	68.03	
Tanzania, United Rep. of	Lower-Middle Income	44.79	**69.97**
Botswana	Upper-Middle Income	57.6	
Equatorial Guinea, Rep. of	Upper-Middle Income	67.23	
Gabon	Upper-Middle Income	32.57	
Mauritius	Upper-Middle Income	61.78	
Namibia	Upper-Middle Income	38.7	
South Africa	Upper-Middle Income	42.77	**50.11**

Source: Author's Compilation based on data from IMF Financial Soundness Indicators (2022).
Note: Income group classification provided by World Bank.

4.5.3 Earnings and Profitability

The financial soundness indicators considered under this subsection include return on equity and return on assets, which are used to gauge banks' profitability. For the years 2010 to 2019, Table 4.5.9 shows the return on equity for seven regions, including SSA. The SSA area had the highest average return on equity throughout the ten-year period (17.3 percent), followed by the Western Hemisphere (14.6 percent) and Developing Asia (12.8 percent), in that order. The SSA area experienced its highest return on equity in ten years in 2010, while the Western Hemisphere experienced its peak in 2019 and Developing Asia experienced it in 2010 and 2011. The SSA still had the best return on

equity in 2010 (22.5 percent), followed by Developing Asia (14.8 percent) among the seven regions.

Table 4.5.9: Return on equity (%) 2010 - 2019

Region	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	Average
Advanced Economies	5.3	0.5	2.0	2.2	5.6	6.2	6.1	7.2	8.1	5.2	**4.8**
Central and Eastern Europe	5.9	6.7	5.4	5.8	4.8	8.4	11.6	12.6	13.2	12.7	**8.7**
Commonwealth of Independent States	9.1	10.0	9.3	11.1	3.9	-0.1	-6.0	6.4	12.9	18.0	**7.5**
Developing Asia	14.8	14.8	12.5	14.4	13.5	12.9	11.7	10.2	12.3	10.8	**12.8**
Middle East and North Africa	-11.0	1.4	5.3	11.4	7.4	8.3	7.8	7.6	8.3	9.0	**5.6**
Sub-Saharan Africa	22.5	18.0	19.8	18.4	17.6	16.2	15.1	14.5	15.4	15.6	**17.3**
Western Hemisphere	14.6	15.2	14.8	15.1	14.7	14.8	13.6	13.5	13.9	16.0	**14.6**

Source: Author's Compilation based on data from IMF Financial Soundness Indicators (2022).

The SSA region's average return on equity for each country and income category from 2010 to 2019 is shown in Table 4.5.10. According to the table, low-income and upper-middle-income economies had the lowest average returns on equity, with 16.03 percent and 16.04 percent, respectively, and lower-middle income economies had the greatest average return on equity at 16.64 percent. Lesotho had the highest country average return on equity in lower-middle income nations, at 29.3 percent, followed by Kenya at 28.14 percent. In low-income economies, Madagascar had the highest country average return on equity, at 26.71 percent, followed by Malawi, at 19.72 percent. Namibia had the highest country average return on equity in upper-middle income nations, at 21.25 percent, followed by Botswana at 19.07 percent.

Table 4.5.10: SSA Average Return on equity (%) 2010 - 2019

Country	Income Group	Country Average	Income Group Average
Burundi	Low-Income	12.41	
Chad	Low-Income	14.55	
Ethiopia, The Federal Dem. Rep. of	Low-Income	19.61	
Gambia, The	Low-Income	11.16	
Guinea	Low-Income	17	
Madagascar, Rep. of	Low-Income	26.71	
Malawi	Low-Income	19.72	
Mozambique, Rep. of	Low-Income	13.61	
Rwanda	Low-Income	11.27	
Uganda	Low-Income	17.07	
Zambia	Low-Income	13.34	**16.04**

Country	Income Group	Country Average	Income Group Average
Angola	Lower-Middle Income	14.79	
Cameroon	Lower-Middle Income	11.07	
Congo, Rep. of	Lower-Middle Income	14.95	
Comoros, Union of the	Lower-Middle Income	1.23	
Eswatini, Kingdom of	Lower-Middle Income	13.51	
Kenya	Lower-Middle Income	28.14	
Lesotho, Kingdom of	Lower-Middle Income	29.3	
Nigeria	Lower-Middle Income	20.02	
Tanzania, United Rep. of	Lower-Middle Income	16.72	**16.64**
Botswana	Upper-Middle Income	19.07	
Equatorial Guinea, Rep. of	Upper-Middle Income	8.35	
Gabon	Upper-Middle Income	17.81	
Mauritius	Upper-Middle Income	14.3	
Namibia	Upper-Middle Income	21.25	
South Africa	Upper-Middle Income	15.41	**16.03**

Source: Author's Compilation based on data from IMF Financial Soundness Indicators (2022).
Note: Income group classification provided by World Bank.

For the years 2010 to 2019, Table 4.5.11 shows the return on assets for seven regions, including SSA. The SSA area had the highest average return on assets for the ten-year period, with 2.7 percent, like the return on equity shown in Table 3.5.10. The Western Hemisphere comes in second with 2.1 percent, and Developing Asia comes in third with 2.0 percent. Once more, the ten-year high return on assets for the SSA region occurred in 2010, while those for the Western Hemisphere and Developing Asia occurred in 2019 and 2013, respectively. The Western Hemisphere and Developing Asia regions tied for second place in terms of regional average return on assets in 2010 after the SSA.

Table 4.5.11: Return on assets (%) 2010 - 2019

Region	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	Average
Advanced Economies	0.4	0.1	0.3	0.5	0.6	0.7	0.7	0.8	0.8	0.6	**0.6**

Central and Eastern Europe	0.6	1.3	1.0	0.7	0.6	1.0	1.4	1.6	1.6	1.5	**1.1**
Commonwealth of Independent States	1.5	1.6	1.6	1.9	0.7	0.4	-0.3	1.1	1.9	2.8	**1.3**
Developing Asia	2.1	2.1	1.9	2.2	2.1	2.0	2.0	1.7	2.0	1.9	**2.0**
Middle East and North Africa	0.7	1.5	1.6	1.7	1.2	1.3	1.3	1.2	1.3	1.4	**1.3**
Sub-Saharan Africa	3.1	2.8	3.1	2.8	2.8	2.7	2.6	2.5	2.5	2.6	**2.7**
Western Hemisphere	2.1	2.2	2.2	2.1	2.1	2.1	1.9	1.9	1.9	2.3	**2.1**

Source: Author's Compilation based on data from IMF Financial Soundness Indicators (2022).

The average return on assets by nation and income group for the SSA region from 2010 to 2019 is detailed in Table 4.5.12. According to the table, lower-middle income nations had the highest average return on assets, at 2.67 percent, followed by upper-middle income countries, at 2.42 percent, and low-income countries, at 2.27 percent. Malawi had the highest country average return on assets (ROA) among low-income nations, at 4.46 percent, followed by Uganda with a ROA of 3.83 percent. At 4.12 percent and 4.06 percent, respectively, Kenya and Lesotho had the highest country average return on assets in lower-middle income economies. The greatest country average return on assets ratios in upper-middle income nations were recorded in Gabon and Namibia, with 3.56 percent and 3.19 percent, respectively.

Table 4.5.12: SSA Average Return on assets (%) 2010 - 2019

Country	Income Classification	Average	Income Group Average
Burundi	Low-Income	2.73	
Chad	Low-Income	1.79	
Ethiopia, The Federal Dem. Rep. of	Low-Income	3	
Gambia, The	Low-Income	2.67	
Guinea	Low-Income	3.31	
Madagascar, Rep. of	Low-Income	3.56	
Malawi	Low-Income	4.46	
Mozambique, Rep. of	Low-Income	2.89	
Rwanda	Low-Income	2.88	
Uganda	Low-Income	3.83	
Zambia	Low-Income	2.67	**2.67**
Angola	Lower-Middle Income	2.43	
Cameroon	Lower-Middle Income	1.68	
Congo, Rep. of	Lower-Middle Income	0.27	
Comoros, Union of the	Lower-Middle Income	1.83	
Eswatini, Kingdom of	Lower-Middle Income	2.16	
Kenya	Lower-Middle Income	4.13	
Lesotho, Kingdom of	Lower-Middle Income	4.06	
Nigeria	Lower-Middle Income	2.22	
Tanzania, United Rep. of	Lower-Middle Income	3	**2.42**

Country	Income Classification	Average	Income Group Average
Botswana	Upper-Middle Income	2.37	
Equatorial Guinea, Rep. of	Upper-Middle Income	1.48	
Gabon	Upper-Middle Income	3.56	
Mauritius	Upper-Middle Income	1.48	
Namibia	Upper-Middle Income	3.19	
South Africa	Upper-Middle Income	1.55	**2.27**

Source: Author's Compilation based on data from IMF Financial Soundness Indicators (2022).
Note: Income group classification provided by World Bank.

4.6 Regulatory and Supervisory Policy Challenges to Financial Stability in SSA

It is impossible to exaggerate the significance of the financial sector as a means of converting savings into investments and promoting economic growth. This is particularly true in the case of SSA, where banks make up most participants in the financial system and previously unregulated deposit-taking non-bank financial institutions (NBFIs), such as micro finance institutions (MFIs), are becoming more significant. For the area to experience sustainable economic growth and development, SSA must first achieve and maintain financial stability. The difficulties with regional regulatory and oversight policies are examined in this section.

Countries in the SSA region have improved their banking legislation and regulatory procedures significantly over the past 20 years. Financial innovation in the region is resulting in the adoption of more advanced financial products and services as well as the increasing significance of non-bank financial institutions due to the SSA financial sector's ever-increasing connectivity with global markets. These advancements significantly contributed to the resilience of the African banking systems throughout the global financial crisis of 2007–2009. They also resulted in increased capital ratios, liquidity, and bank profitability among African banks, as was mentioned in Section 4.5. Despite the outstanding reforms that have made it possible for more people to access bank and non-bank financial goods and services, there are still additional dangers associated with the region's banking sector's expansion. These risks will probably be caused by new product and service offerings, more complicated financial markets, and deeper regional financial sector integration.

Despite this, in a world that is becoming increasingly financially globalized, financial system regulatory and supervisory bodies in low-income nations of SSA face a number of interconnected issues. These include (i) whether and how to adopt complicated regulatory frameworks that were initially created with the financial systems of developed and emerging markets in mind; (ii) how to deal with the difficulties posed by the presence of foreign banks in their respective jurisdictions; and (iii) how to manage the risks associated with a more integrated financial system with the rest of the world because of capital account liberalization.

The regulatory and supervisory frameworks required to support the financial sector's resilience and stability must continuously be strengthened and improved given the swift evolution of the SSA and the global financial system. In this regard, authorities in the SSA area must strike a balance between the need to reduce risks to financial sector stability and the promotion of financial sector development, innovation, and inclusion. Governments, supervisors, and regulators must build their capacities and take on the challenge of aligning with international financial regulatory standards such as the Basel Core Principles for Effective Banking Supervision (BCPs), Basel II, Basel III, International Financial Reporting Standards (IFRS), as well as recommendations of the Financial Action Task Force (FATF) in order to meet the increased pressure on financial regulation and supervision in SSA (Gottschalk, 2014; Masciandaro & Quintyn, 2009). Ensuring public confidence in a global financial environment that is rapidly evolving will assist sustain system-wide stability. Adopting international financial norms continues to be difficult, even though LIC regulators have made tremendous progress in updating their regulatory framework and keeping up with current international regulatory trends. There are two causes for this. The design of the worldwide standards is inherently complicated, to start. The second is that LICs do not have enough technical or human resources to adopt them effectively.

Critical capacity-related shortcomings in the regulation and supervision of the financial sector have been found in several FSAP reports on SSA nations. These include inadequate staffing levels at central banks, regulatory agencies, and departments, as well

as a general shortage of qualified and experienced employees. This compromises their capacity to effectively perform crucial regulatory and supervisory tasks. For instance, due to inadequate supervisory capacity in risk-based techniques or stress testing, regulatory authorities typically encounter difficulties implementing the Basel capital adequacy framework. Another major issue in SSA nations is the lack of extensive and trustworthy data bases, more effective retrieval, processing, and storage techniques, as well as the capacity to evaluate and spot data anomalies during the risk assessment process (Quintyn & Taylor, 2007; EIB, 2013; Gottschalk, 2014). LICs have responded to this difficulty by first taking a gradual approach and, second, being selective and picking for regulatory provisions that are relevant to their country's needs and the characteristics of their financial systems. Third, LICs are committing the required funds to support these initiatives as part of their ongoing capacity building activities (Griffith-Jones, 2016).

SSA countries' regulatory worries also include systemic vulnerabilities. For instance, foreign banks are prevalent in several SSA economies and control their financial systems. The risks associated with capital account liberalization may be amplified by foreign banks in the host country. As an illustration, foreign banks are more likely to obtain capital overseas to finance their on-lending activities in the host nation, which contributes to the amplifying of the risks related to currency mismatches in banks' balance sheets. Currency mismatches pose exchange rate risks, which manifest themselves when the host nation experiences an adjustment in its exchange rate because of outside shocks (EIB, 2013; Gottschalk, 2014). To obtain insight into how subsidiaries are supervised by home regulators and access to pertinent information that would help to identify and mitigate systemic risks early on, it would be useful for host regulators to collaborate with home regulators. Although cooperation and coordination between home and host authorities are essential, they are frequently absent or ineffective in SSA countries.

Information asymmetries caused by the lack of collaboration between home and host authorities make it difficult for financial sector regulators to prevent the emergence of systemic risks and the accumulation of financial stability vulnerabilities that endanger financial stability. This is due to the fact that host regulators have no means of knowing

how well-managed banks' corporate offices are, let alone what their strategy is in the event that their subsidiaries run into serious funding issues. Furthermore, there is no assurance that domestic supervisors are aware of or paying attention to the position of their banks abroad. For these reasons, it is essential that nations put in place strong structures for supervisory coordination, cooperation, and monitoring of the interactions between their own and the host financial sectors. The Southern African Development Community's (SADC) Committee of Central Bank Governors (CCBG), which was founded in 1995 to encourage and achieve better cooperation among SADC's central banks, serves as a notable model in this regard.

Financial sector regulators in LICs have historically relied on micro-prudential rather than macro-prudential regulation as an additional layer to address the challenge of potential systemic risks (Griffith-Jones, 2016). Despite the significance of such actions, they would be best complemented by the employment of counter-cyclical (or macro-prudential) regulatory powers, a significant Basel III standard innovation. LICs would need to suitably adjust them to satisfy their country-specific demands and the distinctive characteristics of their financial systems when determining whether to adopt these higher criteria.

4.7 Conclusions

This chapter has been successful in explaining how financial stability can be measured in general terms. Additionally, it described the kind of activities that have been made to advance financial stability globally and specifically within the SSA region. In addition, it has brought attention to the most recent changes in the SSA region's financial soundness as compared to other regions. A summary of some of the obstacles to financial stability in the SSA region and suggestions for how to overcome them completes this.

The discussion on typical metrics for gauging financial stability highlighted how crucial it is to have reliable systems in place for spotting potential risks to that stability. Some of the most popular approaches for assessing financial stability include early warning systems, macro-stress testing, and financial stability indices. No single strategy to measure financial stability can efficiently and effectively function on its own to foresee

financial stability threats and reliably inform appropriate policy responses, given the advantages and disadvantages of each method. The most useful toolbox in this regard would consist of a collection of financial stability measuring methodologies that collectively assess a variety of qualitative and quantitative risk factors and aggregate the corresponding indicators to present a more complete picture of their interconnections.

The basic point of the discussion on international initiatives to advance global financial stability is that cooperation and coordination among nations in financial market monitoring and surveillance have considerable advantages. The best way to do this is to establish and strengthen international and regional organizations with the strength and capacity to coordinate the efforts of major international financial institutions and important national authorities to address the stability of the financial sector, as well as to incorporate emerging economies into the evaluation of changing financial risks and to harmonize the handling of macroprudential and microprudential issues.

Over the past two decades, SSA nations have made admirable strides toward improving their banking laws and supervision procedures. These advancements not only significantly contributed to the resilience of African banking systems during the global financial crisis of 2007–2009, but they also eventually increased capital ratios and liquidity among African banks and increased bank profitability. Despite this, there is diversity in the region's financial sector's depth and development. For instance, institutional capacity and governance issues continue. Furthermore, despite having little barriers to entry and leave, competition is nonetheless restricted in the banking systems due to their small size and minimal intermediation. In this regard, SSA has some of the lowest rates of financial access globally, which is a major barrier to the operation and expansion of businesses.

SSA is improving in terms of financial intermediation, although it is still lagging behind other developing nations. For instance, when the ratios of broad money (M2) and private sector credit to gross domestic product (GDP) are used to measure the depth and coverage of financial services and goods in the region, respectively, data reveals that there has been a progressive increase over time, albeit from a low base (Mlachila *et al.,*

2013; EIB, 2013). The region's comparatively low levels of financial inclusion indicate the negative consequences of a number of variables, such as the low-income levels of society, infrastructure flaws, and the industry's modest absolute size (i.e., banking systems with low loan-to-deposit ratios). For instance, the results of the FSAP surveys conducted by the IMF and the World Bank indicate that the SSA financial sector has a problematic operating environment due to the inconsistent application of rules and regulations, as well as issues with transparency and governance. Additionally, some areas of the system are plagued by market distortions, which often include restricted access to foreign currency and interference with central bank independence (Pattillo *et al.,* 2006; Quintyn & Taylor, 2007; Mlachila *et al.,* 2013).

Stress tests and risk-based techniques also lack enough supervisory capability, and collaboration and coordination between home and host regulators are frequently absent or ineffective. Governments, supervisors, and regulators must build their capacities and take on the challenge of harmonizing with worldwide financial regulatory standards while fostering greater bank competition in order to overcome these challenges. To effectively supervise the interactions between the domestic and foreign financial sectors, countries should put in place strong mechanisms for supervision, coordination, and collaboration.

Chapter 5: The Financial Stability and Financial Inclusion Nexus

5.1 Introduction

The global financial crisis of 2007–2009 has motivated regulators and policymakers to overhaul the financial system to increase domestic, regional, and global financial stability. The execution of the Basel III agreement and other international pledges to improve financial stability provide evidence of this. In the same vein, there has been great focus on the development of financial inclusion globally to advance equality through programs like the G-20's Maya Declaration. Despite this, policy makers have a propensity to pursue each goal (financial inclusion and financial stability, respectively) independently of the other, disregarding potential synergies and trade-offs between the two goals. For instance, a key takeaway from the GFC of 2007–2009 is that, on the one hand, a rapid growth of credit to uncreditworthy economic agents can seriously erode financial stability. On the other hand, because it helps financial institutions spread out their risks, a wider use of financial services and products by economic agents could support financial stability. In this regard, financial inclusion could have either a positive or negative effect on financial stability.

To create and implement well-informed policies in the pursuit of both objectives in a coordinated way, it is vital to identify and understand synergies and potential trade-offs between financial inclusion and stability. If such relationships are not emphasized and understood, policy design runs the danger of producing less than ideal results. Given this, it would be crucial for policymakers to understand the subtleties of how, for example, increases in financial inclusion or greater inclusion of small and medium-sized enterprises in economies at various stages of development affect financial stability, as measured using various proxies or indicators.

This chapter's goal is to analyse the theoretical and empirical connections between financial inclusion and financial stability. The banking sector's significance in SSA allows for the interchangeability of the terms financial stability and bank level stability. In this sense, the remainder of this chapter is divided into the following three parts. The

theoretical connection between financial inclusion and the stability of the banking industry is examined in Section Two. The empirical connection between financial inclusion and banking sector stability is covered in Section Three. The chapter concludes with Section Four.

5.2 Theoretical Nexus between Financial Inclusion and Banking Sector Stability

Scholars' perspectives on the theoretical connections between financial inclusion and stability differ. The majority of the studies in this area is not very clear about how financial inclusion affects financial stability. By discussing the present observations made in the practice of financial inclusion and the abnormal deviations noticed, a thorough and cogent set of financial inclusion principles may be established. As a result, an effective theory or combination of ideas on financial inclusion should give a practical explanation of the goals, procedures, or results of financial inclusion (Ozili, 2020; Pham *et al.,* 2020 & Kamal *et al.,* 2021). In view of this, the theoretical basis on the connections between financial inclusion and banking sector stability is provided in this section. The discussion that follows is broken up into three sections. First, a clarification of how theoretically favorable effects of financial inclusion on the stability of the banking sector are offered. The soundness of the banking industry is then explored in relation to theoretical claims about how financial inclusion may have a detrimental impact. A review of the probable transmission pathways of the positive and negative links between financial inclusion and financial stability is followed by a graphical representation of the theoretical perspectives.

5.2.1 Positive Impact of Financial Inclusion on Banking Sector Stability

A number of studies have been done that highlight the positive effects of financial inclusion on financial stability (see Khan, 2011; Cull *et al.,* 2012; Ozili, 2018; Ahamed & Mallick, 2019; Berlin & Mester, 1999; Ozili, 2020; Pham & Doan 2020; Frączek, 2019; Danisman & Tarazi, 2020; Kamal 2021; Ozili, 2021; Eton *et al.,* 2021). In these studies, scholars advance several ways through which greater financial inclusion can lead to financial stability. The transmission channels are broadly in line with the institutional theory (Meyer & Rowan, 1977; DiMaggio & Powell, 1983), wherein financial inclusion initiatives are posited to foster greater resource and financial intermediation efficiency,

which in turn enhances financial stability provided that a nation establishes robust financial infrastructure and strengthened financial sector regulation and supervision. These efforts also facilitate better access and use of banking services by a large portion of the population, including the underprivileged (Okpara 2011; Prasad 2010; Cull *et al.* 2012). Further, as financial systems, and the supervisory and regulatory frameworks are strengthened, financial stability in the previous period can have positive spillovers into the current period's level of financial stability (Morgan & Pontines, 2018; Hakimi *et al.,* 2022). Summarily, the ways through which financial inclusion can positively affect financial stability include:

i) A more resilient economy is produced by diversifying the funding sources of financial institutions and absorbing a wider range of economic agents (Khan, 2011; Cull *et al.,* 2012; Ozili, 2018; Ahamed & Mallick, 2019; Berlin & Mester, 1999; Ozili, 2020; Pham & Doan 2020).

ii) Expanding the scope and effectiveness of savings intermediation (Mehrotra & Yetman 2015; Khan 2011; Ozili, 2021; Cull, *et al.,* 2012; Ahamed & Mallick, 2019; Saha & Dutta, 2022; Saha & Dutta, 2021).

iii) Providing ways for households to become more resistant to the various vulnerabilities they face (Mehrotra & Yetman 2015; Khan 2011; Ozili, 2021; Cull, *et al.,* 2012; Ahamed & Mallick, 2019; Saha & Dutta, 2022; Saha & Dutta, 2021).

iv) Creating a more stable foundation of customer deposits and promoting greater confidence in the banking system. In this sense, low-income families tend to save and borrow responsibly even during financial crises when there is faith in the financial system, with deposits being held safely and loans being repaid (Khan, 2011; Cull *et al.,* 2012; Ozili, 2018; Ahamed & Mallick, 2019; Berlin & Mester, 1999; Ozili, 2020; Pham & Doan 2020).

v) Limiting the existence of a sizable informal sector in order to increase the effectiveness of monetary policy (Mehrotra & Yetman 2015; Khan 2011; Ozili, 2021; Cull, *et al.,* 2012; Ahamed & Mallick, 2019).

vi) Assisting in the efficient execution of anti-terrorism and anti-money-laundering laws (Mehrotra & Yetman 2015; Khan 2011; Ozili, 2021; Cull, *et al.,* 2012; Ahamed & Mallick, 2019).

vii) Lowering income disparity in order to increase social and political stability (Khan, 2011; Cull *et al.,* 2012; Ozili, 2018; Ahamed & Mallick, 2019; Berlin & Mester, 1999; Ozili, 2020; Pham & Doan 2020).

In general, the ability of financial institutions to get inexpensive deposits from retail consumers, thereby reducing their marginal costs to provide banking services in a more inclusive financial sector, can be used to highlight the favorable influence of financial inclusion on stability (Aduda *et al.,* 2012; Kamal *et al.,* 2021; Sethy & Goyari, 2022; Barik & Pradhan, 2021). Additionally, banks with inclusive cultures will be better able to tackle the asymmetrical information problem by developing deeper connections with customers, which will allow them to work more efficiently in a setting with stronger institutions and expanded creditor rights (Petersen & Rajan 1995; Ahamed & Mallick, 2019). The theoretical explanation that follows elaborates on these two broad issues and how they impact financial stability.

5.2.1.1 Reducing Information Asymmetry

The most fundamental types of transaction costs in financial intermediation are information asymmetries. For instance, borrowers are in a better position than lenders to assess their collateral, tenacity, and moral integrity. Similar to lenders, business owners have firsthand experience with the projects they are looking to finance. Distance between financial institutions and their clients exacerbates the issue of asymmetric information, impairs the effectiveness of financial services, and can result in subpar market performance (Hannig & Jansen, 2010; Ozili, 2020; Pham & Doan 2020).

On the other hand, by reducing the proximity of a financial service provider's relationship with the customer, this enables the development of a strong relationship between the two parties, better signaling about the customer's quality, as well as the internalization of advantages of supporting customers who are informationally opaque. Additionally, it encourages lower interest rates for loans, as well as fewer strict requirements for collateral and a lower likelihood of credit rationing (Khan, 2011; Cull, *et al.,* 2012; Ozili, 2018; Ahamed & Mallick, 2019). In this situation, banks can reduce the issues of moral hazard and adverse selection by making clearer and more informed lending decisions and setting loan pricing in a proportionate way (Danisman & Tarazi, 2020; Kamal 2021; Ozili, 2021). This leads to more stability in the financial industry.

5.2.1.2 Greater Balance Sheet Diversification

Financial inclusion allows widespread savings intermediation as well as compositional changes in the financial system by giving financial institutions possibilities to operate in newly established firms or expanded markets (Prasad 2010; Hannig & Jansen, 2010; Khan, 2011; Cull, *et al.,* 2012). A sector's balance sheet improves as a result of diversification and increased economic agent participation (Ozili, 2018; Ahamed &Mallick, 2019; Ozili, 2020). As a result, the system is able to perform at a greater level because of an improvement in economic resilience and financial stability (Pham & Doan 2020; Danisman & Tarazi, 2020; Kamal 2021; Ozili, 2021).

5.2.1.3 Diversifying Retail Deposit Funding

Evidence demonstrates that core deposit liabilities, such as demand and savings deposits, give banks the ability to insulate their funding costs against economic shocks because of their relatively inelastic nature when an empirical relationship between banks' lending behavior and the structure of their liabilities is investigated (see Berlin & Mester, 1999). The larger the volume of core deposits, the more borrowers can benefit from mechanisms like loan rate smoothing that buffer them from negative credit shocks. Compared to wholesale funding, retail deposits are slow, risk-averse, and offer a reliable, less expensive source of long-term financing. Financial inclusion makes it possible for

institutions, especially banks, to draw in more retail deposits and thereby build a bigger and more reliable retail funding base (Prasad 2010; Hannig & Jansen, 2010; Khan, 2011; Cull, *et al.,* 2012). Since lower-income individuals appear to develop predictable financial behavior about saving money and repaying loans during boom-bust cycles, having retail deposits as a reserve for borrowing money helps the sector's stability (Ozili, 2018; Ahamed & Mallick, 2019; Ozili, 2020). As a result of this, banks with larger retail deposit funding can lower their funding costs and risks, improving their stability. This happens, especially when banks run out of other sources of credit, and deposits from lower-income groups serve as a steady supply of capital during times of financial difficulty (Pham & Doan 2020; Danisman & Tarazi, 2020; Kamal 2021; Ozili, 2021).

5.2.1.4 Greater Monetary Policy Transmission and Financial Supervision Effectiveness

Monetary policy will not be successful in utilizing the rate of interest to influence aggregate demand and economic growth when financial inclusion is low. This is because increased inclusion makes monetary policy effective since financial systems are the transmission channels for monetary policy, as supported by the credit channel theory. As a result, increased financial inclusion enhances how sensitive the whole demand is to changes in interest rates (Morgan, 1998; Bernanker & Gertler, 1995; Anarfo *et al.,* 2019). Agents of the economy who are financially excluded can participate more formally because of financial inclusion; otherwise, they would often make financial decisions in an unregulated financial environment (Cull, *et al.,* 2012; Ozili, 2018; Ahamed & Mallick, 2019). In order to prevent a sizable informal sector from undermining the efficiency of monetary policy transmission and financial sector oversight, financial inclusion promotes financial stability (Ozili, 2020; Pham & Doan 2020; Frączek, 2019; Danisman & Tarazi, 2020; Kamal 2021; Ozili, 2021; Anarfo *et al.,* 2022).

5.2.1.5 Fostering Complementarity with Employment Creation and Economic Growth

Small and medium-sized businesses (SMEs) are by definition labor-intensive and frequently financially marginalized. This typically results in high rates of business failure and subsequent increases in the unemployment rate for SME employees. Small firms and

SMEs benefit from easier access to financing since it helps them grow, maintain their operations, and contribute more to the economy (Ozili, 2018; Ahamed&Mallick, 2019; Ozili, 2020). Greater employment rates, reduced poverty rates, and increased debt service capacity are concomitant outcomes that, taken together, have a beneficial impact on the soundness of the banking industry (Pham & Doan 2020; Danisman & Tarazi, 2020; Kamal 2021; Ozili, 2021; Matsebula & Sheefeni, 2022; Anarfo *et al.,* 2022).

5.2.2 Negative Impact of Financial Inclusion on Banking Sector Stability

There is literature that contends that increased financial inclusion may result in banking sector instability (see Igan & Pinheiro, 2011; Mehrotra & Yetman 2015; Khan 2011; Ozili, 2021; Cull, *et al.,* 2012; Ahamed & Mallick, 2019; Danisman & Tarazi, 2020). In this regard, economists argue that financial instability risks can manifest from:

i) Low-income clients, outsourcing activities, the makeup of local financial institutions, and financial product developments (Mehrotra & Yetman 2015; Khan 2011; Ozili, 2021; Cull, *et al.,* 2012; Ahamed & Mallick, 2019).

ii) Increased involvement of low-income groups in the financial system, which could lead to high transaction and information costs (due to lack of collateral or credit history) and inefficiencies that are challenging to address technically and managerially (Mehrotra & Yetman 2015; Khan 2011; Ozili, 2021; Cull, *et al.,* 2012; Ahamed & Mallick, 2019).

iii) An important factor contributing to the inefficiency of financial systems is the rise of information asymmetries (Mehrotra & Yetman 2015; Khan 2011; Ozili, 2021; Cull, *et al.,* 2012; Ahamed & Mallick, 2019; Saha & Dutta, 2022; Saha & Dutta, 2021).

iv) Locally focused financial institutions, such as cooperatives or rural banks, may have inadequate governance, lax regulation, lack of supervision, engage in inter-institutional lending, and have a high geographic concentration, making

them more susceptible to disasters and downturns (Mehrotra & Yetman 2015; Khan 2011; Ozili, 2021; Cull, *et al.,* 2012; Ahamed & Mallick, 2019; Saha & Dutta, 2022; Saha & Dutta, 2021).

v) Financial product developments and outsourcing operations that put financial stability at risk by creating new risks due to a lack of regulation or supervision (Mehrotra & Yetman 2015; Khan 2011; Ozili, 2021; Cull *et al.,* 2012; Ahamed & Mallick, 2019; Saha & Dutta, 2022; Saha & Dutta, 2021).

Extreme financial inclusion (EFI) is one way that financial inclusion's detrimental effects on the stability of the banking industry can generally be observed. EFI exists when economic agents are given access to the formal financial sector and its range of products and services, regardless of their level of income or level of risk. It is based on several justifications for completely eliminating financial access restrictions (Cull, *et al.,* 2012; Ahamed & Mallick, 2019; Frączek, 2019; Danisman & Tarazi, 2020; Feghali *et al.,* 2021). Inadvertently, this might result in a violation of the integrity of the financial system, for example, if legal obstacles to financial inclusion, such as methods of identification and verification procedures, were fully abolished to meet rising demand. Avoiding EFI is preferable since it can lessen the likelihood of negative externalities like fraud that might otherwise undermine financial stability. The following theoretical discussion elaborates on the various aspects of EFI and how they can result in instability in the financial system.

5.2.2.1 Aggressive Credit Expansion

Increased central and commercial bank credit drives asset price inflation, which in turn boosts investment and consumption. Long-term asset price inflation increases the probability of a more severe and subsequent downturn because it depletes the supply of good investment projects and causes financial excesses (Hayek, 1925; Eichengreen & Mitchener, 2003). Under the theory of extreme credit expansion, or episodes of financial overinclusion (Morawetz, 1908), banks may aggressively expand lending, which may compromise and worsen credit standards in the banking system if they are motivated to lend to credit-worthy and low-income borrowers (Morawetz, 1908; Igan & Pinheiro, 2011;

Mehrotra & Yetman 2015; Khan 2011; Ozili, 2021). Additionally, because banks' income may suffer, they may be less able to screen borrowers before disbursement and may take on clients with poor credit, endangering the integrity of the financial system (Cull, *et al.,* 2012; Ahamed & Mallick, 2019; Frączek, 2019; Danisman & Tarazi, 2020; Feghali *et al.,* 2021)

5.2.2.2 Rise of Unregulated Financial Institutions

When financial inclusion is tied to the expansion of unregulated portions of the financial sector too quickly or inefficiently, systemic risks may occur in jurisdictions with insufficient oversight. Furthermore, when financial inclusion reaches its full potential, the formal and informal financial sectors will be completely intertwined, increasing the risk to the financial system if, for example, the payment system were to fail (Cull, *et al.,* 2012; Ahamed & Mallick, 2019; Danisman & Tarazi, 2020).

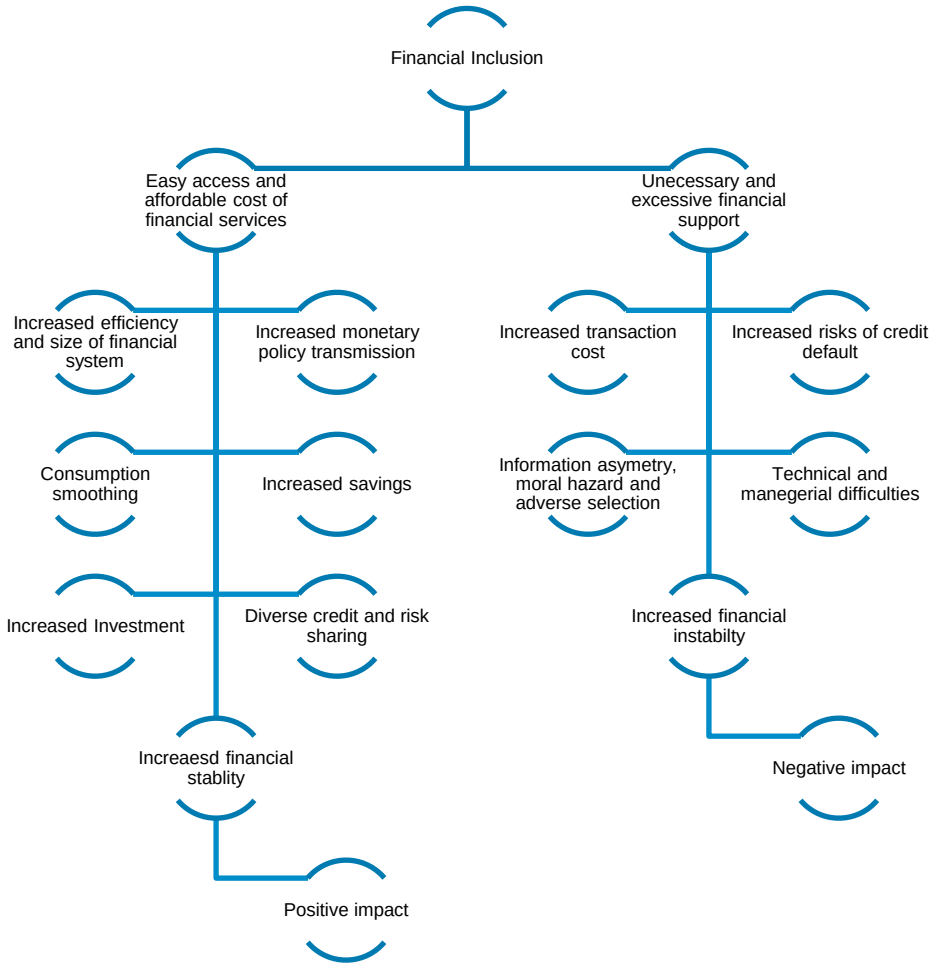
5.2.2.3 Deeper Severity of Financial Crises

The number of economic agents actively engaged in the formal financial sector, with potential ties to the informal financial sector as well, will rise dramatically when extreme financial inclusion is attained. Because more people and businesses will be exposed to financial sector risks and could experience the negative effects of a financial collapse, a financial crisis and a macro-financial collapse under conditions of extreme financial inclusion would be more severe (Ozili, 2021; Cull, *et al.,* 2012; Ahamed & Mallick, 2019; Frączek, 2019; Danisman & Tarazi, 2020).

5.2.3 Summary of Theoretical Views between Financial Inclusion and Financial Stability

According to the discussion so far, there are theoretical justifications for both a positive and a negative association between financial inclusion and financial stability. Figure 5.2.1 summarizes the complex theoretical connections between financial inclusion and financial stability in this regard.

Figure 5.2.1 The Linkages between Financial Inclusion and Financial Stability



Source: Author's own compilation based on the available literature.

On the one hand, Figure 5.21 demonstrates that a higher level of financial inclusion correlates with easier access, more cheap financial services, and an increase in the size and efficiency of the financial system. This supports monetary policy transmission improvements that lead to a more formalized banking sector (Čihák *et al.,* 2021; Mbutor & Uba, 2013; Mehrotra & Yetman, 2014/2015; Mehrotra & Nadhanael, 2016; Lenka & Bairwa, 2016; Yoshino & Morgan, 2018; Huong, 2018). Additionally, high levels of financial inclusion aid in regulating consumption and transferring savings from the unorganized to the organized sectors, strengthening the deposit base and stability of banks (Hawkins, 2006; Prasad, 2010; Cull *et.al.,* 2012; Han & Melecky, 2013; Rahman, 2014; Hannig & Jansen, 2010; Neaime & Gaysset, 2018; Dienillah & Anggraeni, 2018; Čihák *et al.,* 2021). Increased investment finance and a wider range of credit and risk-

sharing options result from larger levels of savings. By lowering the risk of credit default and non-performing loans (NPLs), increasing lending to small and medium-sized businesses (SMEs) can, for example, diversify bank assets, minimize loan book exposure to any one borrower, and contribute to financial stability (Rahman, 2014; Čihák *et. al.*, 2016; Chen *et al.,* 2018; Cull *et al.,* 2012; Čihák *et al.,* 2021). A stable financial system is maintained, and possible instability is avoided with more regulation and formalization of the financial industry.

On the other hand, as financial institutions expand into new and remote locations to accommodate a wider participation of low-income people as well as small and medium sized enterprises (SMEs) in the formal financial system, increased financial inclusion may result in information asymmetry, elevated transaction and information costs, and increased risks of credit default. This may lead to inefficiencies in the financial system, which might cause instability in the market (Beck & De Jonghe, 2013; Sahay *et. al.,* 2015; Garcia & Jose, 2016). For instance, banks might outsource certain know your client (KYC) tasks like the evaluation of credit worthiness to boost the financial inclusion of low-income people and SMEs. This might put their operations and the financial system's efficiency at risk due to reputational hazards, information asymmetry, moral hazard, and adverse selection (Khan, 2011; Aduda *et al.,* 2012; Kamal *et al.,* 2021; Sethy & Goyari, 2022; Barik & Pradhan, 2021). Additionally, when non-bank financial institutions (NBFIs), including microfinance institutions (MFIs), expand financial inclusion by offering their services to previously unbanked people, the credit base will grow as a result. The likelihood of credit default may rise due to the credit base's rapid expansion and challenges with accurate credit evaluation. Consequently, if credit defaults increase, banks may experience liquidity problems due to the ever-increasing financial sector convergence between banks and NBFIs. This could have a negative impact on the financial system's overall regulation and result in financial instability (Dell'Ariccia & Marquez, 2006; Garcia & Jose, 2016; Ahmad, 2018).

5.2.4 Conceptual Framework

Drawing lessons from the discussion of the theoretical literature on the relationship between financial inclusion and financial stability, this section offers a simple conceptual framework to guide our study's empirical analysis of the relationship between financial inclusion and financial stability of banks in SSA. The conceptual framework also draws from empirical work by Hakimi *et al.,* (2022); Le *et al.,* (2019); Vo *et al,* (2021); Wang and Luo (2022); Čihák *et al,* (2016, 2021) and Koudalo and Toure (2023).

The framework assumes that both financial inclusion and financial stability are outcomes that are important and desirable for financial policy makers. In this regard, when prioritizing the design and implementation of financial policies, the interactions between the two outcomes are best not ignored (Hakimi *et al.,* 2022; Le *et al.,* 2019; Wang and Luo, 2022; Čihák *et al,* 2016, 2021; Koudalo and Toure, 2023). This point is illustrated in Equation 5.1

$$E[stable \cdot inclusive] = E[stable] + E[inclusive] + Cov[inclusive, stable], \qquad (5.1)$$

From the equation, $E[\cdot]$ represents the expectation operator and $Cov[\cdot]$ captures the linear dependence between financial inclusion and financial stability. In this regard, linear co-dependency of financial inclusion and financial stability is realised in a covariance term that in absolute value terms is significantly greater than zero. If the covariance is significant negative, then the achievement of the outcomes involves a trade-off for policy makers. Conversely, the covariance can be significantly positive when the pursuit of both outcomes yields synergies.

Through which channels are the negative effects of financial inclusion on financial stability transmitted? According to the extreme financial inclusion theory (Morawetz, 1908), financial stability can be jeopardised when access and use of financial services is promoted to economic agents regardless of their level of income or level of risk (Morawetz, 1908; Hakimi *et al.* 2022; Le *et al.* 2019; Čihák *et al,* 2016; Koudalo and Toure, 2023). Increasing the access and use of financial services and products, especially to low-income segments of the population without taking into consideration the associated

risks – such as the as greater transaction and information costs because of information asymmetry and deficiencies in their credit and collateral history - may lead to moral and social hazard, which puts financial stability at risk. In this sense, increased financial inclusion would be preferable if it were backed by sound governance and a sufficient framework of financial regulation and oversight (Hakimi *et al.* 2022; Le *et al.* 2019; Wang and Luo, 2022).

Through which channels are the positive effects of financial inclusion on financial stability transmitted? According to the institutional theory (Meyer & Rowan, 1977; DiMaggio & Powell, 1983), greater access and use of financial products and services can motivate the strengthening of financial system regulation and supervision and an overall improvement in financial stability (Meyer & Rowan, 1977; DiMaggio & Powell, 1983; Wang and Luo, 2022; Čihák *et al,* 2016; Koudalo and Toure, 2023). Greater financial inclusion allows banks to diversify their loan portfolios and thus reduce their nonperforming loans. Financial inclusion also allows for broader and efficient savings, a more stable base of retail deposits, and better monetary policy transmission. These positive effects of financial inclusion on financial stability are especially pronounced when banks operate in economies with high institutional quality (Hakimi *et al.,* 2022; Le *et al.,* 2019; Wang and Luo, 2022).

5.2.4.1 Measures of Financial Inclusion and Financial Stability

Using the best available data in a cross-country context, financial inclusion and financial stability measures are explained through Equation 5.2 and 5.3, respectively.

$$FI^M = FI^A + FI^E + FI^S + ME^{FI} \quad (5.2)$$

$$FS^M = FS^A + FS^D + ME^{FS} \quad (5.3)$$

In Equation 6.2, FI^M denotes the measures of fiancnial inlcusion. They are assumed to include four orthogonal components, namely: the aggregate component (FI^A) which can be a composite indicator that captures the variation across all financial inclusion indicators

under consideration, a component particular to economic agents (either firms or households) (FI^E), a component indicating the type of financial product or service (FI^S), and last, a measurement error term (ME^{FI}).

The expectation is for FI^A to capture variation across all financial inclusion indicators under consideration, on aggregate. However, when the empirical measures are dissected by type of financial service or product, the $FI^A + FI^S$ components will prevail with the possibility that FI^S dominates FI^A. In the latter case, when the service and product specific component is used in the investigation between inclusion and stability, the results will be different from when the aggregate component is used. Noteworthy, there is a possibility that the measurement error is significantly large that it negates any inference being made on the underling relationship (Hakimi *et al.,* 2022; Le *et al.,* 2019; Čihák *et al,* 2016, 2021).

In Equation 6.3, the measures of financial stability (FS^M) are assumed to include three orthogonal components, namely: the aggregate component (FS^A), that functions like FI^A, the aggregate component under the financial inclusion measures, a component particular to the financial stability dimension under consideration (FS^D), and a measurement error term (ME^{FS}).

In a similar way as is the case under Equation 6.2, in Equation 6.3, FS^A), is expected to dominate the data on aggregate. However, when the measures of stability are dissected by their dimensions, $FS^A + FS^D$ will dominate the data with the chance that FS^D dominates FS^A, thus making the results from the investigation that uses the financial stability dimension different from those that use the aggregate measure. Again, there is a chance that the measurement error is so large that it prevents any inference being made on the underling relationship (Hakimi *et al.,* 2022; Le *et al.,* 2019; Čihák *et al,* 2016, 2021).

Like Vo *et al.* (2021), Le *et al.* (2019), Wang and Luo (2022), Čihák *et al.* (2016, 2021), as well as Koudalo and Toure (2023), we use the component assumptions in Equations 5.1 and 5.2 to analyse the interdependence between financial inclusion and financial stability at different levels of their measurements' aggregation. The analysis is conducted

in four levels. First, composite indicators of financial inclusion (i.e., FI^A) and financial stability (i.e., FS^A) of banks in SSA are constructed from relevant indicators. Second, the study uses the Dynamic Common Correlated Effects Mean Group (DCCE-MG) estimator (Chudik & Pesaran, 2015) to investigate the relationship between financial inclusion and financial stability, considering cross-sectional dependence between study variables and a combination of composite indicators, individual proxies, and relevant macroeconomic control variables. Third, the quantile regression (QREG) model with fixed effects (Koenker & Bassett, 1978; Machado & Santos Silva, 2019) is utilized alongside a combination of composite indicators, individual proxies, and relevant macroeconomic control variables to examine the influence of financial inclusion on financial stability at various financial stability levels. Fourth, the augmented mean group (AMG) estimator (Eberhardt & Teal, 2010; Bond & Eberhardt, 2009) is used together with a combination of composite indicators, individual proxies, and relevant macroeconomic control variables to evaluate the impact of financial inclusion on financial stability in different country income groups.

5.2.4.2 Control Variables

The study aims to assess the impact of financial inclusion on financial stability by controlling for factors whose impact may be mistakenly attributed to financial inclusion. The control variables selected are frequently utilized in models that examine the relationship between financial stability and financial inclusion and or financial development (Brei *et al.,* 2020; Morgan & Pontines, 2018; Siddik *et al.,* 2018; Amatus & Alireza, 2015; Eichengreen, 1998; Hardy & Pazarbaşioğlu, 1999, Sahminan, 2007; Donath & Cismas, 2008; Obstfeld *et al.,* 2010). Specifically, in our baseline model we control for GDP per capita, private sector credit to GDP and consumer inflation, respectively. As additional control variables to be included in model variations, we also control for external debt stocks as a percent of gross national income, gross savings as a percent of GDP and official exchange rate - local currency unit per US$, period average, respectively.

Regarding the impact of GDP per capita – a higher GDP per capita is a good thing since it shows that the economy is doing well. Nonetheless, it is still unclear how this would help

to stabilize the banking sector. Indeed, wealthier nations are less susceptible to economic shocks. However, the potential influence of economic expansion on financial stability might vary based on the type of economic sectors that get credit (Morgan & Pontines, 2018; Siddik *et al.,* 2018; Amatus & Alireza, 2015; Koudalo & Toure, 2023). Therefore, the impact may be mixed. Similar to the effects of economic expansion (i.e., increase in GDP per capita), the impact of an increase in public sector credit to GDP is expected to be mixed, as this will depend on which sectors of the economy the credit is extended to (Morgan & Pontines, 2018; Siddik *et al.,* 2018; Amatus & Alireza, 2015; Koudalo & Toure, 2023). Therefore, the impact may be mixed. We anticipate the impact of inflation on stability to be harmful because fluctuating prices may cause investors to limit borrowing due to their assessment of potential future profits (Fouejieu, 2017; Morgan & Pontines, 2018; Amatus & Alireza, 2015; Koudalo & Toure, 2023)

Maintaining a controllable and sustainable amount of public debt is essential for maintaining financial stability. In particular, there has to be good diversification among holders, currencies, and maturities for foreign public debt stocks. In this regard, we anticipate that rising external debt stocks as a percent of gross national income would harm the stability of the financial system (Eichengreen, 1998; Hardy & Pazarbaşioğlu, 1999). For domestic initiatives to be supported, there should be enough national savings (both public and private) to prevent reliance on unsustainable foreign borrowing. Therefore, we anticipate that a rise in gross savings as a percent of GDP will improve financial stability (Eichengreen, 1998; Hardy & Pazarbaşioğlu, 1999; Sahminan, 2007). Abrupt changes in the exchange rate may have a detrimental effect on trade, economic development, capital flows, inflation, interest rates, and the stability of financial institutions. Financial stability therefore depends on a stable exchange rate. In this regard, we anticipate that a decline in the official exchange rate - local currency unit per US$, period average will have a detrimental effect on financial stability (Sahminan, 2007; Donath & Cismas, 2008; Obstfeld *et al.,* 2010).

5.3 Empirical Evidence of Effects of Financial Inclusion on Banking Sector Stability

As was previously mentioned, there are essentially two strands to the empirical research on the connection between financial stability and financial inclusion. The first comprises studies that back up the idea that financial inclusion will cause financial instability. Academic studies that support the idea that financial inclusion will improve financial stability are the second component. Some evidence from both of these lines of research is provided in the discussion that follows. A summary of the empirical studies reflecting relationship between financial inclusion and banking sector stability is provided in Table 5.3.1.

5.3.1 Positive Impact of Financial Inclusion on Banking Sector Stability

The empirical data from research that looked at the connection between financial inclusion and banking sector stability and discovered a positive relationship between the two are discussed in this section. In other words, higher financial stability results from more financial inclusion. The discussion considers empirical studies conducted in developed, emerging, and developing economies.

Anarfo *et al.,* (2022) used panel vector autoregression (VAR) approach and annual time series data from 2006 to 2017 to examine the connection between financial inclusion and financial stability in 50 African countries. Financial stability was proxied using bank Z-scores. A financial inclusion index that includes the access and usage measure of financial inclusion served as a proxy for financial inclusion. A composite index of banking sector development and net interest margin, respectively, are examples of control variables. The study's findings suggest that financial inclusion and financial stability have a positive and statistically significant association.

Using the Feasible Generalized Least Squares (FGLS) model, Jungo *et al.,* (2022) examine the impact of financial inclusion on banks' financial stability in 46 sub-Saharan African (SSA) and 31 Latin American Caribbean (LAC) countries from 2005 to 2018. Utilizing a composite indicator created by principal component analysis (PCA), financial inclusion is assessed in terms of access to and use of financial services and products as well as geographic and demographic penetration. The bank Z-score is used to gauge

financial stability. A measure of bank regulation and a measure of bank competitiveness are included in the analysis as control variables. The results indicate that financial stability in SSA nations is unaffected by financial inclusion, as indicated by a wide measure created by principal component analysis. Financial stability is positively impacted by financial inclusion as it relates to bank credit expansion and savings.

Khan *et al.,* (2022) use multiple regression models and unbalanced panel data for the years 2001 to 2019 to assess the impact of financial inclusion on financial stability in 54 African nations. The study uses deposits with commercial banks per 1,000 persons and the number of ATMs per 100,000 adults as proxies for financial inclusion. The credit-to-GDP ratio serves as a proxy for financial stability. Inflation, GDP per capita, population growth, trade openness, and financial integration (measured by foreign direct investment as a percentage of GDP) are the study's control variables. According to the study's findings, financial stability is positively and statistically significantly impacted by financial inclusion across all 54 African nations.

Using annual data from 2004 to 2018 and a dynamic panel data model, Wang and Luo (2022) investigate how the inclusion of financial services affects the stability of the financial system in 36 emerging economies. A composite indicator that was created using principal component analysis (PCA) and includes several indicators, such as the number of banks per 1000 km^2, the number of banks per 100,000 adults, the number of ATMs per 1000 km^2, and the number of ATMs per 100,000 adults, is used to measure financial inclusion. Bank Z-scores are used as a proxy for financial stability. A measure of bank size, liquidity, market structure, noninterest income, and GDP growth are among the study's control variables. The study's findings showed that financial inclusion affects financial stability in a way that is both positive and statistically significant, albeit its impacts vary from country to country and can even be adverse in some circumstances.

Pal and Bandyopadhyay (2022) looked at how financial inclusion affected financial stability in 104 developed and developing nations using annual data from 1984 to 2018 and the fully modified ordinary least squares (FMOLS) and dynamic ordinary least

squares (DOLS) models. A financial inclusion index that employs PCA to combine several indicators of access, availability, and utilization serves as a proxy for financial inclusion. A financial stability index that considers the bank Z-score, bank credit to bank deposits (%), liquid assets to deposits, and short-term funding (%), among other factors, serves as a proxy for financial stability. GDP per capita is one of the control variables. According to the study, financial stability is positively and statistically significantly impacted by financial inclusion.

Using a sample of 112 banks from 10 Middle East and North Africa (MENA) nations from 2004 to 2017, Hakimi *et al.,* (2022) employed a system generalized method of moments (GMM) to examine the impact of financial inclusion on bank stability. The utilization dimension (bank deposits to GDP (%), domestic credit to the private sector (% of GDP), access dimension (ATMs per 100,000 people, bank branches per 100,000 adults), and financial inclusion index were used as proxy measures, respectively, for financial inclusion. Using the bank Z-score, portfolio risk, and leverage risk, respectively, bank stability was assessed. A measure of inflation, GDP expansion, and bank-specific characteristics like bank size and credit risk are examples of control variables. The findings of the study demonstrate that greater financial inclusion has a positive and statistically significant effect on regional bank stability.

Using a dataset of 3071 Asian banks from the years 2008 to 2017 and a generalized method of moments (GMM) methodology, Vo *et al.,* (2021) investigate the relationship between financial inclusion and financial stability. A PCA-created index that includes four single indicators—the number of ATMs per 100,000 individuals, bank branches per 100,000 adults, credit cards per 1,000 adults, and debit cards per 1,000 adults, respectively—is used to measure financial inclusion. Bank Z-scores are a metric for measuring financial stability. The GDP per capita, GDP growth, and loan availability are examples of control variables. The study's findings demonstrate that financial inclusion makes a positive and statistically significant impact on the stability of the banking industry.

Banna and Alam (2021) use panel corrected standard errors (PCSE), ordinary least squares (OLS), two-step dynamic systems generalized method of moments (GMM), and unbalanced panel data techniques to examine the relationship between digital financial inclusion and financial stability in 213 banks of 4 ASEAN countries from 2011 to 2019. Bank Z-scores are used as a proxy for financial stability. A composite index that incorporates metrics for usage and access to financial services and products is used to represent financial inclusion. Ratio of total loans to total assets, total assets, ratio of loan loss provision to total loans, and non-interest income to total operating income were all employed as controls in the study. The study's conclusions show that banking stability is positively and statistically significantly impacted by digital financial inclusion.

Saha and Dutta (2021) use panel data from 2004 to 2014, a two-step GMM model, and a two-stage least squares model, respectively, to study the link between financial inclusion and financial stability for a sample of 92 nations across various socioeconomic and economic categories. A composite statistic that combines the number of bank branches and ATMs per 100,000 inhabitants, as well as the number of bank branches and ATMs per 1,000 km^2, is used to represent financial inclusion. The natural logarithm of the Z-score for banks is used as a proxy for financial soundness. A measure of financial depth, GDP per capita, the ratio of a bank's capital to total assets, and the provision for non-performing loans (NPLs) are among the study's control variables. The study's conclusions show that financial stability is positively and statistically significantly impacted by financial inclusion.

Using annual data from 2008 through 2018 and a panel system GMM model, Boachie *et al.,* (2021) evaluate the connections between financial inclusion, banking stability, and economic growth in 18 SSA economies. The World Bank provided financial inclusion indicators, and the International Monetary Fund provided bank soundness measures. The study's findings were contradictory. In other words, they found that financial inclusion has a favorable and substantial impact on the stability of banks. On the other hand, they discovered that the 18 SSA countries' bank capital regulation negatively affects banking stability.

Using a sample of 4,168 banks in 28 EU countries from the years 2010 to 2017, dynamic panel data estimation techniques—the asymptotically effective two-step system GMM estimators with standard errors robust to heteroskedasticity—Danisman and Tarazi (2020) investigate how financial inclusion affects financial stability in the European banking system. Their research looks at account ownership and digital payments as two indicators of financial inclusion. Financial stability indicators include three measures of bank stability—default risk, leverage risk, and portfolio risk—and concentrate primarily on information from the banking industry. Default risk is measured by bank Z-scores. Bank characteristics such as size, loan share, and deposit share are examples of control variables. Real GDP growth and inflation are also included as macroeconomic variables. The study's findings indicate that, in the context of the EU countries, there is a favorable association between financial inclusion and financial stability, particularly for formerly unbanked sections of society who live in rural areas.

Using quantile regression and static and dynamic panel estimation methodologies, Abdulkarim and Ali (2019) investigate the connection between financial inclusion and financial stability in 47 Organization of Islamic Corporations (OIC) nations from 2006 to 2016. Financial inclusion is measured by ATMs, bank branches per 100,000 adults, and deposit accounts with commercial banks, respectively. Financial stability is measured by banks' Z-score. The consumer price index, which measures inflation, the GDP per capital, and the population growth rate are macroeconomic control variables. The findings of the study demonstrate that financial stability in OIC nations is positively and statistically significantly impacted by financial inclusion.

Anthony-Orji *et al.,*'s (2019) analysis of quarterly data from 1986 to 2013 uses an autoregressive distributed lag model based on unrestricted error correction model (ARDL-UECM) to examine the association between financial stability and financial inclusion in Nigeria. Rural deposits serve as a proxy for financial inclusion, whereas the Z-score of the banking system serves as a proxy for financial stability. Measures of financial development, interest rate spread, and a measure of financial development all serve as

control variables. According to the study's findings, financial stability and financial inclusion have a long-term, positive link that is statistically significant.

In 19 high, lower, and higher middle-income countries between 2004 and 2014, Dienillah *et al.,* (2018) assess the effect of financial inclusion on financial stability. An index that considers indicators of banking penetration, accessibility to banking services, and usability is used to measure financial inclusion. The Albulescu and Goyeau index, which considers sub-indices such as a financial development index, financial vulnerability index, financial soundness index, and the World Economic Climate index, is used to gauge financial stability. The Tobit model is used to analyze the impact of financial inclusion on financial stability. The study's findings show that financial inclusion only benefits higher- and upper-middle-income nations in terms of its influence on financial stability. In contrast, financial inclusion has a beneficial but negligible effect on stability in low-income nations.

Neaime and Gaysset (2018) use a dynamic panel data estimator based on the Generalized Method of Moments (GMM) and Generalized Least Squares (GLS) models to evaluate the effect of financial inclusion on financial stability in Middle East and North Africa (MENA) countries from 2002 to 2015. ATMs per 100,000 individuals and banks per 100,000 adults are used as proxy measures of financial inclusion. The standard deviation of the growth rate of bank deposits, which represents the volatility in the total quantity of commercial bank deposits, is used to measure financial stability. Population size, a measure of financial integration, and the average growth in gross domestic product have all been introduced as control variables to the study. The study's findings demonstrate that financial stability in MENA nations is positively impacted by financial inclusion.

5.3.2 Negative Impact of Financial Inclusion on Banking Sector Stability

This section includes empirical findings from research that looked at the connection between financial inclusion and the stability of the banking industry and found a negative relationship between the two. In other words, increased financial instability results from financial inclusion. The discussion considers empirical studies done in developed, emerging, and developing economies.

Matsebula and Sheefeni (2022) used quarterly time-series data for the years 2004 to 2020 and the Engle-Granger technique to Error Correction Model (ECM) to evaluate the connection between financial inclusion and financial stability in South Africa. Commercial bank branches per 100,000 adults and the number of ATMs per 100,000 adults were used as proxy measures of financial inclusion. Bank Z-Score served as a proxy for financial stability. GDP, private credit by deposit money banks and other financial institutions to GDP (%), and liquid assets to deposits and short-term funding (%) are the study's control variables. According to the study, increased financial inclusion outcomes can either have positive or negative effects on financial stability, depending on the sort of financial inclusion undertaking.

Čihák *et al.,* (2021) analyze the relationship between financial inclusion and stability across individuals, enterprises, and country contexts using correlations obtained from data sets often utilized in the field on financial inclusion and stability. The study considers the various forms of inclusion and financial stability measures found in the literature. The investigation's findings imply a relationship between stability and inclusiveness. Additionally, the empirical findings imply a negative association between stability and financial inclusion. The relationships change systematically depending on whether the scenario being considered involves people, businesses, or nations. Positive relationships are also possible, again depending on the inclusion or stability metric utilized.

Feghali *et al.,* (2021) examine the effects of financial inclusion, as measured by credit access, on financial stability using similar cross-country survey data from the World Bank for more than 100 countries, which were accessible from 2011 through 2014 and 2017 respectively. A dynamic panel model that accommodates cross sectional heterogeneity is used in the investigation. The findings of their analysis show that, in contrast to non-credit inclusion, which includes access to savings and payments, credit inclusion has detrimental consequences on bank performance and stability.

Frączek (2019) Analyze case studies from various nations as well as papers and reports from international organizations to determine the impact of financial inclusion on financial

stability. The report defines financial inclusion as the accessibility and equality of possibilities to open accounts at financial institutions, have savings, and take out loans. The study's findings, which show that financial inclusion can both raise and decrease the use of central bank instruments to promote financial stability, are contradictory.

Al-Smadi (2018) uses annual time series data from 2006 to 2017 and the Fully Modified Least Squares (FMOLS) method, to examine the link between financial stability and financial inclusion in Jordan. A Jordanian financial inclusion index and a Jordanian financial stability index, respectively, serve as proxy measures of financial inclusion and stability. According to the study's findings, the impact of financial crises, financial integration, and domestic lending to the private sector on financial stability is all negative.

Čihák *et al.,* (2016) use data from 2007 to 2014 and the analysis of the distribution of pairwise correlation coefficients for various measures of inclusion and stability to investigate the relationship between financial stability and financial inclusion of individuals and firms across 157 countries from low-, middle-, and high-income areas. For individuals, indices of credit availability, savings, account ownership, insurance, and payments are used to measure financial inclusion. The indicators of credit utilization, savings for business purposes, account ownership, and payments, in that order, are used to measure the financial inclusion of businesses. Resilience, volatility, and crisis outcomes are the three aspects along which financial stability is measured. Financial institutions' solvency, liquidity balances, and credit risk exposure are used as proxies to gauge resilience. The standard deviation of credit and deposit growth at the national level is used to measure volatility. Measures of the banking crisis, such as output loss, the cost of government involvement to contain and resolve the crisis, and the peak of realized credit risk, are used to record the results of the crisis. The findings show that various financial stability indicators and financial inclusion variables have a negative relationship.

Using information on 148 countries from the World Bank Global Findex Database, Mehrotra and Yetman (2015) examine the relationship between financial stability and financial inclusion and talk about the implications for central bank policy. The major

conclusions of their analysis demonstrate that how advances in financial access are accomplished determines how financial inclusion impacts financial stability. Greater financial inclusion that results from rapid credit growth, or the quick expansion of relatively unregulated financial system segments where credit is aggressively extended to the less advantaged, previously excluded households and businesses without due care and attention to their ability to repay the loans, can jeopardize financial stability.

In 35 SSA nations, Amatus and Alireza (2015) look into the connection between financial inclusion and financial stability. Annual data from 2004 to 2011 are used in their analysis, which employs a dynamic Generalized Method of Moments model. Financial inclusion is represented by outstanding loans from commercial banks and outstanding deposits with commercial banks, while bank Z-scores are used to represent financial stability. Control variables for the study include GDP per capita, inflation, domestic bank loan to the private sector, and a financial crisis indicator. The results demonstrate that outstanding commercial bank deposits have a detrimental and statistically significant effect on financial stability in SSA nations.

Table 5.3.1: Summary of Empirical Studies Reflecting Relationship between Financial Inclusion and Banking Sector Stability

Author	Region/Country	Study Period	Inclusion Proxy	Stability Proxy	Control variables	Method	Impact of Financial Inclusion on Financial Stability
Amatus and Alireza (2015)	35 SSA countries	2004-2011	Outstanding deposits with commercial banks and outstanding loan from commercial banks	Banks' z-score	GDP per capita, inflation, domestic credit provided to private sector by banks, and financial crisis indicator	Dynamic GMM model	(-)
Al-Smadi (2018)	Jordan	2006 - 2017	Jordanian financial inclusion index	Jordanian financial stability index	Domestic credit to private sector, financial integration indicator, financial crisis indicator	FMOLS	(-)
Abdulkarim and Ali (2019)	47 OIC countries	2006 - 2016	ATMs, bank branches per 100,000 adults; deposit accounts with commercial banks	Bank Z-score	Inflation, GDP per capital and the population growth rate.	Static and dynamic panel estimation and quantile regression techniques	(+)

Author	Region/Country	Study Period	Inclusion Proxy	Stability Proxy	Control variables	Method	Impact of Financial Inclusion on Financial Stability
Anthony-Orji et al., (2019)	Nigeria	1986-2013	Rural deposits	Banks' Z-score	Measures of financial development, interest rate spread, and a measure of financial development.	ARDL-UECM model.	(+)
Anarfo et al., (2022)	50 African countries	2006 - 2017	Financial inclusion index	Banks' Z-score	Composite index of banking sector development and net interest margin	Panel VAR	(+)
Brei et al., (2020)	15 advanced and 17 emerging economies	2007 - 2015	Real growth rate of commercial banks' loans to SMEs	Banks' Z-scores	Real growth in rate of total credit to private non-financial sector, Real GDP growth, Average lending rate	Dynamic panel equation	(+)
Banna and Alam (2021)	213 banks of 4 ASEAN countries	2011-2019	Financial inclusion index	Banks' Z-score	Ratio of total loans over total assets, total assets, ratio of loan loss provision on total loans and non-interest income to total	OLS, two-step dynamic system GMM, and panel corrected standard errors techniques	(+)

Author	Region/Country	Study Period	Inclusion Proxy	Stability Proxy	Control variables	Method	Impact of Financial Inclusion on Financial Stability
					operating income		
Čihák et al., (2016)	157 countries from low-, middle- and high-income areas	2007 - 2014	Indicators of provision of credit, Savings, account ownership, indicators of the use of credit, savings for business purposes, account ownership and payments	Proxies for solvency of financial institutions, financial institutions liquidity positions, financial institutions exposure to credit risk, standard deviation in credit growth, deposits growth at the country level, banking output loss, •costs of government intervention to mitigate and resolve crisis, peak of realized credit risk	GDP per capita growth (annual %), Population density (people per sq. km of land area), Domestic credit to private sector (% of GDP), Age dependency ratio (% of working-age population), Mobile cellular subscriptions (per 100 people), Quality of supervision, Fiscal freedom	Distribution of pairwise correlation coefficient	(-)

Author	Region/Country	Study Period	Inclusion Proxy	Stability Proxy	Control variables	Method	Impact of Financial Inclusion on Financial Stability
Dienillah et al., (2018)	19 high, lower, and upper middle-income countries	2004-2014	Financial inclusion index	Albulescu and Goyeau index	Ratio of private credit from bank deposits and other financial institutions of GDP, financial openness	Tobit model	(+)
Danisman and Tarazi (2020)	4,168 banks in 28 EU countries	2010 - 2017	Account ownership and digital payments	Leverage risk; portfolio risk; Bank Z-scores	Bank size, loan share and deposit share; real GDP growth; inflation	Two-step system GMM	(+)
Feghali et al., (2021)	100 low-, middle- and high-income countries	2011, 2014 and 2017	Credit access	Banks' Z-score	GDP growth (annual %), Domestic credit provided by financial sector (% of GDP), Financial openness index, Total population, log, Governance principal component index	Dynamic panel regression model	(-)
Ghassibe et al., (2019)	Countries from the Middle East and Central Asia (MECA) regions	1990 - 2017	SME financial inclusion index	Short-term nominal interest rates	Output gap; measure of inflation	Panel VAR	(+)

Author	Region/Country	Study Period	Inclusion Proxy	Stability Proxy	Control variables	Method	Impact of Financial Inclusion on Financial Stability
Hakimi *et al.,* (2022)	112 banks from 10 MENA countries	2004 - 2017	Measures of access and usage of financial services	Bank Z-score, portfolio risk, and leverage	Inflation, GDP growth bank size; credit risk	System GMM	(+)
Jungo et al., (2022)	46 SSA and 31 LAC countries	2005 - 2018	Financial inclusion index	Bank Z-score	Measure of bank regulation; and bank competitiveness	FGLS model	(+)
Khan et al., (2022)	54 African countries	2001 - 2019	No. of ATM / 100,000 adults and deposits with commercial banks per 1,000 adults	ratio of credit-to-GDP	Inflation, GDP per capita, population growth, trade openness and financial integration	Multiple regression models	(+)
Morgan and Pontines (2018)	164 advanced, emerging market and developing countries	2007 - 2015	Outstanding commercial bank loans to SMEs as a proportion of banks' total loan book	Banks' Z-score, Non-performing loans	GDP per capita, Liquid assets to deposits and short-term funding, Ratio of non-FDI investment capital flow to GDP, Private sector credit by deposit money banks and other non-financial institutions to GDP, •	System-GMM dynamic panel equation	(+)

Author	Region/Country	Study Period	Inclusion Proxy	Stability Proxy	Control variables	Method	Impact of Financial Inclusion on Financial Stability
					Financial openness		
Matsebula and Sheefeni (2022)	South Africa	2004 - 2020	Commercial bank branches per 100,000 adults and number of ATMs per 100 000 adults	Banks' Z-score	GDP, private credit by deposit money banks and other financial institutions to GDP (%), and liquid assets to deposits and short-term funding (%).	Engle-Granger approach to Error Correction Model (ECM)	(+/-)
Neaime and Gaysset (2018)	MENA countries	2002 - 2015	ATMs per 100,000 adults and Banks per 100,000 adults	Volatility in total commercial bank deposits	Population size, measure of financial integration and the average growth in gross national income	GMM and GLS models	(+)
Naceur et al. (2019)	98 countries	1980–2016	Systemic financial market failures data	measures of financial depth, and efficiency.	GDP growth rate, interest rate spread, 3 − month monetary rate	Dynamic panel logit model	(-)
Negm (2021)	Egypt	2020-2021	Access and usage indicators of financial inclusion	Capital to total assets; credit to deposits; short term debt bank	N/A	Descriptive approach within deductive method and a sample of	(+)

Author	Region/Country	Study Period	Inclusion Proxy	Stability Proxy	Control variables	Method	Impact of Financial Inclusion on Financial Stability
				lending rate; deposit rate		96 respondents	
Operana (2016)	Philippines	2002:4 - 2015:4	Number of physical banking institutions; loans to MSMEs	NPL as a proportion of gross loans; liquid assets to deposits	Log of GDP per capita	Reduced form VAR	(+)
Pal and Bandyopadhyay (2022)	104 developed and developing countries	1984 - 2018	Financial inclusion index	Banks' Z-score, bank credit to bank deposits (%), liquid assets to deposits, and short-term funding (%)	GDP per capita	FMOLS and DOLS model.	(+)
Siddik et al., (2018)	217 advanced, emerging and developing market economies	2001 - 2013	Number of SME borrowers to total borrowers, Ratio of outstanding SME loans to total loans	Banks' Z-scores	GDP per capita, Ratio of M2 to GDP, Liquid assets to deposits, Domestic credit to private sector	GMM dynamic panel estimator	(+)
Saha and Dutta (2021)	92 countries across various income and economic groupings	2004 - 2014	No. of bank branches and number of ATMs per 100,000	Banks' Z-score	Measure of financial depth, GDP per capita, banks' capital to total assets	Two-step GMM model and a two-stage least	(+)

Author	Region/Country	Study Period	Inclusion Proxy	Stability Proxy	Control variables	Method	Impact of Financial Inclusion on Financial Stability
			people, number of bank branches and number of ATMs per 1,000 km2		ratio and provision for NPLs	square model	
Vo et al., (2021)	3071 banks in the Asian region	2008 - 2017	Financial inclusion index	Banks' Z-score	GDP per capita, GDP growth and loan provision	GMM	(+)
Wang and Luo (2022)	36 emerging economies	2004-2018	financial inclusion index	Banks' Z-score	A measure of bank size, liquidity, market structure, noninterest income, and GDP growth	Annual data from 2004 to 2018 and a dynamic panel data model.	(+)

Note: (+); (-) and (+/-) represent positive, negative, and mixed impacts of financial inclusion on financial stability, respectively.

The studies reviewed under the two general strands of literature (i.e., positive, and negative relationships between financial inclusion and financial stability, respectively) cover advanced, developing, and emerging market economies. In most cases, the distance to default, as measured by *bank Z-scores* is a widely used proxy for financial stability. On the same token, some studies use *banks' non-performing loans*, and the *percentage of bank credit to bank deposits* as other possible measures of stability in the financial sector. Control variables included in the models vary across studies but mostly include a measure of income, such as the real GDP or real GDP per capita and a measure of price stability such as the consumer price index. In multi-country research, a dynamic panel equation is generally favored over a static panel model for econometric analysis.

Increasing access to financial services and products, such as lending to those who were previously unbanked (i.e., low-income households or SMEs), can increase bank assets and decrease the relative exposure to any one borrower in the overall portfolio, according to empirical studies that support a positive impact of financial inclusion on financial stability. By lowering the loan book's volatility, the likelihood of nonperforming loans, and the danger of default, this will increase financial stability. The expansion of numerous small deposits as a component of the banks' stable funding is made possible by increased levels of financial inclusion, which also boosts banks' deposit bases and stability. Better financial inclusion also promotes a more formal financial system, which enhances the operation of monetary policy and, thus, promotes financial stability.

According to empirical research on the negative impact of financial inclusion on financial stability, a sharp rise in financial inclusion may cause financial institutions' lending standards to erode and their reputational risks to rise if tasks like determining the credit worthiness of smaller borrowers are outsourced. Again, when additional financial service providers, such microfinance institutions (MFIs), join the market, the overall credit base will increase, which might make credit evaluation more difficult. The likelihood of credit default and bank liquidity issues will rise as a result of inadequate credit evaluation. The

integrity of the entire financial system will be jeopardized and lead to financial instability if the MFIs are not adequately regulated and overseen.

5.3.3 Empirical Gaps in the Literature

Outside of there being too few studies on the relationship between financial inclusion and financial stability with respect to the SSA region, there are four general discernible gaps in the literature when all the empirical investigations assessed are considered. First, none of the panel data-based multi-country studies currently under review take the possibility of cross-sectional dependence between the cross sections into consideration. The failure to acknowledge for instance the impact of the likelihood of cross-country spillover effects of national and regional policies to promote financial inclusion and financial stability could lead to erroneous regression results. Second, most studies only utilize one metric to represent both financial inclusion and stability, respectively. Further, in cases where a composite indicator is used, it leverages a combination of proxies that are broadly non-uniform across studies or authors fashion indices that are of a country specific nature. In the first case, the issue is that the outcomes might be misleading. In the second case, the approach makes it hard to compare results across studies. Third, the majority of the studies reviewed do not investigate how financial inclusion would affect financial stability when financial stability levels differ across countries. This offers a narrow perspective that neglects how financial inclusion may have differing impacts on financial stability when the latter is at a relatively low or high level across countries. Fourth, too few studies investigate the impact of financial inclusion on financial stability with attention to varying levels of country income groups in the SSA context. In this regard, the results fail to adequately capture the effects of the economic development context. The goal of the current research is to fill in these gaps.

5.4 Conclusion

The global financial crisis (GFC) of 2007–2009 increased attention among academics worldwide in the necessity of researching the connection between financial inclusion and financial market regulation. In this way, the relationship between financial regulation and financial inclusions attracted great interest. The relationship between theoretical

foundations and empirical facts that shed light on the relationship between financial inclusion and financial stability, however, has not received thorough consideration in the literature. To understand the synergies and potential trade-offs between the phenomena, this chapter successfully discusses the theoretical and empirical relationship between financial inclusion and banking sector stability. The discussion reveals that different academics have different ideas about the theoretical and empirical connections between financial inclusion and stability. For example, some academics believe that greater financial inclusion has a positive effect on financial stability. On the other hand, several academics hold the opposite view and think that more financial inclusion has detrimental impacts on financial stability.

According to theory, financial inclusion can generally improve stability by enabling financial institutions to obtain inexpensive deposits from retail clients and thereby lower their marginal costs to provide banking services in a more inclusive financial sector. Additionally, as financial institutions work to expand financial services and products to clients, greater inclusivity would result in less information asymmetry. As a result, the financial industry would be less susceptible to risks and instability. Extreme financial inclusion (EFI) may have a detrimental effect on the stability of the financial system. This would happen if economic agents were given credit without proper assessment for their credit worthiness and level of risk. This would compromise the integrity of the financial system and worsen weaknesses that ultimately raise the dangers of financial instability.

Two lines of research appear when regional and national empirical data are considered. The first group includes scholars who believe that financial inclusion causes financial stability. The second is scholarly research that uncovers evidence that financial inclusion impedes financial stability. There are several noticeable discrepancies between the two bodies of research that may have an impact on the outcomes in each situation. For instance, most of the research do not use the same definitions of financial stability and inclusion. The majority of research utilize an assortment of proxies to gauge financial stability and inclusion that usually differ from country(region) to country(region) and dependent on data availability. This shows that in order to create policies that effectively

advance both financial inclusion and financial stability, decision-makers must internalize the theoretical links between the two and consider regional and national dynamics.

Chapter 6: Data and Methods

6.1 Introduction

This chapter describes the data and methodology used in the research. Specifically, the chapter details and explains the variables used in the analysis of the relationship between financial inclusion and financial stability. Additionally, the chapter outlines and justifies the methodology of analysis, that is, the dynamic common correlated effects technique by Chudik and Pesaran (2015), the Augmented Mean Group (AMG) estimator pioneered by Eberhardt and Teal (2010) and Bond and Eberhardt (2009), and the quantile regression (QREG) model with fixed effects of Koenker and Bassett (1978) as well as Machado and Santos Silva (2019). The section also details supporting diagnostic tests as well as the series of robustness checks employed in the study. The rest of this chapter is organized into three sections, namely, data considerations, methodology and conclusion, respectively.

6.2 Data Considerations

In this study, the dynamic common correlated effects of financial inclusion on financial stability are presented for SSA countries. 37 SSA nations were chosen from a total of 48 to make up the study sample. The selection of nations is based on the availability of data for the years 2005 through 2019. In Appendix A2 and A3, respectively, a list of the 48 SSA nations and the 37 countries that make up the study sample are provided. 37 SSA nations' annual panel data from 2005 to 2019 are used in the study. Based on the availability of data, the timeframe, the number of nations, and the inclusion of stability proxies are selected. When there are gaps in the data, linear interpolation will be used to fill them in, in the same way as Danisman and Tarazi (2020). The variables, symbols, transformation, and data sources are presented in Table 6.2.1.

Table 6.2.1: Variable Name, Symbol, Transformation and Data Source

Variables	*Symbol*	*Transformation*	*Data Sources*
Bank credit to bank deposits (%)	$FINSTAB\_1$	Percentage	World Bank Global Financial Development Database (GFDD)
Bank Z-scores / distance to default	$L\_FINSTAB\_2$	Natural log	World Bank Global Financial Development Database (GFDD)

Variables	*Symbol*	*Transformation*	*Data Sources*
Liquid assets to deposits & short-term funding (%)	$FINSTAB\_3$	Percentage	World Bank Global Financial Development Database (GFDD)
Financial stability indicator	$FINSTAB\_PCA$	-	Author's calculation using panel PCA based on data from GFDD
Bank branches per 100,000 adults	L_INCL_1	Natural log	World Bank Global Financial Development Database (GFDD)
ATMs per 100,000 adults	L_INCL_2	Natural log	World Bank Global Financial Development Database (GFDD)
Financial inclusion indicator	$INCL\_PCA$	-	Author's calculation using panel PCA based on data from GFDD
GDP per capita	L_GDPPC	Natural log	World Bank World Development Indicators
Private credit by deposit money banks to GDP (%)	PSC	Percentage	World Bank Global Financial Development Database (GFDD)
Consumer prices (annual %)	INF	Percentage	World Bank World Development Indicators

The World Bank's Global Financial Development Database (GFDD)[12] is an important source of data for our study. It includes yearly information on 214 economies' financial system features dating back to 1960. It offers data through 2021 for 108 indicators, each of which represents a particular feature of financial institutions and financial markets and was last updated in September 2022. Data from the Financial Access Survey (FAS)[13] of the International Monetary Fund (IMF) is combined with data from the GFDD in our analysis, which provides additional useful data on the financial inclusion of non-bank financial institutions (NBFIs).

Financial inclusion and stability are the key study variables. Three distinct proxies and a composite indicator are used to approximate financial stability. First, by the percentage of bank deposits to bank credit. As a percentage of total deposits, this is the amount of money that domestic money banks lend to the private sector. Commercial banks and other financial institutions that take transferable deposits, such as demand deposits, are referred to as domestic money banks. Demand, time, and saving deposits in deposit money institutions are included in the total deposits. The same indicator has been used by Pal and Bandyopadhyay (2022).

[12] The GFDD is available at: https://www.worldbank.org/en/publication/gfdr/data/global-financial-development-database
[13] The IMF FAS database can be accessed at http://fas.imf.org/.

Bank Z-scores are the second. This indicator depicts the likelihood that a nation's banking system may fail. The Z-score contrasts the capitalization and return buffers provided by a nation's banking system with the volatility of such return buffers. It is defined as (ROA+(equity/assets))/sd(ROA); sd(ROA) is the Return on Assets (ROA) standard deviation, calculated for country-years with at least five bank-level observations. ROA, equity, and assets are totals at the national level. derived from underlying unconsolidated bank-by-bank data from Bankscope and Orbis. If a country-year has fewer than three bank-level observations, the result is not reported. Studies that have used the same indicator include Jungo *et al.,* (2022); Hakimi *et al.,* (2022); Abdulkarim and Ali (2019) as well as Saha and Dutta (2021).

Third, the percentage of liquid assets and short-term funding. This is the proportion of short-term funding + total deposits to the value of liquid assets (easily convertible to cash). Cash collaterals, trading securities, securities valued at fair market value through income, loans, and advances to banks, and due from banks cash are all examples of liquid assets. Total client deposits (current, savings, and term) and short-term borrowing (money market instruments, certificate of deposits, and other deposits) include deposits and short-term funding. Studies that have used the same indicator include Matsebula and Sheefeni (2022), Siddik *et al.,* (2018) as well as Operana (2016).

Two distinct proxies and a composite indicator are used to approximate financial inclusion. According to bank branches per 100,000 adults in the first instance and ATMs per 100,000 adults in the second. The ratio of commercial bank branches to adult population in each country is computed as follows: 100,000*reported number of commercial bank branches/adult population. Studies that have used the same indicator include Neaime and Gaysset (2018), Khan *et al.,* (2022), Saha and Dutta (2021) as well as Matsebula and Sheefeni (2022). Data for the two indicators of financial inclusion is available from the GFDD.

A key problem with some of the past studies is that they use a single proxy to represent financial inclusion and financial stability, respectively (see Saha & Dutta, 2021;

Abdulkarim & Ali, 2019; Jungo *et al.,* 2022; Anarfo *et al.,* 2022). In either of these two scenarios, using a single proxy could lead to biased results. Therefore, both composite indices for financial stability and financial inclusion are used in our study. The principal component analysis (PCA) method is used to create the composite indicators for financial inclusion and stability, respectively. The three proxies for financial stability, (i.e., $FINSTAB\_1$, $L\_FINSTAB\_2$ and $FINSTAB\_3$) are used to develop the single composite indicator for financial stability ($FINSTAB\_PCA$). Similarly, the two proxies for financial inclusion, (i.e., L_INCL_1 and L_INCL_2) are used in the development of the composite indication for financial inclusion ($INCL\_PCA$).

The study control variables are GDP per capita, private sector credit to GDP and consumer inflation, respectively. The data is sourced from the GFDD (2022) and World Bank Development Indicators (2022) databases. The 2022 databases in each case are the most recent data vintages, by the time of our study.

6.3 Methodology

This section summarizes the research model and technique used to analyse the dynamic common correlated effects (DCCE) of financial inclusion on financial stability in SSA nations. This is the primary empirical approach of the study. The section also discusses the panel quantile regression (QREG) model with fixed effects, which is used to investigate how financial inclusion affects financial stability in SSA countries at different levels of financial stability. Furthermore, a description of the augmented mean group (AMG) estimator for analysing the influence of financial inclusion on financial stability in SSA countries at various phases of economic development is provided. A list of the study's robustness assessments is also included in this section.

6.3.1 General Functional Form

The study makes use of an annual panel of data from 2005 to 2019 and a dynamic panel equation to examine the relationship between financial stability and financial inclusion in SSA nations. The general form of the model is consistent with the benchmark models used by Amatus and Alireza (2015), Morgan and Pontines (2018), Greene (2001), Brei *et*

al., (2020), Morgan and Pontines (2018), and Siddik *et al.,* (2018). The model that guides the inquiry of how financial inclusion affects financial stability in 37 SSA countries is shown in Equation 6.1.

$$FINSTAB_{i,t} = \alpha FINSTAB_{i,t-1} + \beta INCL_{i,t}, + \gamma X_{i,t} + \Omega_{i,t} + \vartheta_{i,t} + \varepsilon_{i,t} \qquad (6.1)$$

where $i = 1, \dots, N$ *and* $t = 1, \dots, T$, respectively refer to the study's temporal dimension and the panel of nations. $FINSTAB$ is financial stability, the study dependent variable which, as per Table 5.1, is proxied by Bank credit to bank deposits (%), Bank Z-scores / distance to default, Liquid assets to deposits & short-term funding (%) and a composite indicator of financial stability, respectively. $INCL$ is a measure of financial inclusion and it is proxied by bank branches per 100,000 adults, ATMs per 100,000 adults, and a composite indicator of financial inclusion, respectively. X is a vector of parsimonious control variables that have a potential effect on financial stability. From Table 6.2.1, they include the logarithm of GDP per capita (which is used as a proxy for economic development), the ratio of private sector credit by deposit money banks and other financial institutions to GDP (which is used to proxy financial sector development), and a measure of inflation.

The selected control variables are commonly used in models that investigate the financial stability and financial development nexus (Brei *et al.,* 2020; Morgan & Pontines, 2018; Siddik *et al.,* 2018; Amatus &Alireza, 2015). To distinguish the effects of financial inclusion on financial stability from the effects of total private sector credit on financial stability, total credit to the private sector is included alongside proxies for inclusion (Brei *et al.,* 2020). Financial stability is predicted to have a mixed (either positive or negative) association with the measures of economic and financial development, but a negative relationship with the measure of inflation. The increase in inflation frequently comes together with a high level of economic uncertainty, a decline in confidence, and negative consequences on economic agents, which could result in financial instability (Fouejieu, 2017; Morgan & Pontines, 2018; Brei *et al.,* 2020; Phan *et al.,* 2021). α, β and γ are coefficients of the model. The time and country fixed effects are captured with $\Omega_{i,t}$ and $\vartheta_{i,t}$, respectively.

They control for unobserved time-invariant variation in banking system stability across countries. ε is the error term.

6.3.2 Dynamic Common Correlated Effects Model

Historically, methods like the general method of moments (GMM) model, fixed effects, and random effects have all been used to estimate Equation 6.1. These estimation methods have the drawback of not considering the possibility of heterogeneity and cross-sectional dependency between cross-sectional groups, even though they let the intercepts to change among cross-sectional units. It is highly likely that panel units, which are made up of the nations that make up a regional grouping, will exhibit cross-sectional dependence. This is especially true in today's more globally integrated financial and economic sectors. In this type of situation, the policy decisions made by one country could have an impact on several other nations (De Hoyos & Sarafidis 2006; Dogan *et al.,* 2017; Latif *et al.,* 2018). Therefore, it is essential to choose an estimating technique that allows for the possibility of cross-sectional dependence among panels in addition to testing for its occurrence.

In this respect, to estimate Equation 6.1, our study makes use of the Dynamic Common Correlated Effects (DCCE) model by Chudik and Pesaran (2015). According to the DCCE approach, unobserved common characteristics that characterize the regression variables cause cross-sectional dependence between cross-sectional units. The Mean Group (MG) estimation of Pesaran and Smith (1995), the Mean Group (PMG) estimation created by Pesaran *et al.,* (1999), and the Common Correlated Effects (CCE) method introduced by Pesaran (2006) serve as the cornerstones and standards around which the DCCE technique is built.

The PMG approach allows the model's intercepts, error variances, and slope coefficients to vary among cross sectional units while also using pooling and averaging techniques. It permits country-specific heterogeneity in the short-run coefficients, intercepts, and adjustment speed. Despite this, the model faces an important hurdle since it does not allow heterogeneity in the long-run slope coefficients between cross sectional units and

is unable to address the potential of cross-sectional dependence among cross sectional units (Blackburne and Frank, 2007; Ditzen, 2019 / 2021; Arain *et al.,* 2019; Ali *et al.,* 2020; Chaudhry *et al.,* 2021; Adeleye *et al.,* 2022; Chen *et al.,* 2022).

Different intercepts, slopes, and error variances can be accommodated using the MG method. For each cross-sectional unit, it does a separate regression and computes the simple arithmetic mean of the coefficients. The method has a significant drawback due to the inclusion of a lagged dependent variable in the model. The endogeneity issue caused by this inclusion raises the possibility that the MG estimates are inaccurate. The technique's inability to address the problem of cross-sectional dependence is a significant hurdle (Xue *et al.,* 2021; Arain *et al.,* 2019; Ali *et al.,* 2020; Chaudhry *et al.,* 2021; Adeleye *et al.,* 2022; Chen *et al.,* 2022).

By identifying unobserved common components using the cross-sectional means of both dependent and independent variables, the CCE methodology solves the cross-sectional dependency issue. Additionally, it is resistant to structural breakdowns, autocorrelation, and non-stationarity. The CCE technique's dependent variable is not totally exogenous, which is a key flaw in the methodology that prevents it from being used in a dynamic panel data situation (Chudik *et al.,* 2011; Chudik & Pesaran, 2015; Arain *et al.,* 2019; Ali *et al.,* 2020; Chaudhry *et al.,* 2021; Adeleye *et al.,* 2022; Chen *et al.,* 2022).

The procedures described above run the danger of producing false results and incorrect inferences, especially when cross-sectional dependence is present. The DCCE technique solves numerous significant constraints that other conventional approaches miss as a dependable and more effective alternative.

The method first calculates the averages and logs of all cross-sectional units in order to solve the cross-sectional dependence issue. Second, the approach makes use of MG estimating features to account for parameter variability. Third, it considers heterogeneity and assumes that a single factor can account for all regression variables in order to compute the dynamic common correlated effects. Fourth, the method takes into

consideration the fact that panel data exhibit non-stationarity while also removing any asymptotical bias in the estimators brought on by regressor endogeneity (Chudik & Pesaran, 2015). By using lagged versions of the variables to produce instrumental variables (IVs), the methodology facilitates instrumental variable regression. The IVs are robust to cross-sectional dependence and slope heterogeneity. In dynamic and static panel data models, the DCCE approach is thus robust to endogenous regressors. Furthermore, regardless of whether the regressors are endogenous, strictly exogenous, or weakly exogenous, it considerably enhances the estimator's small sample features in dynamic panel models (Chaudhry *et al.,* 2021). Fifth, by employing the Jackknife correction approach, the DCCE technique can be used with small sample sizes (Chudik & Pesaran, 2015). Finally, this method can still deliver accurate results even in the presence of structural breaks or unbalanced panel data (Kapetanios *et al.,* 2011; Ditzen 2016).

Our study uses the empirical findings of Chaudhry *et al.,* (2021) and Chen *et al.,* (2022) to inform the DCCE model specification. These studies make use of the relative superiority of dynamic panel data models over static models to estimate both short-run and long-run outcomes while also adjusting for the likelihood of cross-sectional dependence among the cross-sectional units. In our investigation, the DCCE model is expressed as follows:

$$L\_FINSTAB_{i,t} = \alpha L\_FINSTAB_{i,t-1} + \beta X_{i,t} + \sum_{p=0}^{P_T} \gamma_{x,i,p} \bar{X}_{t-p} + \sum_{p=0}^{P_T} \gamma_{y,i,p} \bar{X}_{t-p} + \varepsilon_{i,t} \qquad (6.2)$$

where i, t refer to the cross-sectional characteristics of the data and the time period, respectively. $L\_FINSTAB$ shows a log of financial stability, with its lag used as an independent variable. $X_{i,t}$ represents a set of other independent variables, including the financial inclusion proxy, the unobserved common elements of the model are shown by $\gamma_{x,i,p}$ and $\gamma_{y,i,p}$, while, P_T represents the lag of cross-sectional averages and $\varepsilon_{i,t}$ is the error term.

Both financial stability and financial inclusion will be approximated by a few different single variable measures as well as composite indicators, as was addressed in earlier sections. When using a single variable measure or combining numerous single indicators into one model, which may result in over-parameterization and multicollinearity issues, the choice of composite indicator is made to reduce the possibility of biased and misleading results. The study employs the principal component analysis (PCA) estimation technique to generate the composite indicators of financial stability and inclusion, respectively. Much like Saha and Dutta (2021), Banna and Alam (2021) as well as Wang and Luo (2022), all indicators included in the composite indicator are normalized before applying the PCA using minmax normalization as follows:

$$nmx = \frac{X_i - X_{min}}{X_{max} - X_{min}} \qquad (6.3)$$

where $X_{min}$is the minimum data point and X_{max} is the maximum data point. To generate the PCA, we follow the study by Ali *et al.,* (2021). They explain that under the panel PCA technique, the jth factor index for financial stability and financial inclusion, respectively can be written as follows:

$$FINSTAB_j = W_{j,1}X_1 + W_{j,2}X_2 + W_{j,3}X_3 + \cdots + W_{j,p}X_p \qquad (6.4)$$

$$INCL_j = W_{j,1}X_1 + W_{j,2}X_2 + W_{j,3}X_3 + \cdots + W_{j,p}X_p \qquad (6.5)$$

Where $FINSTAB_j$ is the financial stability and $INCL_j$ is the financial inclusion, while $W_j, X\ and\ P$ represent the weight of the parameter of the factor score, the original figure of the respective indicators and the number of variables in the equation, in each case.

6.3.3 The Quantile Regression (QREG) Model

We suggest using the fixed effect panel quantile regression model to examine whether financial inclusion affects financial stability differently when levels of financial stability fluctuate in 37 SSA nations. It enables us to account for unobserved individual country

variability in our study while examining the effect of financial inclusion on financial stability in SSA across the conditional distribution. Koenker and Bassett (1978) developed the quantile regression method. It uses a semiparametric approach. In contrast to linear regression, it does not assume the distribution of the errors or call for normally distributed data. This increases its resistance to anomalies and non-normal errors (Porter, 2014; Petscher & Logan, 2014). Additionally, the method is unaffected by monotonic transformations like logarithmic transformations. This is a characteristic that linear regression models lack (Koenker, 2005). The method incorporates all available data to estimate each quantile using the complete sample and assigns weights to the observations. As a result, the weighted data of the whole sample—rather than just the part of the sample at that quantile—is used to estimate the coefficients for each quantile regression (Oliveira et al., 2013; Machado and Santos Silva, 2019).

Depending on the quantile of the result or dependent variable in a quantile regression model, the relevance of the predictors in the model may change (Koenker & Bassett, 1978). This indicates that, in the context of our investigation, the effects of financial inclusion as a predictive variable (and those of other independent factors) on financial stability may vary across the various quantiles (or levels) of financial stability in our study countries. In other words, depending on whether financial stability is distributed at a low, average, or high level in each country, the impact of the predictor factors will vary.

6.3.4 The Augmented Mean Group (AMG) Model with Different Country Income Groups

We employ the augmented mean group (AMG) method developed by Eberhardt and Teal (2010) and Bond and Eberhardt (2009) to examine whether financial inclusion affects financial stability differently among 37 SSA nations dependent on their level of economic development. If the data series has common components, the AMG estimator is robust to cross-sectional dependency and probable endogeneity. It considers heterogeneous slope coefficients in the estimate process and is resistant to serial correlation, missing data, and potential non-stationarity sources in the series (Voumik et al., 2023; Shi et al., 2021). In this regard, we will examine the effects of financial inclusion on financial stability

in groupings of SSA countries with low, lower-middle, and upper middle incomes, respectively. This is because studies that examine the relationship between financial stability and inclusion in the SSA region currently tend to concentrate on either a single country case, a subgroup within the regional group, or a single income group within the regional group (see Aduda & Kalunda, 2012; Amatus & Alireza, 2015; Leigh & Mansoor, 2016; Arora, 2019; Jungo, *et al.,* 2022). Such research offers conflicting results about the influence of financial inclusion on financial stability across country income levels. In this sense, our study attempts to offer a holistic empirical picture of how different nation income groups in the SSA area are impacted by a rise in financial inclusion.

In addition, three additional macroeconomic control variables are included in our empirical study of the relationship between financial inclusion and financial stability across SSA country income categories, as informed by our analysis of the relevant literature and data at the country level. The variables comprise external debt stocks as a percent of gross national income ($DEBT$), gross savings as a percent of GDP ($SAVE$) and the official exchange rate - local currency unit per US$, period average ($ER$). The same variables have been used in previous studies that explore the relationship between financial stability and financial inclusion (see Eichengreen, 1998; Hardy & Pazarbaşioğlu, 1999, Sahminan, 2007; Donath & Cismas, 2008; Obstfeld *et al.,* 2010).

6.3.5 Test for Weak Cross-Sectional Dependence

The unobserved common factor and the heterogeneous factor loading remain a part of the error term $\varepsilon_{i,t}$. if the error structure is not taken into consideration in the estimation of Equation 6.2. In this scenario, the error will no longer be independently and identically distributed (IID), but correlated across units (i.e., cross-sectionally dependent). An omitted-variable bias issue arises if there is a correlation between the observed explanatory variables and the unobserved common components. Ordinary Least Squares is inconsistent in both scenarios (Everaert & Groote 2016). Chudik *et al.,* (2011) describes two types of cross-sectional dependence. Following from Equation 6.2, the error term is weakly cross-sectionally dependent if

$$\lim_{N \to \infty} \frac{1}{N} \sum_{i=1}^{N} |\boldsymbol{\gamma}_i| = 0 \tag{6.6}$$

and strongly cross-sectionally dependent if

$$\lim_{N \to \infty} \frac{1}{N} \sum_{i=1}^{N} |\boldsymbol{\gamma}_i| \geq K > 0 \tag{6.7}$$

Cross-sectional independence is defined by $\boldsymbol{\gamma}_i = 0 \forall i$. However, according to Pesaran (2015), cross-sectional independence is a restrictive assumption for large panels. Only strong cross-sectional dependence poses a problem in model estimation.

Pesaran (2015) develops a procedure to evaluate for weak cross-sectional dependence. Under the test's null hypothesis, the error terms are weakly cross-sectionally dependent.

The test statistic for weak cross-sectional dependence is

$$CD = \sqrt{\frac{2T}{N(N-1)}} \left(\sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \widehat{\rho_{ij}} \right) \tag{6.8}$$

$$\widehat{\rho_{ij}} = \widehat{\rho_{ji}} = \frac{\sum_{t=1}^{T} \widehat{u_{it}} \widehat{u_{jt}}}{\left(\sum_{t=1}^{T} \hat{u}_{it}^2\right)^{1/2} \left(\sum_{t=1}^{T} \hat{u}_{jt}^2\right)^{1/2}} \tag{6.9}$$

where $\widehat{\rho_{ij}}$ is the correlation coefficient. In the case of an unbalanced panel, the correlation coefficient is calculated for the common sample

$$\widehat{\rho_{ij}} = \widehat{\rho_{ji}} = \frac{\sum_{t \in T_i \cap T_j} \left(\widehat{u_{it}} - \bar{\widehat{u}}_i\right)\left(\widehat{u_{jt}} - \bar{\widehat{u}}_j\right)}{\left\{\sum_{t \in T_i \cap T_j} \left(\widehat{u_{it}} - \bar{\widehat{u}}_i\right)^2\right\}^{1/2} \left\{\sum_{t \in T_i \cap T_j} \left(\widehat{u_{jt}} - \bar{\widehat{u}}_j\right)^2\right\}^{1/2}} \tag{6.10}$$

where

$$\widehat{\bar{u}_{\iota}} = \frac{\sum_{t \in T_i \cap T_j} \widehat{u_{\iota t}}}{T_{ij}}, T_{ij} = \#\left(T_i \cap T_j\right) \tag{6.11}$$

and where $T_i \cap T_j$ are the common periods of unit *i* and *j* and $\#(Ti \cap Tj)$ is the number of common periods. The CD test statistic then becomes

$$CD = \sqrt{\frac{2}{N(N-1)}}\left(\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\sqrt{T_{ij}}\widehat{\rho_{\iota J}}\right) \tag{6.12}$$

Under the null, the CD test statistic is asymptotically distributed: $CD \sim N(0,1)$

6.3.6 Robustness Checks

The results of the primary model, the dynamic common correlated effects (DCCE) estimator, will be compared to those of the mean group (MG) estimator of Pesaran and Smith (1995), and the Augmented Mean Group (AMG) estimator developed by Eberhardt and Teal (2010), and the Bond and Eberhardt (2009) estimator as part of the study's robustness checks. On the one hand, without considering cross-sectional dependence, the MG estimator is used to investigate the effect of financial inclusion on financial stability in 37 SSA countries. On the other hand, while accounting for endogeneity, cointegration, and non-stationarity, the AMG estimator is used to examine how financial inclusion affects financial stability in 37 SSA nations.

6.3.6.1 The Mean Group (MG) estimator

For each country in our investigation, independent regressions are estimated using the Mean Group (MG) estimator of Pesaran and Smith (1995). An intercept is included in the estimation to account for fixed effects related to certain nations. To include time-variant and unobservable aspects of the data, a linear trend might be used. In order to estimate a common mean, individual model coefficients are ultimately averaged across panels. The model allows for both short- and long-term heterogeneity in all of the coefficients. The MG method does not, however, account for the existence of cross-section dependence. Instead, it uses a linear trend to abstract away these time-variant unobservables.

6.3.6.2 The Augmented Mean Group (AMG) estimator

In comparison to the MG estimator, the Augmented Mean Group (AMG) estimator is resistant to cross-sectional dependence and potential endogeneity if the data series contains common components. In the estimation process, it also takes into consideration heterogeneous slope coefficients and is resistant to serial correlation, missing data, and potential non-stationarity sources in the series (Voumik *et al.,* 2023; Shi *et al.,* 2021). As a result, we use the AMG estimator in our investigation as an additional layer of robustness checking.

6.4 Conclusion

This chapter successfully described the data and methodology used in the research. Specifically, the chapter detailed and explained the variables used in the analysis of the impact of financial inclusion on financial stability in 37 SSA countries. It outlined and justified the use of the dynamic common correlated effects (DCCE) technique by Chudik and Pesaran (2015) over conventional dynamic panel data techniques, to investigate the impact of financial inclusion on financial stability in 37 SSA countries with possible cross-sectional dependence. This was followed by an overview of the quantile panel regression (QREG) technique with fixed effects by Koenker and Bassett (1978), used to to investigate whether financial inclusion affects financial stability differently when levels of financial stability change in 37 SSA countries. In addition, to determine whether financial inclusion affects financial stability differently across 37 SSA countries based on their level of economic development, the chapter gave an overview of the augmented mean group (AMG) estimator developed by Eberhardt and Teal (2010) and Bond and Eberhardt (2009). The chapter also described the procedure for determining whether there is cross-sectional dependence among the panels and explained and justified the selection of robustness checks.

Appendix

A2: List of Sub-Saharan African Countries

No.	Country	No.	Country
1	Angola	**25**	Liberia
2	Benin	**26**	Madagascar
3	Botswana	**27**	Malawi
4	Burkina Faso	**28**	Mali
5	Burundi	**29**	Mauritania
6	Cabo Verde	**30**	Mauritius
7	Cameroon	**31**	Mozambique
8	Central African Republic	**32**	Namibia
9	Chad	**33**	Niger
10	Comoros	**34**	Nigeria
11	Congo, Dem. Rep.	**35**	Rwanda
12	Congo, Rep.	**36**	Sao Tome And Principe
13	Cote D'ivoire	**37**	Senegal
14	Equatorial Guinea	**38**	Seychelles
15	Eritrea	**39**	Sierra Leone
16	Eswatini	**40**	Somalia
17	Ethiopia	**41**	South Africa
18	Gabon	**42**	South Sudan
19	Gambia, The	**43**	Sudan
20	Ghana	**44**	Tanzania
21	Guinea	**45**	Togo
22	Guinea-Bissau	**46**	Uganda
23	Kenya	**47**	Zambia
24	Lesotho	**48**	Zimbabwe

A3: List of 37 Sub-Saharan African Countries in the Study

No.	Country	No.	Country
1	Angola	**20**	Mauritius
2	Burundi	**21**	Malawi
3	Benin	**22**	Namibia
4	Burkina Faso	**23**	Niger
5	Botswana	**24**	Nigeria
6	Cote d’Ivoire	**25**	Rwanda
7	Cameroon	**26**	Sudan
8	Cabo Verde	**27**	Republic of Congo
9	Chad	**28**	Senegal
10	Eswatini	**29**	Seychelles
11	Gabon	**30**	Sierra Leone
12	Guinea	**31**	South Africa
13	The Gambia	**32**	South Sudan
14	Kenya	**33**	Togo
15	Lesotho	**34**	Tanzania

No.	Country	No.	Country
16	Madagascar	**35**	Uganda
17	Mali	**36**	Zambia
18	Mozambique	**37**	Zimbabwe
19	Mauritania		

Chapter 7: Effects of Financial Inclusion on Financial Stability: Evidence from SSA countries

7.1 Introduction

The relationship between financial stability and financial inclusion in Sub-Saharan Africa (SSA) countries is examined empirically in this chapter. The development of composite indicators for financial inclusion and financial stability is done in Section 7.2, respectively. The variables utilized in the analysis are shown in pairwise correlations and descriptive statistics in Section 7.3. Section 7.4 presents the cross-sectional dependence test.

With attention to the sequence of objectives outlined in our study, Section 7.5 presents the baseline empirical results and discussion of the relationship between financial inclusion and financial stability with evidence from the Dynamic Common Correlated Effects Mean Group (DCCE-MG) estimator (Chudik & Pesaran, 2015). Section 7.6 presents results from the quantile regression (QREG) model with fixed effects (Koenker & Bassett, 1978; Machado & Santos Silva, 2019) under the investigation of the impact of financial inclusion on financial stability across different levels of financial stability. Section 7.7 discusses results from the AMG estimator (Eberhardt & Teal, 2010; Bond & Eberhardt, 2009) under the analysis of the impact of financial inclusion on financial stability in different country income groups.

As part of the robustness checks provided in Section 7.8, the mean group (MG) estimator (Pesaran and Smith, 1995) and the augmented mean group (AMG) estimator (Eberhardt & Teal, 2010; Bond & Eberhardt, 2009) estimators are used to estimate the link between financial inclusion and financial stability. Section 7.9 offers a comprehensive discussion of the results of the study. The chapter is concluded with Section 7.10.

7.2 Composite Indicators of Financial Stability and Financial Inclusion

The two main variables in our analysis are financial stability and financial inclusion. Similar empirical investigations and the accessibility of data across the SSA countries included in our analysis served as the basis for the selection of measures that act as

proxies for financial stability and financial inclusion. Financial stability is measured using three indicators: the ratio of bank credit to bank deposits (%), the bank Z-score, and the ratio of liquid assets to deposits and short-term funding (%).

Pal and Bandyopadhyay (2022) use the ratio of bank credit to bank deposits (%) as a proxy for financial stability. This ratio reflects the financial resources delivered to the private sector by domestic money banks as a fraction of total deposits. Jungo *et al.,* (2022), Hakimi *et al.,* (2022), Abdulkarim and Ali (2019), as well as Saha and Dutta (2021), employ the bank Z-score, which measures the likelihood that a nation's banking sector will default, as a measure of financial stability. In research by Matsebula and Sheefeni (2022), Siddik *et al.,* (2018), and Operana (2016), the ratio of liquid assets to deposits and short-term funding (%), which is the value of liquid assets (easily convertible to cash) to short-term funding + total deposits, is used as a proxy for financial stability.

Two indicators—the number of bank branches per 100,000 individuals and the number of ATMs per 100,000 adults—are used to approximate financial inclusion. Neaime and Gaysset (2018), Khan *et al.,* (2022), Saha and Dutta (2021), and Matsebula and Sheefeni (2022) all employed the same financial inclusion indicators. However, we believe that using a single proxy to assess either financial stability or financial inclusion is likely to produce biased results and make it difficult to draw comparisons or generalizations across studies that are similar, particularly if the proxies used are not consistent between studies. For instance, Saha and Dutta, (2021), Abdulkarim and Ali (2019), Jungo *et al.,* (2022), and Anarfo *et al.,* (2022) are previous research that employ a single proxy to reflect financial inclusion and financial stability, respectively. These studies often offer contrasting perspectives on the nature of the connection between financial inclusion and financial stability.

Our study therefore decides to use the aforementioned proxies of financial inclusion and stability, together with composite measures of both financial stability and inclusion, in order to present a thorough and multidimensional assessment of these phenomena in SSA. Individual indicators that represent several facets or dimensions of a subject, such

as financial stability or financial inclusion, are mathematically integrated to create a composite indicator. The ability of composite indicators to synthesize a group of sub-indicators while keeping the majority of the total variance in the initial group is one of its main advantages (Nardo *et al.,* 2005). Principal Component Analysis (PCA) and Factor Analysis (FA) are typically the two most widely used approaches for creating composite indicators, with PCA being the more common and straightforward approach (Nardo *et al.,* 2005; Jolliffe, 1990; Jackson, 1993; Jolliffe &Cadima, 2016).

Dimension reduction is the goal of the PCA and FA as multivariate statistical approaches. That is, lowering the number of variables to get a data set with fewer dimensions. The PCA approach does this with minimal loss of significant information by generating a fresh set of uncorrelated components from linear weighted combinations of the initial correlated variable set. Either the covariance matrix or the correlation matrix of the data is used to derive the eigenvectors that serve as the weights. Under the condition that the sum of the squared weights is equal to 1, the new variables are ranked in descending order according to the amount of variation they account for in the original variable set (Nardo *et al.,* 2005; Jolliffe, 1990; Jackson, 1993; Manly, 1994; Dunteman, 1989). The FA method is related to the PCA because it is a variation of the PCA. A key distinction between the two is that the FA approach employs a special statistical model that integrates factor loadings associated to each variable in the original set, unlike the PCA, which does not depend on a unique statistical model to create principal components (Nardo *et al.,* 2005). The PCA approach is the most popular due to its simplicity compared to the FA method (Vyas & Kumaranayake, 2006; Jolliffe & Cadima, 2016).

The fact that PCA makes the assumptions that the data are linearly connected and stationary, or constant through time, is a significant disadvantage. This premise might not always be accurate. In this scenario, PCA would struggle to accurately capture the true underlying structure of the data (Nardo *et al.,* 2005; Jolliffe, 1990). Despite its drawbacks, PCA is a powerful dimension reduction technique because of its many advantages. For instance, PCA reduces the number of variables that measure the same attribute or are likely to have a similar impact on the dependent variable, which helps to reduce the

occurrence of multicollinearity and overfitting in an econometric model. Clusters, seasonality, cycles, latent variables, and outliers are just a few examples of the hidden patterns, connections, and trends that PCA is excellent at revealing in the data. Thus, the method enables a more effective data analysis that facilitates a better understanding of the dynamics and behavior of the data over time (Karamizadeh *et al.,* 2013; Nardo *et al.,* 2005; Jolliffe, 1990; Jackson, 1993; Manly, 1994; Dunteman, 1989; Jolliffe & Cadima, 2016).

We decide to apply the PCA technique to create composite indicators for financial stability and financial inclusion, in a manner similar to Jungo *et al.,* (2022). To be more precise, the single composite indicator for financial stability is created using the three proxies for financial stability: bank credit to bank deposits (%), bank Z-scores, and liquid assets to deposits and short-term funding (%), respectively. Similar to this, the two proxies for financial inclusion—bank branches per 100,000 adults and ATMs per 100,000 adults—are combined to construct the composite indicator for financial inclusion.

7.2.1 Composite Indicator of Financial Stability

To develop a composite indicator of financial stability, three study variables are used, namely, bank credit to bank deposits (%), which we denote as $FINSTAB\_1$, bank Z-scores or distance to default, denoted as $FINSTAB\_2$ and liquid assets to deposits and short-term funding (%) denoted as $FINSTAB\_3$, respectively. To determine how dissimilar the three financial stability proxies are from one another, we first compute the pairwise correlations for each of the three proxies. The three proxies are not strongly associated, according to Table 7.2.1.

Table 7.2.1 Pairwise Correlation Between Financial Stability Proxies

Variables	*FINSTAB_1*	*FINSTAB_2*	*FINSTAB_3*
$FINSTAB\_1$	1.000		
FINSTAB_2	0.034	1.000	
	(0.417)		
FINSTAB_3	-0.474	-0.061	1.000
	(0.000)	(0.151)	

Source: Author's composition using STATA 17.
Note: Probabilities are in parenthesis

The PCA fundamentals are summarized in the second step. Similar to Vyas and Kumaranayake (2006), the PCA analysis is based on the correlation matrix to guarantee that all data are given equal weights. Table 7.2.2 lists the results of the PCA. We are specifically interested in an overview of the eigenvalues and eigenvectors that are produced when the correlation matrix corresponding to our three variables of interest is decomposed using the principal component method.

Table 7.2.2: Summary of PCA Fundamentals - Composite Indicator of Financial Stability

Principal components/correlation — Number of obs = 555
Number of comp. = 3
Trace = 3
Rotation: (unrotated = principal) — Rho = 1.0000

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	1.483	0.492	0.494	0.494
Comp2	0.991	0.466	0.330	0.825
Comp3	0.525	.	0.175	1.000

Principal components (eigenvectors)

Variable	Comp1	Comp2	Comp3	Unexplained
FINSTAB_1	0.698	-0.126	0.705	0
FINSTAB_2	0.138	0.990	0.040	0
FINSTAB_3	-0.702	0.070	0.709	0

Source: Author's composition using STATA 17.
Notes: This table shows the output of the PCA analysis. FINSTAB_1, FINSTAB_2, and FINSTAB_3 denote proxies for financial stability, namely bank credit to bank deposits (%), bank Z-scores or distance to default, and liquid assets to deposits and short-term funding (%) respectively.

The eigenvalues from Table 7.2.2 are arranged in terms of importance (principality), and they display the amount of information that each principal direction or principal component explains. For instance, the first principal direction (i.e., $Comp1$) explains approximately 49.4 percent of information in the underlying correlation matrix, whereas the second and third explain roughly 33 percent and 17.5 percent, respectively. In addition, the cumulative proportion of information explained by the first two principal directions (i.e., $Comp1$ and $Comp2$) is approximately 82.5 percent, which is equivalent to approximately 49.4 percent plus 33 percent. Being that we want to reduce the number of indicators from three to one, we choose to develop the composite indicator of financial stability using the first eigenvalue. It retains close to 50 percent of the original information.

The weights each variable has in each principal direction (or principal component) are indicated in the eigenvectors. The eigenvectors are arranged in their principality order, just as the eigenvalues. Each eigenvector has a length of one. Knowing the percentage of the eigenvector length devoted to a given original variable is necessary to understand its relative significance in the primary directions. For instance, when the first eigenvector in Table 7.2.2 is considered, $FINSTAB\_1$ accounts for $0.698^2 * 100\% = 0.4872\%$; whereas $FINSTAB\_2$ accounts for $0.138^2 * 100\% = 0.019\%$. In this analysis, $FINSTAB\_1$ dominates the principal direction in the first eigenvector, followed by $FINSTAB\_2$. The consequence is that relative to liquid assets to deposits and short-term funding, bank credit to bank deposits (%) and bank Z-scores / distance to default each play a higher role in representing financial stability in our analysis. Since it explains the majority of the variation in our key component indicator, the role of bank credit to bank deposits (%) is the most significant of the three original indicators in this regard.

Noteworthy, the correlation coefficients between each of the principal components is zero, as can be seen from Table 7.2.3. For the purpose of our study, $Comp1$, which is the first principal component developed using the first eigenvalue, is denoted as $FINSTAB\_PCA$, going forward.

Table 7.2.3: Matrix of Correlations of Financial Stability Principal Components

Variables	Comp1	Comp2	Comp3
Comp1	1.000		
Comp2	0.000	1.000	
	(1.000)		
Comp3	-0.000	0.000	1.000
	(1.000)	(1.000)	

Source: Author's composition using STATA 17.
Note: Probabilities are in parenthesis

7.2.2 Composite Indicator of Financial Inclusion

To develop a composite indicator of financial inclusion, two study variables are used, namely, bank branches per 100,000 adults, which we denote as $INCL\_1$ and ATMs per 100,000 adults which we denote as $INCL\_2$, respectively. The pairwise correlations of the two proxies for financial inclusion are first examined, similarly to Section 7.2.1, to determine how different they are from one another. The two proxies are not strongly associated, according to Table 7.2.4.

Table 7.2.4 Pairwise Correlation Between Financial Inclusion Proxies

Variables	*INCL_1*	*INCL_2*
$INCL\_1$	1.000	
INCL_2	0.2854 (0.000)	1.000

Source: Author's composition using STATA 17.
Note: Probabilities are in parenthesis

Second, we extract the principal component decomposition's eigenvalues and eigenvectors for the correlation matrix corresponding to our two original variables. Table 7.2.5 lists the results of the PCA.

Table 7.2.5: Summary of PCA Fundamentals - Composite Indicator of Financial Inclusion

Principal components/correlation	Number of obs	=	543
	Number of comp.	=	2
	Trace	=	2
Rotation: (unrotated = principal)	Rho	=	1.0000

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	1.836	1.673	0.918	0.918
Comp2	0.164	.	0.082	1.000

Principal components (eigenvectors)

Variable	Comp1	Comp2	Unexplained
INCL_1	0.707	0.707	0
INCL_2	0.707	-0.707	0

Source: Author's composition using STATA 17.
Notes: This table shows the output of the PCA analysis. INCL_1, and INCL_2 denote proxies for financial inclusion, namely bank branches per 100,000 adults and ATMs per 100,000 adults, respectively.

In the same way as the analysis conducted under Section 7.2.1, we choose the first eigenvalue respective to the first principal component (i.e., $Comp1$) and its associated eigenvectors to develop the financial inclusion indicator. Noteworthy, the two original indicators, $INCL\_1$ and $INCL\_2$, have the same relative importance in $Comp1$, as per the eigenvector results. This shows that the number of bank branches per 100,000 individuals and the number of ATMs per 100,000 adults both play an equally significant influence in our choice of the primary component as proxies of financial inclusion. We decide to assess the impact of both of these original variables and that of the primary component indicator on financial stability in order to better understand analytical issues.

Table 7.2.6 satisfies the condition that the two principal components developed as proxies of financial inclusion using the PCA technique have a correlation of zero. For the purpose of our study, $Comp1$, which is our chosen principal component indicator, is denoted as $INCL\_PCA$, going forward.

Table 7.2.6: Matrix of Correlations of Financial Inclusion Principal Components

Variables	Comp1	Comp2
Comp1	1.000	
Comp2	0.000	1.000
	(1.000)	

Source: Author's composition using STATA 17.
Note: Probabilities are in parenthesis

7.3 Descriptive Statistics and Pairwise Correlations

The variables used in the study are described statistically in this section. The study variables are described in Table 7.3.1, together with details on how they were processed and the sources of the data. In the table, $FINSTAB\_PCA$ is the composite indicator of financial stability and $INCL\_PCA$ is the composite indicator of financial inclusion. The two composite indicators were calculated in Section 7.2 using the PCA technique. Gross domestic product (GDP) per capita, private credit by deposit money banks as a percentage of GDP, and inflation as calculated by the consumer price index are among the study's control variables.

Table 7.3.1 Description of Variables

Variables	***Symbol***	***Transformation***	***Data Sources***
Bank credit to bank deposits (%)	$FINSTAB\_1$	Percentage	World Bank Global Financial Development Database (GFDD)
Bank Z-scores / distance to default	$L\_FINSTAB\_2$	Natural log	World Bank Global Financial Development Database (GFDD)
Liquid assets to deposits & short-term funding (%)	$FINSTAB\_3$	Percentage	World Bank Global Financial Development Database (GFDD)
Financial stability indicator	$FINSTAB\_PCA$	-	Author's calculation using panel PCA based on data from GFDD
Bank branches per 100,000 adults	L_INCL_1	Natural log	World Bank Global Financial Development Database (GFDD)
ATMs per 100,000 adults	L_INCL_2	Natural log	World Bank Global Financial Development Database (GFDD)
Financial inclusion indicator	$INCL\_PCA$	-	Author's calculation using panel PCA based on data from GFDD
GDP per capita	L_GDPPC	Natural log	World Bank World Development Indicators
Private credit by deposit money banks to GDP (%)	PSC	Percentage	World Bank Global Financial Development Database (GFDD)

Variables	*Symbol*	*Transformation*	*Data Sources*
Consumer prices (annual %)	INF	Percentage	World Bank World Development Indicators

Table 7.3.2 displays the descriptive statistics for each variable. The mean represents the average values of each series while the standard deviation captures the degree of variability in the series or how far it deviates from the mean. The minimum and maximum represent, respectively, the lowest and highest values for each series (Livingston, 2004). According to the table, the composite measures of financial stability and financial inclusion have a mean value of zero and a standard deviation that is almost equal to one. Both composite indicators follow a Gaussian or standard normal distribution, according to these data properties (Livingston, 2004). Further, we note that on average, there are 1.39 banks per 100,000 adults in SSA and 1.54 ATMs per 100,000 adults, respectively. The descriptive statistics also show the presence of heterogeneity in the panels, as can be seen from the relatively large standard divisions of private sector credit by deposit money banks as a ratio of GDP and levels of inflation, respectively. The same observation can be made on the standard deviations of the ratio of bank credit to deposits as well as the ratio of liquid assets to deposits and short-term funding. This justifies the use of the panel data techniques that control for individual country heterogeneity.

The pair-wise correlation for all the variables are presented in Table 7.3.3. The table shows that the financial inclusion proxies L_INCL_1, L_INCL_2 and $INCL\_PCA$, each have a positive and statistically significant correlation with the financial stability proxies $FINSTAB\_1$, $L\_FINSTAB\_2$ and $FINSTAB\_PCA$, respectively. This suggests that increases in bank branches per 100,000 adults or ATMs per 100,000 adults are anticipated to have a positive impact on the SSA region's financial stability, as determined by bank credit to bank deposits (%) or bank Z-scores / distance to default. Interestingly, these two indicators play relatively more important roles than the financial stability indicator-liquid assets to deposits & short-term funding (%)-in defining the principal direction of the principal component indicator of financial stability $FINSTAB\_PCA$ (see Section 7.2).

Each proxy of financial inclusion has a negative and statistically significant correlation with the financial stability proxy $FINSTAB\_3$. This implies that an increase in financial

inclusion may have a negative causal effect on financial stability as measured by liquid assets to deposits & short-term funding (%).

Regarding the control variables, the gross domestic product per capita (L_GDPPC) as well as private sector credit (PSC) have a positive and statistically significant correlation with the composite indicator of financial stability while inflation has a negative and statistically significant correlation.

The presence of multicollinearity in the independent variables is also examined using the pair-wise correlation matrix. If the correlation coefficients between two independent variables are more than or equal to 0.7 in absolute terms, then multicollinearity is assumed (Dormann *et al.,* 2013). Multicollinearity increases the variance of the regression parameters and may result in incorrect identification of the predictors. If the assumption is correct in this regard, one of the two highly linked variables must be removed from the model in order to prevent inaccurate findings. The L_GDPPC, PSC, and INF control variables used in our study do not exhibit multicollinearity since the correlation coefficients between range from 0.044 and 0.425, in absolute terms.

Table 7.3.2: Descriptive Statistics

	Mean	Standard Deviation	Minimum	Maximum
FINSTAB_1	69.504	32.988	-1.050	564.576
L_FINSTAB_2	2.578	.052	2.473	2.688
FINSTAB_3	38.861	19.498	-35.302	117.226
FINSTAB_PCA	0	1.218	-3.939	10.546
L_INCL_1	1.385	.936	-1.028	4.009
L_INCL_2	1.543	1.507	-3.054	4.5
INCL_PCA	0	1.355	-3.797	3.366
L_GDPPC	7.218	.952	5.599	9.74
PSC	24.525	31.36	-18.967	187.784
INF	8.595	22.36	-8.975	380

Source: Author's composition using STATA 17.

Table 7.3.3: Pairwise Correlation with Probabilities

Variables	*FINSTAB_1*	*L_FINSTAB_2*	*FINSTAB_3*	*FINSTAB_PCA*	*L_INCL_1*	*L_INCL_2*	*INCL_PCA*	*L_GDPPC*	*PSC*	*INF*
FINSTAB_1	1.000									
L_FINSTAB_2	0.034	1.000								
	(0.417)									
FINSTAB_3	-0.474	-0.061	1.000							
	(0.000)	(0.151)								
FINSTAB_PCA	0.851	0.169	-0.855	1.000						
	(0.000)	(0.000)	(0.000)							
L_INCL_1	0.141	0.129	-0.265	0.249	1.000					
	(0.001)	(0.002)	(0.000)	(0.000)						
L_INCL_2	0.108	0.51	-0.212	0.242	0.285	1.000				
	(0.011)	(0.000)	(0.000)	(0.000)	(0.000)					
INCL_PCA	0.112	0.481	-0.218	0.245	0.287	0.998	1.000			
	(0.008)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)				
L_GDPPC	0.057	0.026	-0.190	0.145	0.688	0.046	0.046	1.000		
	(0.183)	(0.539)	(0.000)	(0.001)	(0.000)	(0.280)	(0.284)			
PSC	0.391	0.018	-0.258	0.375	0.463	0.042	0.043	0.425	1.000	
	(0.000)	(0.681)	(0.000)	(0.000)	(0.000)	(0.322)	(0.314)	(0.000)		
INF	-0.217	0.037	0.234	-0.255	-0.109	0.048	0.045	-0.044	-0.097	1.000
	(0.000)	(0.381)	(0.000)	(0.000)	(0.010)	(0.249)	(0.288)	(0.298)	(0.023)	

Source: Author's composition using STATA 17.
Note: Probabilities are in parenthesis.

7.4 Test of Cross-Sectional Dependence

Cross-sectional dependence is a prevalent issue whenever panels with multiple observations across time and cross-sectional units are estimated. Ordinary least squares regression findings may be biased if the unobserved dependence between cross-sectional units is not taken into consideration, as this might result in autocorrelation in the error term (Ditzen, 2016, 2018a, 2021; Everaert & Groote, 2016; Pesaran, 2006; Chudik & Pesaran, 2015). Recent cross-country research on how financial inclusion affects financial stability sometimes fail to consider the possibility of cross-sectional dependence between panels (*See* Brei *et al.,* 2020; Al-Smadi, 2018; Čihák *et al.,* 2016; Morgan & Pontines, 2018). Cross-sectional dependence may exist as a result of shared, unobservable causes that may have differing effects on financial stability between nations. Aggregate macroeconomic shocks and national policies aimed at increasing financial stability and/or financial inclusion are a few examples of such factors (Ertur & Musolesi, 2017).

Countries in the SSA region have recently started to engage in political agreements to allow regional financial integration (RFI) on the growth of the financial industry and access to finance in SSA. These RFI initiatives are expected to result in the liberalization of cross-border financial institution activity within the integrating region as well as the opening up of capital accounts among nations that are geographically close to one another. The method consists of two steps. It is first made easier by the penetration of foreign banks between nations. Additionally, it calls for the harmonization of payment systems, regional institutional development, and financial regulation. (Lovegrove *et al.,* 2007; Bhatia *et al.,* 2009; Frey & Volz, 2013). These spillovers suggest the possibility of cross-sectional dependence between countries.

Against this background, our study tests for the presence of cross-sectional dependence (or weak cross-sectional dependence) using two tests, namely, tests by Pesaran (2015, 2021), and the power enhancement CD test by Fan *et. al.,* (2015). The absence of cross-sectional dependency is the null hypothesis for each of the four cross-sectional dependence tests. In other words, the alternative hypothesis (H1) of substantial cross-

sectional dependency is compared to the null hypothesis (H0) of weak cross-sectional dependence. According to weak cross-sectional dependence, when the number of cross sections increases to infinity, the correlation between cross sectional units at each point in time converges to zero. This indicates that there is no correlation between a cross-sectional unit i observation in time t and a unit j observation in time t. The correlation converges to a constant in conditions of significant cross-sectional dependency.

There is sufficient evidence to reject the null hypothesis of weak cross-sectional dependence in favor of concluding that for each variable in the study, the cross-sectional units exhibit strong cross-sectional dependence, as per both the Pesaran and the CD tests, which are presented in Table 7.4.1. (2015, 2021) CD test and the CDw+ test with power enhancement from Fan *et al.,* (2015).

Table 7.4.1: Results of Cross-Sectional Dependence Tests

	CD	CDw+
FINSTAB_1	9.790	1031.580
	(0.000)	(0.000)
L_FINSTAB_2	99.950	2577.310
	(0.000)	(0.000)
FINSTAB_3	19.530	938.080
	(0.000)	(0.000)
FINSTAB_PCA	29.440	1066.210
	(0.000)	(0.000)
L_INCL_1	73.500	1878.940
	(0.000)	(0.000)
L_INCL_2	68.550	1987.380
	(0.000)	(0.000)
INCL_PCA	59.800	1838.250
	(0.000)	(0.000)
L_GDPPC	22.750	1437.500
	(0.000)	(0.000)
PSC	41.150	1433.680
	(0.000)	(0.000)
INF	13.050	778.010
	(0.000)	(0.000)

Source: Author's composition using xtcd2 command in STATA 17.
Note: p-values in parenthesis. CD is the cross-sectional dependence test by Pesaran (2015, 2021). CDw+ is the cross-sectional dependence test by with power enhancement by Fan et. al. (2015).

7.5 Baseline Empirical Analysis and Results

This chapter's main goal is to study and evaluate how financial inclusion affects financial stability in the SSA region using the Dynamic Common Correlated Effects Mean Group

(DCCE-MG) pioneered by Chudik and Pesaran (2015). The DCCE estimator is used because it can handle potential endogeneity among the research variables, cross-sectional dependence in the panels, and heterogeneous slopes among cross-sectional groups (Meo *et al.,*2020). The pooled mean group (PMG) estimation by Pesaran *et al.,* (1996), the mean group (MG) estimation by Pesaran and Smith (1995), the common correlated effects (CCE) estimation by Pesaran (2006), and the Chudik and Pesaran (2015) estimation are the foundations of the DCCE approach.

It's important to note that the PMG and MG estimators are not robust to cross-sectional dependence. As a result, when there is such a link between the cross-sectional units, they may produce false findings. Similar to this, when the lag value of the dependent variable is included in the model and is not strictly exogenous, the CCE estimator deviates from consistency in a dynamic panel model context. The DCCE method, in contrast, supports both homogeneous and heterogeneous slopes. The model estimate procedure incorporates cross-sectional means and lags, making it resilient to the presence of cross-sectional dependency (Ditzen, 2018b; Meo *et al.,* 2020). By utilizing the jackknife correction approach, the technique is also as relevant in scenarios involving small samples (Ditzen, 2016). It works effectively when the panel data is imbalanced and is effective when there are structural fractures (Kapetanios *et al.,* 2011; Ditzen, 2016). In this regard, this section discusses three sets of DCCE-MG estimation results presented as separate panels in Table 7.5.1.

Panel 1 presents results of the DCCE-MG estimator when the model comprises the composite indicator of financial stability (i.e., $FINSTAB\_PCA$) as the dependent variable and the lag of the dependent variable (i.e., $L.FINSTAB\_PCA$), the natural log of bank branches per 100,000 adults (i.e., L_INCL_1) and a list of macroeconomic variables (i.e., L_GDPPC, PSC, and INF, respectively) as independent variables. Panel 2 presents results of the DCCE-MG estimator when the dependent variable is the composite indicator of financial stability (i.e., $FINSTAB\_PCA$) and the independent variables consist of the lag of the dependent variable (i.e., $L.FINSTAB\_PCA$), the natural log of ATMs per 100,000 adults (i.e., L_INCL_2) and a list of macroeconomic variables (i.e., L_GDPPC, PSC, and INF,

respectively). Panel 3 presents results of the DCCE-MG estimator when the dependent variable is the composite indicator of financial stability (i.e., $FINSTAB\_PCA$) and the lag of the dependent variable (i.e., $L.FINSTAB\_PCA$), the composite indicator of financial inclusion (i.e., $INCL\_PCA$) together with a list of macroeconomic variables (i.e., L_GDPPC, PSC, and INF, respectively) comprise the model's independent variables.

Table 7.5.1 Dynamic Common Correlated Effects – Mean Group Results – Dependent Variable: FINSTAB_PCA

Panel 1

Regressors	Model 1 Coefficient	Model 2 Coefficient	Model 3 Coefficient	Model 4 Coefficient	Model 5 Coefficient	Model 6 Coefficient	Model 7 Coefficient	Model 8 Coefficient
	0.466***	0.426***	0.390***	0.437***	0.335***	0.437***	0.379***	0.372**
$L.FINSTAB\_PCA$	(0.057)	(0.066)	(0.061)	(0.062)	(0.066)	(0.007)	(0.067)	(0.072)
	0.488*	0.486	-0.189	0.431	-0.149	0.591	0.009	0.057
L_INCL_1	(0.265)	(0.315)	(0.302)	(0.268)	(0.240)	(0.467)	(0.241)	(0.271)
		-0.901			-0.947	-1.309		-0.653
L_GDPPC		(1.34)			(1.349)	(1.785)		(0.874)
			0.075***		0.075***		0.071***	0.071***
PSC			(0.028)		(0.017)		(0.02)	(0.021)
				0.002		0.008	-0.007	0.000
INF				(0.011)		(0.012)	(0.009)	(0.013)
Observation	518	518	518	518	518	518	518	518
R-Squared	0.76	0.69	0.43	0.72	0.39	0.52	0.31	0.26

Panel 2

Regressors	Model 1 Coefficient	Model 2 Coefficient	Model 3 Coefficient	Model 4 Coefficient	Model 5 Coefficient	Model 6 Coefficient	Model 7 Coefficient	Model 8 Coefficient
	0.345***	0.356***	0.373***	0.427***	0.298***	0.413***	0.355***	0.26***
$L.FINSTAB\_PCA$	(0.068)	(0.067)	(0.053)	(0.063)	(0.059)	(0.065)	(0.063)	(0.056)
	-0.067	-0.178	-0.163	-0.127	-0.316	0.617	-0.057	-0.067
L_INCL_2	(0.279)	(0.214)	(0.151)	(0.163)	(0.288)	(0.792)	(0.146)	(0.361)
		1.085			-1.023	1.678		-0.385
L_GDPPC		(0.771)			(1.676)	(1.404)		(1.136)
			0.083**		0.083**		0.085	0.082**
PSC			(0.346)		(0.037)		(0.037)	(0.038)
				-0.002		0.026	-0.003	0.016
INF				(0.007)		(0.031)	(0.010)	(0.021)
Observation	518	518	518	518	518	518	518	518
R-Squared	0.58	0.48	0.53	0.50	0.38	0.48	0.35	0.32

Panel 3

Regressors	Model 1 Coefficient	Model 2 Coefficient	Model 3 Coefficient	Model 4 Coefficient	Model 5 Coefficient	Model 6 Coefficient	Model 7 Coefficient	Model 8 Coefficient
	0.455***	0.439***	0.382***	0.441***	0.304***	0.405***	0.359***	0.261***
$L.FINSTAB\_PCA$	(0.644)	(0.063)	(0.557)	(0.064)	(0.567)	(0.067)	(0.061)	(0.056)
	-0.160	0.349	-0.026	-0.173	-0.373	0.473	-0.059	-0.075
INCL_PCA	(0.215)	(0.556)	(0.196)	(0.196)	(0.291)	(0.802)	(0.185)	(0.548)
		1.109			-0.653	1.712		-0.01
L_GDPPC		(0.960)			(1.471)	(1.446)		(1.114)
			0.078**		0.088**		0.084**	0.085**
PSC			(0.314)		(0.038)		(0.038)	(0.038)
				0.000		0.019	-0.001	0.015
INF				(0.008)		(0.024)	(0.018)	(0.004)
Observation	518	518	518	518	518	518	518	518
R-Squared	0.55	0.55	0.53	0.52	0.38	0.46	0.35	0.32

Source: Author's composition using xtdcce2 command in STATA 17.

Note: From Model 2 to Model 4, we sequentially introduce the macroeconomic control variables, _L_GDPPC, PSC, and INF, respectively in that order. In Model 5 and 6 we introduce a combination of the control variables L_GDPPC, PSC and L_GDPPC, INF, respectively. Model 7 introduces a combination of the control variables PSC and INF only. Model 8 includes all the study variables. Coefficients (standard errors) are outside (inside) the parentheses. ***, **, and * denote the statistical significance at 1%, 5% and 10%, respectively. $L.FINSTAB\_PCA$ denotes the lag of the dependent variable.

7.5.1 Analysis of Panel 1 Results

From Table 7.5.1, the results of model 1 to model 8 under Panel 1 show that the lagged dependent variable (i.e., the lag of the composite indicator of financial stability, $L.FINSTAB\_PCA$) has a positive and statistically significant impact on financial stability in the SSA region over the review period. Accordingly, a one percentage point rise in financial stability in the preceding period will, *ceteris paribus*, result in a one percentage point rise in financial stability in the present time. This outcome is congruent with the institutional theory (Meyer & Rowan, 1977; DiMaggio & Powell, 1983), and empirical findings of Morgan and Pontines (2018), Hakimi *et al.,* (2022) as well as Koudalo and Toure (2023). They emphasize that while it may be challenging to predict or even prevent shocks, a solid financial system supported by stable policies may lessen the effects of shocks and remain resilient in the face of stressful situations and severe downturns. In this way, it may continue to give economic actors the money they need to absorb the shock and carry on with their economic activities in a healthy economy.

The financial inclusion indicator, L_INCL_1 (i.e., the natural log of bank branches per 100,000 adults) has a positive effect on financial stability in six out of the eight models (i.e., model 1, 2, 4, 6, 7 and 8, respectively). However, this outcome is only statistically significant in model 1. In this regard, a one percent increase in financial inclusion leads to a 0.488 percent increase in financial stability, *ceteris paribus.* These results are in line with the study's conceptual framework, the institutional theory (Meyer & Rowan, 1977; DiMaggio & Powell, 1983), as well as empirical evidence from Hakimi *et al.* (2022), Vo *et al.* (2021), Saha and Dutta (2021), Koudalo and Toure (2023), and Abdulkarim and Ali (2019), who show that as more bank branches are opened and more economic agents have access to financial services and products, this reduces information asymmetry because the distance between the financial service provider and the customer decreases. The financial intermediation theory also states that greater financial inclusion aids in boosting the competitiveness of the banking industry and lowering operating expenses for banks. Banks will earn more money as a result, and the financial system will develop and stabilize more. In a similar vein, as banks build their deposit base, this gives them access to a stronger and more diverse retail deposit funding, enabling them to better

protect themselves from credit shocks and so boost sector stability (Čihák *et al.,* 2016; Ozili, 2018; Ahamed & Mallick, 2019; Ozili, 2020).

In all the models included in the study, the influence of private sector credit to GDP (PSC) on financial stability is positive and statistically significant, which is consistent with *a priori* predictions. This implies that higher financial stability results from an increase in private sector credit as a percentage of GDP. Similar conclusions are reached by Hakimi *et al.,* (2022), Ahamed and Mallick (2019), as well as Danisman and Tarazi (2020), who contend that increasing access to credit not only encourages enterprises to invest, but also raises employment and overall well-being. In this regard, businesses can pay back their debts, thereby lowering the amount of non-performing loans held by the bank and, consequently, raising the stability of the bank as a whole.

7.5.2 Analysis of Panel 2 Results

In the same way as the results of model 1 to model 8 under Panel 1, the results of model 1 to model 8 under Panel 2 show that the lagged dependent variable (i.e., the lag of the composite indicator of financial stability, $L.FINSTAB\_PCA$) has a positive and statistically significant impact on financial stability in the SSA region. Conversely, the financial inclusion indicator, L_INCL_2 (i.e., natural log of ATMs per 100,000 adults) has a generally negative impact on financial stability but is not statistically significant across all eight model variants.

Private sector credit has a positive and statistically significant effect on financial stability in model 3, 5 and 8, respectively. These findings confirm our *a priori* expectations. This finding is also consistent with findings of Khan *et al.,* (2022), Wang and Luo (2022), Hakimi *et al.,* (2022), Vo *et al.,* (2021), Saha and Dutta (2021), and Abdulkarim and Ali (2019). Their findings are consistent with the theoretical hypothesis that as more economic agents are integrated into the formal financial sector, there will be an increase in the efficiency of the financial sector, the scope of savings intermediation, and the diversity of the funding bases of financial institutions. Together, these improvements

produce a banking industry and economy that are more resilient, increasing the stability of the financial sector.

In line with *a priori* expectations, inflation has a negative and statistically significant effect on financial stability in model 4. A similar result is found by Amatus and Alireza (2015) in their study of the impact of financial inclusion on financial stability in SSA. A rise in inflation typically coincides with a drop-in confidence and an increase in economic uncertainty, which can have a negative impact on economic actors and lead to financial instability (Fouejieu, 2017; Morgan & Pontines, 2018; Brei *et al.,* 2020; Phan *et al.,* 2021).

7.5.3 Analysis of Panel 3 Results

In the same way as the results of model 1 to model 8 under Panel 1 and Panel 2, the results of model 1 to model 8 under Panel 3 show that the lagged dependent variable (i.e., the lag of the composite indicator of financial stability, $L.FINSTAB\_PCA$) has a positive and statistically significant impact on financial stability in the SSA region over the review period. The composite indicator of financial inclusion (i.e., $INCL\_PCA$), inflation (INF) and (L_GDPPC) respectively have a statistically insignificant impact on financial stability. Conversely, the impact of private sector credit (PSC) on financial stability is positive and statistically significant across all model variants it is included in.

When the results of Panel 1, 2 and 3 are compared, the lagged natural log of the composite indicator of financial stability has a positive and statistically significant impact on financial stability across all model variants in all three panels. The average impact of a 1 percent increase in the last period's level of financial stability on financial stability in the current period is 0.405 percent, 0.353 percent, and 0.385 percent in Panel 1, 2 and 3, respectively. The implication is that a financial sector that sustains stability and resilience over time, even during abrupt downturns or stressful events, fosters an environment that supports a healthy economy and fosters the success of households and businesses, reinforcing the requirement for financial stability.

Financial stability is proven to be positively and statistically significantly impacted by financial inclusion, as measured by the number of bank branches per 100,000 adults. All model versions show that the relationship between financial stability and financial inclusion, as measured by the number of ATMs per 100,000 adults or by the composite indicator of financial inclusion, is not statistically significant. One notable conclusion from our data is that, over the review period, bank branches appear to have played a more significant role than ATMs in promoting financial inclusion and stability in the SSA region. This either suggests that clients prefer to obtain financial products and services through bank branches as opposed to ATMs, or that the abundance of ATMs and the breadth of their networks do not sufficiently represent a form of providing financial services that is widely accepted in the region. A similar hypothesis was explored by Maity and Sahu (2022) who conclude that in the initial stages of banks' expansion, bank branches tend to play a greater role in financial inclusion. However, the role played by ATMs in financial inclusion tends to grow and be positive over time. Like this, Neaime and Gaysset (2018) draw the conclusion that the ATMs' negligible impact on financial stability may be an indication of the banking sector's underdeveloped access to financial services, which could have a substantial impact on financial inclusion and, consequently, financial stability. Furthermore, Ozili (2021b) makes the point that in some less developed economies, economic agents like using and going to bank branches over ATMs because they appreciate the chance to speak with bank employees since it gives them confidence that their transactions will be overseen. They also want to speak with bank employees face-to-face to make sure their issues are addressed.

All three panels show a favourable and statistically significant impact of private sector loans on financial stability in the SSA area. This implies that banks in the area can assess credit risks appropriately, are widely liquid, well capitalized, and have low levels of non-performing loans. Credit serves as a gauge of the strength of the banking system. Additionally, this means that the financial sector's intermediary role is effective and that the credit funding base is well-diversified (Moraes & Costa, 2022; Khan *et al.,* 2022; Wang & Luo, 2022; Hakimi *et al.,* 2022; Vo *et al.,* 2021; Saha & Dutta, 2021; Abdulkarim & Ali, 2019). When used as the only control variable in the model, inflation is revealed to have

a negative and statistically significant impact on financial stability. As we predicted, an increase in inflation reduces household income and business margins, making it more expensive to service existing debt. Due to this, credit risk is increased, endangering financial stability (Fouejieu, 2017; Morgan & Pontines, 2018; Brei *et al.,* 2020; Phan *et al.,* 2021).

7.6 Impact of Financial Inclusion on Financial Stability Across Different Levels of Financial Stability

In this part, we examine whether, as financial stability levels fluctuate across 37 SSA nations, financial inclusion has a varied impact on financial stability. The conventional regression method that we have up to this point employed to calculate how financial inclusion affects financial stability in SSA nations focuses on the average impacts of financial inclusion on stability. As a result, crucial links could be overlooked, underestimated, or overstated (Binder & Coad, 2011). In this section, we utilize a fixed effect panel quantile regression model to examine the influence of financial inclusion on financial stability in SSA as a complement to analysis under the baseline model. As a result, we can evaluate how financial inclusion affects financial stability throughout the conditional distribution while adjusting for hidden country-level variability. Koenker and Bassett (1978) developed the quantile regression method. It uses a semiparametric approach. In contrast to linear regression, it does not assume anything about the distribution of the errors or call for normally distributed data. This increases its resistance to anomalies and non-normal errors (Porter, 2014; Petscher & Logan, 2014). Additionally, the method is unaffected by monotonic transformations like logarithmic transformations. This is a characteristic that linear regression models lack (Koenker, 2005).

Relative to the quantile of the result or dependent variable, the relevance of the model's predictors might vary in quantile regression (Koenker & Bassett, 1978). This indicates that in the context of our investigation, the effects of financial inclusion as a predictor variable (and those of other independent factors) on financial stability may vary across the various quantiles (or levels) of financial stability in our study countries. In other words, the impact of the predictor variables will vary depending on whether financial stability in each country

is distributed at a low, average, or high level. The lack of empirical research on how financial inclusion affects financial stability in the SSA region is addressed by the adoption of this analytical approach in our study. Additionally, it supports related research that has utilized quantile regression to determine if the effects of financial inclusion in Africa vary according to quantiles of financial stability (see Kebede, 2021).

We are aware of two major ways for selecting the number of quantiles in our research, as per Davino *et al.,* (2014) and Petscher and Logan (2014). The first method presents quantiles as columns in a table, with quantiles (10th, 20th, 50th (median), and 90th quantiles) chosen in increments of 10 from the 10th to 90th quantile. In this way, it is possible to compare and follow the impact of independent variables on each quantile of the dependent variable across columns.

In the second approach, quantiles are chosen in increments of .01 from .01 to .99. That is, the effect of each predictor variable is calculated for the 1st quantile, the 2nd quantile, and so forth, until the 99th quantile. In this case, the results are presented in graphical form, as opposed to a table, with the quantiles presented along the x-axis and the size of the quantile regression coefficient on the y-axis. Considering the two approaches, our study choses the number of quantiles based on the first approach. In this regard, the results of the quantile regression model are presented in three panels in Table 7.6.1.

The results show that the various proxies of financial inclusion across all three panels have a positive and statistically significant impact on financial stability in the SSA region. This finding is similar to that of Kebede (2021). Specifically, L_INCL_1, which is the number of bank branches per 100,000 adults has the highest overall positive impact on financial stability relative to the number of ATMs per 100,000 adults (L_INCL_2) and the composite indicator of financial inclusion, $INCL\_PCA$, respectively, across the conditional distribution. However, in all three cases, the positive impact of financial inclusion on financial stability decreases from the 10th to 90th quantile. This suggests that countries with lower levels of financial stability will experience the greatest benefits from financial inclusion. In other words, nations with lower financial stability benefit more from gains in

financial inclusion than do countries with stronger financial stability. This conclusion supports theoretical hypotheses that claim that greater financial inclusion lowers financial intermediation costs related to information asymmetry and, as a result, fosters efficiency in the functioning of financial markets (Hannig & Jansen, 2010; Ozili, 2020; Pham & Doan 2020). Additionally, greater financial inclusion improves the efficacy of financial supervision and the transmission of monetary policy. The aggregate demand is more sensitive to changes in interest rates as a result of greater financial inclusion, and agents who would typically make financial decisions in an unregulated financial environment are more likely to engage in the economy in a formal and regulated way (Cull, *et al.,* 2012; Ozili, 2018; Ahamed & Mallick, 2019). Therefore, financial inclusion promotes financial stability by preventing a large informal sector from impeding monetary policy transmission and financial sector supervision (Ozili, 2020; Pham & Doan 2020; Frączek, 2019; Danisman & Tarazi, 2020; Kamal 2021; Ozili, 2021a; Anarfo *et al.,* 2022).

In Panel 1, the impact of the natural log of GDP per capita (L_GDPPC) is positive and statistically significant only in the 10th to 50th quantile, after which it becomes statistically insignificant. The greatest positive impact of L_GDPPC on financial stability is in the 10th quantile, at 1.019 percent. This means that in the 10th quantile, a one percent increase in L_GDPPC leads to a 1.019 percent increase in financial stability, all other things being constant. In Panels 2 and 3, the impact of L_GDPPC on financial stability is only statistically significant and positive in the 30th quantile, at roughly 0.54 percent in each case. This means that a one percent increase in L_GDPPC leads to a 0.54 percent increase in financial stability, *ceteris paribus*.

PSC's impact on financial stability is negative and statistically significant at the 90th quantile, across all three panels. One reason would be that proper regulatory and risk management policies, which should ideally change in tandem as the volume of financial transactions rise, may start to decouple from one another (Dienillah *et al.,* 2018). In Panel 1 and 3, the impact of inflation on financial stability is negative and statistically significant in the 70th to 90th quantiles but is statistically insignificant elsewhere across the conditional

distribution. Similarly, in Panel 2, it is negative and statistically significant from the 60th to the 90th quantile while insignificant everywhere else across the conditional distribution.

Greater empirical nuance is provided by the investigation of how financial inclusion affects financial stability across the conditional distribution. A noteworthy finding is that financial inclusion has a favorable and statistically significant impact on financial stability in the SSA region. Additionally, when financial stability is at its lowest level, financial inclusion has the strongest stabilizing effects. The SSA region's financial stability trends and developments demonstrate that the region's financial sector varies in depth and development among nations. State- or foreign-owned banks and informal financing continue to hold a significant amount of sway over the broader financial system. African governments have promoted financial sector reforms since the early 1990s, asking for increased restructuring and private sector involvement in the administration of quasi-government institutions (Pattillo *et al.,* 2006; EIB, 2013). Early 1990s restructuring initiatives have coincided with changes in financial sector supervision, particularly in middle-income nations where the financial systems are considerably more advanced. Across nations, reforms have had varying degrees of effectiveness, particularly in terms of fostering financial sector stability (Allen *et al.,* 2011; EIB, 2013).

Our study's quantile regression analysis revealed that improved financial sector stability can result from more financial inclusion, particularly in nations with low levels of financial stability. This result is comparable to that of (Oanh, 2023) who looked into the relationship between monetary policy, financial stability, and financial inclusion in countries with high and poor financial development. Their findings demonstrate a positive relationship between financial stability and financial inclusion in nations with limited financial growth. In this aspect, boosting financial inclusion while also developing the financial sector from a low base might aid in relieving financial limitations, encouraging risk sharing, and reducing information asymmetry. Increased financial inclusion and development also aid the financial system in absorbing shocks, reduce macroeconomic volatility, and lower inequality in society, all of which contribute to stronger financial stability.

Table 7.6.1 Quantile Regression Results – Dependent Variable: FINSTAB_PCA

Panel 1									
Regressors	**10th Quantile**	**20th Quantile**	**30th Quantile**	**40th Quantile**	**50th Quantile**	**60th Quantile**	**70th Quantile**	**80th Quantile**	**90th Quantile**
L_INCL_1	1.012***	0.983***	0.957***	0.939***	0.92***	0.895***	0.872***	0.846***	0.816***
	(0.170)	(0.134)	(0.112)	(0.102)	(0.988)	(0.11)	(0.132)	(0.162)	(0.203)
L_GDPPC	1.019**	0.881**	0.763***	0.679**	0.587**	0.469	0.365	0.239	0.099
	(0.448)	(0.353)	(0.291)	(0.266)	(0.261)	(0.291)	(0.344)	(0.426)	(0.532)
PSC	0.016	0.010	0.006	0.002	-0.001	-0.006	-0.01	-0.015	-0.021*
	(0.011)	(0.008)	(0.007)	(0.006)	(0.006)	(0.007)	(0.001)	(0.01)	(0.013)
INF	0.002	0.001	0.000	0.002	-0.001	-0.002	-0.003**	-0.004**	-0.005**
	(0.002)	(0.002)	(0.001)	(0.006)	(0.001)	(0.001)	(0.003)	(0.002)	(0.002)
Observation	555	555	555	555	555	555	555	555	555
Panel 2									
Regressors	**10th Quantile**	**20th Quantile**	**30th Quantile**	**40th Quantile**	**50th Quantile**	**60th Quantile**	**70th Quantile**	**80th Quantile**	**90th Quantile**
L_INCL_2	0.598***	0.572***	0.552***	0.541***	0.523***	0.504***	0.484***	0.458***	0.436***
	(0.109)	(0.085)	(0.071)	(0.064)	(0.061)	(0.064)	(0.077)	(0.1)	(0.122)
L_GDPPC	0.776	0.639	0.539*	0.481	0.387	0.292	0.185	0.049	-0.064
	(0.504)	(0.391)	(0.325)	(0.298)	(0.281)	(0.299)	(0.357)	(0.46)	(0.562)
PSC	0.013	0.007	0.004	0.001	-0.002	-0.006	-0.01	-0.012	-0.019*
	(0.010)	(0.008)	(0.007)	(0.006)	(0.006)	(0.006)	(0.008)	(0.009)	(0.012)
INF	0.002	0.001	-0.000	-0.001	-0.002	-0.003**	-0.004**	-0.005***	-0.006***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Observation	555	555	555	555	555	555	555	555	555
Panel 3									
Regressors	**10th Quantile**	**20th Quantile**	**30th Quantile**	**40th Quantile**	**50th Quantile**	**60th Quantile**	**70th Quantile**	**80th Quantile**	**90th Quantile**
INCL_PCA	0.753***	0.718***	0.695***	0.679***	0.659***	0.635***	0.608***	0.579***	0.549***
	(0.139)	(0.105)	(0.088)	(0.08)	(0.076)	(0.081)	(0.098)	(0.124)	(0.153)
L_GDPPC	0.786	0.637*	0.543*	0.476	0.391	0.291	0.179	0.054	-0.067
	(0.506)	(0.384)	(0.324)	(0.294)	(0.279)	(0.299)	(0.358)	(0.124)	(0.56)
PSC	0.013	0.007	0.004	0.001	-0.002	-0.006	-0.01	-0.015	-0.019*
	(0.01)	(0.008)	(0.007)	(0.006)	(0.006)	(0.006)	(0.008)	(0.009)	(0.012)
INF	0.002	0.001	-0.000	-0.001	-0.002	-0.002	-0.004**	-0.005***	-0.006***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Observation	555	555	555	555	555	555	555	555	555

Source: Author's composition using xtqreg command in STATA 17.

Note: Coefficients (standard errors) are outside (inside) the parentheses. ***, **, and * denote the statistical significance at 1%, 5% and 10%, respectively.

7.7 Impact of Financial Inclusion on Financial Stability based on Country Income Groups

In this part, we examine whether the amount of economic development in the 37 SSA nations influences financial inclusion differentially. In this context, we examine how financial inclusion affects financial stability in SSA country groups with low, lower-middle, and upper medium incomes[14], respectively, using the AMG technique[15]. The decision to look at the relationship between financial inclusion and financial stability across SSA country income groups is driven by the fact that most studies that look at the relationship between financial inclusion and financial stability in the SSA region currently concentrate on either a single country case, a subgroup within the regional group, or a single income group within the regional group (see Aduda & Kalunda, 2012; Amatus & Alireza, 2015; Leigh & Mansoor, 2016; Arora, 2019; Jungo, *et al.,* 2022). The results of these studies on the influence of financial inclusion on financial stability across country income groups are also contradictory. In this regard, the goal of our study is to offer a comprehensive empirical understanding of the effects of greater financial inclusion on different country income categories in the SSA region.

Theoretically, financial inclusion is anticipated to improve the resilience of commercial banks' deposit funding base in the event of a financial crisis, contributing to financial stability in middle-income and upper-middle income nations (Čihák *et al.,* 2016). Conversely, financial inclusion in lower-middle income countries may have a negative or positive impact on financial stability. On the one hand, as more economic agents are drawn into the formal financial sector, greater financial inclusion in lower-income and lower-middle income countries may result in better asset diversification for banks and improved monetary policy transmission to the real economy, along with improved financial sector supervision, in line with the institutional theory (Meyer & Rowan, 1977; DiMaggio & Powell, 1983). On the other side, as explained under the theory of extreme credit expansion, or episodes of financial overinclusion (Morawetz, 1908), a sharp expansion in

[14] The list of SSA countries by country groups is presented in Appendix A4.
[15] The strengths of the AMG approach are discussed in Section 6.6.2.

financial inclusion through the credit channel, lower income and lower-middle income nations may experience compromises in credit standards and regulatory monitoring. As a result, the number of non-performing loans held by banks would rise, the financial sector would deteriorate, and instability would result (Khan, 2011; Han & Melecky, 2013; Dienillah *et al.,* 2018).

Our empirical examination of the effect of financial inclusion on financial stability across SSA country income groups includes three different macroeconomic control variables to those used in our research thus far. This was done in accordance with the literature and the availability of country level data. The variables comprise external debt stocks as a percent of gross national income ($DEBT$), gross savings as a percent of GDP ($SAVE$) and the official exchange rate - local currency unit per US$, period average ($ER$). For financial stability, the public debt must be kept at a manageable and sustainable level. Particularly, external public debt stocks must be well-diversified in terms of currency, maturity period, and holders. This means that an increase in $DEBT$ is expected to have a negative impact on financial stability (Eichengreen, 1998; Hardy & Pazarbaşioğlu, 1999). In order to avoid relying on unsustainable foreign borrowing, national savings (both private and public) required to support domestic projects should be sufficient. This means that an increase in $SAVE$ is expected to have a positive impact on financial stability (Eichengreen, 1998; Hardy & Pazarbaşioğlu, 1999; Sahminan, 2007). Furthermore, financial stability depends on a stable exchange rate because sharp fluctuations in the exchange rate can have a negative impact on trade, economic growth, capital flows, inflation, interest rates, and the sturdiness of financial institutions. This means that a depreciation in the ER is expected to have a negative impact on financial stability (Sahminan, 2007; Donath & Cismas, 2008; Obstfeld *et al.,* 2010).

The results of the AMG model based on SSA country income groups are presented in three panels in Table 7.7.1. In Panel 1, the impact of financial inclusion as proxied by the number of bank branches per 100,000 adults (L_INCL_1) has a positive and statistically significant impact on financial stability in lower-middle-income countries. In this regard, a one percent increase in *L_INCL_1* increases financial stability by 1.116 percentage

points, *ceteris paribus*. A similar finding was discovered by Barik and Lenka (2023) who argue that an increase in financial inclusion in lower-middle-income countries means that economic agents can access financial services and products such as credit from the formal financial system at an affordable and competitive cost. As long as economic agents can make money off their investments, pay back their loans, and keep the amount of non-performing loans at bay, the credit can be used for investment purposes to promote job creation, increases in economic growth, and general financial sector stability. Similar to this, as more previously unbanked people are served by the formal financial system, gains in financial inclusion in lower-middle-income nations encourage higher financial industry resilience to economic shocks. This is because a rise in low-income groups' financial inclusion is frequently correlated with a reduction in such groups' propensity to remove their savings from the banking sector during times of crisis. This translates into a strengthening of banks' deposit base and thus an improvement in their financial intermediary processes (Hannig & Jansen 2010; Dienillah *et al.,* 2018). Regarding the control variables, the effect of *DEBT*, *SAVE* and *ER* on financial stability, respectively confirm *a priori* expectations in lower-income countries.

In Panel 2, financial inclusion as proxied by the number of ATMs per 100,000 adults is positive and statistically significant in lower-income countries but is insignificant across all other country income groups. The rising availability and use of ATMs offers a practical means of providing economic agents with the dependability and certainty of traditional physical banking services in jurisdictions with comparatively less developed financial sectors and financial inclusion. This is especially true when adding bank branches comes at a rather significant cost. As a result, financial services are more affordable and economic agents can better control their financial activities because a platform is available around-the-clock for them to keep track of their spending (Ozili, 2021b). Regarding control variables, the impact of an increase in ER on financial stability is negative and statistically significant in lower-income and lower-middle income countries. This is consistent with *a priori* expectations.

In Panel 3, the composite indicator of financial inclusion $INCL\_PCA$ has a positive and statistically significant impact on financial stability in lower-income and lower-middle income countries, respectively. However, its impact is not significant in upper-middle income countries. In the same way as the results in Panel 1 and 2, an increase in ER has a negative and statistically significant impact on financial stability in lower-income and lower-middle income countries.

The findings from the analysis of how financial inclusion affects financial stability by country income categories broadly show that more financial inclusion has a positive impact on SSA's financial stability. Notably, the importance of banks and ATMs in promoting financial inclusion is emphasized. This is particularly true in countries with lower incomes and lower middle incomes. This is because the stability of the financial system is strengthened when financial inclusion rises from a lower foundation (Khan, 2011).

Table 7.7.1: Long-Run Augmented Mean Group Results by Country Income Group – Dependent Variable: FINSTAB_PCA

Panel 1

Regressors	Lower-Income Countries Coefficient	Lower-Middle-Income Countries Coefficient	Upper-Middle-Income Countries Coefficient
	-0.001	1.116***	0.158
L_INCL_1	(0.395)	(0.279)	(0.803)
	-0.034***	0.003	0.014
DEBT	(0.009)	(0.008)	(0.009)
	0.186***	0.038	0.072
SAVE	(0.05)	(0.029)	(0.056)
	-5.15e-09***	-1.93r-09***	-7.11e-11
ER	(9.93e-10)	(5.39e-10)	(1.48e-09)
Observation	255	255	255

Panel 2

Regressors	Lower-Income Countries Coefficient	Lower-Middle-Income Countries Coefficient	Upper-Middle-Income Countries Coefficient
	0.654**	0.576	-0.008
L_INCL_2	(0.328)	(0.402)	(0.614)
	0.004	0.007	0.012
DEBT	(0.008)	(0.007)	(0.009)
	0.028	0.019	0.087
SAVE	(0.244)	(0.021)	(0.057)
	-1.44e-09***	-1.94e-09***	-6.30e-10
ER	(4.26e-10)	(7.51e-10)	(1.45e-09)
Observation	255	255	255

Panel 3

Regressors	Lower-Income Countries Coefficient	Lower-Middle-Income Countries Coefficient	Upper-Middle-Income Countries Coefficient
	0.793***	0.622*	0.086
INCL_PCA	(0.352)	(0.346)	(0.586)
	0.004	0.006	0.011
DEBT	(0.009)	(0.009)	(0.009)
	0.018	-0.002	0.086
SAVE	(0.024)	(0.018)	(0.057)
	-1.36e-09***	-1.90e-09**	-4.46e-10
ER	(4.18e-10)	(7.50e-10)	(1.142e-09)
Observation	255	255	255

Source: Author's composition using xtmg command with the amg option, in STATA 17.
Note: Coefficients (standard errors) are outside (inside) the parentheses. ***, **, and * denote the statistical significance at 1%, 5% and 10%, respectively.

7.8 Robustness Checks

This section presents the study's series of robustness checks. For this purpose, the results of the dynamic common correlated effects mean group (DCCE-MG) estimator (i.e., the mean group estimator that corrects for the existence of cross-sectional dependence among the panels) presented in Section 7.5 are compared to those of the mean group (MG) estimator of Pesaran and Smith (1995), and the Augmented Mean Group (AMG) estimator pioneered by Eberhardt and Teal (2010) and Bond and Eberhardt (2009). The MG estimator is used to assess the impact of financial inclusion on financial stability in 37 SSA countries without controlling for cross-sectional dependence. The AMG estimator is used to analyze the impact of financial inclusion on financial stability in 37 SSA countries while controlling for endogeneity, cointegration, and non-stationarity.

7.8.1 Mean Group Estimator Results

For each country in our investigation, independent regressions are estimated using the Mean Group (MG) estimator of Pesaran and Smith (1995). An intercept is included in the estimation to account for fixed effects related to certain nations. To include time-variant and unobservable aspects of the data, a linear trend might be used. To estimate a common mean, individual model coefficients are averaged across panels. The model allows for both short- and long-term heterogeneity in all the coefficients. The MG method does not, however, account for the existence of cross-section dependence. Instead, it uses a linear trend to abstract away these time-variant unobservables. Three panels on Table 6.6.1 display the long-run outcomes of Pesaran and Smith's (1995) MG estimate. The model coefficients correspond to global averages. They are calculated while taking a linear trend and robust standard errors into account. Financial stability in the past period has a favorable and statistically significant impact on financial stability in the present period, which is consistent with the DCCE-MG results under Table 7.8.1. Additionally, it is discovered that the indicators of financial inclusion have a generally positive and statistically significant effect on financial stability. Additionally, private sector credit has a positive and statistically significant impact on financial stability, but inflation has a negative and statistically significant impact.

Table 7.8.1: Long-Run Mean Group Results – Dependent Variable: FINSTAB_PCA

Panel 1

Regressors	Model 1 Coefficient	Model 2 Coefficient	Model 3 Coefficient	Model 4 Coefficient	Model 5 Coefficient	Model 6 Coefficient	Model 7 Coefficient	Model 8 Coefficient
	0.168***	0.203***	0.109***	0.176***	0.142***	0.202***	0.109**	0.131**
L.FINSTAB_PCA	(0.433)	(0.048)	(0.409)	(0.047)	(0.489)	(0.052)	(0.043)	(0.051)
	0.855***	0.377*	0.196	0.795***	-0.375**	0.318	0.104	-0.525**
L_INCL_1	(0.263)	(0.203)	(0.218)	(0.271)	(0.188)	(0.209)	(0.222)	(0.217)
		0.332			0.455	0.434		-0.055
L_GDPPC		(0.996)			(0.055)	(1.016)		(0.865)
			0.074***		0.06***		0.067***	0.058***
PSC			(0.159)		(0.015)		(0.115)	(0.014)
				-0.009		-0.012***	-0.009*	-0.015***
INF				(0.006)		(0.004)	(0.005)	(0.005)
Observation	555	555	555	555	555	555	555	555

Panel 2

Regressors	Model 1 Coefficient	Model 2 Coefficient	Model 3 Coefficient	Model 4 Coefficient	Model 5 Coefficient	Model 6 Coefficient	Model 7 Coefficient	Model 8 Coefficient
	0.149***	0.156***	0.115***	0.152***	0.134***	0.148***	0.098**	0.119**
L.FINSTAB_PCA	(0.038)	(0.051)	(0.039)	(0.041)	(0.047)	(0.055)	(0.423)	(0.051)
	0.635**	-0.039	-0.174	0.624**	-0.513**	-0.115	-0.222	-0.551*
L_INCL_2	(0.246)	(0.243)	(0.252)	(0.248)	(0.24)	(0.231)	(0.231)	(0.288)
		0.712			0.725	0.919		0.257
L_GDPPC		(1.033)			(1.041)	(1.108)		(0.994)
			0.072***		0.063***		0.072***	0.062***
PSC			(0.015)		(0.013)		(0.017)	(0.014)
				-0.008		-0.008**	-0.01*	-0.013***
INF				(0.005)		(0.004)	(0.006)	(0.005)
Observation	555	555	555	555	555	555	555	555

Panel 3

Regressors	Model 1 Coefficient	Model 2 Coefficient	Model 3 Coefficient	Model 4 Coefficient	Model 5 Coefficient	Model 6 Coefficient	Model 7 Coefficient	Model 8 Coefficient
	0.148***	0.159**	0.119***	0.151***	-0.143***	0.149**	0.112**	0.129**
L.FINSTAB_PCA	(0.039)	(0.052)	(0.413)	(0.043)	(0.049)	(0.057)	(0.045)	(0.054)
	0.675**	-0.016	-0.249	0.685**	-0.536**	-0.122	-0.208	-0.53*
INCL_PCA	(0.263)	(0.261)	(0.251)	(0.265)	(0.275)	(0.269)	(0.252)	(0.299)
		1.037			0.939	1.119		0.397
L_GDPPC		(1.079)			(1.073)	(1.232)		(1.001)
			0.078***		0.068***		0.076***	0.071***
PSC			(0.016)		(0.014)		(0.017)	(0.015)
				-0.006		-0.008**	-0.009	-0.012**
INF				(0.005)		(0.004)	(0.006)	(0.005)
Observation	555	555	555	555	555	555	555	555

Source: Author's composition using xtmg command in STATA 17.

Note: From Model 2 to Model 4, we sequentially introduce the macroeconomic control variables, _L_GDPPC, PSC, and INF, respectively in that order. In Model 5 and 6 we introduce a combination of the control variables L_GDPPC, PSC and L_GDPPC, INF, respectively. Model 7 introduces a combination of the control variables PSC and INF only. Model 8 includes all the study variables. Coefficients (standard errors) are outside (inside) the parentheses. ***, **, and * denote the statistical significance at 1%, 5% and 10%, respectively.

7.8.2 Augmented Mean Group Estimator Results

The Augmented Mean Group (AMG) estimator is robust to cross-sectional dependence and potential endogeneity. In the estimate process, it also takes into consideration heterogeneous slope coefficients and is resistant to serial correlation, missing data, and potential non-stationarity sources in the series (Voumik *et al.,* 2023; Shi *et al.,* 2021). The AMG estimator's long-run findings are shown in Table 7.8.2. The model coefficients correspond to global averages. They are calculated while taking a linear trend and robust standard errors into account. The results are broadly like those under the DCCE-MG and MG models. Notably, a distinguishing finding in the AMG results is that in Panel 2 and 3, respectively, the natural log of the GDP per capita (*L_GDPPC*) has a positive and statistically significant effect on financial stability in most model variants in which it is included. This finding is consistent with our *priori* expectations and findings by Al-Smadi (2018) and Siddik *et al.,* (2018) who conclude that an increase in a country's level of income per capita translates into higher financial stability.

Table 7.8.2 Long-Run Augmented Mean Group Results – Dependent Variable: FINSTAB_PCA

Panel 1

Regressors	Model 1 Coefficient	Model 2 Coefficient	Model 3 Coefficient	Model 4 Coefficient	Model 5 Coefficient	Model 6 Coefficient	Model 7 Coefficient	Model 8 Coefficient
	0.279	0.283	-0.190	0.253	-0.287	0.269	-0.249	-0.399*
L_INCL_1	(0.234)	(0.231)	(0.215)	(0.237)	(0.231)	(0.220)	(0.219)	(0.216)
		1.156			1.419	0.821		1.346
L_GDPPC		(1.037)			(0.919)	(1.066)		(0.957)
			0.052***		0.055***		0.042***	0.059***
PSC			(0.014)		(0.034)		(0.009)	(0.013)
				-0.009		-0.008*	-0.008	-0.111**
INF				(0.007)		(0.005)	(0.006)	(0.005)
Observation	555	555	555	555	555	555	555	555

Panel 2

Regressors	Model 1 Coefficient	Model 2 Coefficient	Model 3 Coefficient	Model 4 Coefficient	Model 5 Coefficient	Model 6 Coefficient	Model 7 Coefficient	Model 8 Coefficient
	0.389	0.131	-0.253	0.397	-0.218	0.164	-0.312	-0.389
L_INCL_2	(0.241)	(0.261)	(0.229)	(0.245)	(0.216)	(0.256)	(0.189)	(0.256)
		0.879			1.063*	0.533		1.096*
L_GDPPC		(0.757)			(0.622)	(0.799)		(0.664)
			0.053***		0.047***		0.058***	0.057***
PSC			(0.013)		(0.011)		(0.012)	(0.121)
				-0.005		-0.726	-0.002	-0.007
INF				(0.006)		(0.005)	(0.006)	(0.005)
Observation	555	555	555	555	555	555	555	555

Panel 3

Regressors	Model 1 Coefficient	Model 2 Coefficient	Model 3 Coefficient	Model 4 Coefficient	Model 5 Coefficient	Model 6 Coefficient	Model 7 Coefficient	Model 8 Coefficient
	0.528**	0.143	-0.084	0.58**	-0.235	0.195	-0.175	-0.258
INCL_PCA	(0.267)	(0.290)	(0.242)	(0.27)	(0.261)	(0.305)	(0.202)	(0.276)
		1.483*			1.742**	1.341		1.575**
L_GDPPC		(0.813)			(0.745)	(0.866)		(0.758)
			0.524***		0.048***		0.059***	0.064***
PSC			(0.012)		(0.011)		(0.014)	(0.014)
				-0.003		-0.004	-0.001	0.006
INF				(0.005)		(0.004)	(0.006)	(0.005)
Observation	555	555	555	555	555	555	555	555

Source: Author's composition using xtmg command with the amg option, in STATA 17.

Note: From Model 2 to Model 4, we sequentially introduce the macroeconomic control variables, _L_GDPPC, PSC, and INF, respectively in that order. In Model 5 and 6 we introduce a combination of the control variables L_GDPPC, PSC and L_GDPPC, INF, respectively. Model 7 introduces a combination of the control variables PSC and INF only. Model 8 includes all the study variables. Coefficients (standard errors) are outside (inside) the parentheses. ***, **, and * denote the statistical significance at 1%, 5% and 10%, respectively.

7.9 Discussions

The main objective of our study is to investigate the impact of financial inclusion on financial stability of the banking sector across the SSA region using country level data. The sub-objectives are (i) To investigate the impact of financial inclusion on financial stability of the banking sector in SSA countries with possible cross-sectional dependence. (ii) To investigate whether financial inclusion affects financial stability of the banking sector differently in the SSA countries when different indicators of financial inclusion are used. (iii) To investigate whether financial inclusion affects financial stability of the banking sector differently when levels of banking sector financial stability change in the SSA countries. (iv) To analyze whether financial inclusion affects financial stability of the banking sector differently across the SSA countries based on their level of economic development.

In this regard, the study has been successful. As per the conceptual framework, composite indicators of financial inclusion and financial stability were respectively constructed through the method of principal component analysis (PCA). In addition, cross sectional dependence (CD) among the 37 SSA countries was tested, and the results of the CD tests from Table 7.4.1 confirm the study's hypothesis that there is cross-sectional dependence among the study's 37 SSA countries. The impact of three financial inclusion indicators, including bank branches per 100,000 adults, ATMs per 100,000 adults, and the composite indicator of financial inclusion on financial stability in SSA region was evaluated with the use of a dynamic common correlated effects (DCCE) technique, the panel quantile regression (QREG) technique with fixed effects and the augmented mean group estimator (AMG), respectively. Results from the DCCE model confirm the study's hypothesis that, financial inclusion has a positive and statistically significant impact on financial stability in the study's 37 SSA countries when cross sectional dependence is considered and controlled for. Moreover, financial inclusion has a positive and statistically significant impact on financial stability in the study's 37 SSA countries, irrespective of the type of financial inclusion indicator used.

The results of the QREG model also confirm the study's hypothesis that, financial inclusion has a positive and statistically significant impact on financial stability in SSA countries with low levels of financial stability. Similarly, the results of the AMG estimator also confirm the study's hypothesis that, financial inclusion has a positive and statistically significant impact on financial stability in SSA countries with low levels of economic development. Results of the robustness checks also confirm the study's hypothesis that, financial inclusion has a positive and statistically significant impact on financial stability in the study's 37 SSA countries when cross sectional dependence is not considered and not controlled for. Furthermore, financial inclusion has a positive and statistically significant impact on financial stability in the study's 37 SSA countries when endogeneity, cointegration, and non-stationarity are considered and controlled for.

Overall, the study's findings are in line with the institutional theory (Meyer & Rowan, 1977; DiMaggio & Powell, 1983), such that financial inclusion has a positive and statistically significant impact on financial stability in the SSA region by reducing information asymmetry in the financial sector, fostering greater balance sheet diversification, helping to diversify retail deposit funding, engendering greater monetary policy transition and financial supervision effectiveness as well as fostering complementarity with employment creation and economic growth. This conclusion is consistent even when an evaluation of the impact of financial inclusion on financial stability across the conditional distribution of financial stability and across SSA country income groups is performed. In this regard, the findings suggest that increasing financial inclusion, especially in countries that are at relatively low levels of financial stability, can engender greater financial sector stability. Furthermore, increases in financial inclusion in lower-income and lower-middle-income countries promotes greater financial industry resilience to economic shocks as more of the previously unbanked are catered for in the formal financial system and can access financial services and products such as credit from the formal financial system at an affordable and competitive cost, to finance investment, stimulate job creation and contribute to economic productivity.

7.10 Conclusion

The objective of this chapter is to present an analysis of the impact of financial inclusion on financial stability of the banking sector in the SSA region. In this regard, financial stability is proxied by a composite indicator while financial inclusion is proxied by the number of bank branches per 100,000 adults, the number of ATMs per 100,000 adults and a composite indicator of financial inclusion, respectively. The Dynamic Common Correlated Effects-Mean group (DCCE-MG) is used as the baseline regression model. The DCCE-MG is robust to the presence of cross-sectional dependence and endogeneity in the data. The panel quantile regression (QREG) model with fixed effects is used to investigate whether financial inclusion affects financial stability of the banking sector differently when levels of banking sector financial stability change in 37 SSA countries. The augmented mean group (AMG) estimator is used to analyze whether financial inclusion affects banking sector financial stability differently across 37 SSA countries based on their level of economic development.

Empirical findings confirm that an increase in financial stability in the previous period has a positive and statistically significant impact on financial stability in the current period *ceteris paribus*. The implication is that a financial sector that remains stable and resilient over time, even during sharp downturns or stress events, creates a conducive environment for a well-functioning economy that helps households and businesses to thrive and thereby reinforcing the financial stability condition. In addition, financial inclusion is generally found to have a positive and statistically significant impact on financial stability in the SSA region. Especially among lower-income and lower-middle income countries, as well as at lower quantiles of the conditional distribution. This suggests that the stability-inducing effect of financial inclusion is highest when the extent of financial stability and economic development is lowest.

Appendix

A4: List of sub-Saharan African Countries by Country Groups

Country	Income Classification
Burundi	Low-Income
Burkina Faso	Low-Income
Chad	Low-Income
Guinea	Low-Income
The Gambia	Low-Income
Madagascar	Low-Income
Mali	Low-Income
Mozambique	Low-Income
Malawi	Low-Income
Niger	Low-Income
Rwanda	Low-Income
Sudan	Low-Income
Sierra Leone	Low-Income
South Sudan	Low-Income
Togo	Low-Income
Uganda	Low-Income
Zambia	Low-Income
Angola	Middle-Income
Benin	Middle-Income
Cote d'Ivoire	Middle-Income
Cameroon	Middle-Income
Cabo Verde	Middle-Income
Eswatini	Middle-Income
Kenya	Middle-Income
Lesotho	Middle-Income
Mauritania	Middle-Income
Nigeria	Middle-Income
Republic of Congo	Middle-Income
Senegal	Middle-Income
Tanzania	Middle-Income
Zimbabwe	Middle-Income
Botswana	Upper-Middle Income
Gabon	Upper-Middle Income
Mauritius	Upper-Middle Income
Namibia	Upper-Middle Income
South Africa	Upper-Middle Income

Chapter 8: Conclusion

8.1 Introduction

This chapter ends the study, offers recommendations for public policy, and identifies potential topics for further investigation in light of the findings in the other chapters. In this context, Section 8.2 gives a succinct overview of the research. The study's key findings are presented in Section 8.3. The study's policy recommendations are described in Section 8.4. The study's limitations are highlighted in Section 8.5 before some areas for further investigation are suggested.

8.2 Summary of the Study

This study successfully achieved its objectives set. The main objective of our study was to investigate the impact of financial inclusion on financial stability of the banking sector across 37 countries in the SSA region using country level data that spans from 2005 to 2019. The sub-objectives are to: (i) investigate the impact of financial inclusion on financial stability of the banking sector in the SSA countries with possible cross-sectional dependence; (ii) investigate whether financial inclusion affects financial stability of the banking sector differently in the SSA countries when different indicators of financial inclusion are used; (iii) investigate whether financial inclusion affects financial stability of the banking sector differently when levels of banking sector financial stability change in the SSA countries; and (iv) analyze whether financial inclusion affects financial stability of the banking sector differently across the SSA countries based on their level of economic development.

The decision to focus on the SSA region was motivated by the fact that relative to other regions, a significant number of adults in the SSA region have no access to financial services. In particular, approximately only 43 percent of them have a bank account, a level that is well below the one anticipated in the UN's Sustainable Development Goals (Demirgüç-Kunt *et al.,* 2018). For this reason, several SSA economies have taken deliberate steps to advance financial inclusion at the national level (and by extension, the regional level) by developing and launching national financial inclusion strategies (NFISs)

(Zins & Weill 2016; Demirgüç-Kunt *et al.,* 2018). At the same time, a case can be made for financial inclusion possibly having both a positive and negative impact on financial stability. As a problem, although several efforts have been made, scholars have not yet reached a consensus about financial inclusion's impact on financial stability (Jima & Makoni, 2023a). For these reasons, the study aimed at investigating the impact of financial inclusion on financial stability in the SSA region.

In order to accomplish its main goal, the study first provided a fundamental distinction between access to and use of financial services and products. It also discussed various metrics that can be used to quantify financial inclusion. It described government interventions and policy steps made to increase financial inclusion in SSA and reviewed global initiatives aimed at boosting financial inclusion globally. Additionally, it provided an overview of SSA's financial inclusion trends and advancements as well as a list of the region's most pressing problems.

To analyze the impact of financial inclusion on financial stability of the banking sector in the SSA region over the period 2005 – 2019, the study outlined a conceptual framework that informed the theoretical and empirical specification of a benchmark dynamic panel equation model used in studies, such as Greene (2001), Brei *et al.,* (2020), Morgan and Pontines (2018), Siddik *et al.,* (2018) as well as Amatus and Alireza (2015). In this dynamic panel model, financial stability comprises the dependent variable. It is regressed on financial stability and a series of macroeconomic control variables, including GDP per capita, the ratio of private sector credit by deposit money banks and other financial institutions to GDP, a measure of inflation, external debt stocks as a percent of gross national income, gross savings as a percent of GDP, and the official exchange rate (local currency unit per US$, period average), respectively.

Subsequent to the specification of the empirical model, the study outlined the process of developing respective composite indicators for financial stability and financial inclusion in the studied countries using the method of Principal Component Analysis (PCA). Three

variables were used in the construction of a composite indicator for financial stability, namely, bank credit to bank deposits (%), bank Z-scores or distance to default, and liquid assets to deposits and short-term funding (%). In this regard, the role of bank credit to bank deposits (%) was found to be the most important out of the three original indicators as it accounts for most of the variation in our principal component indicator.

To develop a composite indicator of financial inclusion, two variables were used, namely, bank branches per 100,000 adults, and ATMs per 100,000 adults. In this regard, bank branches per 100,000 adult and ATMs per 100,000 adults were each found to have an equally important role as proxies of financial inclusion in our choice of principal component. For this reason, and to gain more analytical insight, we chose to evaluate the effect of both these original variables, as well as that of the principal component indicator, on financial stability.

After the composite indicators of financial inclusion and financial stability were constructed, the study tested for the presence of cross-sectional dependence (CD) in the studied countries using two tests, namely, weak cross-sectional dependence tests by Pesaran (2015, 2021), and the power enhancement CD test by Fan *et. al.,* (2015). The presence of CD was tested for because if it is found to be present and not controlled for, Ordinary Least Squares estimators become inconsistent. The results of the CD tests confirmed the study's hypothesis that there is cross-sectional dependence among the study's 37 SSA countries. This justified the choice to use the Dynamic Common Correlated Effects (DCCE) estimator, as a baseline model to investigate the effect of financial inclusion on financial stability in the SSA region. The DCCE estimator is chosen because of its robustness to heterogenous slopes across cross-sectional groups, coupled with its ability to address potential endogeneity among the study variables and the presence of cross-sectional dependence in the panels (Meo *et al.,*2020). In addition, the panel quantile regression (QREG) model with fixed effects was used to investigate whether financial inclusion affects financial stability differently when levels of financial stability change in 37 SSA countries. The augmented mean group (AMG) estimator was

also used to analyze whether financial inclusion affects financial stability differently across 37 SSA countries based on their level of economic development. For the robustness checks, the mean group (MG) estimator was used to examine the impact of financial inclusion on financial stability in 37 SSA countries without controlling for cross-sectional dependence. The AMG was used to analyze the impact of financial inclusion on financial stability in 37 SSA countries while controlling for endogeneity, cointegration, and non-stationarity.

8.3 Summary of the Empirical Findings

Several noteworthy results are revealed by the empirical findings. The impact of three financial inclusion indicators, including bank branches per 100,000 adults, ATMs per 100,000 adults, and the composite indicator of financial inclusion on financial stability in SSA region was evaluated with the use of a dynamic common correlated effects (DCCE) technique, the panel quantile regression (QREG) technique with fixed effects, the augmented mean group estimator (AMG), and the mean group (MG) estimator, respectively.

First, the results from the DCCE model confirm the study's hypothesis that financial inclusion has a positive and statistically significant impact on financial stability in the study's 37 SSA countries when cross sectional dependence is considered and controlled for. These findings are consistent with those by Hakimi *et al.,* (2022), Vo *et al.,* (2021), Saha and Dutta (2021), as well as Abdulkarim and Ali (2019), who indicate that as more bank branches are opened across countries and more economic agents have access to financial services and products. This leads to a reduction in information asymmetry as the relationship proximity between the financial service provider and the customer is reduced. Further, according to the financial intermediation theory, greater financial inclusion helps to increase banking sector competitiveness and reduce banks' operational costs. This translates into more revenue for banks as well as greater financial system development and stability. In the same way, as banks expand their deposit base, this provides them with a robust and more diversified retail deposit funding that allows them to insulate

themselves against credit shocks and thus increase the sector's stability (Čihák *et al.,* 2016; Ozili, 2018; Ahamed & Mallick, 2019; Ozili, 2020).

Second, the results of the QREG model also confirmed the study's hypothesis that financial inclusion has a positive and statistically significant impact on financial stability in SSA countries with low levels of financial stability. In other words, increases in financial inclusion promote greater financial stability among countries with weaker financial stability compared to those with stronger financial stability. This finding lends credibility to the institutional theory (Meyer & Rowan, 1977; DiMaggio & Powell, 1983) and other theoretical postulates that assert that greater financial inclusion reduces financial intermediation costs associated with information asymmetry, and by so doing engenders efficiency in financial markets operations (Hannig & Jansen, 2010; Ozili, 2020; Pham & Doan 2020). Furthermore, increased financial inclusion strengthens monetary policy transmission and financial supervision effectiveness. That is, with greater financial inclusion, aggregate demand is more sensitive to changes in interest rates and financially included agents who would otherwise typically make financial decisions within an unregulated financial environment, are more likely to participate in the economy in a formal and regulated manner (Cull *et al.,* 2012; Ozili, 2018; Ahamed & Mallick, 2019). Therefore, financial inclusion promotes financial stability by preventing a large informal sector from impeding monetary policy transmission and financial sector supervision (Ozili, 2020; Pham & Doan 2020; Frączek, 2019; Danisman & Tarazi, 2020; Kamal 2021; Ozili, 2021a; Anarfo *et al.,* 2022).

Third, the results of the AMG estimator also confirmed the study's hypothesis that financial inclusion has a positive and statistically significant impact on financial stability in SSA countries with low levels of economic development. A similar finding was discovered by Barik and Lenka (2023) who argue that an increase in financial inclusion in lower-middle-income countries means that economic agents can access financial services and products such as credit from the formal financial system at an affordable and competitive cost. The credit can in turn be used for investment purposes to stimulate job creation,

increase economic growth and overall financial sector stability, as economic agents are able to generate profits from their investments and service their loans. Similarly, increases in financial inclusion in lower-middle-income countries promotes greater financial industry resilience to economic shocks, as more of the previously unbanked are catered for in the formal financial system. This is because an increase in financial inclusion among low-income groups is often associated with less of a propensity for such groups to withdraw their deposits from the banking sector in times of crisis. This translates into a strengthening of banks' deposit base and thus an improvement in their financial intermediary processes (Hannig & Jansen 2010; Dienillah *et al.,* 2018).

Fourth, the empirical results showed that the lagged value of the composite indicator of financial stability has a positive and statistically significant impact on financial stability in the SSA region over the review period. Specifically, the average impact of a 1 percent increase in the last period's level of financial stability on financial stability in the current period is 0.381 percent. The implication is that a financial sector that remains stable and resilient over time, even during sharp downturns or stress events, creates a conducive environment for a well-functioning economy that helps households and businesses to thrive and thereby reinforcing the financial stability condition. This result is consistent with the findings of Hakimi *et al.* (2022), as well as Morgan and Pontines (2018).

Fifth, results of the robustness reinforced the general finding that financial inclusion has a positive and statistically significant impact on financial stability in the study's 37 SSA countries when cross sectional dependence is not considered and not controlled for. Furthermore, financial inclusion is found to have a positive and statistically significant impact on financial stability in the study's 37 SSA countries when endogeneity, cointegration, and non-stationarity are considered and controlled for.

In conclusion, the study discovered that the SSA region's banking sector financial stability is positively and statistically significantly impacted by financial inclusion. Additionally, it demonstrated that a solid financial system can, over time, withstand stress events and

sudden downturns while reducing the negative effects of shocks. Similarly, higher financial sector stability can result from growing financial inclusion, particularly in nations with low levels of financial stability. As more previously unbanked people are catered for in the formal financial system and have access to financial services and products like credit from the formal financial system at an affordable and competitive cost, to finance investment, stimulate job creation, and contribute to economic productivity, financial inclusion in lower-income and lower-middle-income countries also encourages greater financial industry resilience to economic shocks.

8.4 Recommendations for Policy

The study discovered that financial inclusion generally has a positive and statistically significant impact on financial stability in the SSA region over the review period, especially in lower-income and lower-middle income economies and in countries with relatively lower levels of financial stability. On the basis of the study's findings, two crucial policy recommendations can be made. First, policymakers charged with fostering greater financial inclusion in their respective SSA countries and throughout the region should improve coordination between pertinent regulatory and supervisory organizations, as policies and initiatives aimed at enhancing financial inclusion at the national and regional levels, particularly in low-income and lower-middle income countries, have the potential to improve financial stability in the region. Governments, supervisors, and regulators should thus develop and use avenues for cross-fertilization of skills and capacities necessary to rise to the challenge of aligning with international financial regulatory standards such as the Basel Core Principles for Effective Banking Supervision (BCPs), Basel II, Basel III, and International Financial Reporting Standards (IFRS), as well as to meet the increased pressure on financial regulation and supervision in SSA.

Second, governments should build on the advancements made in the creation of national financial inclusion strategies (NFIs) and implement intentional policies to target financially excluded populations such as small businesses, people living in remote locations, the poor, as well as increase their access to financial services and products. Likewise,

governments might think about stepping up their efforts to promote financial literacy, particularly among low-income groups. By doing this, it will be easier for people to access financial services and products, and financial institutions like banks will have more opportunities to use a larger pool of savings and deposits to finance the additional credit extension required for economic growth.

8.5 Limitations and Suggested Areas for Future Research

The lack of information on financial inclusion and financial stability proxies across SSA nations was this study's principal shortcoming. Although a number of indicators can be used to approximate financial inclusion and financial stability, the bulk of these variables in the context of SSA nations have missing data for a number of years and across a variety of data sources. This had an impact on the study's proxy selection. It also had an impact on the study's choice of nations to examine (i.e., the sample size of 37 out of 48 SSA countries) and its time frame (i.e., 2005 to 2019). This is why we chose the DCCE estimator as our benchmark model since it is robust to small panels, endogeneity in the variables, and—most importantly—the likelihood of cross-sectional dependence among cross-sectional units. Future research could be done by not only extending the list of SSA countries beyond those that were included in our study, but also by increasing the number of proxies for financial inclusion and financial stability as well as the study timeline and comparing the results to those of the current study.

The findings of our analysis indicate that financial inclusion affects financial stability in SSA economies favorably and statistically significantly, particularly in lower-income and lower-middle income nations with relatively low levels of financial stability. The inference is that greater financial stability may result from increased financial inclusion. However, going over a certain point in terms of financial inclusion could result in financial instability (see Vo *et al.,* 2019). In this line, future empirical research may employ a dynamic panel threshold analysis to examine how financial inclusion affects financial stability in SSA nations. This can provide insight into how far financial inclusion should be promoted in order to attain financial stability.

Our research concentrated on how financial inclusion generally affects financial stability in SSA nations. However, in the past ten years, empirical research focusing on the connection between financial stability and financial inclusion of small and medium-sized businesses (SMEs) has gained momentum, with very little on developing economies in the SSA region (see Morgan & Pontines, 2018; Adasme *et al.,* 2006). This line of research emphasized that financial inclusion of SMEs can affect financial stability in both positive and negative ways. Future research might therefore be done to particularly examine the financial stability effects of SME financial inclusion in the SSA region.

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