Causality between Financial Inclusion, Financial Stability and Economic Growth in Sub-Saharan Africa

Meshesha Demie Jima and Patricia Lindelwa Makoni *

Risk Management and Banking, Department of Finance, University of South Africa, Pretoria 0002, South Africa
* Correspondence: patricia.makoni@gmail.com

Abstract: Financial inclusion has become a policy agenda for financial stability and sustainable economic growth for the developing world. However, there seems to be a lack of consensus across the literature on the relationships between financial inclusion, financial stability and economic growth. Given the divergent views, this paper aims to examine the causal relationships between financial inclusion, financial stability and economic growth in the Sub-Saharan African (SSA) countries. In this study, panel data were used for twenty six selected SSA economies and a principal component analysis (PCA) was applied to construct a composite index for financial inclusion. In addition, an autoregressive distributed lags (ARDL) cointegration test was applied to examine the short- and long-run relationships between the variables of interest. Separate and joint Granger causality tests were used to assess the direction of causality. The result of the study indicated that there are both short-run and long-run relationships between financial inclusion, financial stability and economic growth in the SSA countries. Moreover, the Granger causality tests revealed that there are separate two-way causalities and joint uni-directional causalities, indicating complementarity between these variables. It is, therefore, necessary for policy makers, regulators and financial sector advisors to follow a holistic approach while developing and implementing policies and strategies that promote financial inclusion in order to attain sustainable economic growth in the region.

Keywords: financial inclusion; financial stability; economic growth; Sub-Saharan Africa; principal component analysis; panel ARDL; non-Granger causality

JEL Classification: C33; C38; E02; E44; O16; O55

1. Introduction

Since the beginning of 2000, financial inclusion has become a policy agenda for financial stability and economic growth in the developing world. Inadequate access and use of financial services have limited the poor and vulnerable groups as regards attending education and promoting entrepreneurship [1]. It is also noted that the level of financial inclusion affects the stability and the well-being of households, enterprises, and the economy as a whole [2]. Financial inclusion is one of the important drivers that help to realise a country’s sustainable economic growth [2–4]. It is also indicated as one of the key enablers for at least seven of the seventeen UNSDGs and most of the African Union’s (AU) development Agenda of 2063. An inclusive financial system is also helpful in ensuring stability and avoiding systemic risks. Systemic risk is a risk that disturbs the function of a financial system and the economy as a whole [5]. Financial stability is a situation in which the financial system can withstand internal and external shocks without a disruption in the financial intermediations [6].

Nevertheless, despite several efforts, there still remains no consensus amongst academics on the nexus between financial inclusion, financial stability and economic growth. A number of empirical studies show that financial inclusion drives financial stability [7–9], thereby advocating for the need for countries to develop their domestic financial markets,
particularly banks, which can then allow more people to become included in the financial system. Those findings reaffirm the theories proposed by earlier proponents of finance that financial inclusion promotes economic growth [10–13]. This thinking is the driving force behind many macroeconomic policies today, as governments seek to ensure that they tap into the local financial resources of the populous, so that accumulated funds can then be channelled into the productive sectors of the economy. Although the reverse is true, that is, financial stability and economic growth drive financial inclusion [14–16], some scholars aver that economic growth and the personal socio-economic status of the population is also critical in enhancing financial inclusion [14,17,18]. Given the contradictory evidence arrived at in the various studies pertaining to the relationships between financial inclusion, financial stability and economic growth on a global scale [19–22], a knowledge gap was identified, particularly in the context of developing countries.

The SSA is one of the regions with low level of financial inclusion, where the average proportion of adults with bank accounts is below 43%, a level far below that anticipated in the SDGs. Low levels of access and use of financial services contribute to unemployment, income inequality, poverty and other socio-economic challenges in the region [23]. Financial services’ utilisation level of the SSA countries is skewed towards the high-income group, neglecting the poor and the low-income group of the population [24]. Thus, the main objective of this research is to examine the causal relationship between financial inclusion, financial stability and economic growth in the selected SSA countries. As such, we deemed it necessary to undertake an analysis of the nexus between these three concepts to determine their relative importance and causality, using the Sub-Saharan African (SSA) region as a unit of analysis. The findings of this paper will inform policy makers on the appropriate macroeconomic strategies to pursue, in order to maximize all three concepts. In addition, this study contributes to the scholarly debates that exist on the relationship between financial inclusion, financial stability and economic growth in the SSA region, and its findings will provide empirical evidence on this nexus, which remains an important area of interest in the international and development finance space.

2. Literature Review
2.1. Theoretical Foundation

Classical economic theories considered labour, capital, and entrepreneurship the critical factors of production and economic growth. In these theories, the importance of finance was ignored and the market was assumed to be perfect with no transaction cost for financial services, indicating that the importance of a well-developed financial system was given less attention. As a result, few attempts were made to identify the nexus between finance and economic growth. However, the modern economic theories have been promoting the importance of finance and a financial system as a tool that creates conditions favourable for economic growth.

Schumpeter was the first to argue that finance promotes growth. Since the emergence of this concept, a large number of studies were conducted to assess this reality [10]. Goldsmith and McKinnon were the proponents of this theory and advocated that finance promotes growth [13,25]. According to this theory, a financial system helps to mobilize finance necessary for investment, innovations and entrepreneurship, which are critical for economic growth, supporting the supply-leading hypothesis. On the other hand, there are scholars who argue that the real sector is the key driver of financial inclusion. Robinson is one of the more prominent advocates of this theory and argued that, in any case, enterprise leads to finance [14]. In this theory, the economic growth, specifically innovation and entrepreneurship, is important for an inclusive finance, advocating the demand-following hypothesis.

Unlike the two aforementioned contrasting theories, there are scholars who argued for the existence of a bi-directional relationship, which is a combination of both supply-leading and demand-following hypotheses [24,26,27]. Others hypothesised the existence of an independent relationship in which there is no causation between financial inclusion and
economic growth [15,28]. Given the contradicting argument on the relationship between financial inclusion and economic growth, it is critical to assess the causality between the two variables in developing economies, such as the SSA countries, in order to develop and implement evidence-based policies and strategies.

Financial inclusion not only has an impact on sustainable growth but also affects financial stability. Financial information asymmetry, irrational investors’ behaviour, and other financial market imperfections have been identified as the main causes of instability, which lead to uncertainty, misallocation of resources and, thereby, market failure [29]. Scholars have been investigating the causes and consequences of financial instability and developed two well-known theories: cyclical and monetarists. Instability usually arises when some favourable event raises the prices of financial assets after a certain period of time has elapsed since the last financial crises occur and investors become greedy, a phenomenon which is cyclical [29,30]. Unlike the cyclic thought, the monetarists argued that financial instability arises due to a disruption in the money supply, and mistakes in the monetary policy that either initiate financial instability or cause disruptions, attributing financial instability to the external shock [29,30].

Financial inclusion and financial stability usually coexist and mutually complement each other. Financial stability is not sustainable if a large proportion of the population is financially excluded from the system [31]. On the other hand, financial inclusion may endanger financial stability as not all financial service users, particularly borrowers, are creditworthy, leading to credit and liquidity risks [32,33]. Low-income individuals and small businesses with no financial history and lack of collateral increase financial risks, which leads to financial instability [34]. Thus, it is advisable for financial institutions to lend against good collateral, indicating that the financial services’ expansion to the poor cannot be easily achieved since it affects stability.

Instability of the financial system results in economic shock, which in turn reduces income and leads to financial exclusion of some groups of the people. Garcia, and Mehrotra and Yetman promoted the view that financial inclusion affects financial stability [35,36]. Financial inclusion involves low-income population with no financial record, which leads to information asymmetry and inefficiency of the financial system. Given the above theoretical arguments, it is important to examine the relationship between financial stability, financial inclusion and economic growth in the SSA countries, empirically assess the causalities of these variables, and propose possible policies and strategies for the region.

2.2. Empirical Literature

Several studies examined the relationship between financial inclusion and economic growth, and argued that financial inclusion has a strong impact on the economic development of many countries. Others also assessed the relationship between financial inclusion and financial stability and confirmed that an inclusive financial system plays an important role in creating a stable financial system, which in turn plays important roles in a sustainable economy. An inclusive financial system influences economic growth by improving the average productivity of capital, channelling investment funds to the right businesses and increasing savings. Financial inclusion constraints, mainly participation, borrowing, and intermediation costs, have a strong impact on GDP and inequality for low-income countries, and relaxing financial inclusion constraints increases financial inclusion, and, thereby, the level of output [21].

Financial inclusion index has a significant positive effect on some macroeconomic indicators, such as per capita income and human development index, but negative correlation with unemployment and inequality [37]. Large access to formal credit reduces unemployment [38]. However, Law and Singh argued that finance promotes growth up to a certain threshold, such as the finance to GDP ratio, which reached about 88%, and the impact of finance on growth will become negative if it exceeds this threshold [39]. In addition, in a scale between 2 and 4 years of financial services, there is no causality between finance and economic growth [40]. However, at a scale between 4 and 8 years,
there is bi-directional causality between economic growth and financial inclusion. Inclusive finance, including credit to GDP, government consumption to GDP, ratio of primary school enrolment and trade openness, stimulates economic growth in Africa [20]. Policy makers should, therefore, develop effective policies that favour macroeconomic growth. On the other hand, there are several empirical studies on the relationship between financial stability and financial inclusion; however, these studies indicated mixed results. Financial inclusion and a rise in the liquidity of banks leads to greater financial stability, which decreases the probability of default [41]. In addition, the study argued that financial openness has a positive relationship with financial stability. Lowering monitoring costs, relaxing collateral requirements and increasing access to credit could raise non-performing loans, entailing a trade-off with stability [21]. Countries with large financial sectors present both higher economic growth and higher volatility [42].

Financial development has a significant positive relationship with financial stability (proxied by Z-score) [8]. However, the study indicated that financial inclusion has a significant and negative effect on financial stability (proxied by non-performing loans), thus reducing financial risk. Financial inclusion has a significant positive relationship with financial stability [43]. Low-income customers maintain constant depositing and borrowing behaviour, even in the period of financial crises, leading to a stable financial transaction [7]. Financial inclusion has a significant positive impact on financial stability in the banking sector [44]. On the basis of this result, the author concluded that financial inclusion contributes to a rise in banks’ revenue and market share, and reduces costs. Financial inclusion causes financial stability but credit expansion has a negative effect on stability [45].

Other empirical studies found a significant positive relationship between financial stability and economic growth, suggesting that a stable financial system is critical for a sustainable growth [46–48]. Financial instability affects the economic performance of the BRICS [49]. Financial crises, bank reserves and non-performing loans have a negative impact on financial stability and economic growth [50]. An optimal macro-prudential policy, such as higher capital adequacy ratio, reduces financial instability with a weak negative effect on economic growth [22]. The financial inclusion index has a significant positive relationship with stability (Z-score) and a negative effect on the deposit growth rates and nonperforming loan ratio, indicating that an inclusive financial system contributes to more stable deposits and safe loans and, thereby, stable banks [51]. Economic policy uncertainty has adverse consequences on bank stability in all countries irrespective of their level of development, advocating the importance of institutional quality [52].

On the basis of the literature above, it is possible to conclude that financial inclusion is critical for stability and sustainable economic growth. Large and deep financial systems help to diversify risk and reduce vulnerability to external shocks, which leads to low output volatility. On the other hand, a sustainable economic performance requires a stable and well-functioning financial system. Unstable and crisis-prone financial systems undermine business activities and impede economic growth. These mixed results on the relationship between financial inclusion, financial stability and economic growth indicate that the debates are still inconclusive, and have inspired scholars such as us to conduct similar researches to determine if the narrative will change if we focus on a different group of economies, such as those that form the Sub-Saharan African region.

3. Research Methodology

In terms of approach, the study applied a quantitative approach where both econometric and descriptive techniques are applied to achieve the objectives of the study. Unlike other similar studies that use primary data, this research used a secondary panel data collected from well-known open public sources, such as the World Bank (WB), International Monetary Fund (IMF), the United Nations (UN), and reports of central banks for the period from 2000 to 2019. In terms of coverage, the study focused on 26 Sub-Saharan African
nations selected from all corners of the region and found under different income categories with an adequate dataset.

Several indicators have been used to assess the extent of financial inclusion, which can be classified into accessibility, availability and usage dimensions. However, the use of an individual indicator may lead to partial information and a misleading conclusion; therefore, we proposed a composite index [19,20,53,54]. On the other hand, there are various financial stability indicators that are linked to financial soundness, stress testing and financial sector development [4,31,48]. However, cross-country data for most of these variables is scarce; hence, most scholars proposed the banks Z-score as a proxy of financial stability. Higher Z-score indicates a low probability for a system to become unstable [7,31,52,55]. Consequently, this research used a composite index for financial inclusion and Z-score for financial stability as proxy variables.

Several scholars used various economic growth indicators in their research, including GDP growth rate, GDP per capita, and real GDP per capita. Either of these indicators are used as a proxy for economic growth [20,53,56]. Consistent with these researches, this study applied one of the most common proxy indicators, GDP per capita (GDPPc), as a proxy indicator for the economic growth of the selected SSA countries.

3.1. Composite Index Development

In order to address the limitations of using individual indicators as proxies for financial inclusion and avoid the possibility of multicollinearity, this study developed and applied a composite index. Six indicators were selected from the three dimensions: accessibility (number of accounts with commercial banks per 1000 adults), availability (number of ATMs and branches of commercial banks per 1000 km² and demographic spreads of ATMs and branches of commercial banks per 100,000 adults), and usage (private domestic credit as percentage of GDP) [1,19,20]. These were then used to construct a composite index using a two-stage approach. In order to develop the index, the data series were normalised first using a min–max approach. The min–max approach helps to smooth-out the variation within the data and makes the trend appropriate for index development. Accordingly, the study used the formula stated below.

\[ F_{i,t} = \frac{P_{i,t} - \text{Min}_{i,t}}{\text{Max}_{i,t} - \text{Min}_{i,t}} \]  

where \( F_{i,t} \) represents the normalized indicator \( i \) at time \( t \), and \( P_{i,t} \) an individual FI indicator, \( \text{Max}_{i,t} \) is the maximum and \( \text{Min}_{i,t} \) is the minimum values of each indicator, respectively.

Second, the study applied the principal components analysis (PCA) technique to calculate the Eigen values of the variance matrix for the indicators and develop the composite index. In this case, the study employed the equations below to construct the composite index for the selected SSA economies.

\[ FI_i = W_{i1}X_1 + W_{i2}X_2 + W_{i3}X_3 + \ldots + W_{in}X_n \]  

where \( FI_i \) = estimate of the \( i \)th factor of financial inclusion; \( W_i \) = weight on the factor of score coefficient; \( X_i \) = variable of interest; \( n \) = number of variables

3.2. Econometric Model Specification

In this study, efforts were undertaken to ascertain the stationarity of the data and avoid possible serial correlation across the variables using a panel unit root and a serial correlation test. In addition, a panel ARDL cointegration test was used to test the short-run and long-run relationships between the three variables, i.e., financial inclusion, financial stability and economic growth. Moreover, a non-Granger causality test was used to examine the existence of causality and its direction. In the next section, the tests and estimation equations are presented for clarity.

(i) Unit Root and Serial Correlation Tests
The unit root test ascertained that the variables are stationary and prevent the possibility of spurious regression. In a panel unit root test, there are two generations of tests, i.e., first and second generations. Nonetheless, a dynamic panel data approach is effective irrespective of the nature of the regressors, exogenous or endogenous, and irrespective of whether the variables are I(0) or I(1). However, it is necessary to ensure that none of the variables are in second difference [57]. Subsequently, both first and second generation tests were conducted to identify the stationarity of the data series using the model specified below.

\[
\Delta Y_{it} = \alpha_i + \delta Y_{i,t-1} + \sum_{j=1}^{n} \gamma_j \Delta Y_{i,t-j} + z_i \gamma + u_{i,t}
\]  

where \( \Delta \) is the first difference operator in the series of observation for country \( i \) for \( t = 1, \ldots, n \) periods. The panel unit root test has the following null hypothesis \( H_0 : \delta_i = \delta = 0 \) for all \( i \), which presumes that all series are stationary.

(ii) Panel ARDL Cointegration Tests

In order to assess the existence of a long-run relationship between the financial inclusion, financial stability and economic growth (EG, FI and FS), the study applied a panel ARDL cointegration test. In addition, the study used dummy variables to capture the impact of structural breaks on the relationship between these variables. The panel ARDL cointegration test provides information about the nature of relationship and the speed of adjustment to equilibrium after every shock. The panel ARDL cointegration test uses both lagged and differenced variables to assess the existence of cointegration. Unlike the time series bound cointegration estimation, this study is based on a dynamic panel data, used the mean group (MG), and pooled mean group (PMG) estimators [57,58]. The econometric specification of the model is stated below.

\[
\Delta F_{ij} = \Pi_1 + \theta_1 [F_{ij,t-1} - \lambda_1 F_{ij,t-1} - \lambda_2 E_{ij,t-1} - \lambda_3 S_{B1ij,t-1} - \lambda_4 S_{B2ij,t-1}] + \sum_{j=1}^{h} \pi_{ij} \Delta F_{ij,t-j} + \sum_{j=0}^{n-1} \beta_{i,j} \Delta F_{ij,t-k} + \sum_{j=0}^{n-1} \alpha_{ij} \Delta E_{ij,t-1} + \sum_{j=0}^{n-1} \sigma_{ij} \Delta S_{B1ij,t-m} + \sum_{j=0}^{n-1} \varphi_{ij} + \epsilon_{it}
\]

where \( \theta_1 = -(1-\alpha_i) \) group-specific speed adjustment coefficient (expected that \( \theta_1 < 0 \)); \( \lambda_2 \) = vector of the long-run relationships, ECT—the error correction term, which is presented in the parenthesis [1]. \( \pi_{ij} \) and \( \beta_{ij} \) represent the short-term dynamic coefficient, \( \Delta \) represents the first difference operator, \( E_{ij,t} \), \( F_{ij,t} \) and \( S_{Bij,t} \) are the respective dependent variables. EG (log of the per capita income); FI (composite indicator of six variables), and FS (Z-score), for country \( i \) at time \( t \). \( S_{B1} \) and \( S_{B2} \) are the dummy variables to capture the structural breaks in 2007 and 2012. \( \epsilon_{it} \) is a random error term.

(iii) Granger Causality Tests

Inspecting the long-run and short-run relationships between variables does not always specify the existence of causality. Consequently, non-Granger causality tests were applied to verify the relationships between the three variables, FI, FS and EG, using their optimal lags lengths. The results of the Granger causality tests can take any of the three forms: unidirectional causality, bidirectional causality, and absence of causality between the variables. In order to undertake the test for non-Granger causality between the variables, the following standard dynamic panel data specification is stated for \( t \) years and \( i \) individual subjects.

\[
Y_{i,t} = \varphi_i + \sum_{k=1}^{K} \vartheta_{ik} Y_{i,t-k} + \sum_{k=1}^{K} \beta_{i,k} X_{i,t-1} + \epsilon_{i,t}
\]

where \( X_{i,t} \) and \( Y_{i,t} \) are observations of the two stationary variables for individual \( i \) in period \( t \). \( \vartheta_{i,k} \) and \( \beta_{i,k} \) are coefficients for individual variables. \( K \) is the lag order for the variables.

4. Analysis Result and Discussion

4.1. Panel Unit Root Tests

The panel unit roots and stationarity test results of the study proved the stationarity of the variables. However, the regression results of the panel unit root tests found a mixed
order of integration, indicating the need to select a proper model that fits with the result. Table 1 below depicts the various panel unit root test results of the variables used in the study.

Table 1. Results of the various unit root tests.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Levin Lin Chu (LLC)</th>
<th>Im Pesaran Shin (IPS)</th>
<th>Breitung</th>
<th>Pesaran (2007) (CIPS)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Statistic</td>
<td>Order</td>
<td>Statistic</td>
<td>Order</td>
</tr>
<tr>
<td>FI</td>
<td>−1.370 *</td>
<td>I(0)</td>
<td>−6.465 ***</td>
<td>I(1)</td>
</tr>
<tr>
<td>LFI</td>
<td>−3.7161 ***</td>
<td>I(1)</td>
<td>−6.4904 ***</td>
<td>I(1)</td>
</tr>
<tr>
<td>Z-score</td>
<td>−3.8917 ***</td>
<td>I(0)</td>
<td>−5.4304 ***</td>
<td>I(0)</td>
</tr>
<tr>
<td>LnGDPPc</td>
<td>−7.260 ***</td>
<td>I(0)</td>
<td>−8.195 ***</td>
<td>I(1)</td>
</tr>
</tbody>
</table>

Source: authors’ own computations. Note: Robust standard errors in parenthesis (***), (*) indicate the level of significance at 1% and 10%, respectively.

4.2. Panel ARDL Cointegration and Granger causality Tests

Once the stationarity of the variables had been ascertained, the optimal lag lengths of the panel and the variables were examined using unrestricted error correction model and information criterion; then, the lag lengths of the variables were used as an optimal lag length for the variables and the model in the panel cointegration tests. On the basis of the analysis result, the optimal lag lengths of the variables and the model become (LnGDPPc (1), FI (0) and FS (0)), i.e., (1, 0, 0).

(i) Dynamic Panel ARDL Cointegration Tests

In this study, two alternative estimators, namely the mean group (MG) and the pooled mean group (PMG), were used to assess the panel ARDL cointegration tests. In addition, the Hausman test was applied to select between the two estimators. Overall results on the relationship between financial inclusion (FI) and financial stability (FS) and economic growth (LnGDPPc) using the two panel ARDL cointegration tests revealed the existence of a long-run cointegration across the output of the estimators. A summary of the regression results for the two estimators is summarised and presented in Table 2 below.

Table 2. Panel ARDL estimations results of the three variables (FI, FS and LnGDPPc).

<table>
<thead>
<tr>
<th>Variables (Dependent Variable FI)</th>
<th>Mean Group (MG)</th>
<th>Pooled Mean Group (PMG)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Short run</td>
<td></td>
</tr>
<tr>
<td>ETC</td>
<td>−0.1998 ***</td>
<td>−0.1774 ***</td>
</tr>
<tr>
<td></td>
<td>(0.034)</td>
<td>(0.0267)</td>
</tr>
<tr>
<td>ΔZ-score</td>
<td>−0.0013 *</td>
<td>−0.0012</td>
</tr>
<tr>
<td></td>
<td>(0.0007)</td>
<td>(0.0007)</td>
</tr>
<tr>
<td>ΔLnGDPPc</td>
<td>−0.0087</td>
<td>−0.0122</td>
</tr>
<tr>
<td></td>
<td>(0.0058)</td>
<td>(0.0054)</td>
</tr>
<tr>
<td>ΔSB1</td>
<td>−0.0017</td>
<td>−0.0014</td>
</tr>
<tr>
<td></td>
<td>(0.0029)</td>
<td>(0.0031)</td>
</tr>
<tr>
<td>ΔSB2</td>
<td>0.0014</td>
<td>0.0004</td>
</tr>
<tr>
<td></td>
<td>(0.0012)</td>
<td>(0.0012)</td>
</tr>
<tr>
<td>Constant</td>
<td>−0.0961 ***</td>
<td>−0.0045</td>
</tr>
<tr>
<td></td>
<td>(0.0341)</td>
<td>(0.0055)</td>
</tr>
<tr>
<td></td>
<td>Long run</td>
<td></td>
</tr>
<tr>
<td>Z-score</td>
<td>−0.0268</td>
<td>0.0043 ***</td>
</tr>
<tr>
<td></td>
<td>(0.0248)</td>
<td>(0.0011)</td>
</tr>
<tr>
<td>LnGDPPc</td>
<td>0.0115</td>
<td>0.033 ***</td>
</tr>
<tr>
<td></td>
<td>(0.0808)</td>
<td>(0.0027)</td>
</tr>
</tbody>
</table>
On the basis of the results shown in the table above, the error correction term (ETC) is significant across the estimators, indicating the existence of a long-run cointegration among the variables at 5% level of significant. On the other hand, regardless of the estimator applied, economic growth has a significant and positive influence on financial inclusion in the long run. However, financial stability and economic growth have significant negative effects on financial inclusion in the short run, in both estimators (MG and PMG), implying that the level of financial inclusion is affected by financial stability and economic growth both in the short run and long run. In addition, financial stability has a positive and significant effect in the case of the PMG estimator, implying that financial stability is necessary for financial inclusion.

Hausman test result between the MG and PMG, which determines whether there are significant differences among these estimators, revealed that the PMG is more efficient and consistent compared to the MG [59]. Therefore, the study used the PMG as the most appropriate estimator in these relationships. On the basis of the results from the pooled mean group (PMG) estimator, it is possible to conclude that there is a long-run cointegration across the three variables at 5% level of significance. In addition, the error correction term and the short- and long-run coefficients are significant at 1% and 5%, respectively, indicating the existence of a strong relationship between the dependent and explanatory variables, indicating that any deviation from the long-run equilibrium is corrected at an adjustment speed of around 18%. On the basis of the above results, increase in per capita income has significant impacts on financial inclusion at 5% and 1% level of significance in the short run and long run, respectively.

The structural break test results of this study indicated the presence of structural changes in 2007 and 2012, respectively. This shows that the global financial crises of the period from 2007 to 2009, as well as the improvement in economic growth and adoption of financial technologies in some economies during the period from 2011 to 2013, have resulted in structural breaks in the dataset. However, the structural changes noticed in the dataset have no significant impact on the relationship between financial inclusion, financial stability and economic growth. Despite the above analysis results, for SSA economies, the catch-up mechanism serves as an enabler for the low-income countries to increase their economic growth and development by embracing lessons and technologies adopted from more advanced economies [60].

Consistent with the findings of others [31,61], this study found a negative and significant relationship between financial inclusion and economic growth in the short run. High inequality within the SSA countries may be one of the reasons for this relationship, which indicates that a high concentration of per capita income within a small group of people may not contribute to financial inclusion. Financial services have seen remarkable growth over the past consecutive years, but no clear evidence shows that this is improving the lives of the poor, indicating economic growth may not lead to rise in the per capita income of the masses [62]. Rather, it improves the wealth of a small number of rich individuals, and may not have an impact or negatively affect financial inclusion, as the rich people may use this opportunity to spend their resources in the short run. Expansion in the basic bank accounts did not have a significant effect on savings because of the inability to predict how households would use their income [63].
On the other hand, consistent with the findings of other scholars [64,65], this study proved the existence of a significant positive relationship between financial access and economic growth. An inclusive financial system ensures availability, accessibility and usage of formal financial services by the marginalised groups of the population, thereby enhancing economic growth [66]. On the other hand, consistent with the findings of others [41], this study found a positive and significant relationship between financial inclusion and financial stability (low non-performing loans and financial distress). Stable financial institutions provide proper financial products and services, and significantly contribute to increasing financial inclusion [67]. It is, therefore, critical to develop and introduce a proper policy and regulation that helps to ensure financial stability and promote financial inclusion.

On the basis of the above findings, it is possible to say that there is a long-run cointegration between the variables of interest, namely financial inclusion, financial stability and economic growth. In addition, it is logical to argue that there is a joint relationship between all the three variables. Financial stability and economic growth jointly and separately cause financial inclusion both in the short and long run. Therefore, it is appropriate to conduct a test for Granger causality and identify the direction of causalities.

(ii) Panel Granger Causality Tests

Outputs of the panel ARDL cointegration tests above ascertained that there is a long-run cointegration between financial inclusion (FI), financial stability (FS) and economic growth (EG); however, the test did not indicate the existence and direction of causalities. Consequently, separate and joint Granger causality tests were conducted on the relationship between these variables using the equations stated below:

\[
FI_{i,t} = \varnothing_i + \sum_{k=1}^{K} \partial_{i,k} FI_{i,t-k} + \sum_{k=1}^{K} \beta_{i,k} FS_{i,t-1} + \sum_{k=1}^{K} \beta_{i,k} EG_{i,t-1} + \epsilon_{i,t} \tag{6}
\]

\[
FS_{i,t} = \varnothing_i + \sum_{k=1}^{K} \partial_{i,k} FS_{i,t-k} + \sum_{k=1}^{K} \beta_{i,k} FI_{i,t-1} + \sum_{k=1}^{K} \beta_{i,k} EG_{i,t-1} + \epsilon_{i,t} \tag{7}
\]

\[
EG_{i,t} = \varnothing_i + \sum_{k=1}^{K} \partial_{i,k} EG_{i,t-k} + \sum_{k=1}^{K} \beta_{i,k} FI_{i,t-1} + \sum_{k=1}^{K} \beta_{i,k} FS_{i,t-1} + \epsilon_{i,t} \tag{8}
\]

where FI and FS and EG are the three stationary variables; i is the country; p is the time lag; k is the number of lags and \( t \in [1, T] \); \( \beta \) and \( \partial \) are coefficients; \( \epsilon_{i,t} \) is the error term. The key assumption here is that there exists a relationship between FI and FS and EG for at least one causal subset of the variables.

The results of the Granger causality tests show that there is causality between the variables under examination. In addition, variables were interchanged to the other directions to observe the existence of bi-directional causality. Table 3 below summarizes the findings of the Granger causality tests.

<table>
<thead>
<tr>
<th>Variable Y</th>
<th>Causality Directions</th>
<th>Variable X</th>
<th>Juodis et al. (2021) Wald Test</th>
<th>Dumitrescu and Hurlin (2012) Z-Bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>FI</td>
<td>Z-score</td>
<td>FI</td>
<td>38.328 ***</td>
<td>2.121 **</td>
</tr>
<tr>
<td>Z-score</td>
<td>FI</td>
<td>FI</td>
<td>54.590 ***</td>
<td>7.149 ***</td>
</tr>
<tr>
<td>FI</td>
<td>LnGDPPc</td>
<td>FI</td>
<td>40.369 ***</td>
<td>40.571 ***</td>
</tr>
<tr>
<td>LnGDPPc</td>
<td>FI</td>
<td>LnGDPPc</td>
<td>10.137 ***</td>
<td>4.798 ***</td>
</tr>
<tr>
<td>Z-score</td>
<td>LnGDPPc</td>
<td>Z-score</td>
<td>10.693 ***</td>
<td>7.039 ***</td>
</tr>
<tr>
<td>LnGDPPc</td>
<td>Z-score</td>
<td>LnGDPPc</td>
<td>26.890 ***</td>
<td>12.001 ***</td>
</tr>
<tr>
<td>FI</td>
<td>Z-score and LnGDPPc</td>
<td>Z-score</td>
<td>65.902 ***</td>
<td>-</td>
</tr>
<tr>
<td>Z-score</td>
<td>FI and LnGDPPc</td>
<td>LnGDPPc</td>
<td>82.580 ***</td>
<td>-</td>
</tr>
<tr>
<td>LnGDPPc</td>
<td>FI and Z-score</td>
<td>FI</td>
<td>22.983 ***</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: authors' own computations. Note: Robust standard errors in parenthesis (***), (**) indicates the level of significance at 1% and 5%, respectively.
Table 3 above shows that there are three joint and four separate causalities that have bi-directional as well as uni-directional nature. Wald statistic [68], and Z-bar statistics [69] of the separate causality tests revealed that the null hypothesis, financial inclusion, does not Granger-cause economic growth and is rejected at a 5% level of significance, indicating causality running from financial inclusion to economic growth, and vice versa. A similar conclusion is reached for the null hypothesis that financial stability Granger-causes financial inclusion, and financial stability Granger-causes economic growth, and vice versa, implying bi-directional causality between the variables and confirming complementarity between the three variables. Lewis was the pioneer to confirm the existence of a two-way causality between financial inclusion and economic growth [70]. Several other studies also suggested this type of retroactivity, and supported the two-way assertion [19,71,72].

On the other hand, there are uni-directional joint causalities, as economic growth and financial stability cause financial inclusion, while financial inclusion and economic growth influence financial stability, and not the other way. In the same manner, financial inclusion and economic growth affect financial stability. On the basis of the above results, it is possible to conclude that the SSA countries are expected to adopt holistic approaches and formulate macro-economic policies and strategies that promote complementarity and sustainable economic growth in the region.

5. Summary and Conclusions

Inclusive financial systems have become a policy agenda for financial stability and sustainable growth, as reflected in the UN’s SDGs 2030 and the African Union’s Agenda 2063. However, existing evidence based on theories and empirical findings lacks consensus and shows mixed assessments on the relationship between financial inclusion, financial stability and economic growth. Given the above facts, we found it important to examine the causation between these three concepts in the context of selected SSA countries. To this effect, a secondary panel data was collected for 26 SSA countries for the period from 2000 to 2019. In addition, a composite index was developed from six individual financial inclusion (FI) indicators and used as a proxy for FI. Panel unit root tests and panel ARDL cointegration tests were conducted to assess the stationarity of the data and examine the short- and long-run relationships between financial inclusion, financial stability and economic growth. Moreover, Granger causality tests were applied to identify the direction of causality between the three variables of interest.

On the basis of the overall results of the Granger causality tests, it is possible to conclude that there are a two-way separate causality and a uni-directional joint causality between financial inclusion, financial stability, and economic growth, indicating complementarity between our variables. Hence, financial services’ expansion enhances both financial stability and economic performance, while simultaneously contributing towards achieving sustainable development in the SSA countries. Thus, this implies that financial services’ expansion increases the level of intermediation, as well as the overall stability of the formal financial sector and economic growth. Similar to the recommendations of [73], we concur that it is important to expand the accessibility and affordability of formal financial products and services by introducing financial products which would serve the needs of the poor and disadvantaged groups within communities. By so doing, countries can achieve multiple sustainable development goals in line with their respective national development plans, derived from the principles of the UN’s SDGs and the AU 2063 agenda in the region.

Our study was limited by the availability of complete data for a larger sample. Future studies could consider expanding the scope and undertaking an economic bloc comparative analysis, for instance, between BRICS, MENA and SADC countries. This would account for the broader economic development differentials between these blocs, rather than examining this nexus from the perspective of countries that comprise a single bloc or region, which tend to be influenced by one major economy. Moreover, the impact of the COVID-19 pandemic would present an interesting dimension on structural breaks, and this could add
valuable insights to the field of international and development finance, as several countries had to provide bailouts for players in the financial sector, which posed a threat to financial inclusion, financial stability and economic growth.

**Author Contributions:** Conceptualization, M.D.J.; formal analysis, M.D.J.; methodology, M.D.J. and P.L.M.; project administration, P.L.M.; software, M.D.J.; supervision, P.L.M.; validation, P.L.M.; writing—original draft, M.D.J.; writing—review and editing, M.D.J. and P.L.M. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** Not applicable.

**Conflicts of Interest:** The authors declare no conflict of interest.

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