

# An Analysis of the Impact of Digital Financial Inclusion on Financial Stability

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## ABSTRACT

Over the last few years the world at large have witnessed a rapid development in digital finance providing a promise to accelerate financial and economic inclusion. This has led to an inclusive growth focused on financial inclusion as a policy issue. Digital financial services have allowed governments to disburse funds to those in need quickly and have opened up new opportunities to many households and firms that had limited or no access to formal financial services. The major objective of the study was to examine the impact of digital financial inclusion on financial sector stability. The study adopted a quantitative research design and used two-step Generalized Method of Moments for dynamic panel data to explore such a relationship in twelve selected banking institutions for the period 2013 to 2023. An index of digital financial inclusion, z- score, real GDP, loans to asset ratio as well as inflation were used as data variables. The results of this study suggest that digital financial inclusion has a significant positive relationship with bank stability (z-score). Economic growth has a marginal positive effect with bank stability. In order to achieve sustainable digital financial inclusion, the study calls for policymakers to ensure digital financial literacy for all since it feeds into bank stability and also reduces bank insolvency. They should also find ways of enhancing depositor confidence and trust in the banking industry.

**Keywords:** Digital financial services, digital financial inclusion, FinTechs, Financial System Stability

## INTRODUCTION

Over the years, there have been an unprecedented growth in the revolution of information technology (IT), affecting every aspect of life. Digital transformations have had a big influence on how businesses operate and banks are not an exception. Digital innovations have transformed financial systems across developing, emerging and developed countries (Wysokińska, 2021). Today, a dynamic new wave of digital innovation is gathering on the horizon with advanced technological developments including smartphones, mobile data, cloud computing, micro-service architectures, machine learning, and other types of artificial intelligence which are rapidly becoming pervasive and enabling the emergence of significant new business models and platforms (CGAP, 2022). New players that include mobile network operators, financial technology providers, regulators, agents, chains of retailers have changed many aspects of financial intermediation, banking business models, products, services and customer experiences across the global village creating a new wave of operational and systemic risks for which the industry is ill-prepared (ADBI, 2020). On the other hand, however, barriers in traditional financial systems continue to fall (Kooli et al. 2022) resulting in a rise in

financial inclusion thus improving the livelihoods of individuals. According to a Finscope report Zimbabwe recorded significant progress in formal financial inclusion from 69% of the adult population in 2014 to 83% in 2022, reducing the financial exclusion gap from 23% in 2014 to 12% in 2022 (Finscope, 2022). Considering the prospects and importance of digital financial inclusion, banks in SSA countries have started implementing digital financial services in a full-fledged manner. This is because broader digital financial inclusion helps banks achieve financial advancement (Demirgüç-Kunt et al. 2018), stability (Ahamed and Mallick, 2019) and a flourishing global financial sector. By 2019, there were 469 million active mobile

money accounts in Sub-Saharan Africa, with over 181 million accounts registered. This is similar to having a mobile money account with more than 15% active users in over 40% of the region's total population (Munoz et al.2022). While other African countries can possess more than double the mobile money users than the number of bank accounts, in Zimbabwe, the number of active mobile money users is just 4.3 million (RBZ 2022).

Chivasa and Simbanegavi (2016) researched on financial inclusion in Zimbabwe post hyper inflationary period focusing on barriers and effects on societal livelihoods. The study established that exclusion is due to number of factors which includes, high bank charges, high interest rate, unavailability of financial services infrastructure and financial illiteracy inter alia. Ngoma (2019) examined financial inclusion and its determinants in Zimbabwe and established that individual characteristics like age, income, gender, education and employment status were the determinants of financial inclusion in Zimbabwe. In addition, this study established that trust in financial institutions was the major reason why the majority remained unbanked. Munyaengeterwa (2020) analysed the effect of financial inclusion technologies on the financial performance of Zimbabwean banks. The study employed ATM, mobile banking (MB), internet banking (IB) and point of sale (POS) transactions on the financial performance of banks as measured by return on assets. The findings of the research indicated that all the commercial banks in Zimbabwe at the time of doing this study were using POS, ATM, Mobile banking and Internet banking as they adopted digital forms of banking. In terms of financial performance, the study highlighted that banks have been able to increase their return on assets between the years 2013 and 2018.

On another study, Maune, Matanda and Mutonde (2020) investigated the relationship between financial inclusion and economic growth in Zimbabwe. The empirical findings of this study show that financial inclusion has a positive impact on economic growth in Zimbabwe. Chitirima and Torerai (2022) examined the nexus between mobile money regulation, innovative technology and the promotion of financial inclusion in Zimbabwe. It was highlighted that the Zimbabwean National Financial Inclusion Strategy appears to push more for bank-led financial inclusion than it does for innovation-driven initiatives such as mobile money services. The study recommended that Zimbabwean mobile money services regulations and the financial regulatory framework should be carefully amended in line with the recent innovations in mobile money to adequately regulate the use of mobile money services and innovative technology to address the financial exclusion of the poor, unbanked and low-income earners in Zimbabwe.

Sakarombe (2018) examined the impact of financial inclusion on bank stability in Zimbabwe and found that financial inclusion can increase stability in the banking sector. The above studies show a progression in research on financial inclusion in Zimbabwe with Sakarombe having considered traditional financial inclusion which only included ATMs as the only digital aspect. It however, did not consider the effect of other digital financial inclusion aspects like mobile money, internet banking and agent banking. Our study seeks to close the gap by including these aspects using the current time frame and dataset. Moreso, studies on the nexus between digital financial inclusion and bank stability have been carried out on African countries and the Sub Saharian African region but those on the Zimbabwean economy are limited if any, warranting further research. It is clear from the above studies that there is a dearth in the literature that specifically focuses on the relationship between digital financial inclusion and bank stability in Zimbabwe. Another reason that probed the study is that for any financial system to be inclusive (providing basic financial services to all segments of the society), the stability is required. The stability of the financial system is related to financial infrastructure of different internet facilities. These internet facilities have made it easier for people to directly access various kinds of payments, savings, credit and even investments thus stimulating an increase in the demand for financing. However, this growth in financing can have dire implications for financial stability (Utari et al., 2012). Due to the lessons from the global financial crisis, it follows that financial institutions need to contain systemic risks and maintain financial stability, at the same time seeking to promote financial inclusion towards economic and financial development (Ozili,2019).

These two strategies may be subject to conflict because when the banks attempt to contain systemic risk, it can lead to reducing facilitation of financial services to the vulnerable and low income groups. More stable banks are abler to offer financial products and services and contribute significantly to increasing financial inclusion (Musau et al. 2018). Yet at the same time, regulatory pressure to mitigate credit risk and increase bank stability may contribute to the unintended exclusion of the most disadvantaged customers (Anarfo et al. 2020). Besides, banks play a key role in connecting the financial system to the real economy, yet financial inclusion makes monetary policy more effective in controlling inflation by expanding its effect to a larger proportion of the population (Jungo et al. 2021).The lack of concordance therefore among the anomalous rate of digital transformations, financial inclusion and financial stability have probed the researcher to examine the impact of digital financial inclusion on bank and financial stability in Zimbabwe.

### Research objective

The primary objective of the study was to analyse the impact of digital financial inclusion on financial stability

## LITERATURE REVIEW

### Digital Finance

Digital finance is the term used to describe the impact of new technologies on the financial services industry. It includes a variety of products, applications, processes and business models that have transformed the traditional way of providing banking and financial services (EU 2020). This is the same with the definition given by Ozili (2018) shares the same sentiments by defining digital finance as financial services delivered through mobile phones, personal computers, the internet or cards linked to a reliable digital payment system. Digital financial services (DFS) are financial services (e.g., payments, remittances, and credit) accessed and delivered through digital channels, including via mobile devices. These encompass established instruments (e.g., debit and credit cards) offered primarily by banks, as well as new solutions built on cloud computing, digital platforms, and distributed ledger technologies (DLT), spanning mobile payments, crypto-assets and peer-to-peer (P2P) applications (IMF,2020) .Digital finance facilitates payments via a mobile device and helps households to manage their personal assets and **Digital Financial Inclusion**

Digital financial inclusion is described as the deployment of the cost-saving digital means to reach currently financially excluded and underserved populations with a range of formal financial services suited to their needs that are responsibly delivered at a cost affordable to customers and sustainable for providers (World Bank 2014). It is the access to and use of formal financial services by excluded and underserved populations. Such services should be suited to the customers' needs and delivered responsibly, at a cost both affordable to customers and sustainable for providers. (CGAP 2015). CGAP (2020) further articulates that inclusive digital financial services refer to mobile money, online accounts, electronic payments, insurance and credit, combinations of them and newer fintech apps, that reach people who were formerly excluded. Digital financial inclusion, when provided responsibly and sustainably in a well- regulated environment, not only drives growth, but also enables faster progress toward many of the other Sustainable Development Goals.

Digital financial inclusion (DFI) is not very different from the notion of financial inclusion (FI): It is the extension phase of FI where the notion of advanced technology is entertained. It has been widely discussed as a global issue in recent years (Ozili 2018). The CGAP defines digital financial inclusion as “digital access to, and the use of, formal financial services by the excluded and underserved population” (CGAP, 2019).

Digital financial inclusion promises to help banks lower costs by reducing queuing lines in banking halls,

reduce manual paperwork and documentation and to maintain fewer bank branches (IFC, 2017)

### **Digital Financial Inclusion and Financial Stability**

According to Chamboko (2022), DFS have been instrumental in facilitating formal financial inclusion for the past decade citing its benefits to be major to the marginalized, women and youth who were largely excluded. This is supported by Demir et al. (2022) who suggests that even though they are financial market imperfections such as information asymmetries and transaction costs which tend to impede the marginalized from accessing formal financial services, innovative digital financial services (DFS) such as mobile money are providing new opportunities to accelerate financial inclusion. If these digital services are responsibly provided, there will be significant benefits to consumers especially the unserved and underserved individuals, including giving them a range of financial products and services to choose from, possibly with better speed, convenience, accessibility, security, and cost (Chamboko et al.2021).As awareness of these benefits increases, expanding the provision of digital innovations such as mobile money has become a key policy intervention for many developing countries as they aim to advance financial and economic inclusion (AFI, 2022)

Weiser et.al (2019) reiterates that the provisioning, adoption, and use of DFS leads to immense improvements in formal financial inclusion for both households and firms, as reflected by the growth in the propensities to save, borrow, and to receive and send remittances during financial and income shocks. This therefore means that financial and economic exclusion imply that for individuals, families, governments, and the broader economy, they will be lost opportunities and costs with significant negative consequences highlighting the need for all citizens to participate fully and without discrimination to achieve their highest potential (Chamboko et al.2018) The COVID-19 epidemic also quickened the uptake of these innovations. Mobile money-driven activities increased along with the digital economy, leading to notable developments in some African nations, including Zimbabwe (Ecocash), Kenya (M-Pesa), and South Africa (E-wallet), among others. According to Barugahara (2021) Zimbabwe is an ailing economy where incomes are low and sometimes irregular and this hinders financial inclusion along with soaring inflation. With such a fragile economic environment, very few individuals and businesses seek financial services to save or invest and also the very few financial institutions are less willing to loosen up on credit provision. Zikhali (2022) adds on to say that the financial sector suffers from a lack of trust by consumers due to a history of tumultuous currency changes and multi-tiering and policy inconsistency. Consumers have also lost their savings due to runaway inflationary pressures (Ngoma,2019) whilst cash is difficult to get at a par value thus mobile money has become a major instrument with which to perform financial transactions (Zikhali,2022).

According to Khan, (2011) financial inclusion enhances financial stability by reducing pro-cyclicality risk. This occurs when a substantial increase in the number of small savers via greater financial inclusion increases both the size and stability of the deposit base of banks which would reduce banks' dependence on "non-core" financing, which tend to be more volatile during a crisis thus improving banking system stability. He also adds that low-income groups are relatively unsusceptible to fluctuations in economic cycles hence including them in the financial sector will improve the stability of the deposit and loan bases in the financial system. Hannig and Jansen (2010) show that financial institutions catering to the lower end individuals tend to survive through macro-crises well and help sustain local economic activity. The low-income individuals are also provided with the possibility to save for the future fostering personal financial stability, and a high level of use of bank deposits which contributes to securing a more stable deposit base for banks during distressed times (Han and Melecky, 2013).Also, greater levels of financial inclusion can facilitate increased participation by different sectors of the economy in the formal financial system because, as the share of the formal financial sector increases, it strengthens the case for the use of interest rate as a key policy tool for macroeconomic stability, which has positive effects for economic growth (Cecchetti and Kharroubi, 2012). Another point to note is that with digital financial inclusion, large number of depositors

can easily switch banks within minutes; forcing banks to provide quality services or risk losing depositors to rival banks. For financial and monetary system regulators, digital financial inclusion also helps to reduce the amount of physical cash in circulation and is instrumental in reducing high inflation levels in developing and poor countries (GPFI, 2016).

Batiz-Lazo and Woldeesenbet (2006) cited in Zewdia (2013) modern financial innovations stand out for many reasons that include tax benefits, reduced organization costs, decrease in bankruptcy costs, and decrease in moral hazard, transparency and conditioning. Zewdia (2013) adds that technological innovations have improved the most banks efficiency in offering services to customers since they play a significant task in their daily operations because consumers are mindful of technological improvements and insist on higher service quality. These sentiments are akin to those of Weigelt ve Sarkar (2012) who stated that rapid development of ICT has made some of the functions of the banks more efficient and cheaper, increasing deposits, sales and performance of these firms. These studies showed that electronic banking applications required advanced technology increasing the overall profitability of the banks in the US and European countries.

While all the benefits of digital financial inclusion have been highlighted, it has also been contended that competition and digital finance have their related challenges that could result in financial instability (Nelson, 2019). Digital finance is also a phenomenon of globalization in the financial sector which is facilitated by technological advances. This phenomenon has led to the emergence of an integrated financial system without national borders and the economy. This can expand the possible sources of financial system instability in macroeconomic terms (Mörttinen et al., 2005). The interconnectivity of these interconnected financial transactions will have a chain effect, that is, when difficulties occur in one entity it can be transmitted quickly to other entities in the network. That financial system instability in other countries can easily be transmitted and destabilizes the financial system in any country hence the need to determine the extent to which digital finance negatively or positively affect the stability of the financial system. Chinoda and Kapingura (2023) cite that recently there has been a debate that digital financial inclusion is an essential avenue and a game changer in ascertaining progress towards the accomplishment of the United Nations Sustainable Development Goals (SDGs) through global financial inclusion particularly in developing countries. Constructing on this discourse, this paper focuses on digital financial inclusion and bank stability in Zimbabwe where a sizeable number of adults remain unbanked.

## METHODOLOGY

A quantitative research design was adopted for this study in view of the nature of the objectives where an econometric modeling based on the multiple ordinary least squares (OLS) approaches was used to enable the researcher to determine the impact of digital financial inclusion on financial stability. Secondary panel data was collected from 12 banking institutions for the period 2013 to 2023 since it provided the most complete relevant data for the twelve banks under study. The secondary data was obtained from the Reserve Bank of Zimbabwe publications and websites, World bank, Zimstats and Zimbabwean banking institutions. Financial statements data obtained from banks' websites were used to calculate the bank stability variables like loans to assets ratio and ratio of equity to total assets. The secondary data collected from Zim-stats were basically used to calculate the growth rates of Gross Domestic Product (economic growth) and to establish the number of agents, internet banking and mobile banking users. Data on inflation rates was obtained from World bank. Panel data is a special type of data in which the same cross sectional unit in this case banks are surveyed over time. It provided very useful information on the dynamics of change. Thus by combining time series of cross section observations, panel data gave more informative data, more variability and more degrees of freedom and more efficiency. Further, since panel data relate to individuals, firms, banks and states over time, there is bound to be heterogeneity in these units. The techniques of panel data estimation can take such heterogeneity explicitly into account by allowing for individual specific variables. The banks

were purposively sampled due to their long term resilience from economic ailments that bedeviled the country as well as availability of data. The data was then analysed using Stata.

In analyzing financial stability which is said to be endogenous and extensive, this study adopted the System Generalised Method of Moments (S-GMM) by Arellano and Bover (1995) following Akande et.al (2018). Basically, stability is affected by the state of the banking industry and the macroeconomic environment (Houben, Kakes and Schinasi, 2004). A system- GMM is a dynamic panel data model which is used when the dependent is expressed as a function of its lagged values and other variables. This method was selected for the handling of cross-sectional dependence incidences since the method is presumed to be identically and independently distributed. In addition, the increasing usage of the panel data technique, which allows individual cross-section dynamics in economic and finance studies, has favoured the application of dynamic panel data analysis. Panel data analysis alleviates multicollinearity issues among variables and also allows the removal of unobserved heterogeneity for each sample observation (Arellano and Bravo,1995). For the validity of the S-GMM instruments, we used the Hansen J statistics in robust estimation. The study also used two-step system estimators to obtain efficient and consistent approximations of parameters given that lagged values of regressors are poor instruments for the GMM equation in difference form and difference equations can suffer from small sample bias following Chinoda and Kapingura (2023). The study thus employs the robust command in Stata to modify standard errors in two-step estimation that are strongly downward biased. The analysis of the data used in this study was also carried out using static (pooled Ordinary Least Squares-random effect) model, and the results are presented in Table 4.3. The essence was to help validate the results of the GMM model and to provide evidence to substantiate the results' robustness even in the long term. The focus of this analysis was on the GMM, although the static models were also provided for further robustness purposes.

### **Econometric Model**

The study therefore adopted the following general form of linear panel model to analyze the nexus between digital financial inclusion and bank stability:

$$Z_{it} = \beta_0 + \beta_1 DFI_t + \beta_2 LTA_t + \beta_3 INF_t + \beta_4 GDP_t + e_t$$

where  $Z_{it}$  is Z-score, a measure of bank stability

$\beta$  indicates co-efficients to be estimated

DFI stands for digital financial inclusion;

GDP stands for gross domestic product,

LTA stands for the ratio of loans to total assets

$e_t$  is the error term

### **Variables Specification and Description**

#### **Bank Stability**

This study used bank Z-Scores to measure bank stability following Syed et.al, (2021). Literature has widely used the Z-Score as an unbiased bank riskiness indicator (Banna et al.2021). The Z-Score reflects the probability of bank failure. A higher Z-score implies a low probability of failure (insolvency) which means the bank is stable. In contrast, a lower Z-score implies a higher risk of insolvency. This measure portrays a banking system buffer (return and capitalisation) to the standard deviation in returns (Klapper and

Lusardi,2020). It also reflects the number of volatility (standard deviations) where profits may decline before a bank fail in returns. Bank capitalisation (ratio of equity to assets), profits (return on assets) and volatility (standard deviation of return on assets) are the three measures of bank soundness which is the Z-score(Beck, Jonghe and Schepens, 2011) thus by analysing the impact of explanatory variables on this Z-score,the source of instability can be identified. Inorder to reduce data skewness, we followed Ahmed and Allick (2019) and used the natural logarithm of Z-score. As indicated above,the study adopted the formula by in calculating the Z-score as follows:

$$Z_{it} = \frac{E(ROA)it + EQAit}{\delta ROAit}$$

where  $ROA$  is the two year rolling average of return on assets recorded for bank  $i$  at time  $t$ .

$EQAit$  is the two year rolling average of the ratio of equity to assets for bank  $i$  at time  $t$ .

$\delta ROA$  is the standard deviation of return on asset based on two year calculations for bank  $i$  at time  $t$ .

According to Beck (2008a) the above formula indicated that higher capitalization and profitability increases the Z-score (stability)but higher volatility reduces the Z-score. The  $ROA$ ,  $EQA$  and  $\delta(ROA)$  where calculated based on two year rolling averages because according to Petrescu and Pop (2016), rolling the average makes the results consistent and relevant.

## Digital Financial Inclusion

The study used data from the World Development Indicators Database (World Bank) as well as from the Reserve Bank of Zimbabwe (RBZ) website to measure digital financial proxies for the period 2013 to 2023. The panel data was balanced for all 12 selected banking institutions. This period as well as institutions was selected based on data availability for the employed variables. The study considered both the digital financial usage and outreach penetrations(access) in computing digital financial based on previous studies (e.g. Ahmed and Allick (2019). Following Khera et.al (2021) we constructed an enhanced digital financial inclusion index which is different from the traditional financial inclusion index. Unlike Khera et.al (2021),we added indicators of the use of digital financial transactions and access to physical infrastructure. The indices consist of access and usage indicators provided by digital financial services, including banks and microfinance institutions, mobile money operators, and mobile money agents. As usage variables, we considered the number of active mobile money accounts per 1000 adults. We also considered the percentage population with access to the Internet and mobile subscription per 100 people as indicators for access to digital infrastructure and the number of registered mobile money agents per 100,000 adults as availability unlike Sakarombe (2018) who only used number of ATMs per 1000 people. To come up with the Digital Financial Inclusion Index(DFII) we used the modern multivariate data analysis tool of the principal component analysis (PCA) to construct “usage” and “access” sub-indices, to capture supply and demand-side aspects of financial inclusion, respectively following Chinoda and Kapingura (2023).The PCA was also used to combine access and usage sub-indices into a digital financial inclusion index, to capture financial inclusion through financial institutions and enabled by technology separately. The PCA technique was adopted given that it reduces data dimensionality and also resolves the possible multicollinearity that may arise among the variables (Nizam et.al 2020). Also using PCA, the study normalized each dimensional indicator to have values between zero (0) and one (1) to make immaterial the scale that they were measured. Afterwards, the PCA extracts the common principal component of the dimensions that capture various aspects of digital finance. The study modified the following formula by Sakarombe (2018):

$$DFI_{it} = 1 - \sqrt{\frac{(1-a_t)^2 + (1-p_t)^2}{2}}$$

Given the two dimensions: access and usage, a two dimensional Cartesian space was created such that  $0 = a, p = 1$ . The point (0,0) would represent complete digital financial exclusion while point (1,1) would represent complete digital financial inclusion. The PCA was thus used to combine access and usage indices into a digital financial inclusion index.

## RESULTS

Table 4.1 below relates to descriptive statistics. The results relate to twelve banking institutions chosen based on availability of data and also those which were in the industry during the period under study

**Table 4.1 Descriptive Statistics**

|               | DFII  | LTA      | INF     | RGDP  | ZSCORE |
|---------------|-------|----------|---------|-------|--------|
| Mean          | 0.324 | 0.365    | 99.474  | 6.782 | 14.85  |
| Maximum       | 0.516 | 2.788    | 100.653 | 16.3  | 47.50  |
| Minimum       | 0.061 | 1.00e-36 | 95.4    | .7    | 3.00   |
| St. Dev.      | 0.16  | 0.342    | 3.0078  | 6.110 | 8.87   |
| Probabilities | 0.14  | 0.000    | 0.000   | 0.000 | 0.212  |
| Observations  | 152   | 152      | 152     | 152   | 152    |

**Source: Author estimation**

As illustrated in table 4.1 above, digital financial inclusion index's mean is 32.4% with minimum and maximum values of 3% and 52%, respectively. This implies that there are serious digital financial inclusion discrepancies in Zimbabwean banks which is attributed to the bank's market share and size and level of digital uptake by customers, consistent with Thaddeus et.al (2020). The standard deviation of 16% suggests low levels of digital financial inclusion as the mean (32.4%), and volatility fails to exceed the 50% level. This reveals that the digital economy and mobile money-driven activities have expanded in Zimbabwe, resulting in noteworthy outcomes in certain fintech such as Ecocash, Onemoney, Telecash and the coming in of Innbucks, Access finance and other microfinance products. However, other banks and fintech institutions still lag behind. The discrepancies could be a result of a lack of adoption of state of the art technology, continued dwindling of employment opportunities in the formal sector as well as the economic policy inconsistencies which may breed mistrust and undermine effective digital financial inclusion. Economic growth as measured by Real GDP has a standard deviation of 6.1% compared to a mean of 6.78% and a maximum of 16.3% shows low variation in the data. Bank stability (z-score) in averages 14.85% reflecting that banks in the country are less stable. It reveals a mean maximum and minimum values of 47.5% and 3%, respectively. The debt ratio of banks has a mean of 36.5% and a standard deviation of 34.2%. The standard deviation of 34.2% which is relatively lower than the mean suggests a low variation in debt usage in the Zimbabwean banking system. The bank market in the country have had strong earnings positions in recent years hence banking institutions had adequate capital buffers to support banking operations and to enable the sector to continue playing its role of providing credit to the real economy (RBZ, 2021). The standard deviation for inflation of 3.00% is far much lower than the mean showing low variation in the data.



The study also estimated the correlation between the variables, and the results are indicated in Table 4.2 below.

**Table 4.2 Correlation Analysis**

|          | DFII     | LTA      | LNZSCORE | INF      | RGDP    |
|----------|----------|----------|----------|----------|---------|
| DFII     | 1.0000   | 0.2364   | 0.2068   | -0.14127 | 0.0227  |
| LTA      | 0.2364   | 1.0000   | 0.13243  | -0.15217 | 0.2714  |
| LNZSCORE | 0.2068   | 0.13243  | 1.0000   | -0.16872 | 0.2290  |
| INF      | -0.14127 | -0.15217 | -0.16872 | 1.0000   | -0.3214 |
| RGDP     | 0.02272  | 0.2714   | 0.2290   | -0.3214  | 1.0000  |

**Source: Author Computations**

As shown in the table above the study found a significant positive association between digital financial inclusion and bank stability (LNZSCORE), providing evidence that digital financial inclusion is favourable for bank stability measured by ZSCORE and the loans to asset ratio. A slight positive relationship between bank stability and economic growth(RGDP) was also highlighted by the study. On the other hand, the study found a significant negative association between digital financial inclusion and one of the control variables that is inflation. Inflation also indicated a negative association with bank stability (LNZSCORE), digital financial inclusion(DFII), debt ratio(LTA) and economic growth(RGDP) providing evidence that increases in inflation hurts the general performance of the economy thus affecting the level of digital finance adoption, bank capital structure and hence stability.

**Regression Results of the Impact between Digital Financial Inclusion and Bank stability**

The results of the Arellano and Bond two-step system GMM estimator on the impact of digital financial inclusion and bank stability measured by LNZSCORE are presented in Table 4.3 below

**Table 4.3 Digital Financial Inclusion and Bank Stability Estimated Results**

| OLS-Random Effect | 2 System GMM | (LNZSCORE)    | (LNZSCORE) |
|-------------------|--------------|---------------|------------|
|                   |              | Co-efficient  | pfit)      |
| LLNZSCORE         |              | .9211382***   | 0.000      |
| DFI               | 0.789***     | 0.1020021**   | 0.009      |
| LNRGDP            | 0.412        | 0.0270786***  | 0.041      |
| LTA               | 0.781**      | 0.2756064**   | 0.063      |
| INF               | -0.0967***   | -0.1376001*** | 0.023      |
| Constant          | 2.345***     | 0.913***      |            |

Prob>Chi2 =0.183

Observations = 152

Arellano-Bond test for AR(1) in first differences z =-2.68 Pr>2=0.007

Arellano-Bond test for AR(2) in first differences z =-0.40 Pr>2=0.692

Hansen test of overid. restrictions:  $\chi^2(15)$  Statistical

significance \*\*  $p < 0.1$ , \*\*\*  $p < 0.05$ .

The study findings reveal that digital financial inclusion has a significant positive relationship with bank stability (z-score). The regression coefficient of digital financial inclusion and the lnzscore is 0,102021 significant at 10% which shows that a 1% increase in digital financial inclusion enhances bank stability by 10.20%. The results propose that higher levels of digital financial inclusion significantly enhance bank stability (greater stability in a country). This also means digital financial inclusion has allowed many people in Zimbabwe to join and participate in the financial sector, which makes the sector more stable due to the evolution of new credit facilities and other commercial activities, which permits the start of a wide range of financial products and services as financial institutions pursue a steady increase in income. Moreover, an increased number of bank customers as well as state of the art DFI applications have increased the banks' profitability, which brings financial growth and stability. This suggests that bank soundness is enhanced through digital financial inclusion. These findings corroborate Ahmed and Allick (2019) and Banna and Alam(2021b) who found that financial systems with highly inclusive digital financial services tend to enhance bank stability and that greater DFI implementation reduces the NPLs of a bank.

The study also found a weak positive effect of economic growth on financial stability. A 1% increase in economic growth increases financial stability by 2,7%. This finding is not surprising given that the increase in RGDP (economic growth) is usually accompanied by an increase in employment and, most likely, higher incomes over the estimated time, this has however not been the case in Zimbabwe as economic growth-led employment hasn't been significant and incomes are continually eroded by inflation. Total loan disbursement also increases stability by 27.5% per 1% increase in loans. This is regarded by some scholars as an approach to improve bank stability. This is in line with a priori expectations as increase in bank assets improves its resilience. Inflation on the other hand however is one factor that reduces stability in the banking sector of Zimbabwe. As inflation increases stability falls by 13,76 percent since bank runs tend to increase faster, this can cause systemic risk. These findings are the same with those of Sakarombe (2018) who found that inflation reduces financial system stability.

## SUMMARY AND CONCLUSIONS

Banks are the key providers of financial services and products in any economy and they play a pivotal role in enhancing financial inclusion. In this paper, we provided evidence of a significantly positive impact of digital financial inclusion on bank stability. This study examines the impact of digital financial inclusion on bank stability in Zimbabwe for the period 2013 to 2022 using the two-step System Generalised Method of Moments. The study findings reveal that digital financial inclusion has a significant positive relationship with bank stability (z-score). The study establishes that digital finance in emerging markets can address the needs of underserved customer segments, including entrepreneurs, by providing them with solutions for key areas of their lives and business, such as banking and payments. These finding are in line with those of Sakarombe (2018), Yang et al (2020) and Chinoda and Kapingura (2023) who found that financial inclusion can foster stability in the financial sector or reduce stability. These scholars also highlighted the need for financial literacy to improve digital trust. The study also found a slight positive effect of economic growth on bank stability. Our findings are consistent with those of Jungo et al. (2022) who highlighted that inclusive economic growth and financial development must balance financial stability and financial inclusion since prioritizing only one component would stifle the other.

Policymakers should thus ensure digital financial literacy for all since it feeds into bank stability and also reduces bank insolvency. Considering that financial illiteracy is prevalent in developing countries, it is

necessary to use policy measures, such as education and awareness campaigns, to increase households' financial knowledge. Such policies should prioritize the needs of vulnerable populations, for example illiterate households with low levels of wealth and income and in rural or undeveloped areas. Inasmuch as strategies are being put in place in Zimbabwe in order to increase financial inclusion as documented in the Zimbabwe Financial Inclusion Agenda of 2022-2026 this study highlights the need to enhancing depositor confidence and trust in the banking industry given that the Zimbabwean public had lost their trust leaving the financial sector under a confidence crisis. A stable macroeconomic environment should also be created and establish more favourable conditions that encourage private and foreign direct investment which is one of the vital conditions for attaining technological advancements so as to keep pace with the global village. The regulator at the same time need to play a proactive role in supporting the development and growth of a digital environment, deepen and widen the financial sector so as to allow financial institutions to diversify their investment. This should be done with a corresponding improvement of the whole financial sector regulation and supervision as the coming in of more players (non-banking institutions) offering financial services may pose a threat to the current underlying bank supervision policies.

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