Financial Inclusion and Bank Stability in Zimbabwe

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Abstract

The relevance of financial inclusion is increasing rapidly as it is becoming a policy issue especially in developing countries. However, financial inclusion can cause stability or fragility in the financial sector. The nexus between the two has to be clarified before fostering major strategies of financial inclusion. This study employed a system Generalised Method of Moments (GMM) to investigate this relationship. The results of this study suggest that financial inclusion can increase stability in the banking sector. This entails a positive, holistic approach towards implementation of agenda 2016-2020. In essence, financial inclusion is designed to bring about capacity to the economically and socially excluded population by creating equal opportunities. In order to achieve a sustainable financial inclusion framework there is need for viable business models (such as mobile money services), efficient, cheap and non-complicated technology contained in an appropriate regulatory approach by the Central Bank.

Keywords: Financial Inclusion, Bank stability JEL-E52

Introduction

Financial inclusion has become one of the core objective of Central Banks in developing countries in the past decade. Literature provides that financial inclusion can spearhead the welfare of households through enabling access to financial products by the disadvantaged groups. The formality in ownership of accounts and saving tends to cultivate benefits both to the nation and to individuals at micro-level. However, less attention has been put to assess the implications of financial inclusion on bank soundness. Scholars have revealed that the prevailing poverty in developing countries is as a result of financial exclusion. Although, financial inclusion is needed to facilitate ushering of basic financial services to all, stability in the banking sector is a prerequisite. Amatus and Alireza (2015) found out that the conclusions of the few studies which focused on financial inclusion and financial stability had conflicting results. It is mixed bag of positive, negative and insignificant relationships.

In a bid to construct a financial inclusion index, (Cámara and Tuesta, 2014) define financial inclusion as an extensive access to financial services, facilitated by absence of both non-price and price barriers. This is a condition which gives everyone an equal chance to access and make use of basic financial services like payments, transfer to credit and insurance as well as

savings. It can further be viewed as the approach of ensuring easy and timely access to adequate financial services whenever needed at an affordable cost across the population. Primarily, financial inclusion has been viewed as access to a bank account backed by deposit insurance and cheap credit (P. J. Morgan and Pontines, 2014).

The detrimental issue is around willingness of financial institutions to offer credit in face of high operating costs, on the other hand, restrained by the risk of servicing and monitoring, given that individual households and Small to Medium Enterprises (SMEs) often lack necessary documents, credit profiles and collaterals. Financial institutions have often viewed this approach as risky and one which is most likely to dampen the soundness of the banks. Contrarily, financial institutions have a great potential to utilise their economies of scale and tap into the market of the marginalised groups where micro and informal institutions are enjoying abnormal profits. This can easily be aided by the use of technology such as mobile money. Those institutions which have utilised this idea earlier are more likely to be enjoying massive competitive advantages as they are already established. By leaning on the advantage set in the context that financial exclusion has already been noted as a key barrier to development internationally, extending services to this prioritised group is a plausible way of enhancing performance of these financial institutions.

Zimbabwe Financial Inclusion Agenda of 2016-2020
Zimbabwe Financial Inclusion Strategy (2016-2020) is a set of strategies aiming at introducing better resourced, prioritised and evidence based approach to enhance access and usage of financial services. This approach is supposed to stimulate savings and investment, thus stimulating loanable funds. This should proportionately translate into poverty reduction and inequalities by enhancing economic growth while reducing financial instability and systemic risk. According to (RBZ, 2016) in spite of the country's strides in ensuring access to financial services, gaps are still prominent in special groups such as women, rural population, youth, Micro, Small and Medium Enterprises (MSMEs) and the small scale agricultural sector. Therefore, the strategy defines financial inclusion as the effective usage of a range of affordable and accessible financial services which are of quality. These services should be provided in a transparent and fair manner through regulated/formal entities to all citizens. The strategy paper uses the National Census of 2012 to proxy gaps in financial inclusion for instance, out of 13.06 million Zimbabweans, 52% are females and also 67% of the population resides in the rural areas. This makes the gap of financial inclusion wide, thus suggesting that the level of financial exclusion in Zimbabwe is high. Regarding these special groups (women, rural population, youth, Micro, Small and Medium Enterprises (MSMEs) and the small scale agricultural sector) the Reserve Bank of Zimbabwe came up with strategies, some of which stretch to 2020, suggesting approaches to enable financial inclusion.

Summary of Selected Proposed Financial Inclusion Strategies

Measures	Target Implementation Date	Responsible Stakeholder

|		
To register 85% of the MSMEs with the Companies Registry	On-going up to 31 December 2020	Registrar of Companies and Deeds Office
Financially including MSMEs to proportion of 80%	a31 December 2020	Financial Sector Regulators, Financial Institutions
Making sure that at least 80% of the MSMEs opens a formal bank account using the name of the business	31 December 2020	Reserve Bank, Ministry of Small & Medium Enterprises (SMEs), Financial Institutions and Cooperative Development, and MSMEs industry associations.
Capacity building programs, financial and consumer education programs	On-going	Reserve bank, banking Institutions, Ministry of SMEs & Cooperative Development and Development Partners.
Build the capacity of financial institutions to serve women entrepreneurs better and raise awareness of financial products among women	On-going	Reserve Bank, Financial sector regulators, Ministry of Women Affairs, Gender and Community Development, Financial Institutions women lobby groups and Ministry of Education.
Implement Revolving Youth Empowerment Funds	On-going	Financial Institutions, Reserve Bank, Ministry of Finance and Economic Development, Youth Organisations and Ministry of Youth, Indigenisation and Economic Empowerment.
An approach to increase access point in rural areas to less than 5 kilometres through low cost bank branch models, mobile and electronic delivery channels combined with agent banking.	31 December 2020	Financial Institutions, Financial Sector Regulators and Mobile Network Operators.
Banking institution's total loan portfolio should constitute at least 20% that goes to agriculture and development of agricultural insurance products	On-going	Banking Institutions, IPEC and Reserve Bank

Source: Extracted from (RBZ, 2016)

Stability in the Banking Sector of Zimbabwe

In 1980, at independence, the Government of Zimbabwe inherited a sound banking system which was considered to be the second from the best after South Africa (Chitokwindo, Mago and Hofisi, 2014), but most of the black majority were exclude from the banking sector including credit. For a decade, the banking sector propelled as an oligopoly with few foreign banks dominating the market (Kadenge and Tafirei, 2012). In 1990, the country adopted the

Economic Structural Adjustment Program (ESAP), through which as part of the package, the financial sector was liberalised. This resulted in black owned banks entering the market and competing with foreign banks. Chitokwindo, Mago and Hofisi (2014) argue that the competition was mainly concentrated in Merchant Banking where many banks were opened such as Trust Merchant Bank (TMB), United Merchant Bank (UMB), Universal Merchant Bank (UMB) and National Merchant Bank
(NMB). The first indigenous bank is the First Banking Corporation (FBC) which was licenced in 1997, changing the number of commercial banks from five to six. The five commercial banks were Standard Chartered, Zimbank, the Bank of Credit and Commerce International (now called Commercial Bank of Zimbabwe-CBZ), ANZ Grindlays (now Stanbic) and Barclays (RBZ, 2012). The banking sector could not resist the economic meltdown which started in 1997 which resulted in the United Merchant Bank collapsing in 1998 (Mambondiani, Zhang and Arun, 2010). However, other banking institutions could still join the sector. The sector contracted significantly in 2004 when some commercial banks were such as Royal bank, Trust bank, Barbican bank and Time Bank were placed under curatorship and the RBZ withdrew their silences (RBZ, 2004). The Central Bank tried to set up a Troubled Bank Fund (TBF) in order to save collapsing banks, but it was fruitless. Consequently, the RBZ created the allied Financial Services initiative where troubled banking institutions which qualified were consolidated into a single institution called the Zimbabwe Allied Banking Group (ZABG)(RBZ, 2004). Trust Bank, Barbican Bank and Trust Bank were amalgamated into the ZABG.

Trends of the Zimbabwean Banking Institutions from ESAP and Beyond
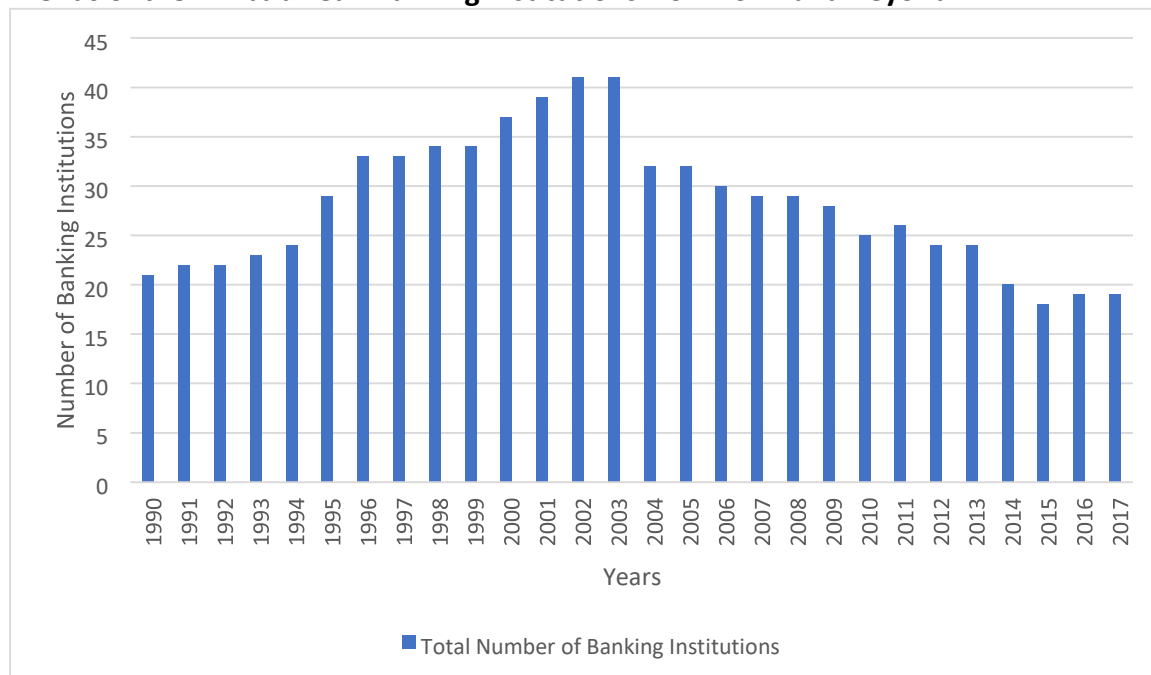
Source: RBZ Annual Supervision Reports[1]

Generally, the trend shows that the banking sector has been contracting from 2004. This has implications on the confidence of the general public in the sector since collapse of a single bank can be associated with contagion effects. Contagion effects can be defined as failure of

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[1] Data from the Reserve Bank of Zimbabwe Annual Supervisory Reports were collected by the author from the 1990 report to the 2017 report.

a single bank may cause a systemic failure. Therefore, policies which can retain stability are necessary to reduce manage bank runs.

Theoretical Framework for Stability
Jiang (2014) argues that issues to do with financial stability are still complicated because there are a lot of definitions used, therefore, the operational definition which is the one which should specify variables to use differs with situations. The traditional economics, the classical view just focused on the equilibrium in the market as the existence of stability and ignored concrete factors which may affect that equilibrium. Therefore, in literature, some scholars solely defined stability as the absence of instability, which is the absence of fluctuations in the financial assets prices (Crockett, 1996). However, the banking sector is becoming complicated through globalisation and technology, the definition cannot be such simple and narrow. However, considering that the banking sector is becoming more integrated globally which makes it more complex and diverse, the definition cannot be such narrow and simple. Other scholars who tried to expand the definition viewed stability resulting from macroeconomic fundamentals such as debt liquidation (Fisher, 1933) and cyclical excess (Kindleberger, 1978). Schwartz (1987) discussed financial instability emanating from s misfired monetary policy specifically mismanaged money supply generating financial distress. On the other hand Williamson (1987) emphasised credit risk as a source of financial instability, hence, Non-Performing Loans were modelled using business cycles. Macroeconomic performance indicators were used to explain financial stability by (Bernanke, Gertler and Gilchrist, 1999). They viewed inflation and Gross Domestic Product growth as the major variables which affect financial stability. However, all these views ignore nonmacroeconomic causes. The micro-economic perspective was introduced by Greenwald and Stiglits (1992). They used the agent behaviour approach to explain how financial instability can produced. They explained financial instability or stability which can come through the game theory.
Financial stability has been discussed in two views in the 21st Century. (Allen and Wood, 2005)and
(Padoa-Schioppa, 2003)view stability as exogenous to the system whereas (Schinasi, 2005)and (Borio and Drehmann, 2009) suggest that it is endogenous to the system. (Houben, Kakes and Schinasi, 2004) made progressive strides towards reconciling literature on financial stability. The combined both macroeconomic factors and microeconomic factors in modelling a framework for stability. They viewed financial stability as state in which it can absorb shocks, assess and mange financial risks and allocate resources efficiently. Since it is a state, it is dynamic, hence when accounting for stability, five key principles have to be taken into consideration. They argued that financial stability is a dynamic concept which can be both inter-temporal and innovative with interconnected components of the macro economy, financial infrastructure and financial markets. Therefore, financial stability covers many elements of the financial system including markets, infrastructure and institutions. It involves mobilisation of savings, growth and development, management of risk, allocation of resources and a well-functioning payment system. It is viewed as not only the absence of crises but entails the ability of the system to contain, restrain and cope with shocks when they arise. Financial stability framework has to be modelled taking into account possible effects to the real economy. Lastly, financial stability is endogenous, which means variables should be analysed in a continuum framework.
According to (Vives, 2010), the probability of bankruptcy can efficiently reflect the level of stability. (Elferink, 2011; Fungáčová and Weill, 2013; P. J. Morgan and Pontines, 2014;

Ahamed, 2016) used the Z-score[2] to measure probability of failure. On the other hand, some studies used Non-Performing Loans and capital ratios to measure bank instability such as (Berger, Klapper and Turk-Ariss, 2009) whereas (Beck, 2008a) argues that NPL only measures credit risk but not the probability of failure.

The Conceptual Relationship between Financial Inclusion and Stability

Literature suggests that financial inclusion can have both positive and negative effects on stability. However stability can also cause financial inclusion positively. Hence, this study focus on the causality that runs from financial inclusion to stability. Khan (2011) explains three ways in which increase in financial inclusion can increase financial stability. The first way is through increase in diversification of bank assets due to increase in lending to smaller firms which has the ability to reduce the riskiness of the portfolio of a bank's loans. The overall effect is reducing the volatility of the overall portfolio and the size of each borrower. The second way is through the increase in the size and stability of the deposit base which comes through increasing the number of smaller savers. This in turn reduces each bank's dependence on 'non-core' financing which is subject to volatility in times of crises, hence, the reduction in pro-cyclicality risk. Finally, increase in financial inclusion can enhance transmission of monetary policy transmission thus contributing to higher financial stability.

On the contrary, Khan (2011) gives three approaches in which financial inclusion may reduce financial stability. One way is the falling in lending standards as a result of an attempt to expand the pool of borrowers. This was one of the contributors of the sub-prime crisis in the United States. Alternatively, reputational risk may increase by outsourcing various functions with an aim to reach small borrowers. Finally, lack of proper regulation of Microfinance Institutions (MFIs) may lead to excessive lending by them thereby diluting the effectiveness of regulation in the economy thereby causing financial system risks.

Empirical Evidence on Financial Inclusion and Bank Stability

A number of studies present the nexus between financial inclusion and bank stability as inconclusive. Allen *et al.* (2012) conducted a study in Kenya which revealed that bank presence increases access to bank accounts and modest access to credit. This study discussed the period between 2006 and 2009 in which most banks expanded their branches but the effect was mainly felt in the urban areas, apparently leaving the rural areas. They found out that most foreign banks had no branches in the rural locations, only, domestic banks had branches there. This study revealed that the poor are bankable, but only that they are excluded. On the other hand, it identified the potential threat of financial stability as emanating from concentration of many customers in one bank.

On the contrary, Hannig and Jansen (2010) views financial inclusion as a source of instability through changes in the composition of the financial system. They argue that financial inclusion changes client types and transactions undertaken when institutions operate in newly created or expanded markets. These new changes can be a source of instability linked to increased bank risks. This approach can support such views like financial repression can prevent systemic problems but rather increase stability. It is important to note that the

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[2] It is calculated as the summation of return on assets (ROA) and capital-assets ratio (CAR) over the standard deviation on assets. A high Z-score implies stability but a low one implies otherwise, hence a negative is even worse.

authors pointed risks at institutional level and not at systemic level. This type of risk is generally manageable using prudential tools and effective customer protection strategies. Other authors with such contrasting views as Bateman (2010) questioned the long term effect of financial inclusion in Microfinance approaches. They forecasted a 'microfinance meltdown' in India where the poor are taking more and more microloans which they use to pay earlier microloans. This would lead to a hub of microloans default threats, which may eventually collapse the industry. This has been coined as 'Microfinance illusion'. This was supported by a study by Zhang and Kipesha (2013) on MFIs in East Africa where a trade-off between outreach and financial sustainability was found. A study on the role of MFI interventions in financial inclusion in a rural district in India by Barman, Mathur and Kalra (2009) revealed that as much as financial inclusion is seen as a strategy to poverty eradication it leads to increased indebtedness to noninstitutional or informal sources. This was seen to threaten financial sustainability and the overall financial stability. The study revealed the importance of credit information before issue on credit facilities.

Thus, the issues of financial inclusion and stability remain inclusive. Morgan and Pontines (2014) empirically analysed the causality between financial inclusion and financial stability. They found that financial stability is improved through increasing share of lending to small and medium-sized enterprises mainly by reducing non-performing loans and the probability of default by financial institutions. This confirms the positive relationship running from financial inclusion to financial stability through lending to medium-size enterprises.

Using the measures of financial inclusion to check its effect to the maximum drop in bank deposit growth, Han, Melecky and Bank (2013) concluded that 10% increase in the share of people that have access to bank deposits could reduce the deposit growth drops (or deposit withdrawal rates) by 3 to 8% points. This also supports a positive relationship between financial inclusion and financial stability.

Amatus and Alireza (2015) used Generalized Method of Moments for dynamic panel data to explore such a relationship in 35 Sub-Saharan African countries for the period 2004-2011. The variables utilized are bank-z score for financial stability; outstanding deposits with and outstanding loan from commercial banks commercial banks for financial inclusion; and GDP per capita, inflation domestic credit provided to private sector by banks, and financial crisis are used as control variables. The findings show that outstanding deposits with commercial banks negatively affect financial stability. This implies that deposit accounts held with the banks are less diversified in SSA. Outstanding loans from commercial banks have a positive role on financial stability. In terms of controlling variables greater GDP per capita helps financial stability while inflation, financial crisis, and credit to private sector have adverse effect of financial stability. In light of this literature, this study developed the following methodology.

Methodology

The literature on stability presented an interlinked framework for its analysis. It is argued to be a systemic imbalances that affect banks (Vourdas, 2017). These imbalances will make banks unable to exercise their roles effectively (Beck, 2008b). The framework for analysing financial stability shows that it is endogenous, extensive and extensive. Basically, stability is affected by the state of the banking industry and the macroeconomic environment (Houben, Kakes and Schinasi, 2004). For the sake of the endogeneity problem in the financial stability analysis, this study adopted the system-GMM by Arellano and Bover (1995). A system- GMM is a dynamic panel data model which is used estimated when the dependent is expressed as

a function of its lagged values and other variables. Therefore, the model which was estimated is presented as follows:

$$logZ_{it} = \beta_0 + \beta_1 FI_t + \beta_2 logNIY_{it} + \beta_3 logLTA_{it} + \beta_4 logTE_{it} + \beta_5 logLD_{it} + \beta_6 logSIZE_{it} + \beta_7 logEG_t + \beta_8 logINF_t + \beta_9 logUNE_t + \beta_{10} logZ_{i(t-1)} + _{it} \dots \dots \dots (1)$$

Table of Definition of Variables and Sources of Data

Variable	Definition	Prior Expectation	Data Source
Z	*Independent variable:* Z-score of risk of failure, a measure of financial stability. A higher Z-score implies a low probability of failure which means the bank is stable.	N/A	Author's calculations using data from RBZ
FI	Financial Inclusion index	Negative or Positive[3]	Author's calculations using data from RBZ
NIY	Ratio of non-interest income to interest income	Negative or Positive[4]	Author's calculations using data from RBZ
LTA	Ratio of loans to total assets	Positive[5]	Author's calculations using data from RBZ
TE	Technical Efficiency is the ratio of overheads to bank revenue.	Positive[6]	Author's calculations using data from RBZ
LD	Proportion of loans to deposits	Negative[7]	Author's calculations using data from RBZ

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[3] As discussed in literature

[4] Beck, Demirgüç-Kunt and Levine (2006), venturing into non-interest income generating activities enhances the rate of return on assets which increases stability only if done at low levels. According to Amidu and Wolfe (2013) high diversification may increase the agency problem and may lead to profit volatility which may result in bank fragility.

[5] Bailey-Tapper (2009) suggests that if a bank specialises in disbursing loans, it will have quality screening and monitoring skills and this can reduce non-performing loans.

[6] Boyd, De Nicoló and Jalal (2006) and Mulyaningsih (2014) a high ratio of overheads to bank revenue implying a low technical efficiency may reduce the capacity of a bank to generate profits

[7] See (Freixas and Freixas, 2015; Titko, Kozlovsis and Kaliyeva, 2015; Ahamed, 2016; Sarpong-kumankoma, 2016)

SIZE	Strength (size) of the bank measured by total assets of a bank.	Negative[8]	Author's calculations using data from RBZ
EG	Economic Growth	Positive[9]	World Bank Website
INF	Rate of Inflation	Negative[10]	World Bank Website
UNE	Unemployment	Negative[11]	World Bank Website
$Zi(t-1)$	Lag of the dependent variable (risk of failure) that is previous risk	Positive[13]	Author's calculations using data from RBZ
$\beta_0, \beta_1, \beta_2 \ldots \ldots \ldots \beta_{10}$	Coefficients to be estimated		
E	The error term which is assumed to be Independent and Identically Distributed (IID) and stationary		
i and t	Relate to bank and time indicant respectively		

In this model bank specific variables are *NIY, LTA, TE, LD* and *SIZE* while control variables are *EG, INF* and *UNE*. Lagging the dependent variable (Z) makes the model a dynamic panel model. Data used were relating to 2009-2017.

The GMM eliminates the entity specific effects by differencing the explanatory variables. The system –GMM can combine level regression with difference regression. It uses the differenced explanatory variables as instruments to address the endogeneity problem. In order to check for the consistency of the model, the validity of the instruments was tested. Arellano and Bond (1988) and Arellano and Bover (1995) suggested the use of the Sargan test. The Sargan test verifies the validity of all instruments by analysing the sample analogue of the moment conditions used during the estimation procedure. In addition, serial correlation of errors was carried out. This test is carried out in order to check whether the differenced error term is second order serially correlated. If the null hypotheses of both tests are rejected, then the model is consistent. The system-GMM is used to estimate dynamic models (Arellano and Bond, 1988; Arellano and Bover, 1995; Mulyaningsih, 2014). It manages the problems associated with joint endogeneity of independent variables and induced unobserved entity specific effects (Beck, Demirgüç-Kunt and Levine, 2006). According to Greene (2007), a GMM estimation can be done from the following heterogeneous panel data framework:

$$Yi,t = \alpha Yi,t-1 + \beta Xi,t + \gamma i + \varepsilon i,t \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots . . (2)$$

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[8] Owing to the 'too big to fail' moral hazard of Mishkin (1996)
[9] See Kindleberger (1978) and the business cycle approach
[10] See Crockett (1996)
[11] Bailey-Tapper (2009) and Jiang (2014) explains the impact of unemployment on stability [13] As contained in the stability framework of (Houben, Kakes and Schinasi, 2004).

In order to eliminate the individual specific effects, equation (2) should be differenced. This will give the following equation;

$$\Delta Y_{i,t} = \alpha \Delta Y_{i,t-1} + \beta \Delta X_{i,t} + \Delta i, t \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots (3)$$

In Equation (3) there are no more individual specific effects but there is the endogeneity of the newly constructed error term $\Delta i, t$ related to $\Delta Y_{i,t-1}$ and independent variables which require instruments. In order to make sure that explanatory variables are weak exogenous and errors are not serially correlated, the system-GMM by Arellano and Bover (1995) uses the moment conditions bellow:

$$E[Y_{i,t-s}(_{i,t} - _{i,t-1})] = 0; for \ s \geq 2; t = 3, \dots \dots , T, \dots \dots \dots \dots \dots \dots \dots \dots \ (4),$$

$$E[X_{i,t-s}(_{i,t} - _{i,t-1})] = 0; for \ s \geq 2; t = 3, \dots \dots , T \dots \dots \dots \dots \dots \dots \dots \dots \ (5).$$

Having set these two moment conditions, the difference estimators can be efficient. For level regressions, two more conditions have to be set. These are specified as follows:

$$E[(Y_{i,t-s} - Y_{i,t-s-1})(\mu_i - _{i,t})] = 0; for \ s = 1 \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \ (6)$$

$$E[(X_{i,t-s} - X_{i,t-s-1})(\mu_{i,} - _{i,t})] = 0; for \ s = 1 \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \ (7)$$ These four conditions and GMM procedures were used to generate consistent and efficient parameter estimates.

Measurement of Bank Stability and Financial Inclusion

Bank stability was measured using the Z-score. A higher Z-score implies a low probability of failure which means the bank is stable. In contrast, a lower Z-score implies a higher risk of insolvency. In calculating the Z-score, this study adopted the formula by Mulyaningsih (2014) as follows:

$$z_{it} = \frac{E(ROA)_{it} + EQTA_{it}}{\delta(ROA)_{it}} \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \ (8)$$

where[12]: ROA_{it} is the two year rolling average of return on assets recorded for bank *i* at time *t*.

$EQTA_{it}$ is the two year rolling average of the ratio of equity to assets for bank *i* at time t.
$\delta(ROA)_{it}$ is the standard deviation of return on asset based on two years calculations for bank *i* at time *t*.

The above formula (Equation 8) shows that higher capitalisation and profitability increases the Zscore (stability) but higher volatility reduces the Z-score (Beck, 2008a). 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 (Beck, Jonghe and Schepens, 2011). These three measures are the components of the Z-score (insolvency risk measure). Therefore by analysing the impact of explanatory variables on this Z-score, the source of instability can be identified. Using a two year rolling window captures variations in capital, profitability and the external environment (Schaeck, Cihak and Wolfe, 2009).

Financial Inclusion

The index used in this study adopted the approach developed by (Kainth, 2004) by measuring it as a multi-dimensional index. The Financial Inclusion Index (FII) presented paper takes three basic dimensions, which are the size of the banked population (measured by bank

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[12] The ROA, EQTA and δ(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.

penetration), availability of banking services and usage of the banking system. These dimensions were adopted because of their popularity in literature and availability of data. Availability was measured using number of ATMs per 1000 people while usage was measured using volume of deposit as proportion of the GDP. The Financial Inclusion Index (FII) for each year was measured by the normalized inverse Euclidean distance of each point d_i from the ideal point in the multidimensional positive quadrant {I=(1,1,....,n). This formula is presented as follows:

$$FII_t = 1 - \frac{\sqrt{(1-d_1)^2 + (1-d_2)^2 +, ..., (1-d_n)^2}}{\sqrt{n}}$$

'The numerator of the second component is the Euclidean distance of d_i from the ideal point I, normalizing it by n and subtracting by 1 gives the inverse normalized distance. The normalization is done in order to make the value lie between 0 and 1 and the inverse distance is considered so that higher value of the IFI corresponds to higher financial inclusion' (Kainth, 2004).

Now, considering the three dimensions: availability, penetration and usage, a three dimensional Cartesian space was created such that 0≤ a, p, u ≤ 1. The point (0,0,0) would represent complete financial exclusion while point (1,1,1) would represent complete financial inclusion. The formula above would be presented as:

$$FII_t = 1 - \frac{\sqrt{(1-a_t)^2 + (1-p_t)^2 + (1-u_t)^2}}{\sqrt{3}}$$

Robustness Checks
The model was tested for robustness using two tests. The Sargan Test was used for testing the validity of instrumental variables used. The Arrellano-Bond test was used to test for the presence of serial autocorrelation.

Presentation of Results
Table 1 relates to descriptive statistics. The results relate to seventeen banking institutions which were in the industry during the period under study. There is generally low stability in the banking sector as well as very high financial exclusion. The averages for these variables are generally lower

than their maximum values attained in the industry. The bank specific variables are showing low ratios as well representing poor performance in the banking sector. The macroeconomic environment is characterised with low economic growth on average and low variations in
inflation and employment.

Table 1
Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max

Z	153	18.1256112.47478	5.009383	66.78272
FI	153	.0313412.0424555	.0089292	.0483744
SIZE	153	3.45e+043.23e+02	4.00e+87	1.97e+89
NIY	153	1.111112.9599383	.0683873	6.773733
LTA	153	.3658585.3428484	1.00e-36	2.788923
TE	153	5.7585754.793898	.0484787	36.00737
LD	153	2.4784731.948484	1.02e-36	11.04788
EG	153	6.7828226.110938	.7	16.3
UNE	153	5.392928.1940090	5.1	5.4
INFL	153	99.474843.007893	95.4	100.6

Source: Author's Computations in Stata 13

Multicollinearity

The pairwise multicollinearity matrix does not show any sign of serious multicollinearity as
presented in Table 2 below.

Table 2
Multicollinearity Results

	FI	SIZE	NIY	LTATE	LD	INFL	RGDP	UNE
FI	1.0000							
SIZE	0.1536	1.0000						
NIY	-0.3645	-0.3081	1.0000					
LTA	0.1026 1.0000 4	-0.1678	-0.6232					
TE	0.4565 0.1429 0	0.3194	-0.0469	-1.0000				
LD	0.0097 0.1862 7	-0.1365	-0.1827	0.0390	1.0000			
INFL	-0.5165 0.0556	-0.1143	0.2844	--0.4331	-0.1114	1.0000		
RGDP	-0.4367 0.0346	-0.1595	0.3078	--0.6125	-0.0033	0.6081	1.0000	
UNE	-0.7212 0.0146	-0.3236	0.1978	-0.5032	-0.1561	0.6759	0.6988	1.0000

Source: Author's Computations in Stata 13

Regression Results

The model satisfied both tests that is validity of instruments and absence of serial autocorrelation. The results of the regression are presented in Table 3 and are to be discussed in the following sections.

Table 3
Regression Results

Variable	Coefficient
Constant	2.733583
Z_{t-1}	0.994628***
FI	18.08170***
SIZE	-0.04671
NIY	0.000878
LTA	0.2681103***
TE	0.0556747***
LD	-0.410077***
EG	0.0746932
UNE	1.128921
INFL	-0.0011883**

Wald Chi2(10)=12145.89
Prob>Chi2=0.0000
*Sargan Test for overidentifying restrictions: Chi2(13) =8.93737****
Prob >Chi2 =0.876
*Serial Correlation (Arrellano Bond test)-Order 1=0.22352****
*Order 2=-.74108****
Instruments for differenced equation
GMM type: (L2/.).Z
Standard: D.B D.SIZE D.NIY D.LTA D.TE D.LD D.EG D.UNE D.INFL
**represents significant statistics at 5%
*** represents significant statistics at 1%

Results are reflecting on the importance of financial inclusion. There is a positive relationship between financial inclusion and bank stability in Zimbabwe. Increasing financial inclusion results in 0.1808170 percent increase in stability. As most people are financially excluded due to lack of trust in the banking system, the business of the banks is falling. Increasing inclusion can sustain the functionality of the banking system. Other variables which increase stability include previous levels of stability- intuitively correct as a reinforcement; total loan disbursement increases stability by 0.2681103 percent - which some scholars regard as an approach to include financial stability and technical efficiency also increases stability by 0.0556747 percent.

However, increase in loans in relation to deposits is an enemy of stability. An increase in loan to deposit ratio reduces stability by 0.410077 percent. This threatens the levels of liquidity of the banks. Inflation is another factor that reduces stability in the banking sector of Zimbabwe. As inflation increases stability falls by 0.0011883 percent since bank runs tend to increase faster, this can cause systemic risk.

Conclusion

The approach to foster financial inclusion has been overarching in developing country. This study has been motivated by the strategies being put in place in Zimbabwe in order to increase financial inclusion. Some of the strategies are documented in the *Zimbabwe Financial Inclusion Agenda of 2016-2020* and are major policy issues which may have different impacts on the economy. Literature suggest a two may channels of the impact of financial inclusion on the banking sector itself. Financial inclusion can foster stability in the financial sector or reduce stability. This paper used a system GMM approach to analyse the effect of financial inclusion on the stability of the banking system. The results of this study suggest that financial inclusion can increase stability in the banking sector. This entails a positive, holistic approach towards implementation of agenda 2016-2020. In essence, financial inclusion is designed to bring about capacity to the economically and socially excluded population by creating equal opportunities. In order to achieve a sustainable financial inclusion framework there is need for viable business models (such as mobile money services), efficient, cheap and non-complicated technology contained in an appropriate regulatory approach by the Central Bank. What is of much concern is to make sure that the strategies used to make financial inclusion attainable make the services available, affordable and usable. However, there is need to take a further study that illuminates the linkage between financial stability and access for well-informed policy implications.

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