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Competition-Stability Nexus in the Banking Sector of Zimbabwe (2009-2016)

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*A Dissertation Submitted in Partial Fulfilment of the Requirements of a Master of Science
Degree in Economics*

DECLARATION

I declare that the entire work contained in this paper is my original work and has not been submitted for any examination purposes to any University. Any uses made within it of the works of other authors in any form (such as ideas, equations, figures, text, and tables) have been acknowledged accordingly.

Signed: _____

Date: ____/____/2018

DEDICATION

Dedicated to Penny Went for your motherly love.

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ABSTRACT

This study explored the relationship between competition and stability in the banking sector of Zimbabwe. The aims were to investigate the relationship between competition and stability in the banking sector of Zimbabwe and to establish the determinants of bank stability in Zimbabwe. This was done using the System Generalised Method of Moments (GMM) because it can solve the endogeneity problem between the measure of stability and the measure of competition. The GMM uses the lags of the dependent variables as instruments in the equation thereby managing the endogeneity problem. Panel data of 17 banking institutions from 2009 to 2016 were analysed using Stata 13. The results suggest that competition leads to stability instead of the fragility. This implies that competition enhances the stability of the banking system in Zimbabwe. Previous stability level contributes positively to current stability. The results also suggest that stability in the banking sector can also be enhanced through increase in loan disbursement and technical efficiency. However, increase in loans in relation to deposits reduces stability by increasing liquidity risks.

The study recommends financial liberalisation through facilitating existence of a contestable market, that is, a market with zero entry and exit costs, where there are no barriers to entry and exit such as sunk costs. The regulatory authority should design proper ease of entry and exit policies for insolvent banks and reduce the too-important-to-fail subsidies. Enough credit information should be enabled to flow easily and fast. The government should also enable the increment of loan customer base by giving property rights to farm owners; respecting and protecting property rights so that they can be recognised by banks as credible collateral security. This study also recommends the maintenance of the loans to deposits ratio at optimum levels in order to control liquidity problems.

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LIST OF ACRONYMS AND ABBREVIATIONS

CR	Concentration Ratio
EMH	Efficiency-Market-Hypothesis
ESAP	Economic Structural Adjustment Programme
GDP	Gross Domestic Product
GMM	Generalised Method of Moments
HHI	Herfindahl- Hirshman Index
NIO	New Industrial Organisation
QLH	Quiet Life Hypothesis
RBZ	Reserve Bank of Zimbabwe
SCP	Structure-Conduct-Performance
ZIMPREST	Zimbabwe Program for Economic and Social Transformation

CHAPTER I

INTRODUCTION AND BACKGROUND

1.0 Introduction

Tobin (1996) posits that governments regulate financial institutions more than any other sector of the economy. This view drew much attention by the beginning of the global financial crisis of 2008. Since the financial crisis of 2008, the competition-stability nexus has received much focus with an increasing number of researches. Its importance became prominent as policies had become pro-liberalisation to stabilise banks through mergers. Experts have questioned whether approaches to relax competition rules in the banking sector such as the 1970s financial liberalisation or the consolidation in the sector have resulted in a more or less fragile financial system (Ifo and Aper, 2013).

Literature is not conclusive regarding the effect of competition on financial stability. The major antagonistic views hold: the ‘competition-stability’¹ view- increased competition increases stability in the banking industry against the ‘competition-fragility’² view- increased competition increases fragility in the banking industry. A comprehensive ex-ante competition framework can only be arrived at with an explicit understanding of the relationship between competition and stability. The ramifications of authorising a merger in the banking industry should be backed by a trade-off between stability and competition.

The debate has evolved over time, from the great depression of the 1930s, in advanced economies there was a view that there is a trade-off between competition benefits namely productive, dynamic and allocative efficiency vis-à-vis the costs of the likelihood of bank failure (Ahamed, 2016). This led to the high protection of the banking system with very low levels of competition. Regulations put in place post the great depression period suggest that policy makers were of the view of ‘competition-stability’ and ‘competition- fragility’. From 1970, the views became less important as deregulation policies were put in place leading to increasing competition from domestic and foreign banks. In the 1980s more banks entered the banking industry, more competition was the result. This competition increased up to the 2008 financial crisis onset, and as a therapy to the crisis, a number of countries relaxed the

¹ see (Mishkin, 1996), (Berger and Hannan, 1998), (Boyd, De Nicoló and Jalal, 2006) & (Schaeck and Cihák, 2012).

²see (Keeley, 1990), (Allen and Gale, 2000) & (Davis, 1995)

competition policy and permitting takeovers enabling establishment of giant banks which is of the view of competition-stability.

According to Vourdas (2017), post-crisis regulatory reform has focused much on increasing systemic stability by consolidating each bank's resilience to adverse shocks. A narrow definition of systemic banking crisis is a situation where the failure of a single financial institution leads to a sequential fashion on other financial institutions or markets having adverse effects such as their crash or failure. The analysis includes financial distress in one institution which can cause a contagion effect³ on others but excludes conditions in which all banks are hit by a common shock like poor macroeconomic fundamentals. The concept of systemic banking crises is of much interest to policy makers with the need to secure the continuity of the role of banks of intermediating which is special and unique in the economy, whilst eliminating the possibility that failure of a single bank causes systemic risk to the economy as the customers of the failed bank would switch to other banks.

1.1 Background

After the hyperinflationary period of 2007-08, the significance and the role of the financial sector in Zimbabwe grew substantially. According to Nhavira (2014) financial assets relative to Gross Domestic Product (GDP) increased significantly. The financial sector plays a very important role in supporting and enhancing economic activity through facilitation of payments, intermediation between savers and lenders, among others. The vulnerability of the system which results from prudential, systemic and market conduct perspective is the one that calls for more attention. This is because it may result in turbulence and contagion which result in loss of confidence in the banking industry.

Zimbabwe moved out of the financial crisis in 2009, after almost a decade of falling GDP and hyperinflation; finally switching to dollarization after abandoning the local currency. The financial crisis revealed weaknesses in the supervisory and regulatory regimes.

Zimbabwe's supervisory and regulatory framework in the financial sector was inherited from the government of Rhodesia in 1980 at independence. The explicit financial repression period (1980 to 1990) was characterised by a number of government controls on interest rates determination and credit rationing (Chigumira and Makochehanwa, 2014) . Most of the

³ Contagion effect can occur in two forms: (i) the bankruptcy of a bank increases the uncertainty of other banks' clients regarding the immunity of their own banks and may induce them to withdraw their deposits; (ii) because banks hold claims on other banks, the bankruptcy of one of the banks may cause losses also to other connected banks.

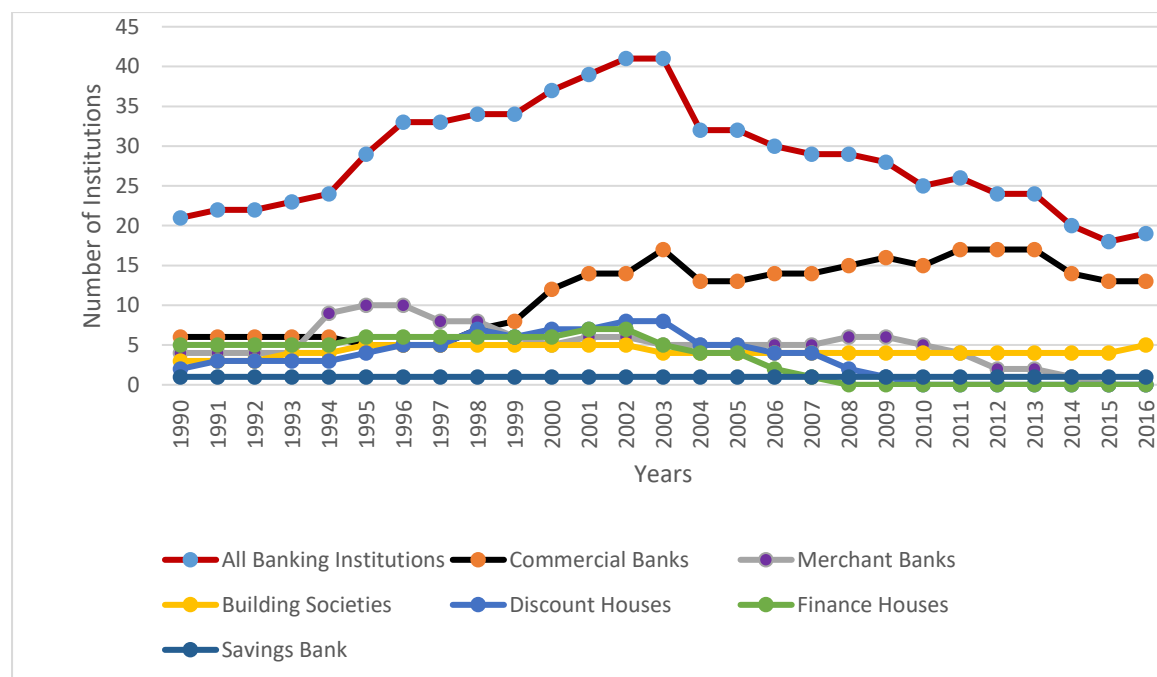
controls were however removed during the reform period (1991 to 1999) when government adopted a financial reform policy agenda under the Economic Structural Adjustment Program (ESAP) in 1991 and the Zimbabwe Program for Economic and Social Transformation (ZIMPREST) in 1996. The latter was adopted in order to reverse the earlier. The reform period was characterised by a number of policy changes taking place including interest rate decontrol, licensing of new banking institutions which saw the emergence of indigenous banks, establishment of bureau de change to facilitate buying and selling of foreign currencies and defragmentation of the functions of financial institutions.

The period of 2000 to 2008 was characterised by policy dynamics and the main highlights include foreign currency rationing following the banning of bureau de changes (Chigumira and Makochekeanwa, 2014). This development induced the emergency of parallel market activities. The last period, the dollarization/multi-currency period (2009 to 2016) saw the suspension of the local Zimbabwean dollar currency from functioning as legal tender and instead allowance of multicurrency regime. Regulators of the capital markets were the Reserve Bank of Zimbabwe (RBZ), the Zimbabwe Stock Exchange and the Commissioner of Insurance and Pension Funds. The Insurance and Pension Fund Commissioner replaced the Commissioner of Insurance by the Act 7 of 2000, and the Securities Exchange Commission superseded the Zimbabwe Stock Exchange by the Securities Act 17 of 2004 (Mambondiani, Zhang and Arun, 2010). It is important to note that there was no bank collapse nor financial crisis till 1990 as the framework was as it was since independence.

1.1.1 The Economic Structural Adjustment Programme (ESAP) Period and Beyond

The liberalisation of the financial sector in Zimbabwe was an integral part of the Economic Structural Adjustment Programme (ESAP), a programme which was introduced by the government in 1991. It was aimed at restructuring the economy from a predominantly state interventionist type of economic management towards a more market-driven system. In 1991, Economic Structural Adjustment Program (ESAP) was introduced by the government, part of it was implementation of reforms in the financial sector through deregulation and liberalisation. The main argument was on the oligopolistic structure which was in the industry that was inhibiting competition and depriving sovereignty of choice as well as quality in service (Kadenge and Tafirei, 2012). There was low efficiency and innovation. The Ministry of Finance and the RBZ started to issue new licences to players in the financial sector resultantly, from 1993 to 2003 there were many new players in the sector.

Figure 1: Trends of Banking Institutions



Source: RBZ Annual Supervision Reports⁴

The Figure 1 above shows that banking industry is on a contracting trend since 2003 owing to collapsing of banks. In Figure 1, before financial reforms (1990), only 21 banking institutions were in the industry, but by 1993 they had increased to 23, before the massive banking institutions collapse in 2004, they had increased to a total of 41 by 2003. In 1990 before the reforms, there were 6 commercial banks, 5 merchant banks, 5 finance houses, 3 building societies and 2 discount houses only. In 1998, commercial banks rose to 7, United Merchant Bank collapsed in the same year (Mambondiani, Zhang and Arun, 2010). From 2000 to 2003, commercial banks increased from 12 to 17. From then, a number of banks were put under curatorship and banking licences of some of these banks were cancelled (Chigumira and

⁴ Data from the Reserve Bank of Zimbabwe Annual Supervisory Reports were collected by the author from the 1990 report to the 2016 report.

Makochekanwa, 2014). Discount houses increased to 8 by 2003, then started to decline to zero by 2010, the same trend applies to finance houses. Entry into the industry before liberalisation (1990) has been limited due to policies such as 30% local shareholding, as well as tight foreign currency controls (Nhavira, 2014), but after liberalisation, entry increased as well as collapse of many banks increased but not instantaneously. Currently, there are only 19 banking institutions of which 13 are commercial banks as shown in Figure 1. Generally, the banking sector is contracting, banks are collapsing at the same time the Central Bank is fostering implementation of Basel Accords (Reserve Bank of Zimbabwe, 2017). It is to the satisfaction of the Reserve Bank that all banking institutions have implemented Basel Accord II, and now aiming at making sure that Accord III will be implemented. Collapsing of institutions has been reducing competition in the industry but could have implications on stability. More tightening controls came up through the indigenisation and empowerment policy. Therefore, more entrants were local.

The Banking Act was revised in 2000, thus enabling non-commercial banking institutions to transform into commercial banks through performing more functions apart from those on their licences (Katuka, 2013). This transformation was a reflection of the effects of liberalisation and deregulation of the 1990s which removed market segmentation and interest controls and credit controls. Most significantly, the liberalisation of entry into the financial industry leading to increased competition.

In the same period, the financial sector witnessed the rising of financial conglomerates; demarcations between banking, insurance and securities disappeared. For example, the Bancassurance model has become prevalent in Zimbabwe (Nhavira, 2014). This is a situation where a commercial bank performs both insurance and banking services. The emerging of innovative financial products like Textacash and Ecocash, internet and mobile banking increased sources of fragility thus raising concerns about how conglomerates ought to be supervised (Mambondiani, Zhang and Arun, 2010).

Innovation in the sector which erupted due to technology alongside loss of confidence in the banking sector as well as the need to address the financial inclusion question resulted in mobile based products like the prominent use of Ecocash. Confidence in the banking system became low due to the hyperinflation which eroded 100 years' worth of savings (Mambondiani, Zhang and Arun, 2010). The shift to dollarization made life much harder for people even in conversion of pensions and life assurance proceeds and high bank charges. On the other hand, the RBZ

and the Ministry of Finance took too long to respond to issues of protecting bank customers and market conduct drove away many customers and opted for a backward society which is cash based. Besides switching to cash, weaknesses in the sector have also pushed some to open accounts off-shore and prefer the use of MasterCard or Visa Cards.

The lack of confidence did not affect the Zimbabwean market only but also international players who wished to do business with Zimbabwe. These problems and the collapse of Renaissance and Interfin which were considered to be strong in the market caused a significant mishap in the market (Reserve Bank of Zimbabwe, 2011) and had significant impact on the stability of the banking system as a whole.

1.2 Problem Statement

There is a contraction in the banking sector of Zimbabwe (see Figure 1) which is due to collapsing of some banks. Since 2003, the banking sector has been contracting. The sector contracted significantly in 2004 when some commercial banks such as Royal Bank, Trust Bank, Barbican Bank and Time Bank were placed under curatorship and the RBZ withdrew their licenses (Reserve Bank of Zimbabwe, 2004). According to Mhlanga (2016) the collapse of six banks namely Trust Bank, Genesis Investment Bank, Royal Bank, Interfin Bank, Allied Bank and AfrAsia had an aggregate cost of US\$190 million on depositors. Issues of over-trading, failure to manage risk, credit defaults and competition were suspected to be the main causes. Policies have evolved from liberalization to controls. The current stance of the increase in regulations and tightening controls in accordance to the Basel Accords II and III has implications on competition which impliedly affects stability as well. Before liberalisation and deregulation in the banking industry there was no massive bank failure but during liberalisation of the industry, banks began to collapse starting with the United Merchant Bank in 1998. Though there was an increase in entry of banks into the industry, there was an increase in collapsing banks as well. After the 2008 global financial crisis, policies became pro-restrictive in support of regulatory views such as too big to fail, for instance the setting of new minimum capital levels (Jabangwe and Kadenge, 2013). Despite this change banks continued to fail. Bank failure has been recorded both during liberalization and even in conditions of controls and restrictions in the banking industry. In face of inconclusive literature about competition-stability relationship, there is no research on Zimbabwe and other developing countries to explain this relationship in order to help on policy formulation hence this study will establish this relationship.

1.3 Objectives

The main objective of this study is to assess factors affecting stability in the banking sector of Zimbabwe. Specific objectives are

- i. To establish the relationship between bank stability and competition in Zimbabwe.
- ii. To establish the determinants of bank stability in Zimbabwe.

1.4 Research Questions

- i. What is the relationship between bank stability and competition in Zimbabwe?
- ii. What are the determinants of bank stability in Zimbabwe?

1.5 Justification of the Study

The study is important for the banking sector of Zimbabwe because it tries to establish and quantify the relationship between competition and stability in the Zimbabwean banking sector especially in the view of the major role of the intermediation played by banks. The intermediation role played by banks is very crucial because it links lenders and borrowers hence banks should be stable stewards in order to facilitate this role appropriately. Understanding that capital markets and money markets are still infant or at times non-existent in comparison to developed countries gives an insight on policy making. The results of this study inform on regulatory and supervisory issues, against the current stance which is pro-controls.

Since there is no study on Zimbabwe focusing on competition –stability issues, this can provide a useful step in trying to quantify the relationship. By examining both bank specific factors and macroeconomic factors, this study may help in discussing possible bank fragility issues in the country, in which case the framework would also be used on other developing countries with similar features.

1.6 Organisation of the Rest of the Study

The following chapter will be on literature review. Chapter three will be on the methodology used to answer the problem question. Results will be presented in chapter four whilst chapter five will present summary, conclusion and policy recommendations.

CHAPTER II

LITERATURE REVIEW

2.0 Introduction

This chapter focuses on literature based on competition and stability. There is theoretical literature on competition as a concept. Competition policies are thought to influence stability in the banking sector, hence, a theoretical background of competition and how it can be best measured is discussed. Theoretical literature on the stability framework is analysed in order to understand the parameters in which stability can be assessed. Furthermore, literature on competition stability nexus is presented. This literature helps in building basis for predicting the relationships between competition and stability upon which the methodology will be modelled. Empirical literature relating to the relationship between competition and stability will be presented which will aid in building the methodology of this study as well.

2.1 Theoretical Literature

Theoretical Concept and Determinants of Competition in Banking

Structure-Conduct-Performance (SCP) Paradigm - Mason (1939)

The Structure-Conduct-Performance (SCP) paradigm suggests that there is a relationship between the structure of the industry and the performance of the industry (Mason, 1939). The relationship is assumed to be exogenous by assuming that structure is exogenously determined. The number of firms in the industry (structure) has implications on the behaviour of each firm, this in turn affects competition and performance of the industry. A concentrated market reduces competition which results in less competitive behaviour, resultantly firms will earn more profits through high prices. On the contrary, low concentration enhances competition which results in better performance such as low prices and low profits. This theory suggests that the identification of structure is important before interfering with the level of competition.

Mason (1939) argues that differences in market structures is the cause for different prices. Market structures distribute resources between producers and consumers. In a monopoly industry, firms invest and produce below the level of a competitive market to keep prices up. Producers then gain profits whilst consumers loose. Berger and Hannan (1998) illustrated that the SCP paradigm holds in a banking sector where banks in concentrated markets had lower

deposit rates than in less concentrated markets. In addition, they found out that structure promotes price rigidity.

Competition in the SCP hypothesis is measured by two prominent methods: the concentration ratio (CR) and the Herfindahl- Hirshman index (HHI), though there are other methods but not popular in literature. In an industry of n - banks, calculating CR_j (the first index) one adds the market shares of j largest banks in the industry and ignores all other banks (Mustafa, 2014). Berger and Hannan (1998) asserts that the concentration ratio is backed by the assumption of industry being controlled by few large banks. But, the HHI takes all banks in the industry but assigns weights to each bank in the industry. This normally gives it an advantage over the CR_j .

The approach to strengthen the banking sector by increasing capital requirements and better risk management has implications on the structure of the industry as banks which were not able to meet the requirement had to exit or be taken over by others. It has also implications on potential entrants. The introduction of the Basel II made the environment more restrictive by requiring banks to abide by the new minimum capital requirement and prudent assets management system.

Non-Structural Paradigm/ New Industrial Organisation (NIO) and the Austrian View – Baumol (1982)

The Non-Structural paradigm goes beyond the number of firms in the industry. It suggests that a small number of firms in an industry can result in a competitive industry. This approach argues that market structure is endogenous rather than being exogenous as suggested by the SCP. Earlier studies by Demsetz (1973) and Peltzman (1977) argue that the structure of the industry is determined by efficiency levels hence contestable markets play a major role on structure. This became the foundation of the Efficiency-Market-Hypothesis (EMH). An efficient firm determines the firm's share in the market thus the relationship between concentration and efficiency is positive but in SCP concentration is explained by collusion. The EMH make use of the Lerner index by Lerner (1934) to determine the level of efficiency and competition. The index reflects the level of market power a firm has. It measures the extent to which a firm is able to charge a price greater than the marginal cost. The index ranges from 1 to 0 whereas a greater value represents market power. Therefore, in NIO, competition is explained by efficiency and not collusion.

Based on the Austrian view or school of thought, Baumol (1982) brought a significant contribution by explaining how contestable markets exist. This highlighted the significance of

non-existence of barriers of entry and exit which promotes competition. When there is freedom of entry and exit, incumbent firms will be pushed to be efficient since any excess profit may attract new entrants. In the contestable markets model, entry and exit are assumed to be costless by proposing that there is no any disadvantage in relation to production technique or product quality in comparison to the incumbent. Potential entrants have room for evaluation of profitability using pre-entry prices hence contestable markets have no profits thus prices are equal to marginal cost. In the case that the incumbent makes profits other firms will enter the market. Therefore, there are no inefficiencies. If entry and exit is costless, then few firms can be efficient (Baumol, 1982). These findings stress the significance of public policies of competition in the banking industry. Liberalisation, consolidation or deregulation may impact competition in banking since they influence the extent to which the industry is open.

Berger (1995) criticised the EMH by arguing that market share is not a good measure of market efficiency but rather scale and X-efficiencies should be used because they are more direct in measuring efficiency. The study argued that controlling for efficiency is important so that the outcome would not be ambiguously resulting from either greater market power or superior management.

In NIO, assuming market structure is endogenous, three traditional models were developed to determine the level of competition which are the Panzar and Rosse (P-R) model (1987), the Bresnahan model (1982) and the Iwata model (1974). In the Iwata model (1974), an oligopolistic structure is assumed where each bank supplies a homogeneous product. Market power is estimated by measuring assumptions a firm can make about its rival's reactions when responding to its own actions (conjectural variation). However, in practice this is too technical because determinants of profitability in this model are interrelated making them hard to observe. In addition, if data about production and cost is unavailable, the model becomes difficult to empirically estimate.

Bresnahan (1982) and Lau (1982) developed the Bresnahan model posing the assumption of homogeneity of all banks which perform the role of intermediation. A short run model was developed in which each bank uses many input factors to produce only a single output. The model determines market power of an average bank through conjectural variation. Demand and supply curves in the market are used to determine conjectural variation whose values range from zero to one. If the market is perfectly competitive, the value becomes one – by justification, if one firm increases output, other firms must decrease output analogously.

The Panzar-Rosse model (1987) calculates the H- statistic which is the addition of reduced form revenue in relation to changes in factor prices. Empirically, it distinguishes perfect competition from oligopoly, monopolistic competition or monopoly. The statistic can be high if there is a competitive industry, but can be low or negative in cases of a collusive oligopoly or monopoly. Although this model does not have oversimplified assumptions like the Bresnahan model (1982), data on factor prices may be difficult to get.

In addressing the issue of X-efficiency and scale, Boone (2004) came up with a modern model- the Boone indicator. It is based on measures of efficiency and market structure variables. The approach views an industry with efficient firms as that with lower marginal costs. This condition enables firms in such an industry to be able to gain higher profits through higher market shares. If the effect is stronger, the competition becomes heavier. In the Boone indicator model (2004), if banks are efficient, they opt to either pass those lower costs into either lower output prices to gain market share or higher profits. Therefore, there is a possibility that banks have a behaviour of passing their gains of efficiency to clients. The approach also assumes that product design and quality is identical though it might not be homogeneous and also ignores attractiveness of innovations. The justification for this is that banks over time are forced to adopt same line of quality and design which are more or less similar possibly due to the copying syndrome. This makes the indicator focus on the ability to be efficient as the determinant of competition. Although the indicator suffers from the disadvantage of being an estimate (like any other model based measure for instance, the H-statistic), it is the modest and most efficient way of measuring competition (Van Leuvensteijn, Bikker and Van Rixtel, 2007). To this end, this study may employ this indicator to measure competition.

Conceptual Framework for Stability

According to Jiang (2014) issues around financial stability are not yet crystal clear since there are a range of definitions, the operational definition is not typically specified, that is, variables to target. The responsibility of the Central Bank to manage it, is shared and research on the topic is still developing. Classical economics focuses on the equilibrium in the market and not on the factors which may lead to disequilibrium. This made some of the literature on stability solely define it as the absence of instability, for instance Crockett (1996), defined stability as the mere absence of fluctuations in financial asset prices or failure of financial intermediaries to meet its obligations. 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. There is interdependency between financial stability and monetary stability, or any other sector of the economy and this interconnectedness has to be taken into account.

Early scholars believed that financial instability results from macroeconomic fundamentals, that is debt liquidation (Fisher, 1933); cyclical excess (Kindleberger, 1978). They observed that when financial assets prices rise, speculators will be encouraged to finance more purchases on margin. When assets would then be significantly overvalued, there can be a sudden drop in prices which would damage the financial system. Schwartz (1987) viewed financial instability as a result of a misfired monetary policy especially disruption of money supply which would generate financial distress. Williamson (1987) used business cycles to model Non Performing Loans (NPL) thereby emphasising credit risk. Bernanke, Gertler and Gilchrist (1999) explained how macroeconomic performance would affect the financial system using inflation, GDP growth and unemployment as the major causes of instability in the financial sector. These views ignore the non-macroeconomic causes. Greenwald and Stiglitz (1992), introduced a new view point of explaining how agent behaviour would produce financial instability. This was a micro-economic perspective commonly known as the game theory.

In the 21st century two main views of financial stability developed. Some economists view instability as exogenous to the system for instance Allen and Wood (2005) and Padoa-Schioppa (2003). However, others define it as endogenously determined from the system for example Borio and Drehmann (2009) and Schinasi (2005). A comprehensive reconciliation of literature models a framework in which financial stability can be contained. This reconciliation of literature takes the traditional understanding of stability which is macroeconomic based and combines it with the micro perspective which is based on competition and the banking conditions. This has been done by Houben *et al.* (2004) where they explained financial stability as the consideration of specific states of the financial system which enables it to:

1. absorb shocks;
2. manage and assess financial risks; and
3. allocate resources efficiently.

The same authors⁵ gave five key principles that need to be taken into consideration when accounting for financial stability. They argued that financial stability is a dynamic concept

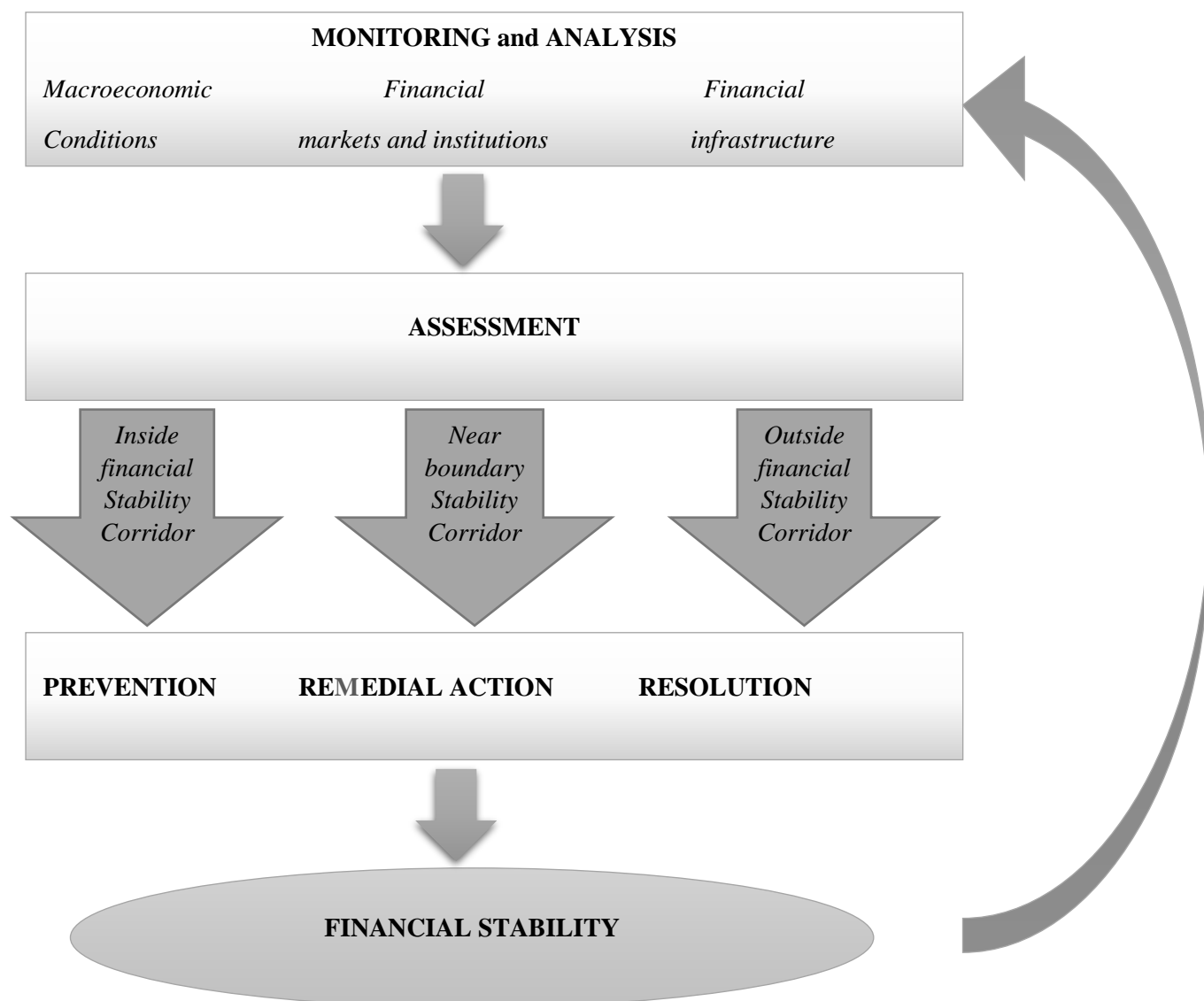
⁵ Houben et al. (2004)

which can be both inter-temporal and innovative with interconnected components of the macro economy, financial infrastructure and financial markets. The five key principles are:

1. financial stability covers various elements of the financial system such as institutions, markets and infrastructure;
2. financial stability involves savings mobilisation, development and growth, risk management, resource allocation and also a well-functioning payment system;
3. the concept of financial stability is not only limited to lack of financial crises; however, it extends to the ability of the system to contain, restrain and cope with the emerging of imbalances before changing into a threat;
4. the framework for financial stability should be modelled considering possible consequences to the real economy;
5. financial stability should be considered in parameters of a continuum.

In this regard, assessment of financial stability entails analysing endogenously a framework of variables that affect stability in the financial sector. These variables should be macroeconomic, microeconomic and bank specific based. The following diagram illustrates the endogenous model of financial stability.

Figure 2: Framework for Analysing Financial Stability



Source: Author's Summary of Information Accessed from Houben et al. (2004) p.17

Distance to bankruptcy is often used to measure stability (Beck, 2008b). Boyd, De Nicoló and Jalal (2006); Berger, Klapper and Turk-Ariss (2009) and Elferink (2011) used the Z-score to proxy the firm's probability of failure. It is calculated as the summation of return on assets (ROA) and capital-assets ratio (CAR) over the standard deviation on assets (Verschuren, 2014). A high Z-score implies stability but a low one implies otherwise, hence a negative is even worse. However, Berger, Klapper and Turk-Ariss (2009) also use NPL and capital ratio to

measure banking stability where capital ratio is believed to measure banks' ability to control risk. In contrary Beck (2008) proposes that NPL ratio only measures credit risk but not the likelihood of failure. This study may adopt the Z-score.

Competition- Fragility Hypothesis

In the competition-fragility hypothesis, the trade-off between competition and stability is explained by the charter value (Keeley, 1990), agency problems (Allen and Gale, 2000) and franchise value (Davis, 1995). Charter value shows firm rents which is measured by summing the market value of equity and liabilities at accounting value then divide by the assets at accounting value. Charter value reflects the value of the bank's ability to continue doing business in future. In an efficient capital market, an appropriate rent value is attained since firm's risk is incorporated by the capital market. Keeley (1990) posits that deregulation and liberalisation in the banking system contribute to a falling charter value. The results of the United States banking by Keeley (1990) showed that in the period of restrictions on competition and entry, bank charter values were high but in the 1970s and 1980s where competition was increased, the charter value fell. Agency problems can be induced by a lower charter value because taking excessive risk would be attractive (Allen and Gale, 2000). Therefore, a lower charter value can increase default risk by taking excess risky assets or reducing capital.

The agency problem happens when risk is shifted from the principal to the agent. According to Allen and Gale (2000), in the banking industry, the agency problem arises because banks are debt-financed and also managers (agent) would be working in the depositors' (principal) interest. The agent would then take benefits at the principal's expense. Davis (1995) suggests three conditions in which agency problem occurrence increases. These conditions are: mismatching incentives of the principal and the agent, if the principal cannot control the agent and when the principal cannot assess actions of the agent.

Banking fragility can be due to franchise value because it is significant in limiting risk taking by banks. Franchise value in this case refers to the popularity of the brand, service or bank not the traditional franchise known. Davis (1995) asserts that a fall in franchise value increases incentives for managers and shareholders to take risk. Assuming that the source of franchise value is market power, a monopolistic market contributes to banking stability. As a market becomes more competitive, firm rents will be eroded thereby inducing banks to take more risk. In addition, if government does not protect depositors, management or shareholders may

increase assets value through taking risky business, for instance investment in risky assets portfolios.

Competition- Stability Hypothesis

A number of ideas have been put forward in order to explain competition-stability hypothesis. These ideas in literature include preventing the moral hazard of ‘too big to fail’ ideology (Mishkin, 1996), the market discipline-efficiency view (Berger and Hannan, 1998), the reduced profit volatility view (Boyd, De Nicoló and Jalal, 2006) and the increased capitalisation inducement view (Schaeck and Cihák, 2012). All these views argue that bank instability results from market power emanating from high concentration in a market.

Mishkin (1996) emphasises the elimination of the moral hazard of the ‘too big to fail’ or ‘too important to fail’ view in the banking sector by the introduction of competition. The word big does not necessarily mean size of the institution but can also imply the important role played by the institution in the financial sector. In a concentrated market, large banks are most likely to take more risk because they would be receiving larger subsidies based on the ‘too important to fail’ view. Governments protect important/big banks because failure of such banks can lead to systemic risk and this can threaten the whole system. Their failure may cause panics in the financial system leading to contagion effects. By being big/ important, the banks would be an instrument to the central bank in the implementation of the monetary policy as well as retaining confidence in the sector. For these reasons, government would protect them and resultantly such banks would abuse this treatment by taking more risk (moral hazard) which may lead to its failure. Competition forces all banks to be efficient and to take less risk which removes the moral hazard of the ‘too big to fail’ view and policies.

Berger and Hannan (1998) argue that competition motivates banks to be efficient hence a less competitive banking industry is more fragile. They explained that besides deadweight loss, a less competitive industry generates other social costs. Using the Quiet Life Hypothesis (QLH) by Hicks (1935), they argue that firms in a less competitive system enjoy a quiet life due to their market power. These firms can charge high prices and enjoy abnormal profits which generates a comfort zone for them. In these markets, firms have no incentives to keep costs low. Market power may also cause managerial incompetence to exist without any intention to pursue other goals or efforts to obtain or defend market power. This view provides a competition-stability nexus via efficiency.

Boyd, De Nicoló and Jalal (2006) assume a model where banks have an option to either allocate portfolio in loans or bonds. Banks will then choose to allocate their portfolios in such a way that will achieve the maximum optimal portfolio choice. In the event that banks can invest in riskless bonds (government bonds), banks in concentrated markets prefer bonds to disburse loans (Boyd, De Nicoló and Jalal, 2006). If the market for loans is concentrated, entrepreneurs (borrowers) will have few options when looking for loans which will make borrowers willing to pay high interest rates. But banks may remain unwilling to disburse loans because high rent which banks extract from borrowers will force entrepreneurs to opt for a high level of risk so as to make the possibility of a favourable outcome small. This low probability of making a good outcome will result in increasing the possibility of default loans. The increase in possibility of default loans overrides the positive effect of increasing the monitoring activity which results in fragility in a concentrated market. Profit volatility and loans defaults result from higher rates charged by banks, this will cause fragility. However, in a competitive industry for loans, there will be stiff competition which encourages banks to lend more at lower rates. This stabilises profits and thereby enhancing bank stability.

Schaeck and Cihák (2012) argues that increase in competition induces banks to increase their capitalisation. In trying to model the relationship between competition in the banking sector and capital ratios level, they discovered that banks would act prudently by increasing their capital level in highly competitive conditions. This is the move banks would take in stiff competition which would increase their resilience to shocks. All these views may work together in a competitive set up to promote stability. Therefore, at times it would be difficult to determine which view has promoted stability in face of competition in the banking industry.

2.2 Empirical Literature Review

Financial stability policy debate has focused much on competition in the banking sector. In other markets, economic wise, competition is considered as a pre-requisite for enhancing effective market system. Various empirical researches have been contradicting this view, proposing that monopoly enables banks to earn higher incentives to expand their relationships with borrowers. Empirical results have been inconclusive on the relationship between banking industry competition and stability. Studies that provide evidence for the competition–fragility hypothesis include Beck, Demirgüç-Kunt and Levine (2006), Berger, Klapper and Turk-Ariss (2009), Fungáčová and Weill (2013) and Diallo (2015). They find similar results, suggesting that increased competition may undermine bank stability. On the other hand, gains in market power will increase the stability and reduce the risk for the banking system. In contrast, a

number of studies have found support for the hypothesis that competition enhances bank stability, for example, Boyd and De Nicoló (2005), Schaeck, Cihak and Wolfe (2009), Uhde and Heimeshoff (2009) and Schaeck and Cihák (2014). There is a view that increase in competition may lead to fragility thus reducing competition is necessary to conserve stability in the banking system. After the financial crisis of the 1930s which led to imposition of restrictions with the aim to confine competition in the banking sector. Between the 1970s and the 1980s, financial liberalisation was the main policy which resulted in free competition, but has been frequently attacked for causing fragility in the banking sector in both developed and developing countries. The 2008 global financial crisis has been ascertained to have been caused by the uncontrolled competition in the United States financial industry. This could have partly caused the boom and eventually bust in the mortgage market.

There is an inconclusive empirical literature on competition- stability or competition-fragility views just as there is an inconclusive theoretical literature. Evidence for competition-fragility hypothesis is given by Beck, Demirgüç-Kunt and Levine (2006) who suggest that in cases of highly concentrated banking industries, crises are less likely to occur. This holds even after controlling for economic shocks, macroeconomic conditions and regulatory policies. This paper studies the impact of national bank concentration, bank regulations, and national institutions on the likelihood of a country suffering a systemic banking crisis. The study used data of 69 countries from 1980 to 1997. Berger, Klapper and Turk-Ariss (2009) also found supporting evidence to the competition-fragility hypothesis. In 23 developed nations, banks with high market power have less risk to exposure. The study regressed bank equity capital, loan risk and bank risk on various measures of market power using the Maximum Likelihood technique.

Ariss-Turk (2010) finds that less competition can lead to more bank stability, and implying that an increase in competition may threaten bank stability. It sheds light on the competition-stability nexus by documenting and analysing the complex interactions between a tripod of variables that are central for regulators: the degree of market power, bank cost and profit efficiency, and overall firm stability. This study used the Lerner index as a measure of market power. Increase in competition may have significant repercussions in developing countries especially if the banking system is stressed. Amidu and Wolfe (2013) suggest that during 2000-2007 the low insolvency risk that existed among banks in developing and emerging countries could be due to the high degree of market power. Likewise, Fungáčová and Weill (2013) analysed the Russian banks from 2001-2007 using the Generalised Method of Moments

(GMM) and found out that financial stability can be undermined by the increase in bank competition.

In Africa, Kouki and Al-Nasser (2017) argue that market power increases stability and eliminates risk in the banking system. They used the Lerner index to estimate the bank level competition and analysed data for Sub-Saharan Africa using the GMM approach. They emphasise the need for the Quiet Life Hypothesis to strengthen stability in the African banking system. A study by Diallo (2015) reports that stability is greatly affected by competition. Using data of 145 countries including Africa for the period: 1997-2010, results show that increase in competition shortens the survival of the banking industry. Three measures of competition were employed, namely the adjusted Lerner index, the conventional Lerner index and the Boone indicator. The results also show that the Boone indicator give more precise results.

On the other hand, some studies found evidence of the competition-stability hypothesis. Uhde and Heimeshoff (2009) used the GMM approach to study the Eastern European banking industry for the period 1997 to 2005 and established that a low level of competition which existed in the market was more prone to fragility. On a nation level, they found out that high concentration reduces the financial market's soundness. Stability was measured using the Z-score while incorporating institutional, regulatory, bank-specific and macroeconomic factors in the model, then competition was measured using the Boone indicator.

Schaeck, Cihak and Wolfe (2009) find that a competitive industry is less prone to systemic crisis. They used the Panzar and Rosse (1987) H statistic to measure competition for 38 developed countries for the period 1980 to 2003 estimating using the Generalised Least Squares approach. Again Schaeck and Cihák (2014) carried a similar study for European Banks and established that competition enhances stability but more significantly for healthy banks than fragile banks. Using a modified methodology, Mulyaningsih (2014) established a stability relationship in the Indonesian banking system from 1980-2010 using the System Generalised Method of Moments. H-statistics derived from the Panzar-Rosse method were employed to reflect the evolution of the degree of competition, while the Z-score was used to measure bank stability in the Indonesian banking industry. The results suggested that better capitalised and more efficient banks enables banks to earn higher profits in a competitive environment. The empirical model considers the possible endogeneity between the measure of competition and the measure of a banks' stability as suggested by the literature.

Empirical literature has shown that both hypotheses are possible results. These mixed results do not take any bias towards the level of development of the nations considered since either of the hypotheses can be found valid in either a developing or developed country.

2.3 Chapter Summary

Theoretical literature on competition and stability was presented first then theoretical literature on the relationship of the two was presented later. This chapter also presented empirical literature on competition-stability nexus. The synthesis of literature shows that modest and common ways of measuring stability and competition are the Z-score and the Boone indicator respectively. This study is mostly to use these measures because they are the modest in literature and they are precise and efficient. The debate on competition-stability relationship remains inconclusive, hence it calls for country specific investigations.

CHAPTER III

METHODOLOGY

3.0 Introduction

The methodology and the estimation procedures used in this study are presented in this chapter. The literature revealed in the previous Chapter gave a solid base for the framework of the methodology adopted by this study. This methodology was then used to answer research questions presented in Chapter one by augmenting both theoretical and empirical literature reviewed in the previous Chapter. This Chapter presents the conceptual framework first, which summaries the model in which stability can be analysed as provided by theory. The model used in the analysis of data is then presented later. The data set sources and all necessary tests are discussed in this chapter.

3.1 Conceptual Model

In literature, financial stability is mostly presented as systemic or individual imbalances affecting banks. Beck (2008a) defines systemic banking difficulties as the time in which the banking system cannot exercise its roles effectively. The framework for analysing stability above shows that financial stability is an endogenous, multidimensional and extensive concept. While stability is affected by conditions in the banking sector, the macroeconomic environment may influence stability as well. Sometimes some factors may be endogenously determined. Houben *et al.* (2004) presented the theoretical model as follows:

Risk

$$= f(\text{Previous Risk}, \text{Competition}, \text{Bank Specific Variables}, \text{Control Variables}) \dots \dots \dots (3.1)$$

where risk refers to the possibility of bank failure thus implying the level of stability since they assumed that any sort of instability is associated with systemic risk and contagion effects. Explanatory variables include previous risk or stability, competition in the banking structure, bank specific variables such as total assets and loans; and control variables which are macroeconomic in nature such as inflation and economic growth.

3.2 Empirical Model Specification

A number of studies employed the conceptual models by Houben *et al.* (2004) and Vasilescu (2012) of which these two are similar. These studies include Beck (2008b); Enrique and Sánchez (2014); Moyo *et al.* (2014); Mulyaningsih (2014); Titko, Kozlovsis and Kaliyeva,

(2015) and Ahamed (2016). This study closely followed Mulyaningsih (2014) who adopted a dynamic panel data model by specifying the model as a log-log function except for the variable of competition (B) which a log transformation could not be applied because it is always negative. Competition, bank specific variables, control variables and the lag of the dependent were explanatory variables as given below.

$$\log Z_{it} = \beta_0 + \beta_1 B_t + \beta_2 \log NIY_{it} + \beta_3 \log LTA_{it} + \beta_4 \log TE_{it} + \beta_5 \log LD_{it} + \beta_6 \log SIZE_{it} + \beta_7 \log EG_t + \beta_8 \log INF_t + \beta_9 \log UNE_t + \beta_{10} \log Z_{i(t-1)} + \varepsilon_{it} \dots \dots \dots (3.2)$$

where; Z is the Z-score of risk of failure, a measure of financial stability; B is the Boone indicator (2004) measure of competition; NIY is the ratio of non-interest income to interest income; LTA is the ratio of loans to total assets; TE represents technical efficiency; LD is the proportions of loans to deposits; SIZE is the strength (size) of the bank; EG refers to economic growth; INF is the rate of inflation; UNE refers to the level of unemployment and $Z_{i(t-1)}$ is the lag of the dependent variable (risk of failure). $\beta_0, \beta_1, \beta_2 \dots \dots \dots \beta_{10}$ are coefficients to be estimated and ε is the error term which is assumed to be Independent and Identically Distributed (IID) and stationary. Finally, 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.

3.3 Justification of Variables

3.3.1 Dependent Variable

Risk (Z)

Risk is the dependent variable measure of financial stability represented by the Z-score. The Z-score measures the probability of bank failure through insolvency. It is valid by the assumption that if negative returns of a bank in a given year exceed its equity capital the risk of insolvency increases and this may force the bank to default (Mulyaningsih, 2014). In addition, the Z-score normalises equity and returns in relation to assets. Boyd, De Nicoló and Jalal (2006) view the Z-score as an indicator that identifies the possibility of insolvency occurrence caused by the inability of gross profit to cover depositors which results in depletion of equity.

The Z-score is a composite index which reflects the probability of failure when loss is greater than equity. Algebraically: $P\{r \leq -K\}$ where $K = \frac{k}{A}$ and $r = \frac{\pi}{A}$. K is the ratio of bank equity

(k) to assets (A). r is the ratio of bank returns (π) to assets (A). Posing an assumption that returns follow a normal distribution with bounded two moments μ and δ_r^2 the insolvency risk or probability as follows:

$$P\{r \leq -K\} \leq \frac{\delta_r^2}{(\mu + K)^2} \dots \dots \dots (3.3)$$

The insolvency risk which is the Z-score is defined as:

$$Z = \frac{\mu + K}{\delta_r} \dots \dots \dots (3.4)$$

The inequality in Equation (3.3) becomes: $P\{r \leq -K\} \leq \frac{1}{z^2}$. This equation means that a bank is close to failing as returns (standard deviations) fall below anticipated values and deplete the equity of the bank. The equation which follows further demonstrates this.

$$P\{r \leq K\} = P\left\{\frac{r - \mu}{\delta_r} \leq \frac{-K - \mu}{\delta_r}\right\} = P\left\{\frac{r - \mu}{\sigma_r} \leq z\right\} = P\{r \leq \mu - z\sigma_r\} \dots \dots \dots (3.5)$$

Equation (3.5) implies that there is an inverse relationship between the probability of failure of a bank and 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:

$$z_{it} = \frac{E(ROA)_{it} + EQTA_{it}}{\delta(ROA)_{it}} \dots \dots \dots (3.6)$$

where⁶: 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 3.6) shows that higher capitalisation and profitability increases the Z-score (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

⁶ The ROA, EQTA and $\delta(ROA)$ were calculated based on two year rolling averages because according to Petrescu and Pop (2016), rolling the average makes the results consistent and relevant.

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).

3.3.2 Independent Variables

Competition (B)

The Boone indicator was used to capture competition in the banking sector. The indicator measures the ability of a bank to acquire higher market share through X-efficiency. Although data on the indicator was available from World Bank (2016), this study followed closely the computation procedure in order to understand the intuition of the index. Boone (2004) considered a banking system where each bank i produces a single product which has a demand function of the form:

$$p(q_i, q_{j \neq i}) = a - bq_i - d \sum_{j \neq i} q_j \dots \dots \dots (3.7)$$

and has marginal costs (mc_i) which are constant. This industry maximises profits $\pi_i = (p_i - mc_i)$ but it has to choose the level of output q_i . Posing the assumptions that $a > mc$ and $0 < d \leq b$. The model takes a Cournot-Nash equilibrium as its first order conditions which can be written as:

$$a - 2bq_i - d \sum_{i \neq j} q_i - mc_i = 0 \dots \dots \dots (3.8)$$

Given that all banks, N , can produce positive output levels, then solving for N first-order conditions in equation (8) gives:

$$q_i(c_i) = \left[\left(\frac{2b}{d} - 1 \right) a - \left(\frac{2b}{d} + N - 1 \right) mc_i + \sum_j mc_j \right] \frac{1}{\left[(2b + d(N-1)) \left(\frac{2b}{d} - 1 \right) \right]} \dots \dots \dots (3.9)$$

The model defines profits as variable, not including entry costs. A bank enters the industry only when profits are greater than entry costs. Equation (3.9) gives the relationship between marginal cost and output. Therefore, competition increases in two ways which are; if services of different banks are closer substitutes (d increases but d remains below b) and when entry costs decline. This makes the Boone indicator be established through the relationship between market share and marginal costs as follows:

$$\ln s_i = \alpha + \beta \ln mc_i \dots \dots \dots (3.10)$$

where: $s_i = q_i / \sum_j q_j$

Equation (3.10) shows that the bank with lower marginal cost can increase its market share such that β is negative. The parameter β is the Boone indicator. The indicator is always negative, but the larger it is in absolute terms the stronger is the effect. A number of modern studies such as (Diallo, 2015; Titko, Kozlovsis and Kaliyeva, 2015; Tushaj and Hashorva, 2015) used this indicator to capture competition in banking. This variable (competition) was the test hypothesis in which the prior expectation of it is positive or negative because of the competition-fragility vis-à-vis the competition stability hypotheses in literature.

Non-Interest Income to Interest Income (NIY) Ratio

Non-interest income to interest income ratio is a bank portfolio characteristic that measures the contribution of non-interest investments of a bank in relation to interest-based activities. It reflects the extent to which a bank is diversifying into other income generating activities such as brokerage services and insurance underwriting. A low ratio suggests that a bank is specialising in lending activities only. Diversification enhances revenue and profits. In a study by 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. Therefore, the expected relationship between non-interest income to interest income ratio with risk is both negative and positive.

Loans to Total Assets (LTA) Ratio

Loans to total assets ratio is the assessment of the composition of a bank's assets. A high proportion of loans implies specialisation in issuing out loans. 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. A high ratio lowers the risk of a bank. Thus, the prior expectation in relation stability is positive.

Technical Efficiency (TE)

Technical efficiency is defined as the ability of a bank to control its overhead costs. Following 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. Thus, a positive relationship technical efficiency and stability is expected. Overhead cost was captured by the ratio of operating expenses to total revenue (Mulyaningsih, 2014).

Loan to Deposit (LD) Ratio

The loan to deposit ratio measures the level of bank liquidity. A more liquid bank is able to meet its cash demands timeously and prevents bank runs and bank defaults. Although there are a number of measures of liquidity, most recent studies such as (Freixas and Freixas, 2015; Titko, Kozlovsis and Kaliyeva, 2015; Ahamed, 2016; Sarpong-kumankoma, 2016) used loan to deposit ratio as a proxy for bank liquidity. The prior expectation is negative because the greater the ratio the less liquid is the bank.

Size (SIZE)

Most studies analysing the relationship between competition and stability factor in the impact of size on stability (Berger, Klapper and Turk-Ariss, 2009; Beck, Jonghe and Schepens, 2011; Mulyaningsih, 2014; Schaeck and Cihák, 2014a). Mulyaningsih (2014) argues that factoring in size is important to check whether large banks venture into high risk activities owing to the ‘too big to fail’ effect of Mishkin (1996). Given that the variable is associated with a moral hazard as theory say, then a negative relationship is expected.

Economic Growth (EG)

Economic growth is the change in national output over a period of time. Vasilescu (2012) presents economic growth as a macroeconomic variable that controls stability in the banking sector. As output grows, the banking sector becomes more stable. Kindleberger (1978) associated business cycles with financial instability. In times of low output, financial crises tend to be rampant. According to Beck, Demirgüç-Kunt and Levine (2006) economic growth has a strong link with development. They argue that as development increases, the financial sector becomes more sophisticated and more resilient to shocks. Economic growth measured as changes in Real Gross Domestic Product (RGDP) is expected to have a positive impact on stability.

Inflation (INF)

In theory, Crockett (1996) argues that crises erupt when the macroeconomic environment is weak particularly, high inflation and low output. Inflation refers to changes in the general price levels. A favourable macroeconomic environment has a significant impact on the capacity of

banks to capitalise (Schaeck and Cihák, 2012). An increase in inflation is expected to have a negatively impact on stability.

Unemployment (UNE)

As more people are unemployed the financial sector is expected to be unstable. Unemployment relates to the number of people who are eligible to get employment but they cannot find one. Bailey-Tapper (2009) and Jiang (2014) explain the impact of unemployment on stability via non-performing loans. Most of the non-performing loans are due to a rise in unemployment which makes investments unprofitable thus reducing the probability to paying back the amount. Therefore, unemployment has a negative relationship with stability.

Lagged Risk ($Z_{i(t-1)}$)

Theoretically, current risk of failure is affected by previous probability of failure (Houben, Kakes and Schinasi, 2004). As a bank exists, it performs as a going concern such that its current activities are a function of its previous flaws and successes (performance). A high risk of failure in the previous period may exacerbate its probability of failure in the current period. In this case, failure is explained as process not a once off activity (Houben, Kakes and Schinasi, 2004). Therefore, there is a positive relationship between previous possibility of failure and current possibility of failure.

3.4 Estimation Procedure

In order to demystify the relationship between competition and bank stability, this study used a dynamic panel data set of the banking industry. A dynamic panel data model is estimated when the dependent is expressed as a function of its lagged values and other variables (Arellano and Bover, 1995). A dynamic panel data has an advantage of managing the endogeneity problem. Literature suggests that competition measures may suffer from the problem of endogeneity. According to Berger, Klapper and Turk-Ariss (2009) and Schaeck and Cihák (2012) competition levels can be affected by the capitalisation level and the overall bank risk. Having assumed that increase in capitalisation lowers insolvency risk but low competition enables capitalisation, the opposite may happen where by a well-capitalised bank takes growth strategies and merge with another bank thereby reducing competition. In this case, the causality would have been reversed. This study employed the System Generalised Method of Moment (GMM) by Arellano and Bover (1995) in Stata 13 Software to overcome such problems.

The system GMM was employed because it was designed for data and models with the following characteristics:

1. Data with a small time series observations and relatively large number of panels.
2. A model with a linear function.
3. The dependent variable is dynamic, being explained by its previous values.
4. The independent variables are not purely exogenous; they may correlate with the error term.
5. The model assumes fixed individual effects.
6. The model assumes the existence of autocorrelation and heteroskedasticity within banks only but not applying across banks (Mulyaningsih 2014, p. 221)

These characteristics enables the System GMM to produce efficient and unbiased estimators. Equation (3.2) was estimated using the System GMM which have the econometric underpinnings specified below. Consider a shorter version of the model given as:

$$Z_{it} = \alpha Z_{i,t-1} + \beta' X_{it} + (\gamma_i + v_{it} + \varepsilon_{it}) \dots \dots \dots (3.11)$$

where: $v_{it} = \rho v_{i,t-1} + \mu_{it}$ $|\rho| < 1$

$$\mu_{it}, \varepsilon_{it} \sim MA(0)$$

γ_i is the unobserved fixed individual effect

v_{it} is a possibly autoregressive shock

ε_{it} is measurement errors which are serially uncorrelated

X_{it} is vector of explanatory variables

A dynamic version of the above model can be presented as below:

$$Z_{it} = \beta' X_{it} - \beta' X_{i,t-1} + \alpha Z_{i,t-1} + (\gamma_i(1 - \rho) + \mu_{it} + \varepsilon_{it} - \rho m_{i,t-1}) \dots \dots \dots (3.12)$$

In the System GMM, first differencing is done under the assumption that serial measurement errors (μ_{it} or ε_{it}) do not correlate with the variables (X_{it}).

$$E[n_{i1}\mu_{it}] = E[X_{i1}\varepsilon_{it}] = 0, \text{ for } t = 2, \dots, T$$

The assumption given above produces a moment condition given as:

$$E[n_{i,t-s}\Delta w_{it}] = 0, \text{ where } n_{it} = (\gamma_{it}, X_{it}, Z_{it}), \text{ for } t = 2, \dots, T$$

The model adds lagged suitable first differences of the variables as instruments. Instrumental variables are added under the assumption that they do not correlate with the presumed unobserved fixed individual effect, that is to say, $E(\Delta X_{it}, \gamma_i^*) = 0$. This makes an additional moment condition stated as: $E[\Delta X_{i,t-s}(\gamma_i^* + w_{it})] = 0$. Following Arellano and Bover (1995), this stated moment condition is only fulfilled for $s = 1$ when $w_{it} \sim MA(0)$, and for $s = 2$ when $w_{it} \sim MA(1)$. The assumption is important because it enables the use of suitably first difference lagged variables as instruments for the estimated equation in levels. The approach improves estimators' precision and reduces bias in finite samples (Arellano and O Bover, 1995).

3.5 Diagnostic Tests

There are two main tests which were conducted to give assurance on whether the model fulfilled the System GMM assumptions. These are the Sargan/Hansen Test and the serial correlation test. Multicollinearity was also tested to check the extent to which independent variables are correlated.

Multicollinearity Test

This test was conducted using the pairwise correlation matrix test. It was used to identify explanatory variables which are highly correlated. If variables are highly correlated, individual effects of coefficients would be difficult to determine. A correlation coefficient in excess of 0.8 shows that the problem of multicollinearity exists therefore one of the variables should be dropped.

Sargan/Hansen Test

The suitability of instruments was examined using the Hansen test. The instruments used are the lagged independent variables. It tested the hypothesis that errors in the first differenced equation are not correlated with the instruments. The test is computed as follows:

$$S = NJ_N(\alpha_2) = N \left(\frac{1}{N} \sum_{i=1}^N Z_i' \Delta v_{i2} \right)' W_N^{-1}(\alpha_1) \left(\frac{1}{N} \sum_{i=1}^N Z_i' \Delta v_{i2} \right)$$

The test is done using a χ_q^2 distribution, q equals the number of instruments minus the total number of parameters in the model. When the Hansen test is accepted, it means the instruments have passed the identification test therefore, the System GMM can be used to estimate the model.

Serial Correlation Test

A dynamic panel data may have serial correlation in errors measurements. If errors are correlated over time, the model would not be consistent. In the first order $[(\Delta v_{it}, \Delta v_{i,t-1}) = -\delta_v^2]$ errors can be serially correlated but in the second order $[(\Delta v_{it}, \Delta v_{i,t-2}) = 0]$ errors cannot be serially correlated (Mulyaningsih, 2014). Therefore, if serial correlation is present, the model would be transformed into the second order.

3.6 Type and Sources of Data

Panel data of all banks which were in the banking industry from 2009-2016 were used to estimate the model. Data for 2017 could not be used because it was not yet published by the RBZ. A panel of 17 banking institutions was used. Data on bank characteristics were collected from the RBZ annual supervisory reports and data on control variables were collected from the World Bank Indicators Website.

3.7 Chapter Summary

This chapter presented the methodology used in the analysis of data following Arellano and Bover (1995) and Mulyaningsih (2014) closely. The method of System GMM by Arellano and Bover (1995) was adopted because it is the most recent version of estimating GMM equations available in literature and in Econometric softwares. This modified GMM approach enables the estimation of dynamic panel data systems of equations with endogeneity problem and produces efficient estimators using short time span data. This makes results reliable. The following chapter shall present the results obtained.

CHAPTER IV

PRESENTATION, ANALYSIS AND INTERPRETATION OF RESULTS

4.0 Introduction

This chapter presents results of the study based on the methodology presented in Chapter Three. Descriptive statistics are presented first, then diagnostics tests before presentation and interpretation of results. The System Generalised Method of Moments was employed using Stata 13 to get the following results.

4.1 Descriptive Statistics

The Table 1 below presents descriptive statistics based on original values of observations before they were transformed into log form. The mean value of the measure of stability (Z) is 18.17879 which is relatively low compared to the highest recorded in the industry of 66.7 reflecting a high degree of instability. The same variable has a standard deviation of 12.36605, minimum and maximum values of 5.206738 and 66.70384 respectively. The measure of competition (B) which is the Boone indicator has a mean of -0.0880273 with a standard deviation of 0.324254, a minimum of -0.135917 and a maximum of -0.05782. The ratio of non-interest income to interest income (NIY) has an average of 1.114152, standard deviation of 0.9759993, a minimum of 0.0609011 and a maximum of 6.33944. Regarding the ratio of loans to total assets, the mean value is 0.4756775 and a standard deviation of 0.2858114. Its minimum value is 0.000000000001 and a maximum value of 2.676244. Technical efficiency (TE) has an average value of 5.906641 and a standard deviation of 4.821289, minimum and maximum values of 0.96506 and 35.00858 respectively. The mean value of the ratio of loan to deposit (LD) is 2.686666 and a standard deviation of 1.548889. It has a minimum 0.000000000001 of and a maximum of 11.03663 Economic growth (EG) has an average of 6.683333% and a standard deviation of 6.099409. It has a minimum value of 0.7% and a maximum value of 16.3%. Unemployment rate (UNE) has a mean of 5.216667%, with a minimum value of 5.1% and a maximum value of 5.4%. Its standard deviation is 0.1072457. Inflation, measured by Consumer Price Index (CPI) has a maximum of 100.6 and a minimum value of 95.4. It has a mean of 98.23333 and a standard deviation of 2.007922.

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Z	102	18.17879	12.36605	5.206738	66.70384
B	102	-.0880273	.0324254	-.135917	-.05782
SIZE	102	3.76e+08	3.77e+08	3.28e+07	1.96e+09
NIY	102	1.114152	.9759993	.0609011	6.33944
LTA	102	.4756775	.2858114	1.00e-12	2.676244
TE	102	5.906641	4.821289	.096506	35.00858
LD	102	2.686666	1.548889	1.00e-12	11.03663
EG	102	6.683333	6.099409	.7	16.3
UNE	102	5.216667	.1072457	5.1	5.4
INFL	102	98.23333	2.007922	95.4	100.6

Source: Author's Computations in Stata 13

4.2 Multicollinearity

The computation of pairwise correlation matrix presented in Table 2 shows that there is no high multicollinearity in the variables used in this study. All coefficients are less than 0.8.

Table 2: Multicollinearity Results

	B	SIZE	NIY	LTA	TE	LD	INFL	RGDP	UNE
B	1.0000								
SIZE	0.2536	1.0000							
NIY	-0.2645	-0.4081	1.0000						
LTA	0.0264	-0.0678	-0.8232	1.0000					
TE	0.5650	0.4194	-0.2469	-0.0429	1.0000				
LD	0.0977	-0.0365	-0.0827	0.0862	0.0390	1.0000			
INFL	-0.6165	-0.2143	0.1844	-0.1556	-0.4331	-0.2114	1.0000		
RGDP	-0.5367	-0.2595	0.2078	-0.0346	-0.5125	-0.1033	0.7081	1.0000	
UNE	-0.6212	-0.2236	0.2978	0.0146	-0.6032	-0.0561	0.7759	0.7488	1.0000

Source: Author's Computations in Stata 13

4.3 Sargan Test

The Sargan test was used to validate instruments used in the regression analysis. The results in Table 3 have a probability of 0.7856, implying that the null hypothesis cannot be rejected. The acceptance of the Sargan test means that all the instruments passed the tests. Therefore, the System GMM can be used to estimate the model.

Table 3: Sargan Test Results

```
. estat sargan
Sargan test of overidentifying restrictions
      H0: overidentifying restrictions are valid

      chi2(13)      =    8.831183
      Prob > chi2    =    0.7856
```

Source: Author's Computations in Stata 13

4.4 Serial Correlation

The test for serial correlation in error measurements has probabilities of 0.8231 and 0.4586 for order one and two respectively as presented in Table 4 below. Both probabilities are greater than 0.05, which implies that the null hypothesis of no autocorrelation cannot be rejected. Therefore, the regression results can be presented and interpreted.

Table 4: Serial Correlation Results

```
. estat abond

Arellano-Bond test for zero autocorrelation in first-differenced errors
```

Order	z	Prob > z
1	.22351	0.8231
2	-.74108	0.4586

```
H0: no autocorrelation
```

Source: Author's Computations in Stata 13

4.5 Presentation of Regression Results

After passing all necessary tests, the model was estimated using the System Generalised Method of Moments by Arellano and Bover (1995). The method expresses the lag of the dependent variable as an explanatory variable and also employs differenced explanatory variables as instruments to cater for the endogeneity problem as explained in Chapter Three. The regression results are presented in Table 5 which follows. The model was of good fit as

reflected by the Chi-square probability statistic. The coefficients of competition, previous risk, loans to total assets ratio, technical efficiency and loans to deposits ratio were found to be significant at 0.01 level, other variables had no significant coefficients.

Table 5: System Dynamic Panel Data Estimation Results

Dependent Variable: Z

Variable	Coefficient	Std. Error	Z	Probability
Constant	3.733583	2.36692	1.58	0.115
Z _{t-1}	0.924628	0.095364	9.70	0.000***
B	4.481704	1.297097	3.46	0.001***
SIZE	-0.0338181	0.802931	-0.42	0.674
NIY	0.058878	0.0716882	0.82	0.412
LTA	0.1681103	0.064474	2.61	0.009***
TE	0.0537747	0.0171322	3.14	0.002***
LD	-0.1594717	0.0602956	-2.64	0.008***
EG	0.0646932	0.0391744	1.65	0.099
UNE	1.128921	0.94422	1.2	0.232
INFL	0.0011883	0.0012167	0.98	0.329
Wald Chi2(10)=12145.89 Prob>Chi2=0.0000 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				

*** Denotes significance at 1% level

Source: Author's Computations in Stata 13

4.6 Interpretation of Results

The empirical results posit that there is no trade-off between competition and stability in the Zimbabwean banking system for the period 2009-2016. A competitive banking set up contributes towards system stability. These results support the competition-stability hypothesis. Therefore, the hypothesis that competition leads to fragility can be rejected at 1% level of significance. An increase in competition results in 0.04481704 increase in stability. These results are in line with (Beck, Demirgüç-Kunt and Levine, 2006; Boyd, De Nicoló and

Jalal, 2006; Schaeck and Cihák, 2014b; Mulyaningsih, 2014). Mulyaningsih (2014) reveals that competition-stability hypothesis best suits developing countries because of conditions existing in them. Developing countries are characterised by lower coverage of deposits insurance, low amount of information sharing and less liquid stock markets. Therefore, considering the same conditions for Zimbabwe, competition is necessary to improve these conditions thereby increasing stability. This means the QLH⁷ holds in which case the EMH⁸ becomes ideal to explain the prediction of these results.

Regarding disbursement of loans, there is a positive relationship between loans to total assets (LTA) ratio and the measure of stability. An increase in loan disbursement increases banking system stability thus reducing profit volatility. A percentage increase in the loan to total asset ratio results in 0.1681103 percent increase in stability. Bailey-Tapper (2009) suggests that if correct screening and monitoring measures are put in place, the level of non-performing loans reduces and enhances stability. These findings are according to prior expectations and they are consistent with those of Mulyaningsih (2014) and Ahamed (2016).

Technical efficiency (TE) enhances the banking system stability. A percentage increase in technical efficiency level results in 0.0537747 percent increase in the banking system stability. These findings are according to expectations and they are consistent with those of (Beck, 2008a; Jiang, 2014; Sarpong-kumankoma, 2016), who found out that stability is enhanced by technical efficiency through boosting of profits.

There is a negative relationship between loans to deposit (LD) ratio and stability. An increase in the ratio by a unit reduces the level of stability by 0.1594717 percent. This implies that a higher ratio is associated with high risk. Intuitively, a bank with a higher LD is likely to encounter more liquidity problems than one with a lower LD. Therefore, these results are according to expectations. Other researchers such as Martinez-Miera and Repullo (2010) and Kouki and Al-Nasser (2017) support this finding.

As financial stability should be considered in parameters of a continuum (Houben, Kakes and Schinasi, 2004), previous stability level (Z_{t-1}) has a significant impact on current stability (Z_t). An increase in previous stability by a unit results in 0.924628 percent increase in current

⁷ In a Quiet Life Hypothesis firms in an uncompetitive market are perceived to enjoy a quiet life as a result of their market power. Firms with market power generate supernormal profits because the actual price is higher than the competitive price level. The supernormal profits provide a comfort zone for firms. In such markets, firms will not be motivated to keep costs low.

⁸ In the Efficient Market Hypothesis (EMH) concentration in an industry is the main factor that increases efficiency which enables banks to be more profitable and resilient to shocks.

stability level. The result is theoretically correct and expected as it was also found by Mulyaningsih (2014) and Kouki and Al-Nasser (2017).

4.7 Conclusion

The results in this Chapter reveal that stability in the banking sector of Zimbabwe is determined by its previous values, competition, and the level of loan disbursement, technical efficiency and the ratio of loans to deposit. Competition enhances stability in the banking sector of Zimbabwe. All other variables were found to be insignificant in explaining stability. Therefore, based on these findings, the following Chapter will present the conclusion and policy recommendations.

SUMMARY AND POLICY IMPLICATIONS

CHAPTER V

5.0 Introduction

This Chapter focuses on summary and policy implications of this study. Policy implications and the conclusion are drawn from the results presented in Chapter Four. Finally, areas for further study are discussed.

5.1 Summary

This study employed the System Generalised Method of Moments to determine the relationship between competition and stability in the banking sector of Zimbabwe. The aims were to establish the relationship between competition-stability in the banking sector of Zimbabwe and to establish the determinants of bank stability in Zimbabwe, owing to the fact that there is no study that has been carried out on Zimbabwe concerning this issue. Panel data of 17 banking institutions from 2009 to 2016 were analysed using Stata 13. The System GMM was used because it can solve the endogeneity problem between the measure of stability and the measure of competition. The GMM uses the lags of the dependent variables as instruments in the equation thereby managing the endogeneity problem. These instruments were tested for their validity before interpreting the results.

The results rejected the competition-fragility hypothesis and suggest the competition-stability hypothesis. This implies that competition matters for the stability of the banking system. Intuitively, a competitive industry forces banks to improve their efficiency which may enhance stability (Berger and Hannan, 1998). Previous stability level has a positive impact on current stability. Stability can also be enhanced through increase in loan disbursement and technical efficiency. However, increase in loans to deposit ratio reduces stability by increasing liquidity risks.

5.2 Policy Implications

The importance of competition in the banking sector has been underlined by the findings of this study. Competition increases stability rather than fragility, therefore policies aiming at increasing controls and restriction should be minimised and let the sector freely compete. A study by Jabangwe and Kadenge (2013), shows that minimum capital requirements have no impact on the performance of the banking industry, in the same manner, this study has found capitalisation being insignificant in affecting stability. This reveals that policies which are

aimed at controlling and restricting the banking sector in Zimbabwe do not enhance stability. Therefore, tightening entry conditions and increasing minimum capital base is not necessary in the Zimbabwean banking sector. Banks should get incentives for increasing capitalisation and improving efficiency from competitive conditions since technical efficiency enhances stability not from regulatory pressure.

This study recommended financial liberalisation through facilitating existence of a contestable market that is a market with zero entry and exit costs, where there are no barriers to entry and exit such as sunk costs. The regulatory authority should design proper exit policies for insolvent banks and reduce the too-important-to-fail subsidies. This policy will enable proper management of crisis which do not facilitate protection of unhealthy competition and that encourages risk-taking incentives. However, efficient safety nets should be provided to protect depositors when banks exit the industry. The competition-stability hypothesis implies existence of contestable market through the New Industrial Organisation (NIO) approach which the government should guarantee by allowing easy of entry of both local and foreign banks. In addition, the fact that previous stability enhances current stability implies that efforts should be made to facilitate current stability for the banking sector to be stable in future.

Loan disbursement increases stability. Therefore, this study recommends that policy formulation should be directed towards easy and fast flow of enough credit information and enable enforceable contracts. The government should also enable the increment of loan customer base by giving property rights to farm owners; respecting and protecting property rights so that they can be recognised by banks as credible collateral security.

This study also recommends the maintenance of the loans to deposits ratio at optimum levels in order to control liquidity problems. Thus, surveillances of complying with reserve ratio requirements should be properly done. This can even help to restore confidence in the sector.

5.3 Areas for Further Research

This study was limited to a research on competition among banking institutions in Zimbabwe. Future research should be focusing on non-banking financial institutions which offer products that are substitutes to those offered by the banking institutions in Zimbabwe. As presented in Chapter One, the Bancassurance model makes the banking institutions compete with the insurance institutions thus making it a single industry.

In addition, there is need to study the differences on market segmentation and pricing strategy of banks across different ownerships and sizes. This qualitative study helps to understand how competition behaves across banks of different groups like government, foreign and private owned banks and also small and large banks.

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