



# **Determinants of Non-Performing Loans in a multicurrency environment: A case of Zimbabwe**

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## **ABSTRACT**

*Zimbabwe has been experiencing an unprecedented increase in Non-performing loans (NPLs), since the adoption of the multi-currency regime in 2009. The NPL ratio which stood at 15.92% as at 31 December 2013, has attracted much attention considering its impact on banking sector stability and its effect on the real sector. The banking sector has since reduced its risk appetite, adopting conservative lending strategies, in response to the scourge, in an environment where industry is in need of funding thus causing second round effects. There has been conflicting views in literature on factors influencing the rise in NPLs. Shareholders and bank management have placed the blame of the increase in NPLs on the macroeconomic environment, while regulatory authorities and policy makers have attributed the levels to corporate governance weaknesses. This study sets out to ascertain the factors that have been instrumental in driving the level of non-performing loans in Zimbabwe and the extent to which each of these factors has contributed to this trend. The population of study was the Zimbabwean banking sector which comprised 21 banking institutions as at 31 December 2013. The factors that were investigated were: lending interest rates, shareholding structure, GDP growth, inflation rate, management efficiency, capital adequacy, loan tenure, size of the institution and the lagged NPLs. The study used statistical techniques, in particular panel data analysis for bank level data collected on a quarterly basis over a 5 year period beginning March 2009 and ending December 2013. The findings indicate that all the macroeconomic factors were not statistically significantly related to the rise of the NPLs. On the other hand bank specific factors with the exception of loan tenure and lending rates, were found to be significantly related to the rise in NPLs. Lagged NPLs were found to be more influential implying that the country is blight with credit indiscipline. Findings of this study, with the exception of size were found to be generally consistent with previous literature on determinants of NPLs. An interesting observation made was that bank size was found to be positively related to NPLs, contrary to literature, indicating that larger banks are not benefiting from diversification benefits. Based on the findings, the research recommends enhanced monitoring of banking institutions by the supervisory authority coupled with a collaborative NPL resolution options. Banking institutions are encouraged to tighten their credit risk management systems and practices.*

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## **GLOSSARY OF TERMS**

BIS	Bank of International Settlements
CPI	Consumer Price Index
GDP	Gross Domestic Product
IMF	International Monetary Fund
NPL	Non-Performing Loans
OLS	Ordinary Least Squares
RBZ	Reserve Bank of Zimbabwe
USD/ \$	United States Dollars
VMI	Volume of Manufacturing Index
ZWD	Zimbabwe Dollar

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# CHAPTER 1: INTRODUCTION

## 1.1 Research Area

The introduction of the multicurrency system in Zimbabwe in January 2009 was heralded as not only a stabilizer but a panacea to economic growth. The adoption of multicurrency followed a “lost decade”, a protracted period of adverse macro-economic conditions characterized by the precipitous decline in the value of the local currency, Zimbabwe Dollars (ZWD) and rapid growth in inflation, inadequate funding for the productive sectors of the economy. This development necessitated the restatement of banking institutions’ balance sheets to take into account the value of assets which in conventional accounting terms had been depleted to zero. Concomitantly, it provided an opportunity for removal of ZWD denominated toxic assets from the banking institutions' balance sheet, providing them with an opportunity to start on a clean slate. (Reserve Bank of Zimbabwe, 2009).

The decimation of the balances also entailed that banking institutions and companies alike had to restart. Financial institutions had to start deposit build up from almost zero, in a market that had an insatiable desire for funding, considering the fact that the companies had not retooled for close to a decade. Aside companies, individuals’ demand for credit also went up the roof due to a combination of two things; firstly the fact that they had no savings to meet transaction needs in a dollarized economy and secondly due to the fact that companies and companies did not have resources to adequately pay their workers.

The period that ensued saw mixed reactions, on one hand, locally owned banking institutions pursued aggressive lending policies, to take advantage of the burgeoning demand; while on the other hand, foreign owned banking institutions were a bit more cautious due to the transitory nature of deposits (RBZ 2010). Policy makers<sup>1</sup>, on their part, did little to help matters, as they encouraged banking institutions to increase general or targeted intermediation (sectoral thresholds were set) at long tenures and better terms (interest rate and charges) as a stimulus to economic growth.

Expectedly, the country noticed an increasing in lending to sectors of the economy. As loan books increased, pressures of non-performing loans begun to be evident. The NPL ratio

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<sup>1</sup> RBZ Monetary Policy Statements (2009-12)

increased from 1,8% in December 2009 to 15.92% as at 31 December 2013 (RBZ, 2014), which is currently among the highest in sub-Saharan Africa (SSA). The ratio which is above the 10% threshold requires close supervisory monitoring in terms of the Reserve Bank of Zimbabwe's Troubled and Insolvent Bank Resolution Framework and is viewed as a catastrophe in terms of the IMF benchmarks.

Concomitantly, Zimbabwe has witnessed a widespread foreclosures<sup>2</sup> on properties pledged as collateral, indicating increasing cases of defaulting clients in an environment characterized by tight liquidity and other operational constraints that are affecting repayment capacity. In addition, judicial management and liquidations have become the order of the day. Worryingly, is the fact that even the blue chip companies of yester year (Blue Ribbon, CAPS and CFI) have also been caught in this web.

This development has not only threatened the survival of banking institutions, through the decimation of bank assets and depletion of capital, but also pose a macroeconomic threat to the stability of the sector and the economy in general. The nonperforming loans (NPLs) have translated into both liquidity and solvency concern for banks resulting in some banks failing to meet maturing obligations thus denting the confidence of the banking public still reeling from 2003/4 banking crisis.

In addition, this has affected companies whose properties are being foreclosed and sold at forced values in an illiquid market. This scenario has proved a hindrance to the pursuit of financial, macroeconomic stability and economic growth objectives of the nation, especially in the context of a narrow tax base and growing fiscal deficits. Against this background, the research raised important questions regarding the determinants of the NPLs in a multicurrency environment and the policy implications.

## **1.2 Problem Statement**

In response to these challenges confronting the banking industry in Zimbabwe, banking institutions became conservative preferring retail loans<sup>3</sup> at the expense of the productive sectors of the economy which fosters economic growth. The institutions became reluctant to

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<sup>2</sup> <http://www.dailynews.co.zw/articles/2013/10/28/foreclosures-dramatically-increase>  
<http://www.newsdezimbabwe.co.uk/2013/11/byo-properties-auctioned-for-song.html>

<sup>3</sup> RBZ Reports

assume new risks and underwrite new commercial loans. This deprives business of working capital needs, especially for companies recovering from a decade of chronic inflation and zero capacity utilization thereby triggering second-round business failures. This creates a vicious cycle, as business failures result in them failing to service their obligations and staff redundancies' which will trigger delinquency in the retail portfolio, which banks would be highly concentrated in.

Despite an aggregate increase in the aggregate level of NPLs, it has been noted that the proportionate increase has not been uniform across banking institutions, classes and profiles. Resultantly, it is imperative to establish whether the causes of NPLs are systemic or rather bank specific.

Consequently, debate has emerged on the determinants of poor asset quality considering their linkages to other risks such as liquidity risk, solvency risk, interest rate risk and reputational risk which might result into the re-emergence of another banking crisis which adversely affect economic growth.

Based on the foregoing, it was inevitable that the study of the determinants of NPLs is an important priority in academic and policy settings; as it will not only inform the policy proposals on the resolution of nonperforming loans, but also assist bank management in addressing credit risk management weakness to prevent the NPL problem before it research crisis levels.

Although there is a vast amount of literature on the determinants of nonperforming loans globally, to the knowledge of the researcher no studies have been done in context of multicurrency or a dollarized economy. Additionally, the body of literature is still in its infancy in Zimbabwe (Chikoko, Mutambanadzo & Vhimisai, 2013) and (Mabvure, Gwangwava, Manuere, Mutibvu, and Kamoyo, 2012). While these studies were conducted in a multicurrency setting, the papers used survey methodologies instead of secondary data and focused on a single financial class.

The present research aims to provide some empirical evidence as to the bank specific and macroeconomic determinants of nonperforming loans in Zimbabwe.

### 1.3 Purpose and Significance of the Research

Zimbabwean banking sector and the economy as a whole is reeling under the scourge of NPLs, and there is growing discontent from the general public. Debating is emerging on whether the NPLs are as a result of moral hazard or the economy. Policy makers on their part are exploring various resolution options to address the challenge.

Understanding the key determinants of NPLs will assist in the overall assessment of credit vulnerabilities which is important to governments, policy makers and practitioners. Studies have shown that the fiscal costs of loans are huge and vary with the scope and length of the crisis [Cortavarria *et al.* (2000)]. The recent bank failure due to NPLs, the case of African Bank, South Africa resulted in a \$1.6 billion bailout from the South African Reserve Bank (SARB). (SARB, 2014)

The resolution of these loans has largely been borne by the public through the creation of government funded Asset Management Companies and/or deposit insurance schemes whose main function is to take over nonperforming assets of distressed financial institutions. These Asset Management Companies have been seen to exacerbate the already high pressure on government revenues. This pressure is likely to be more huge and consequently in developing countries, which Zimbabwe is part of, in view of the fact that most of these countries are confronted with a narrow fiscal base and limited prospects for increased domestic resource mobilization.

For policy makers, this will assist in the formulation of supervisory methodologies which is a critical element for financial stability policy, in particular macro-prudential supervision. Understanding the sources of the credit vulnerabilities will assist in informing supervisory approach and reactions. In addition, NPLs might translate into other risks which might dent the confidence of the banking public thus affecting savings mobilisation and then ultimately economic growth.

The results from the regression analysis can also be used for stress testing which has gained prominence since the adoption of Basel II. Key in stress testing methodologies is the need for accurate calibration of stress tests assumptions or parameters. The determinants of NPLs can also act as plausible and uniform benchmark parameters not only for Zimbabwe but also for emerging market economies in view of data availability constraints.

#### **1.4 Research Questions, Objectives and Scope**

The present research aimed to provide some empirical evidence as to the bank specific and macroeconomic determinants of nonperforming loans in Zimbabwe for the period 2009 to 2013. In order to ascertain the determinants, the following research questions were formulated:

- a) are NPLs a result of macroeconomic conditions?
- b) are NPLs a result of bank specific factors?

The pursuit of the study was expressed through the following objectives:

- a) to ascertain the role played by macroeconomic factors in influencing NPLs.
- b) to ascertain the relationship between bank specific factors and NPLs.

The study on determinants of NPLs was conducted on the Zimbabwean banking sector using annual publications, that is, economic bulletins (for macroeconomic variables) and financial statements (for idiosyncratic variables) for the period 2009 to 2013; where Zimbabwe has been using multicurrency. The period under study was assumed sufficient to note significant trends.

#### **1.5 Research Assumptions**

The research assumed that:

- a) the multiple currency regime will continue into the near future.
- b) banks, like any other corporates, pursue shareholder wealth maximisation.
- c) economic bulletins and Annual Reports of banking institutions are subject of uniform accounting standards, that is, IFRS and hence reflect the true and fair representation of positions.

#### **1.6 Organisation of the study**

The research is divided into seven (7) chapters. The remainder of the paper is as follows: Chapter 2 provides the evolution of the Zimbabwean banking sector. In particular, it analyses the changes that happened in the sector since independence in 1980. It also provides an insight on the bank failures that were experienced between 1980 and 2013. The study analyzed the multicurrency environment and its effect on the banking sector and provides some financial indicators. The chapter ends by providing an evolution of the NPLs since adoption of the multicurrency regime. The chapter provides useful background for

understanding the Zimbabwean banking system.

Chapter 3 focuses on literature review, which includes theoretical and empirical literature review. Under empirical literature review of similar studies in different jurisdictions and in particular studies done on the Zimbabwean sector banking institutions are highlighted.

Chapter 4 gives a description of the research methodology. This chapter discusses the research methods used to collect and analyze the data, and introduces the research hypothesis. It also provides the data sources and the justification for the variables.

Chapter 5 covers research findings, analysis and discussion. Research findings are discussed in the context of what other similar researches quoted in literature review found. Chapter 6 is a discussion of the research conclusions, policy implications and concludes by providing recommendations for future research.

## **CHAPTER 2: ZIMBABWEAN BANKING SECTOR**

### **2.0 Introduction**

The chapter provides an overview of the Zimbabwean banking sector. It starts by providing the evolution of the sector since independence in 1980 to 2013. The key financial indicators of the sector since adoption of the multicurrency regime are proffered and thereafter the current structure of the sector follows. The chapter concludes by providing a snippet of how non-performing loans have evolved since adoption of the multicurrency ratio in 2009.

### **2.1 Regulatory Framework for the Zimbabwean Banking Sector<sup>4</sup>**

Banking institutions in Zimbabwe are registered and regulated under the Banking Act (Chapter 24:20) and the supporting Banking Regulations, Statutory Instrument 205 of 2000. Provisions of the Companies Act (Chapter 24:03) also apply generally to banks as companies. The Banking Act and Regulations 2000, together establish the supervisory and regulatory framework for the banking sector.

### **2.2 Evolution of Zimbabwe Banking Sector**

Zimbabwe has a comparatively sophisticated financial sector for an economy of its size, with fully developed banking and non-banking institutions. The banking sector has evolved over the past three decades, from a relatively shallow regime consisting of a few players operating under a highly regulated environment into a well-diversified and developed sector. The Economic reforms introduced in the early 1990's under the auspices of the IMF/World Bank Economic Structural Adjustment Programme (ESAP), heralded the liberalization of the financial sector in general and the banking sector in particular. Financial sector reforms included the liberalization of interest rates, relaxation of entry requirements of entering into the banking sector and foreign exchange liberalization.

The resultant liberalisation of regulatory controls triggered the influx of new entrants onto the market thus deepening competition in the sector. As a result of the increased competition, banking institutions became more innovative in their product offerings, resulting in a sophisticated financial system with a diverse and complex range of products that compared well with developed international markets. Regionally, in terms of development and innovation, the Zimbabwean financial system is second only to the South African market.

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<sup>4</sup> For the purposes of this paper, the institutions making up the banking sector are commercial banks, merchant banks, building societies and savings banks.

(RBZ, 2010). The evolution of the Zimbabwean banking sector can be best described over three key eras, the periods: 1980-1999; 2000-2008; and 2009 to 2013.

### **2.2.1 New Democracy Period: 1980 to 1999**

At independence (in 1980) Zimbabwe's banking sector and financial market was relatively sophisticated and dominated by five traditional Banks, majority of which were foreign owned. These were Standard Chartered, Barclays Bank, ZimBank, Grindlays Bank and Bank of Credit and Commerce.

The period that followed after the new democracy era would see the government purchasing some shareholding in two banks Zimbank and BCCI. The acquisitions were neither nationalisation of foreign banks nor restrictive legislative interference on the sector but were motivated by the desire to stabilise the banking system following decisions by the then existing shareholders of the institutions to divest. The status quo, ownership structure and financial architecture, would continue for the rest of the first decade as the government did not license any institution.

### **Financial Reforms**

The Reserve Bank of Zimbabwe (RBZ), under guidance from multilateral institutions, started advocating financial reforms through liberalisation and deregulation. The main objective of liberalising the Banking Sector was to improve on its efficiency and effectiveness, as an agent of national economic development. This was also motivated by the failures of the oligopoly structure in the banking system which was argued to be less competitive depriving the public of choice and quality in service, innovation and efficiency.

The reform during this liberalisation era, resulted in many new participants, mostly indigenous entrepreneurs coming into the sector. From the mid-1990s up to December 2003, there was a flurry of activity in the financial sector as indigenous owned banks were set up. These include the likes of Universal Merchant Bank Limited, United Merchant Bank, the Commercial Bank of Zimbabwe (previously the Bank of Credit & Commerce), National Merchant Bank, Genesis Investment Bank, Agricultural Development Bank (previously Agricultural Finance Corporation), Trust Merchant Bank and First Banking Corporation.

It is however noteworthy, that the reforms did not result in a concomitant increase in foreigners entering the market. This has been largely attributed to shareholding limits that were imposed, a minimum 30% local shareholding, and the stringent foreign currency controls. Existing foreign banks were not required to shed part of their shareholding although Barclay's Bank did, through listing on the local stock exchange, (RBZ 2000).

Most of the institutions licensed between 1994 and 1998 were merchant banks and discount houses, with a few seeking commercial banking license. Towards, the turn of the millennium, there was a surge in the number of commercial banking. The decline in merchant banks and discount houses was due to their conversion, mostly into commercial banks. The number of deposit taking registered increased from a total of twenty one (21), including the Post Office Savings Bank as at 31 December, 1990 to thirty nine (39) as at 31 December, 1999.

### **2.2.2 Hyperinflationary Period: 2000 to 2008**

At the dawn of the new millennium, the Zimbabwean economy started experiencing weak domestic demand coupled with high and rising inflation, persistently high budget deficits, and declining export performance, driven by falling commodity prices on international markets, which led to severe foreign currency shortages. GDP growth contracted by 7.4% in 2001 and an estimated 11.1% in 2002 (The Zimbabwe Stock Exchange Handbook 2003). The Reserve Bank, estimated that the real value of savings dropped from \$25 billion to \$11.6 billion in the twelve months to July 2002, due to the sharp acceleration in inflation (Zimbabwe Top Companies Survey, 2002). By the year 2008, Zimbabwe's real GDP had contracted by 48% from the 2000 level. (Biti, 2009)

By the year 2005, monthly inflation was unofficially estimated at 79.6 billion per cent, while unemployment rate stood at over 80%, external payment arrears at US\$3.07 billion and budget deficit at ZW\$1760 quadrillion (Biti, 2013; CSO, 2005). The dwindling government revenue forced the Reserve Bank to monetize the budget, thus exacerbating pressure on prices leading to incessant depreciation in the real and nominal exchange rate (CSO, 2008, 2012). The impact of an exchange rate pass-through effect on prices further stimulated the hyperinflation in the period 2000 – 2008 (Gust et al., 2010; Neiman, 2010; Gust et al., 2009).

The hyperinflationary environment brought different operating dynamics for banks, which were both positive and negative, but arguably more beneficial from the intermediary

perspective through lowering of funding costs, as customers save higher amounts for transactional purposes, and increased nominal interest income, as borrowing becomes relatively attractive. In addition, the shortage of foreign exchange resulted in some banks trading on the parallel market, thus further boosting their income. Resultantly, the banking sector outperformed the other sectors of the economy.

In order to cushion themselves against hyperinflation, the banking sector also engaged in speculative activities, which included among other, trading in best performing counters on the Zimbabwe Stock Exchange (ZSE), real estate and commodities like fuel and bricks (Gono 2008). These assets were viewed as a cushion against inflation as opposed to saving money. The Zimbabwe Stock Exchange (ZSE) was argued to be the best performing stock exchange in Africa, with the key Zimbabwe industrials index going up by 595 percent over a period of twelve months in 2007 (Koning 2008).

The challenging operating environment in the ensuing period to 2008, resulted in the voluntary and forced closures of banks, as some failed to cope with the operating environment, while others strayed too deep into non banking activities, thus attracting the wrath of the Reserve Bank. By the end 2008, the banking sector had shrunk from the thirty nine (39) deposit taking institutions to twenty eight (28). The sector was now composed of fifteen (15) commercial banks, six (6) merchant banks, three (3) discount houses and four (4) building societies (UNDP 2008). Of the commercial banks, four were foreign owned, three state owned and the others were wholly indigenous privately owned (RBZ, 2009).

### **Bank Failures**

The phenomenal growth in the Zimbabwean banking sector experienced between the 1990s and 2000s, which was anchored on the emergence of indigenous owned entities, turned into a curse by the turn of the new millennium as the sector slid into a crisis. The banking sector experienced two waves of bank failures between 1998 and 2003.

The first wave of bank failures was when United Merchant Bank was placed in liquidation and Founders Building Society saved from collapse by RBZ. There was generally calm after the incidences, expect for placement of the following institutions; Genesis Investment Bank, Founders Building Society and Zimbabwe Building Society under curatorship by RBZ.

The second phase which was experienced in the last quarter of 2003 was characterized by liquidity and solvency challenges which were underpinned by corporate governance deficiencies. Banking institutions were accused of using their unregulated associates and subsidiaries to engage in unethical banking practices and non-banking businesses. (RBZ, 2003). There is thus, no surprise in the fact that the sector also experienced an epidemic of non-performing loans that reflected poor corporate governance practices and insider lending.

The financial instability that obtained presented the RBZ, the supervisory authority, with a set of new challenges which threatened to affect the economy prompting RBZ to initiate a host of banking reforms in 2004. The reforms were aimed at fostering corporate governance in the sector and to build greater confidence among the depositing and investing public.

The RBZ instituted a clean-up exercise which saw the number of operating banking institutions declining from forty (40) as at 31 December 2003 to twenty-nine (29) as at 31 December 2004, following the liquidation of two discount houses and the placement of nine other institutions under curatorship. This number was to ultimately increase to 30, at 30 June 2005, following the amalgamation of three of the distressed banks to form a new institution, Zimbabwe Allied Banking Group (ZABG). The banking institutions were distributed as follows: twelve (12) Commercial Banks, Five (5) Merchant Banks, Five (5) Discount Houses, Four (4) Finance Houses and Four (4) Building Societies.

### **2.2.3 Multicurrency Period: 2009 to 2013**

The introduction of the multi-currency regime effective February 2009, ushered in a radically new environment, which created both opportunities and challenges for the banking sector. The opportunities revolved around increased demand for credit, stabilization in inflation expectations and restored confidence in the socioeconomic outlook. Additionally, improved stability and restored confidence in the financial sector resulted in notable positive impact as banks started to underwrite meaningful business.

#### **2.2.3.1 Economic Performance in the multicurrency regime**

The adoption of the multicurrency regime while ushering a period of relative stability accompanied with trade and financial integration, brought with it a set of new dynamics. Firstly, inflation rate substantially went down to within single digits, which would subsist

over the period of the multicurrency (ZimStat, 2012). This coupled with minimized exchange rate risk provided a stable macroeconomic environment for existing and new businesses to consider a case for investment.

On the other hand, the Reserve Bank, could no longer exercise an independent monetary stance, and therefore forfeited its role as lender of last resort, and lost its seigniorage power. The government had been obtaining substantial revenues from seigniorage during the hyperinflationary period. Resultantly, government had to look at tax revenue as the primary source of financing.

In line view of the limited fiscal space, the Government of National Unity (GNU) decided to pay every civil servant an allowance of \$100, regardless of one's post or educational qualifications. This move by the government resulted in increased public sector employment levels which induced demand for a lot of sectors. For example, the consumer goods that were in short supply between 2000 –2008 periods became readily available.

On the back of renewed business interest and increasing aggregate demand year on year real GDP growth rates increased from -14.8% in 2008 to 5.4% by 2009. The positive growth rate continued in year 2010, which saw a real GDP growth rate of 11.4%. In addition, positive growth rates of 11.9% and 10.6% were reported for the 2011/2012 periods.

The economy lost significant steam off the economic growth momentum attained between 2009 and 2011 and is estimated to have slowed down to 4.5% in 2013, from a growth of 10.6% registered in 2012, (RBZ, 2013). The deceleration in economic activity was a manifestation of macro structural rigidities in the economy, which included drying up credit sources, liquidity shortages, infrastructural bottlenecks, company closures; and the attendant job losses which resulted in decreased aggregate demand. This was exacerbated by the uncertainties associated with pre and post National Elections period. The graph below shows the GDP growth and capacity utilisation trends of the period 2009 to 2013:

**Figure 2.1: GDP Growth vs Capacity Utilisation**



Source: Author’s compilation

As shown in the graph above, average capacity utilization mimicked Real GDP growth over the same period increasing from 32.3% in 2009 to a peak of 57.2% in 2011, before retreating to 39.6% in 2013. The declining aggregate demand combined with funding scarcity, for an economy still retooling significantly affected the aggregate demand.

**2.2.3.2 The Banking Sector under the multicurrency regime**

The banking sector has largely been mirroring the real economy, and as such has not been immune to both positive and negative development therein. The adoption of the multicurrency meant that the banking sector had to re-establish its intermediary role, that is, it had to build foreign currency deposits, from which loans could be underwritten.

The past performance (2003/4) of the sector did not however help matters as the resultant low confidence in the financial institutions of the country caused the public to keep their foreign currency transactions outside the financial system. As the economy grew however, the discipline brought about by dollarization caused a change in the practice of financial institutions, and the low inflation encouraged savings. The multicurrency regime forced banks to adopt more competitive and transparent practices and this, among other benefits resulted in

increased confidence in them. The absence of foreign currency buffers for individuals and companies, however, meant that the deposits were transitional in nature, as they remained in the banks only so long as they were not needed to make payments (RBZ, 2010).

The problems facing banking institutions were compounded by the fact that the Reserve Bank of Zimbabwe had ceased to exist as a lender of last resort, absence of money market instruments and limited interbank trading, on bilateral basis. Consequently, banks existed and transacted in silo, resulting in uneven distribution of liquidity across the market. On one end, there were cash rich institutions while on the other side some were in need of liquidity.

This however presented disconnect, as banks were faced with transitional deposits, while insatiable demand of businesses, were rather for long term money for retooling. In response to increasing aggregate demand, banks sought for funding to retool their companies to meet the demand. In the meanwhile, the government policy inconsistencies on the issue of foreign investment meant that entities could not raise sufficient, if any, funding from capital markets. Resultantly, they had to rely on the banking sector and could only but accept the funds at the terms of the banking institutions, some of which included shorter tenures. The sector, in general, thus started charging exorbitant interest rates of upto 62% per annum, which translated into strong earnings performance (RBZ, 2014).

The general macroeconomic environment and returns of the sector coupled with the economic growth potential of the country, transformed financial sector into an impressive growth potential for foreign strategic investors resulting in an influx of foreign regional and international banking groups. The same period also saw the conversion and intention to convert merchant banks to commercial banks, as investors sought the activities associated with the commercial banking license.

The multicurrency period was punctuated by the unbundling of ZABG, which culminated in return to Trust Bank, Royal Bank and Barbican Bank owners in April 2010 by the RBZ of assets previously taken over. The three institutions which had been consolidated into ZABG in 2005, had appealed to the courts against their amalgamation.

Like its predecessor era, the period 2009-13 saw a collapse of five (5) institutions namely: Genesis Investment Bank, NDH, Royal Bank, Trust Bank, Capital Bank, while Interfin was

placed under recuperative curatorship in 2012. According to Reserve Bank (2013), the institution were saddled by non-performing loans mainly emanating from insider lending and poor credit risk management which affected their earnings performance and resulted in them being critically undercapitalized. Note worth, is the fact that all of the failed institutions were indigenous owned entities.

## 2.3 Current status of the banking sector

### 2.3.1 Architecture of the banking sector

Over time, the banking sector has become more concentrated due to declining number of banking institutions across all classes of banks from a peak of 34 in 2003. The compositional dynamics in the financial architecture in Zimbabwe shows migration of institutions from the discount house and finance house sectors to the merchant bank and commercial bank sectors.

As at 31 December 2013, there were 21 operating banking institutions, 15 asset management companies and 146 microfinance institutions as shown in the table below.

**Table 2.1: Architecture of the banking sector**

Type of Institution	Number
Commercial Banks	15
Merchant Banks	2
Building Societies	4
Savings Bank	1
Microfinance Bank	0
<b>Total</b>	<b>22</b>

Source: RBZ 2014 Monetary Policy

The table below shows some structural indicators of the sector as at 31 December 2013:

**Table 2.2: Structural indicators of banking sectors**

	Share of Assets	Share of Deposits	Loans/ Deposits	Liquidity Ratio	NPLs Ratio	Capital Adequacy	ROA	ROE
Commercial Banks (16)	82.8	81.5	104.4	37.0	15.4	12.3	-0.3	-3.3
Top Five	53.2	53.0	96.2	24.8	7.1	17.2	1.7	11.8
Top Domestic Bank	23.5	20.0	129.0	31.7	5.0	13.8	1.1	9.2
Top foreign owned banks	29.7	33.0	76.4	32.0	9.2	19.1	2.2	12.9
Merchant Bank	2.1	2.5	93.2	5.2	84.4	-10.8	17.6	131.1
Building Societies	13.7	14.1	98.1	36.8	8.1	29.3	3.3	14.4
Savings Bank	1.4	1.9	58.9	39.9	13.6	14.1	0.8	5.3
<b>Total Banking Sector</b>	<b>100.0</b>	<b>100</b>	<b>102.4</b>	<b>37.4</b>	<b>15.9</b>	<b>14.0</b>	<b>0.1</b>	<b>-0.8</b>

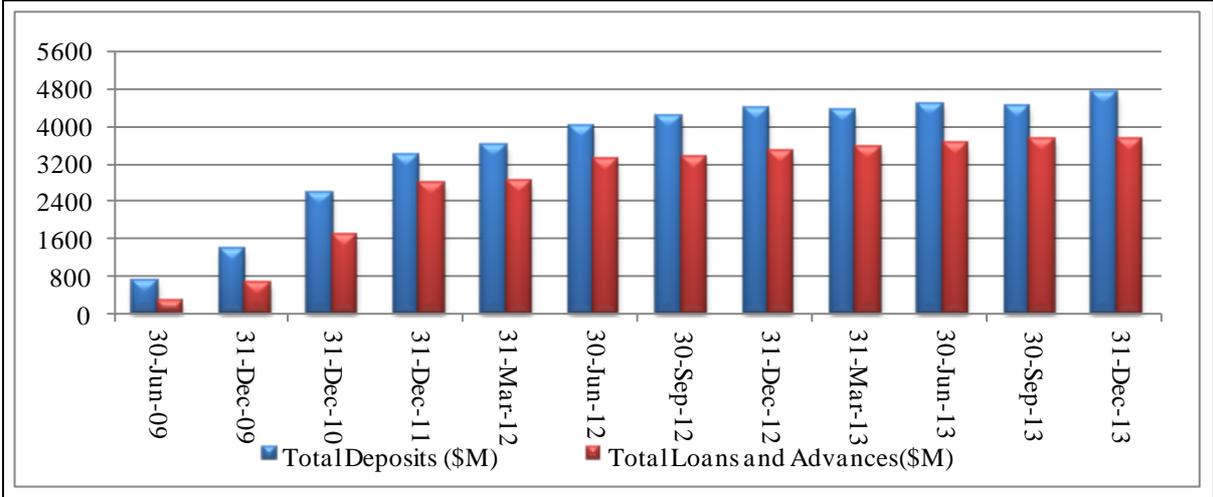
Source: IMF Article IV Consultation Report (Country Report No. 14/202)

The sector is relatively concentrated, with the largest five banks accounting for over 53.2 per cent of total bank assets. The table below provides key intermediation indicators as at 31 December 2013

### 2.3.1.1 Key intermediation indicators

As at 31 December 2013, total banking sector deposits amounted to \$4.73 billion while loans & advances were \$3.70 billion. There has been a slowdown in deposit and loan growth levels as from June 2012, consistent with the economic slowdown experienced over the same period. The graph below shows the trend of deposits and loans since June 2009.

**Figure 2.2:Trends of Deposits and Loans & Advances**

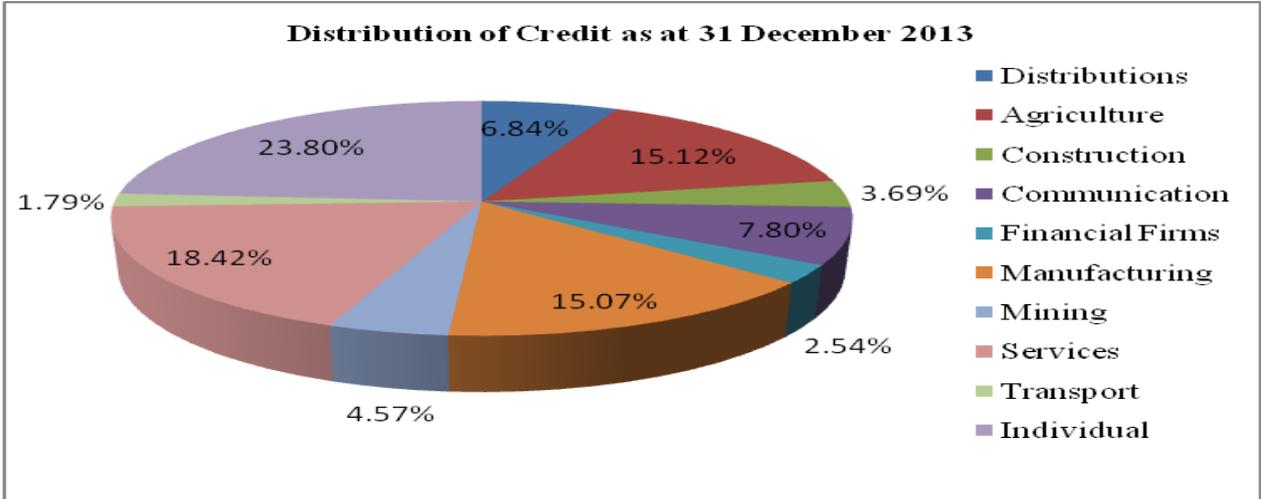


Source: IMF Article IV Consultation Report (Country Report No. 14/202) & RBZ MPS

IMF (2014) highlights that short term deposits constituted 68% of the total banking sector deposits. The pre-eminence of short-term deposits is reflected in the lending patterns of the banking sector; where institutions are currently focusing more on short term funding in an environment where long-term funding is required for re-tooling.

The transitory nature of deposits has curtailed the ability of the banking sector to lend long term funding leading to dominance of consumptive lending at the expense of productive sectors of the economy. Resultantly, the distribution of credit was skewed towards the individuals (23.80%), services (18.42%), manufacturing (15.07%) and agriculture (15.12%) sectors. The figure below provides the distribution of credit as at 31 December 2014:

**Figure 2.3: Distribution of credit as at 31 December 2013**



Source: IMF Article IV Consultation Report (Country Report No. 14/202)

### 2.3.1.2 Ownership structure

As at 31 December 2013, the banking sector's ownership structure was spread across state, foreigners and local, that is, individuals and corporate. Foreign owned banks had assets worth \$3,254.75 million, constituting 48.37% of total banking sector assets; while locally owned banks held assets worth \$2,941.41 million representing 43.71%, with the remainder of 7.93% of the total banking sector assets being owned by the government and its agencies. While foreign owned institutions controlled majority of deposits and assets; locally owned institutions underwrote most loans (49.52%). Concomitantly, these institutions had a high level of nonperforming loans. The table below shows the banking sector ownership structure as at 31 December 2013.

**Table 2.3: Ownership Dynamics**

	<b>Number of institution by ownership</b>	<b>Total assets</b>	<b>Total Non- Bank Deposits</b>	<b>Total loans</b>	<b>NPLs</b>
Local (private)	10	2,941,409,779.72	1,360,642,656.48	1,879,400,231.25	324,303,182.13
State owned	3	505,970,678.51	312,389,360.02	287,102,582.79	57,093,123.11
Foreign owned	9	3,254,753,970.56	2,026,242,796.03	1,628,907,297.27	216,263,519.62
<b>Total</b>	<b>22</b>	<b>6,702,134,428.79</b>	<b>3,699,274,812.54</b>	<b>3,795,410,111.31</b>	<b>597,659,824.86</b>

Source: RBZ 2014

### 2.3.2 Financial Sector Indicators

Banking sector reforms introduced since the 1990s have resulted in a relatively sound, efficient, and profitable banking sector that is largely compliant with international practices. Zimbabwean banks are generally adequately capitalized, with a capital adequacy ratio above the prescribed minimum of 12%. The table below shows the financial performance indicators for Zimbabwe from 2009 to 2013:

**Table 2.4: Financial Sector Indicators**

	2009	2010	2011	2012	2013
Capital Adequacy Ratio	21.6	15.3	13.4	11.1	12.3
Capital to assets	12.0	9.4	9.3	6.6	7.3
Past Due to Gross Loans	19.9	16.1	21.1	30.0	31.6
NPL to Total Gross loans	1.8	3.1	5.9	13.8	15.92
Net income before tax to Net Income	188.1	166.0	139.7	221.0	-47.1
Return on assets	0.5	1.9	2.7	1.2	0.1
Return on equity	1.9	11.0	17.6	5.4	-2.5
Expenses to Income	95.5	84.1	80.2	89.7	98.8
Liquid assets to Total Assets	39.6	30.8	27.7	24.9	27.8
Liquid assets to short term liabilities	96.3	37.5	32.6	29.9	34.8
Loan to Deposit	48.1	79.1	86.2	92.9	104.4
Sensitivity	5.2	33.1	26.6	46.9	53.8
Interest rate spread	3.0	7.9	9.3	8.9	8.6

Source: IMF Article IV Consultation Report (Country Report No. 14/202)

The asset quality in the Zimbabwean banking system has been significantly worsening in recent years from an average of 1.8% in 2009 to 15.92% in 2013. The deteriorating asset quality is a reflection of the high interest rate regime against the backdrop of squeezed profit margins in the corporate sector. In addition, it reflects, in part the sharp contraction in economic activity and the lack of robust economic recovery in the post-crisis period.

Resultantly, banking institutions have adopted cautious lending models and in certain instances gone to the extent of deleveraging, thus increasing the NPLs ratio through its impact on the denominator.

The liquidity ratios have largely been above prudential thresholds, suggesting that Zimbabwean banks have sufficient liquidity to meet unexpected demand for withdrawals. A decreasing trend in liquidity ratios is reflective of the tightening liquidity conditions and increasing loan delinquency. Liquidity crunch was experienced in June-August 2013, amid political and policy uncertainty related to the election and its immediate aftermath.

The banking sector is currently typified by wide ranging interest spreads among banking institutions reflecting the different banking models, strategies and capabilities. International banks have very low costs of funds reflecting their relative ease in mobilize deposits, on account of their low risk profiles as well as access to lines of credit. On the other hand, small banks had very high weighted cost of funds, a reflection of the high costs they face in mobilizing funds.

The interest rate spread, which can also be an indicator of intermediation efficiency and competition, is high in Zimbabwe, suggesting that relative to other SSA countries, the country's financial system is less competitive. The spread has, however, been gradually declining to the current average levels of about 8.6%, an indication of growing market competition.

High interest rate margin did not, however, translate into concomitant high profit margins that characterized the sector in periods prior to the multicurrency reflecting low inflation levels, high operating costs and high impairment charges. The economic downturn and the impact of the MOU on Interest and Bank Charges introduced by the Reserve Bank of Zimbabwe in March 2013 to reduce the cost of banking services further put a strain on average bank profitability. The Bankers Association of Zimbabwe estimated that in excess of \$50 million in lost revenue. The sector's return on assets significantly fell to 0.1% in 2013. (RBZ, 2014)

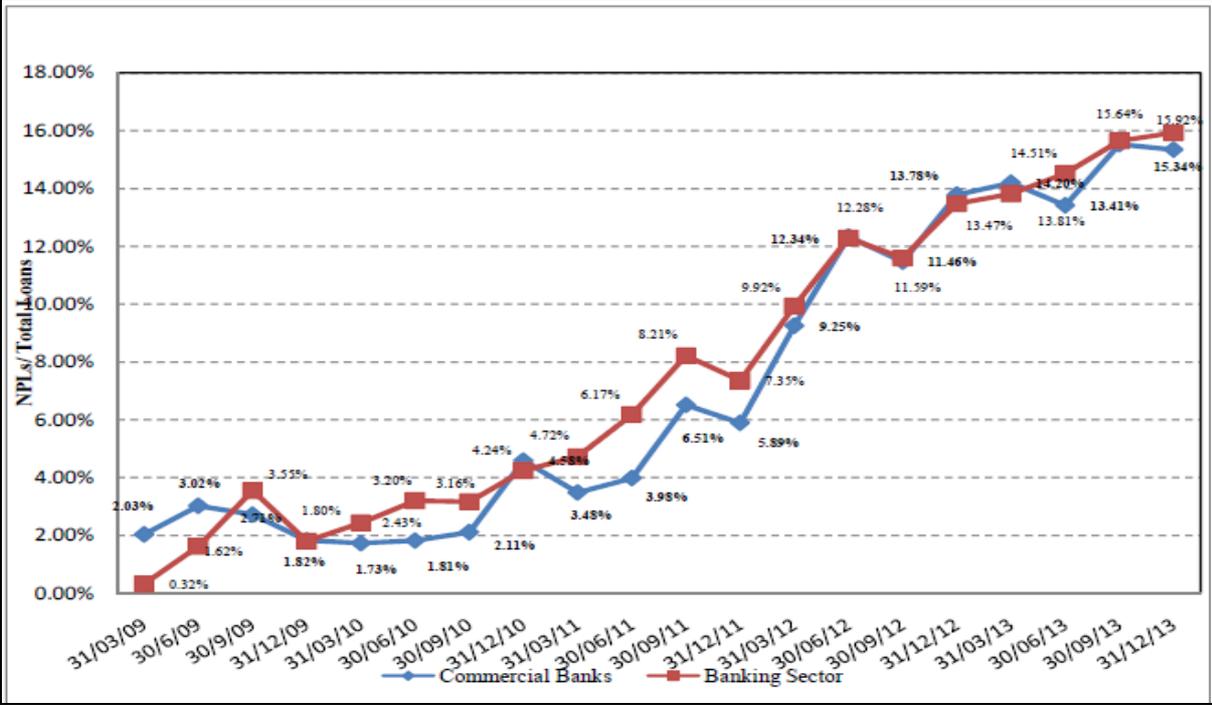
#### **2.4 Evolution of NPLs since 2009**

The adoption of the multicurrency resulted in steep credit expansion in a period where deposits were largely short term and transitory. Borrowers accessed the wrong type of funding at high interest rates, as manifested by the failure to repay the loans at due dates, resulting in "ever-greening of loans" or continuous renegotiation of loan tenures reflecting loan delinquency. This scenario was particularly exacerbated by the Monetary Authorities which encouraged lending and also pronounced sectoral thresholds and the absence of a public credit reference system which inhibited effective information sharing, (RBZ, 2012).

Resultantly, credit risk has been increasing over period as evidenced by increasing NPL to Total Loans trend doubt on the quality of loans that were granted. As at 31 December 2013, the banking sector total non-performing loans to total loans were 15.34%. The trend in the

NPL/Total Loans (TL) ratio since the adoption of the multi-currency is depicted in the graph below.

**Figure 2.4: Credit Risk in the Zimbabwe Banking**



Source: RBZ Monetary Policy Statement January 2014

**2.5 Conclusion**

The outlook for the Zimbabwean banking system is negative, driven mainly by macroeconomic constraints and weak aggregate demand resulting in sluggish growth over the short to medium term. The operating environment characterized by a contracting economy, widening fiscal deficit, rising unemployment and liquidity squeeze and presents an additional source of vulnerability to the banking sector. This development might result in a sharp increase in the level of nonperforming loans.

The current levels of NPLs are expected to exert strong pressure on bank balance sheets and capitalisation levels, with possible effects on bank’s loan books and profitability levels. This impact is forecasted to transmit, through feedback effects, to real economy posing significant vulnerabilities going forward, resulting in depressed growth levels thus threatening second round effects. It is, however, imperative to note that the current resolution initiatives being proposed by the policymakers such as, establishment of a credit reference system and creation of the asset management company to resolve NPLs, may stop the scourge.

## CHAPTER 3: LITERATURE REVIEW

### 3.0 Introduction

This chapter provides the literature that is available on the subject of non-performing loans. The chapter begins by introducing the definition of non-performing loans and then provides the theoretical underpinnings of non-performing loans. A review of the empirical literature on the subject under study with particular emphasis on macroeconomic and bank specific determinants of NPLs is provided. The chapter concludes by looking at the studies conducted on the subject in the Zimbabwean context.

### 3.1 Definition of non-performing loans

While it is generally agreed that the term “non performing loans” can be used interchangeably with "impaired loans" and “problem loans" (Fofack, 2005; Berger and De Young, 1997; and Basu, 1998), there has been no consensus on the single definition of a **non-performing loan**. Definitions differ across jurisdictions and resultantly the recognition thereof.

IMF (2004) and BIS (2004) both define a loan as **nonperforming** "*when payments of interest and/or principal are past due by 90 days or more, or interest payments equal to 90 days or more have been capitalized, refinanced, or delayed by agreement, or payments are less than 90 days overdue, but there are other good reasons—such as a debtor filing for bankruptcy—to doubt that payments will be made in full.*"

There is growing acceptance and adoption of that definition, especially in light of the adoption of the Basel II Capital Accord.

Consistent with best practice, the Zimbabwean **Banking Regulations, Statutory Instrument 205 of 2000** defines nonperforming loans in terms of income generation capacity and based on the number of days in arrears. Paragraph 19 of the regulations specifies that an asset is deemed to be non-performing when “... principal, interest or both is due and unpaid for 90 days or more; or interest payments equal to 90 days or more have been capitalised, refinanced or rolled over.

Nonperforming loans are classified as either “substandard” that is arrears of over 90 days; doubtful, when they are in arrears for over 180 days and “loss” when arrears exceed 360 days. Full provisioning is required for loss making, whereas substandard loans required 20% provisioning and doubtful require 50% provisioning.

### **3.2 Theories underpinning non performing loans**

Literature on non-performing loan is largely policy oriented, as available theoretical literature does not explicitly mention non-performing loans but simply implies it in many models. The vast policy literature on non-performing loans, thus clearly, has certain theoretical models in mind. There are four major theories that have attempted to provide insight into how macroeconomic and idiosyncratic factors influence nonperforming loans levels namely: the Deflation theory (Fisher, 1933); the Financial theory (Minsky, 1974); the Ownership structure theory (Jensen, 1976) and the Moral hazard hypothesis. These are discussed in detail hereunder.

#### **3.2.1 Deflation Theory**

The deflation theory was posited by Fisher (1933) and suggested that when the debt bubble bursts it resulted in deposit contraction, as people and corporates alike liquidate their borrowings. As savings levels for economic agents fall, their propensity to spend also falls thus resulting in reduction in aggregate demand.

A fall in aggregate demand will affect corporates, which react through downscaling production. A reduction in production levels will cause companies, with questionable capacity to meet obligations, to retrench excess staff thus triggering thus triggering bankruptcies. Given the fact that both the companies under bankruptcy and the retrenched workers are borrowed, the loss of income will result in defaults and ultimately feed the vicious cycle of loan delinquency.

#### **3.2.2 Ownership structure theory**

While the financial theory and the deflation theory, provides an analysis of the macroeconomic cause of loan non-performance, Jensen (1976) assessed ownership structure as one of the firm specific cause. Jensen (1976) argues that, “ownership structure” is an important determinant and expands the analysis to include the effect of owner managers’, that is, equity held by an institution’s management. The theory posits that public ownership makes it difficult for financial institutions to exercise effective financial discipline and observe

prudential norms. His work integrated the elements of theory of property rights (Ronald, 1937), the theory of agency (Ross, 1973) and (Minsky, 1974) and the theory of finance (Minsky, 1974).

The agency theory argues that the level of NPLs is high as bank management have little incentive to monitor borrowers or select appropriate projects. It was noted due to the fact that banking is highly regulated and that owner management is largely low, and because banking is largely based on depositors' funds, managers have less incentive to worry about bank failures (Wang 2010). Tied to the agency theory is the reward system issue. Hawkins and Turner (1999) argued that loan quality was likely to suffer, if the credit officers' reward system is tied to the volume of loans

State ownership has been argued to result in political interference as managers are directed to advance to certain projects or towards a policy based lending to support projects that are not commercially viable (Liu, 2001). It was also noted that governments of emerging economies (China, South Africa, Zimbabwe among others) generally use state owned banking institutions to undertake policy based lending which then reduces, bank manager's incentive to monitor the funded projects. In most cases, banks and the funded firms undertake risky investments under the impression that government will absorb any losses. The Asian Development Bank (1999) noted that banks usually have fewer incentives to monitor loans that are government guaranteed, which result in the funded firms thinking that they do not have any obligation to repay the loan.

### **3.2.3 Moral Hazard**

Information asymmetry between bank and their customers is prevalent. Resultantly either of the parties can exploit these imperfections to the other's detriment. It thus follows, therefore, that lending decisions are only good to the extent that the information received is accurate and complete. This problem is particularly exacerbated in economies without credit reference systems and where bribery and corruption is rife.

The problem of moral hazard has also been analysed from the angle where the banking institutions, especially the big ones, operate under the "too big to fail" believe. Cole (1998), noted that ease at which government bailout is perceived to come can impact the lending culture of banking institutions thus, increasing the likelihood of a crisis.

High level of non-performing loans in banking institutions has also been attributed to moral hazard due to low capital. Dornbusch and Giavazzi (1999), argue that as banking institutions become technically insolvent, they lose the incentive to price new loans accurately. Loanable funds become channeled to risky enterprises at high interest rates. Most of these borrowers are on the brink of collapse and will be having problems in meeting repayments precipitating into continuous rollovers. This finding was supported by the Asian Development Bank (1995) and Cooper and Ross (2002), who noted that NPLs may perpetuate a culture of non-repayment and risk seeking behavior on the part of banks.

Lau (1999) argues that legal system makes it very difficult to collect nonperforming loans. Resultantly, banking institutions do not expect their loans to be collectible and borrowers know they will not have to repay. This means there is little incentive for banks to monitor loans.

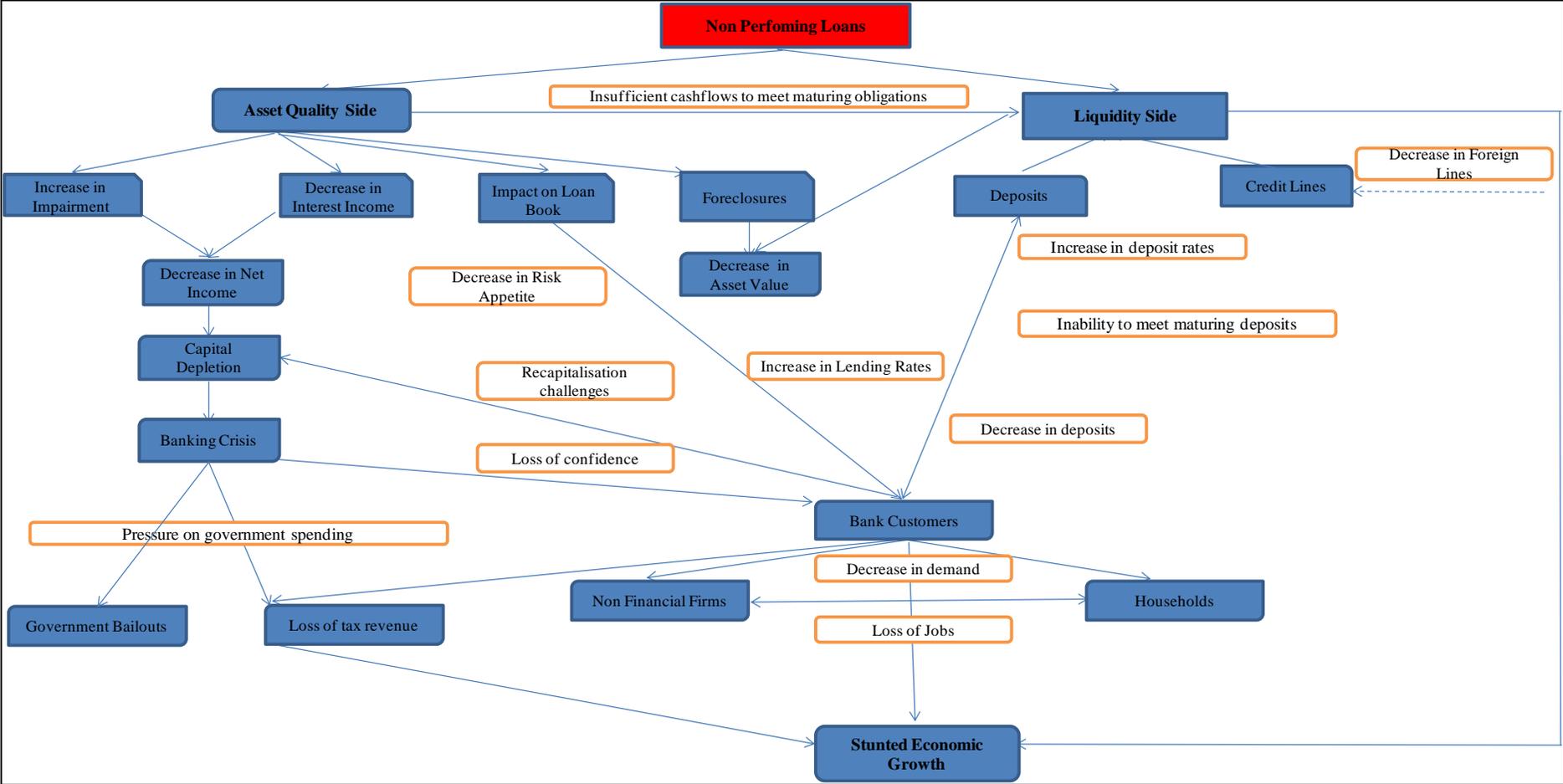
#### **3.2.4 Financial instability hypothesis**

Pioneered by Minsky (1974), the financial theory or the financial instability hypothesis attempts to demystify the causes and characteristics of financial crisis. The theory posits that an economic boom promotes a speculative culture which drives up borrowing to levels that are unsustainable, which in turn produces a financial crisis. This scenario triggers credit rationing even to creditworthy borrowers, resulting in the economy contracting.

NPLs affect the economy through both the asset and liquidity side. On the asset side, by eroding the capital base, NPLs affects banks risk appetite and capacity to underwrite new business thus causing a credit crunch and ultimately impacting on the fiscal space (Bernanke *et al.*, 1991). This will affect the collateral market, hence affecting asset market liquidity. On the other hand as NPLs increase, it decreases the amount paid as repayments thus affecting liquidity and the ability of the sector to attract credit lines.

Bonin and Huang (2001) assert that if unattended to non-performing loans might heighten the probability of a banking crisis. The economic and financial implications of NPLs can be best explained by the following diagram:

**Figure 3.5: Macroeconomic impact of Non-Performing Loans**



Source: Author

### **3.3 Empirical review of determinants of NPLs**

There has been an increasing number of researches examining non-performing loans given its inter linkage to financial instability given the strong association between nonperforming loans and banking crises. This section reviews the empirical work on macroeconomic, bank specific and regulatory (bank supervision) determinants of non-performing loans. The studies and authors considered a gamut of bank specific and macroeconomic explanatory variables and estimation methodologies to assess the determinants of NPLs across institutions, banking sectors and jurisdictions. Expectedly, the studies have reached different conclusions across different jurisdictions and time periods.

#### **3.3.1 Macroeconomic factors**

Literature has generally acknowledged the state of the economy as the single most important systematic factor that affects loan performance and ultimately the stability of banking institutions. Business cycles are argued to affect asset quality, as such economic booms are expected to increase disposable income and thus reduce incidences of NPLs, as borrowers have sufficient streams of income and revenues to service their debts. This scenario, however, results in credit push, where poor quality borrowers get credit and good borrowers' access more than commensurate debt thus affecting their capacity to repay in periods of recession. The major macroeconomic causes of NPLs range from real GDP growth, government expenditure, money supply, foreign exchange rate, inflation rate, asset prices, unemployment, and the lending interest rate. This study, however, focuses on GDP growth rate and inflation rate.

##### **3.3.1.1 GDP Growth/ State of Economy**

The relationship between non-performing loans and the economy, can be argued to be similar to the "hen and egg" hypothesis with some arguing that non-performing loans result in an economic downturn while others argue that the later exacerbate the incidence of non-performing loans.

Keeton and Morris (1987) are the pioneers who examined the causes of loan losses. The study was conducted on 2,470 banking institutions in USA, and was meant to ascertain the reason behind differing NPL ratios among banks. Among the findings of their study is the fact that local economic conditions along with the poor performance of certain sectors explain the variation in loan losses recorded by the banks. Banks operating in areas with unfavorable

economic conditions were found to have higher ratios. They also noticed a positive relationship between bank risk appetite and loan losses.

In their progressive studies, Salas and Saurina (2002); Quagliariello (2007) and Cifter *et al* (2009), across different economies which include Spain, Italy and Turkey; all concurred on the impact of the state of the economy on the levels of nonperforming loans. The researches established that deterioration in the economic performance impacted on the ability and capacity of borrowers to meet their obligations and was thus the major determinant of NPLs.

In related study, Rottke and Gentgen (2006) looked at the macroeconomic determinants of increasing non-performing loans in Germany in the early 2000s. The study posited that weak economic performance, typified by declining GDP growth and closure of firms and tax reforms which resulted in the construction of a poor quality of real estate stock were the major cause of increasing NPLs. The study reveals interrelatedness between the ultimate performance of the corporate book and the retail (consumer) book. Vulnerabilities in the cooperate sector result in second round effects through redundancies of staff and downscaling of office space as firms realign their business models to survive. This impacts the mortgage portfolio through decrease in rentals and property values and on the retail property through decrease in disposable income.

The findings of the studies listed above are consistent with the conclusions of a cross-country analysis done using dynamic panel data analysis which noted that low economic growth and higher interest rates trigger an increase in NPLs (Espinoza and Prasad, 2010 and Nkusu, 2011).

Louzis *et al* (2011) using dynamic panel set comprising 9 largest Greek banks, which constituted approximately 90% of the total banking sector, examined the determinants of non-performing loans (NPLs) in the Greek banking sector for the period 2003Q1 to 2009Q3. The study examined macroeconomic determinants across different loan categories, that is, consumer loans, business loans and mortgages. They used the GDP growth rate, the unemployment rate and the lending rates as the primary macroeconomic determinants of NPLs and estimated a baseline model using this set of variables. The results showed that, for all loan categories, NPLs in the Greek banking system were explained mainly by GDP growth rate, unemployment, interest rates and public debt.

A study by the Working Group on NPLs in Central, Eastern and Southeastern Europe (2012) using a variety of panel estimates noted that post **2008/09 GFC, NPLs had increased rapidly across CESEE countries**. This was more prevalent in countries where the economic slump was particularly deep. The study showed that the NPLs problem was prevalent in both the corporate and retail books reflecting increasing exposure of consumer and mortgage loans pre the GFC period. This phenomena is in contrast with other NPLs crises where corporate clients were the major defaulters but concurs to the premise that performance in retail loans is a mirror image of the performance of the corporate sector. While the paper's main findings remain robust they should be treated with caution as they are subject to caveats, including those that arise from the NPLs' data quality and differences in the classification of NPLs across countries (Klein, 2013).

While there is general consensus that a GDP negatively impacts NPLs, Beck, *et al*, (2013, p.4) noted a disproportionate relationship between NPLs and GDP growth. They noted that an 18% decline in GDP in Latvia in 2009 had translated to a triple increase in NPLs while a 5% contraction in the German economy in 2009 had at the same time resulted in less than anticipated increase in NPLs. This then confirms that there are other variables other than the economic output which explain the increase.

### **3.3.1.2 Inflation Rates**

Empirical studies on the link between inflation and asset quality has remained ambiguous. On one hand, higher inflation is argued to make debt servicing easier by reducing the real value of outstanding loan, while on the other hand, it can also reduce the borrowers' real income in instances where wages are sticky. The debate has been compounded by the fact that interest structures vary across countries, that is, some loan rates are fixed while others are variable. Higher inflation will lead to higher rates resulting from the monetary policy actions to combat inflation thus affecting loan performance (Nkusu, 2011).

The impact of inflation on loan performance has been studied particularly on consumer and mortgage books. Studies conducted in the United Kingdom and across 11 European countries modelled arrears in the mortgage and consumer books concurred on the effect of increasing inflation on increasing mortgage and consumer defaults (Brooks, Dicks, and Pradhan (1994); Rinaldi and Sanchis-Arellano (2006); Jappelli, Pagano, and Marco (2008)).

A study by Klein (2013) using panel data of individual banks' balance sheets for the period 1998 to 2011, covering the ten largest banks (commercial, savings, cooperative, real estate and mortgage banks) of the 16 countries covered under the analysis confirmed that the level of NPLs tends to increase when inflation is high. The study also noted differences in the quantitative impact of macroeconomic factors among types of loans. Mortgages were found to be the least responsive towards changes in the macroeconomic conditions. This can be attributable to the fact that most of the mortgages are on principal residence, which reduces loan delinquency.

A study by Hess, Grimes and Holmes (2008) on 32 Austrian banks over the period covering 1980 – 2005, determined a positive correlation between NPL ratio and inflation growth rate confirming earlier findings.

Another strand of literature analysed the effect of inflation through the asset side. The studies posit that inflation can cause a drop in shares prices thus leading to defaults via the wealth effects. As share prices decline and the value of collaterals deteriorates, incidences of NPLs increases. Asset price fall will mean that investors are discounting the future cash flows at higher discount rates. This encourages borrowers to default as the value of collateral become less than their exposures.

### **3.3.2 Bank specific factors**

While, systematic factors are the major causes of loan delinquency, idiosyncratic factors across banking institutions, as reflected by differences in NPL ratio within banks in similar macroeconomic settings prove that these factors exert a decisive influence on the evolution of NPLs. A strand in the literature has considered variability of NPLs across banks and attributed the levels to bank specific factors. This study will consider lending rates, management, size, capitalisation, loan tenure and ownership structure.

#### **3.3.2.1 Bank Management**

Bank management is measured by management's capacity to monitor credit quality, efficiently utilise resources and ability to contain costs to within sustainable levels that enables the growth of the bank's capital.

A study by Salas and Saurina (2002) assessed both macroeconomic and microeconomic variables that cause NPLs and concluded that management inefficiencies and the size of the institution as some of the major determinants of NPLs. The findings on management inefficiencies concur with the moral hazard hypothesis, which postulates that borrowers or management might enter into the contracts with "bad faith". The findings supported an earlier study by Keeton and Morris (1987) on US Banks which noted that banks that tend to take more risks, including in the form of excess lending eventually absorbed higher losses, usually in form of impairment charge.

Podpiera and Weill (2008, p. 138) in their study on the relationship between cost efficiency and non-performing loans in the Czech Republic for the period 1994 to 2005, found sufficient empirical evidence that management inefficiencies or bad management resulted in higher incidence of NPLs. Their findings supported an earlier research which found evidence of the effect of bad management and moral hazard on NPLs. Their study also noted negative bidirectional causation between cost efficiency and NPLs. They postulate that high cost efficiency may be reflection of poor credit origination and monitoring standards which may result in higher NPLs. This hypothesis is consistent with the findings of Berger and DeYoung (1997) and Rossi, Schwaiger, and Winkler (2005). The latter looked at a sample of 278 banking institutions from nine transition countries from 1995 to 2002.

Boudriga A. et al (2009) noted that profitability may also determine the risk taking behavior of managers. He argued that banks with high profitability are less pressured to revenue creation and are thus less likely to engage in risky credit offerings. Conversely, inefficient banks were found to be more likely to experience high levels of problem loans.

A study by Louzis, Vouldis and Metaxas (2011), assessed the effect of management inefficiency, which was proxied by a higher ratio of operating expenses-to-operating income; noted a positive relation. The study found that that management quality had a bearing on the levels of NPLs.

### **3.3.2.2 Lending Rates**

One of the major terms of a funding structure is the lending rate. Interest rate affects the ability to service debt, with rising interest rate repayments are likely to lead to higher

incidences of NPLs. Consistent with the adverse selection theory as explained by Stiglitz and Weiss (1981, p. 393), Boudriga *et al.* (2009) noted lending rates as one of the causes of NPLs. As interest rate increases, good borrowers are priced out of the market as they will not be willing to pay more than the market rates. Resultantly the banking institutions start attracting low quality customers, who are usually willing to pay more. Banks will thus charge higher interest rates on these riskier borrowers hence increasing the probability of default. Consequently, from date of origination banks will be sitting with non-performing loans in waiting.

Fofack (2005, p.17) using a panel-based model study on several Sub-Saharan African countries, noted that economic growth, real exchange rate appreciation, the real interest rate, net interest margins, and inter-bank loans were significant determinants of NPLs. The findings are informed by the undiversified nature of the study entities which make the vulnerable to cyclical changes.

Using aggregate industry data on Chinese banking sector, Foglia (2008) assessed the systemic causes of NPLs. The research identified nominal interest rate, inflation rate, change in real GDP, economic growth, unemployment, and the change in terms of trade as the major determinants. The limitation inherent in the taking macroeconomic variables as explanatory factors is the notion that they are also response variables that are affected by challenges in the banking sector. In addition, the generic limitation is the fact that Chinese markets are generally secretive and resultantly the figures used are inaccurate.

Espinoza and Prasad (2010) in a study using dynamic panel data estimated over 1995–2008 on around 80 banks in the GCC region, and noted that interest rates had a negative effect on NPLs. This postulate that as a decrease in economic growth is likely to result in higher interest rates as banks try to maximize and also cover their operating costs. This finding confirmed an earlier research on Chilean banks by Fuentes and Maquieira (2003) who found that interest rates had a greater effect on NPLs than the business cycle.

Vogiazas and Nikolaidou (2011) using time series modelling approach on monthly series data of the Bulgarian banking sector, that span from January 2001 to December 2010, investigated the determinants for non-performing loans. The research hypothesized that exogenous and bank-specific variables have a role to play on the non-performing loans. They

found that the macroeconomic and financial market variables, influenced the quality of the Bulgarian banks' assets.

In their study on non-performing loans in Guyana, Khemraj and Pasha (2009) examined the relationship between NPLs and bank specific variables namely; loans to total assets ratio, size, real interest rate and annual growth in loans. Their findings indicated that banks which charge relatively higher interest rates and lend excessively are likely to incur higher levels of non-performing loans.

### **3.3.2.3 Bank Shareholding/ Ownership Structure**

Wang and Peiser (2002, p. 120) postulates that ownership structure is also an explanatory variable for increase in NPLs in China in the late 1990/2000s. Their study noted that banking institutions with high NPLs were largely state owned entities which the government used to further their economic and development objectives. The study discovered that state owned institutions' underwriting methodologies were inadequate, since they were driven by central government and that as with all rent seeking policies, most of the entities financed were loss making either due to their inherent design or mismanagement. This finding confirmed an earlier study by Novaes and Werlang (1995) who noted that state controlled banks in Brazil and Argentina posted lower performances due to high NPLs. The study noted that most of the NPLs emanated from loans that had been extended to government.

In a research on determinants of NPLs in 119 countries over the period 1995-2002, Micco *et al.* (2004) as cited by Sočuvková (2012) concluded "... that state-owned banks, especially in developing countries, have usually higher volume of bad debt due to their weak credit recovery capacity in comparison to private-owned banks. The opposite holds for foreign-owned banks." Studies of Chinese financial system suffer from one generic limitation that Chinese markets are generally secretive and resultantly the figures used may be inaccurate.

A study conducted on a sample of 81 banks from 22 developing countries, a few years later by Boubakri *et al.* (2005) posited private ownership enhanced asset quality and hence performance. Unlike other studies, it went on to denote that foreign participation reduced the level of risk taking amongst banks concurring with earlier studies. Bercoff, Giovanniz and

Grimardx (2002) using accelerated failure time (AFT) model in their study of Argentina's banking sector found that foreign controlled banks performed better than domestic ones.

Sahori and Tariq (2009) conducted a study on the effect of 1990 to 2002 privatisation of the Pakistan banking sector on NPLs. The research which used both the qualitative and quantitative methodologies established that the NPL to total loans ratio had improved following the drastic change in ownership. This finding supported an earlier finding by the IMF Technical Report on Pakistan (2005) which stated that the privatisation of the sector had significantly improved the asset quality of banking institutions. The authors attributed the decline in NPLs to the fact that the high incidence of NPLs before privatisation was as a result of management inefficiencies, which were concentrated in state owned banks that were being used to further government economic policies. Interestingly, though post privatisation, the levels of NPLs in Pakistan have begun to increase, and was at 14% in March 2013 mainly due to sluggish economic growth (IMF 2013).

This finding was confirmed by a paper on NPLs in Middle East and North Africa (MENA) region by Boudriga *et al.* (2009) which noted that foreign ownership, especially by investors from developed economies had an effect of reducing levels NPLs. The study did not however find compelling evidence on the effect of state ownership of banks in NPL loans incidence.

#### **3.3.2.4 Bank Size**

Body of literature has been inconclusive on the relationship between size of the bank and incidence of NPLs. There are three strands of literature that postulates different hypothesis; with one saying the relationship is positive while the other postulates negative relationship. Last but not least, is the group that noted that there was no relationship between size and NPLs. Importantly, though, is the fact that all the studies that have been conducted have generally concurred on the definition of bank size as the logarithm of total assets of a bank.

The strand that posited positive correlation argued that as the bank's size increase, their capacity and appetite increase and with it comes the potential to pursue higher risk loans and utilize higher levels of leverage. The researchers do not find a diversification benefit determined by bank size, instead they note that big institutions are likely to fail due to the problem of moral hazards, as institutions become "too big to fail".

Rajan and Dhal (2003) cited Bercoff et al (2002) who analyzed the vulnerability of the banking sector in Argentina over four years between 1993 and 1996 using the accelerated failure time model (AFT). The authors postulated that non-performing loans are also driven by bank specific factors. They determined that, the size of a bank had a positive effect on non-performing loans while asset growth had a negative effect on non-performing loans.

Khemraj and Pasha (2012) in a study of Guyanese banking sector using a panel dataset and a fixed effect model noted that there was no significant relationship between the size of a banking institution and the level of NPL. This is contrary to other studies that had posited that large banks are more effective in screening loan customers when compared to their smaller counterparts.

On the other hand, Salas and Saurina (2002) examined Spanish banks over a period covering 1985 to 1997 using panel data and found a negative correlation between bank size and NPLs. The conclusion was built on the theory of diversification. Larger banks have generally less concentrated loan portfolios than small banks, as their borrowers can vary by industry, geographical locations, capital size and other customer segments. They noted that as a bank's size increase, it provides a higher likelihood of a diversified loan portfolio, thereby lowering risk, as represented by loan delinquency and a higher probability of achieving target returns.

Studies by Hu *et al.* (2004) using panel data on 40 Taiwanese commercial banks from 1996 to 1999; supported earlier researches by Demsetz, Saldenberg and Strahan (1996) and Saunders and Wilson (1996) on U.S. banks that showed that greater market power translated to largest solvency ratios and lower level of non-performing loan.

Park and Zhang (2012) used an OLS regression analysis on U.S banks for a 9 year period covering both pre and post global financial crisis period (2002 to 2010). The paper drew annual data from 2670 banks, which represents the vast majority of banking institutions in US, from Wharton Research Data Services (WRDS). The research concluded that size did not seem to affect the level of NPLs. This was especially so in periods of economic recessions; where the NPL levels were not related to size.

### 3.3.2.5 Capitalisation (Capital Adequacy)

International best practice, Basel Accord, have postulated capital adequacy ratio (CAR) as a tool of controlling excessive risk taking. Banks with CAR less than the regulatory minimum are forced to adjust their balance sheet to comply with the regulatory requirements either by raising more capital (holding assets constant) or reducing risk-weighted assets (holding capital constant). Empirically, there is no consensus on the relation between capital adequacy and NPLs

On one hand, Keeton and Morris (1987) posited the “moral hazard” hypothesis, which argued that banks with relatively low capital respond to moral hazard incentives by increasing the riskiness of their loan portfolio in search of higher income, which in turn results in higher non-performing loans on average in the future. Their study on US Banks showed that NPLs, as evidenced by high impairment charges, were prominent among banks that had relatively low equity-to-assets ratio. Subsequent researches by Berger and DeYoung (1997), and Salas and Saurina (2002) concurred with this finding noting that there was a negative link between the capital ratio and NPLs.

Godlewski (2004) examined another explanatory variable of NPLs in the form of capital. The study noted that capitalisation levels and regulatory requirements usually increase risk-taking behavior which results in high levels of NPLs. He postulates that a low capital base in high capital requirement regimes impresses on the need for high asset returns, which is only possible to achieve through higher risk taking. A study using data from transition economies, by Delis et al. (2008) however dispels the statistical significance of capital requirements in causing NPLs.

On the other hand, Sinkey and Greenawalt (1991) show that banks with adequate capital ratio experience lower rates of NPLs, while on the other hand, high levels of CARs might encourage banks to embark in riskier activities leading to riskier credit portfolios. Rime (2001) corroborates this argument. He observed a positive relationship between bank risk and capital ratio for a panel of Swiss banks during the period 1989-1995.

### **3.3.2.6 Loan Tenure**

In a research conducted through regression analysis, Ranjan and Dhal (2003) studied the causes of NPLs in India based on three explanatory factors namely terms of credit; bank size induced risk preference and macroeconomic shocks. While the results showed the terms of credit to be significant, it found that longer horizon of maturity of credit and favorable macroeconomic decreased levels of NPLs.

In a similar study on NPLs, Saurina (2003) used logit model for analysing the determinants of the probability of default (PD) of bank loans in terms of microeconomic variables such as collateral, type of lender and bank-borrower relationship while controlling for the other explanatory variables such as size of loan, size of borrower, maturity structure of loans and currency composition of loans. Their empirical results suggested that collateralised loans had a higher PD, loans granted by savings banks were riskier and a close bank-borrower relationship had a positive effect on the willingness to take more risk. They also noted a significant positive effect of maturity term of loans on default. Short-term loans of less than 1-year maturity had a propensity to default.

### **3.4 Empirical Studies on Zimbabwe**

While there is a growing body of literature on the determinants of NPLs across economies, there is no sweeping consensus on the nature of the relationship between these variables in a multicurrency environment. Studies that have attempted to consider this have been done on Zimbabwe. A survey of the finding from the studies is presented in the paragraphs that follow.

Mabvure *et al* (2012) conducted a case study of the causes of non-performing loans using a questionnaires and interviews on CBZ Bank, the biggest commercial bank in Zimbabwe. They found some evidences that non-performing loans were mainly as a result of micro and macro causes. The bank specific causes included poor credit policy, weak credit analysis, poor credit monitoring, and inadequate risk management. Insider loans were noted to have a limited influence towards non performing loans. Regards the macro economy, the research found natural disaster, government policy and the integrity of the borrower affecting nonperforming loans. The natural disasters were in respect of the exposures to the agricultural sector which has been blighted by droughts.

Chikoko *et al* (2012) using survey research design conducted a study on the causes on NPLs on commercial banks in Zimbabwe. The research found poor credit analysis; product profiles; lending methodologies, information asymmetry; economic environment and political influence as the major causes. The study suffers from biases due to the sensitivity of the subject matter resulting in inaccurate conclusions.

### **3.5 Conclusions**

The determinants of non-performing loans are not exactly clear in the literature. The relationships tend to be different across countries and through time. In addition, differences in the underlying economies result in countries reacting differently to macroeconomic shocks. Thus identification of the determinants of NPLs and the underlying relationships is an empirical issue. There is, however, no evidence of a quantitative study on NPLs in a multicurrency environment. This study considers the determinants in a multicurrency setting.

## CHAPTER 4: RESEARCH METHODOLOGY

### 4.0 Introduction

This chapter outlines the methodology employed in this study. It begins with econometric methodology including model specification, data employed in the analysis, its sources and finally the transformations that have been performed on the data. The analysis uses quarterly panel data analysis of banking institutions in Zimbabwe for the period 2009 to 2013. Diagnostic tests are also discussed to ensure that the model is parsimonious.

### 4.1 Research Approach and Strategy

Cooper *et al.* (2003) define research design as the process of focusing on the researcher's perspective for the purpose of a particular study. The research uses a quantitative approach. This approach is used to answer question about relationships among measured variables with the purpose of explaining, predicting and controlling phenomenon.

This research adopted an explanatory research strategy to econometrically analyse the macroeconomic and bank specific determinants of nonperforming loans in a multicurrency environment. This research approach enabled the researcher to gather quantitative data needed to accomplish all the research objectives.

The research adopted a regression approach utilising time series data which was collected on a quarterly basis over a 5 year period, beginning March 2009 and ending December 2013. The use of quarterly data effectively increased the number of observations to 20 over the 5 year period. This is in line with the provisions of regression analysis which requires that the number of observations be many in order to produce reliable results.

### 4.2 Model Specification

#### 4.2.1 Model

The model is specified following the empirical literature on the determinants of nonperforming loans with adjustments to take into consideration Zimbabwe specific macroeconomic and financial situation.

The general specification of the regression equation is of the form:

$$\ln NPL_{A_{i,t}} = \beta_0 i + \beta_1 DLOGVMI_t + \beta_3 DLOGCPI_t + \beta_2 LR_t + \beta_4 LOG(TA)_{i,t} + \beta_5 MGT_{i,t} + \beta_6 STL_{i,t} + \beta_7 OWNER_{i,t} + \beta_8 CAR_{i,t} + NPL_{i,t-1} + \eta + \varepsilon_{i,t} \quad i = 1, \dots, N, \\ t = 1, \dots, T$$

where:

- $\ln NPL_{i,t}$  represent the natural log of the ratio of NPLs to total loans for bank  $i$  in year  $t$ ;
- $\ln NPL_{i,t-1}$  represent the lagged NPL ratio;
- $DLOG(VMI)_t$  represent the differenced logarithm of the Volume of Manufacturing Index at time  $t$ , and shall be the proxy of GDP growth rate;
- $DLOG(CPI)_t$  is the differenced logarithm of Consumer Price Index and shall measure inflation rate at time  $t$ ;
- $LR_t$  denotes the lending rates at time  $t$ ;
- $SIZE_{i,t}$  is the ratio of the relative market share of each bank's assets that capture the size of the institution at time  $t$  and shall be measured as the Log of Total Assets;
- $MGT_{i,t}$  indicate the bank  $i$ 's management performance at time  $t$  (research will utilise operating efficiency ratio as the proxy);
- $STL_{i,t}$  indicate the ratio of bank  $i$ 's short term loans to total loans at time  $t$  (proxy for loan tenure);
- $OWNER_{i,t}$  indicate bank  $i$ 's ownership structure at time  $t$ ;
- $CAR_{i,t}$  indicate bank  $i$ 's capital adequacy ratio at time  $t$  (proxy for capitalisation); and
- $\varepsilon_{i,t}$  is the white noise error term.

A panel regression analysis covering quarterly time series data on bank specific and macroeconomic variables from 2009 to 2013 is applied. Where applicable, the model is estimated in logarithmic differences in order to avoid possible measurement error in the dependent variable. (Beck *et al* 2013).

The use of panel data techniques to analyze and quantify the impact of the macroeconomic and financial variables allows the capturing of the institution specific effects and the unobservable differences. This enables the control of biases generated by potential heterogeneity and omitted variable problems.

### **4.3 Data Collection, Frequency and Choice of Data**

The study uses quarterly seasonally unadjusted data, spanning the period March 2009 through to December 2013. Quarterly data is used to reduce the extent of measurement error and the problem of heteroskedasticity that is often present in high frequency data.

The data sources are financial releases and public statements, Reserve Bank of Zimbabwe Economic Bulletins and Monetary Policy Statements and International Monetary Fund financial statistics database and publications. The data includes the GDP growth rate, real gross domestic product, interest rates, management, loan tenure, capitalisation levels and shareholding structure.

### **4.4 Sampling**

The study population will comprise all banking institutions in Zimbabwe which are licensed by the Reserve Bank of Zimbabwe in terms of the Banking Act Chapter [24:20] due to ease of access of data.

Due to institution closures that happened during the period under study, the issue of individual banking institutions with missing variables will arise. Given the fact that banking institutions with missing values are few compared to our population size, all observations with missing values will be dropped as opposed to applying one of gamut of techniques available to deal with this issue. Resultantly, the study will analyse 21 banking institutions, which represent all the operational banking institutions as at 31 December 2013.

### **4.5 Justification of variables**

The macroeconomic factors, used for this study, are assessed through two key variables: GDP growth and inflation. The performance of the economy is expected to have a positive bearing on the quality of the loan book and effectively the quantum of NPLs. Inflation rates affect the borrowers' capacity and thus should have a positive impact on credit risk, an increase in inflation rates is expected to trigger an increase in loan delinquency.

For this study, bank specific factors will be size, ownership structure, loan tenure, quality of management and capitalisation levels. Size was based on asset base of the banks while ownership was classified as foreign and local banks (includes where the government has controlling interest). Equally, quality management which reflect institutional performance and efficiency was assessed using the operational efficiency ratio while capitalisation denoted the

level of regulatory capital (Tier 1 and Tier 2), which represents underwriting capacity. Finally, loan tenure was assessed using the ratio of short term loans to total loans; wherein short term loans are defined as loans with a tenure of up to 1 year. The table below shows a summary of the variables and the apriori expectations:

**Table 4.6: Summary of variables used in regression model**

Variable	Apriori expectation	Research Support
GDP growth rate	- (negative)	Salas and Suarina, 2002; Fofack, 2005; and Jimenez and Saurina, 2005
Inflation rate	+ (positive)	Brooks, Dicks, and Pradhan (1994); Rinaldi and Sanchis-Arellano (2006); Jappelli, Pagano, and Marco (2008); Nkusu (2011)
Lending Rate	+ (positive)	Stiglitz and Weiss (1981, p. 393), Boudriga <i>et al.</i> (2009); Foglia (2010)
Size	-(negative)	Salas and Saurina (2002); Waure B. (2013); Hu <i>et al.</i> (2004)
Shareholding	+ (positive)	Novaes and Werlang (1995); Micco <i>et al.</i> (2004); Giovanniz and Grimardx (2002)
Tenure	-(negative)	Ranjan and Dhal (2003); Saurina (2003)
Capitalisation (CAR)	-(negative)/ + (positive)	Sinkey and Greenawalt (1991); Rime (2001); Godlewski (2004)
Management	-(negative)	Podpiera and Weill (2008); (Berger and DeYoung, 1997); Louzis, Vouldis and Metaxas (2010)
Lagged NPLs - NPL(-1)	+ (positive)	Jimenez and Saurina (2006), Manoj K. Dash and Gaurav Kabra (2010), and Misra and Dhal (2010)

## 4.6 Data Analysis Methods

### 4.6.1 Hausman Test

The Hausman test is conducted to make sure that the population has specific individual effects. The test assumes the null hypothesis, that is, the difference of the coefficients obtained from the random effects and the fixed effects is not systematic. Thus, if the null hypothesis is rejected, the fixed effects method will be assumed. The Hausman test rejects the null hypothesis and shows the evidence of the fixed effects.

Fixed effects estimations account for the time-constant unobserved heterogeneity between institutions. Also, because regression analysis is limited to a specific set of institutions and all the variables are time varying, makes it reasonable to use this estimation technique as one of the methods. The fixed effects estimation allows the unobserved institutions specifics to be arbitrarily correlated with the determinants of asset quality (Wooldridge, 2002) and under the assumption of strict exogeneity it also takes into account the institution specific differences. Moreover, it addresses the omitted-variables bias problem by controlling for institution specific effects.

#### 4.6.2 Unit Root Tests

Granger and Newbold (1974) posit that when non-stationary data is employed in panel data analysis it is likely to yield misleading results. They state that the trends in the data will lead to spurious correlations which imply relationships between the data when in actual fact no relationships exist. The panel is thus tested for stationarity, using a unit root test.

To test whether the variables are stationary, the Fisher test for a panel unit root, using the augmented Dickey-Fuller (ADF) test is employed. Maddala and Wu (1999) argue that the Fisher unit root test for panel data performs best when compared with other panel data unit root tests, e.g. the Lin, Levin and Chu (2002) and Im, Pesaran and Shin (2003) tests. Moreover, it does not require a balanced panel dataset. For each series under study, the ADF regression of the following form is estimated:

$$\Delta Y_t = \gamma Y_{t-1} + \sum_{i=1}^p \beta_i \Delta Y_{t-i} + \varepsilon_t \quad (1)$$

Where  $\Delta Y_t$  are the first differences of the series under consideration,  $p$  is the appropriate lag length,  $\beta$  and  $\gamma$  are estimated parameters and  $\varepsilon_t$  is the random error term. The ADF test is performed on  $\gamma$  and critical values from the Dickey and Fuller (1976) tables are employed in assessing statistical significance of estimated parameters. The critical values are provided automatically in E- views.

#### 4.6.3 Multicollinearity tests

Also as part of preliminary analysis, the pairwise correlation coefficients between the dependant and explanatory variables is estimated to identify potential sources of multicollinearity in the estimated model. The analysis is done using the Variance Inflation Factor (VIF). The VIF quantifies the severity of multicollinearity in regression analysis. It

provides an index that measures how much the variance (the square of the estimate's standard deviation) of an estimated regression coefficient is increased because of collinearity.

#### **4.6.4 Autocorrelation**

This will be tested using the Durbin Watson test. It is assumed that the errors are uncorrelated with one another. If the errors are not uncorrelated with one another, it would be stated that they are 'autocorrelated' or that they are 'serially correlated'. A test of this assumption is therefore required and it is important to do the test in order to avert instances making a type I error - that is, a tendency to reject the null hypothesis sometimes when it is correct.

### **4.7 Statistical Tests of Significance**

#### **4.7.1 Goodness of fit with R<sup>2</sup>**

After the estimation of the parameters and the determination of the least squares regression line, there is a need to know how good is the fit of this line to the sample observations of Y (dependent variable) and X (independent variables). A measure of the goodness of fit is the square of the correlation coefficient, R<sup>2</sup> which shows the percentage of the total variation of the dependent variable that can be explained by the independent variable X. It has been noted that the value of R<sup>2</sup> increases with an increase/addition of another independent (explanatory) variable(s). Therefore, in assessing the goodness of fit of a regression equation, another statistic, called R<sup>2</sup>-adjusted or R<sup>2</sup> adj was calculated.

#### **4.7.2 Testing the significance of the coefficients**

After estimation of the model the parameters of the model are tested for their adequacy and mathematical plausibility. In this research the t- ratios and the probabilities of the coefficient were used to test for the significance of the coefficients. The decision rule is that if the magnitudes of the t-ratios are greater than 2 (rule of thumb) and the probabilities less than 5% the coefficients are significant.

### **4.8 Limitations**

The limitations of the study are listed hereunder:

- a) time period under study is peculiar (multicurrency) hence the possibility that the results will be applicable to that setting and period only;
- b) the list of variables that have an impact on the outcome of the study is not exhaustive;

and

- c) data on macroeconomic variables from the CSO was largely estimations and annual averages which might reduce the predictive power of the results.

The author tried as much as possible to minimize the effect of these limitations on the achievement of the objectives of the study.

One inherent weakness of panel data analysis is that it assumes that there is no correlation of explanatory variables, that is, it does not consider the issue of reverse causality. To address that limitation, evade the problem of error terms and to obtain additional efficiency gains, the analysis will be complemented by the Correlation Matrix.

#### **4.9 Summary**

The research which aims to ascertain the determinants of non-performing loans in the Zimbabwean banking sector, adopted a panel data analysis utilising time series of quarterly data over a 5 year period Q1:2009 to Q4:2013. Both macro-economic and idiosyncratic variables were considered. The study used an econometric technique (i.e. e-views) for data treatment and analysis.

The next chapter focuses on the data analysis of results.

## CHAPTER 5: RESEARCH FINDINGS, ANALYSIS AND DISCUSSION

### 5.0 Introduction

This chapter presents and discusses the results of the study. The analysis includes a discussion of data properties, diagnostics tests and regression results. The chapter provides the basis on which conclusions and recommendations of the study are formulated.

### 5.1 Preliminary Analysis

As a preliminary analysis, the properties of the data were first explored. The analysis involved assessing the descriptive statistics of the data, unit root tests and cross correlation analysis.

#### 5.1.1 Descriptive Statistics

The results of the descriptive statistics are shown in table 5.1 below.

**Table 5.5: Descriptive statistics for variables**

	NPL	DLOG(VMI)	DLOG(CPI)	LOG(TA)	COST	OWNER	CAP	SLOANS	RATES
Mean	0.094007	0.018251	0.004561	18.55712	1.109281	0.325359	0.221466	0.756993	0.184611
Median	0.040600	-0.003899	0.007517	18.70876	0.894100	0.000000	0.187650	0.804400	0.180000
Maximum	0.985000	0.227286	0.020574	21.18333	5.711500	1.000000	1.062000	1.000100	0.580000
Minimum	0.000000	-0.186940	-0.046944	15.58892	0.167400	0.000000	-1.545400	0.000000	0.000000
Std. Dev.	0.158254	0.113344	0.013567	1.088586	0.779818	0.469070	0.294030	0.225892	0.101018
Skewness	3.315101	0.290010	-2.771820	-0.215156	3.442957	0.745519	-2.330666	-0.791229	0.948383
Kurtosis	16.06630	2.188443	11.14876	2.574492	16.42944	1.555799	15.86437	2.873963	4.617514

The results in table 5.1 show that about 75.69% of the loans on average are short term loans, that is, with tenure of at most 12 months. In addition, a median of 80.44% indicate that the market is largely offering short term loans. This phenomenon is consistent with the transitory nature of the deposits in the market (RBZ, 2013).

The maximum lending rate noted was 58%, while the rates over the 5 year period averaged 18.46%. This figure is consistent with the multicurrency regime, given the high country risk premium that is punctuated by the absence of the lender of last resort. A standard deviation of 10.10% reflects little variability of the rates from the mean rate.

The results also clearly reflect the mixed record of NPL and other macroeconomic and financial variables (Table 1). The differenced VMI (growth of manufacturing production) ranges from -18.69% to 22.73%, the minimum differenced log of CPI (inflation) at -0.469%

is consistent with the deflationary pressures that the economy has been experiencing since 2011. The low standard deviation at 0.01%, indicates low variability from the mean of 0.46%.

The mean cost efficiency of roughly 110.93% is fairly typical for an emerging banking market (as found by Weill, 2003, and Bonin et al., 2005), since the cost efficiency scores exhibit high variability, corresponding to the substantial differences in business models and profitability among institutions.

### 5.1.2 Unit Root Test

The study employed the Augmented Dickey-Fuller Test to check the stationarity of the bank-specific and macro-economic variables. The results of the stationarity tests are shown in table 5.2 below.

**Table 5.6: Results of unit root tests**

Variable	ADF*	Probability
NPL	60.7811	0.0474
DLOG(VMI)	369.350	0.0000
Inflation (DLOG(CPI))	180.381	0.0000
Lending Rates	44.5865	0.4470
Short term loans	144.273	0.0000
Cost to Income	370.053	0.0000
SIZE(Total Assets)	174.607	0.0000
Capitalisation (CAR)	491.927	0.0000

\*indicates 5% level of significance

Source: researchers own computations

The ADF test results in table 5.2 suggests that, the null hypothesis is rejected for NPL ratio, VMI, Inflation ratio, Short Terms Loans Ratio, Cost to Income Ratio, Capitalisation and the Total Assets variables indicating that there is no unit root and that the variables are stationary at level. The Lending Rates variable was observed to be stationary at integration of order 1. The detailed results of the stationarity tests are presented in the appendix.

### 5.1.3 Multicollinearity

The preliminary analysis also involved checking the cross-correlations matrix, among the variables used in the study. The results of the crops correlations are shown in table 5.3 below

**Table 5.7: Correlation matrix**

	NPL	COST	OWNER	CAP	LOG(TA)	DLOG(VMI)	DLOG(CPI)	SLOANS	RATES	NPL(-1)
NPL	1.00000									
COST	0.48390	1.00000								
OWNER	-0.05394	-0.15220	1.00000							
CAP	-0.63789	-0.32408	-0.02682	1.00000						
LOG(TA)	0.02739	-0.21043	0.33052	-0.34489	1.00000					
DLOG(VMI)	-0.05127	0.04337	-0.00505	0.02743	-0.06146	1.00000				
DLOG(CPI)	0.01264	-0.08352	0.00630	-0.14585	0.14249	0.25453	1.00000			
SLOANS	0.02267	0.00889	0.26224	-0.14604	0.06779	0.06536	-0.02205	1.00000		
RATES	0.24500	-0.06936	0.01010	-0.23306	0.24048	0.02232	0.15481	-0.13417	1.00000	
NPL(-1)	0.91507	0.43674	-0.03574	-0.60270	0.01569	-0.05758	-0.02740	0.03093	0.23689	1.00000

The table 5.3 above shows that there is no significant correlations between independent or explanatory variables, as shown by low coefficients, which ranged from -0.35 to 0.33. The relationships, however, vary in sign, for example, there is a negative relationship between Log(TA) and costs, indicating that the larger the asset base, the more the critical mass to generate sufficient revenue to meet operating costs.

The matrix shows significant correlations between NPLs and lagged NPLs, Capitalisation and Cost, albeit, the relationship with capitalisation is negative. The correlation between NPLs and rest of the explanatory variables being less significant as indicated by the coefficients. The weak correlations suggests that the impact of those variables had a less pronounced impact on NPLs, in the multicurrency regime, during our sample period. Ownership, capitalisation and GDP growth are negatively related with NPL, while the relationship with all the other variables is positive.

## 5.2 Granger Test

To assess the direction of causality between variables used in the study, some granger causality tests were conducted. The results are shown in table 5.4 below.

**Table 5.8: GDP-NPL Granger Causality Tests**

Pairwise Granger Causality Tests

Date: 10/22/14 Time: 21:18

Sample: 2009Q1 2013Q4

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
DLOG(VMI) does not Granger Cause NPL	374	0.58803	0.5559
NPL does not Granger Cause DLOG(VMI)		6.37831	0.0019

The granger causality tests results in table 5.4 suggests that, the hypothesis that DLOG(VMI) does not Granger Cause NPL cannot be rejected, but the hypothesis that NPL does not Granger cause DLOG(VMI) can be rejected. Therefore, it appears that Granger causality runs one way, from NPL to DLOG(VMI), but not the other way. Although economic theory suggests that economic performance causes nonperforming loans, the above results imply that as NPLs increases, banks will restrict lending thus affecting the volume of manufacturing. This thus results in a vicious cycle, where lack of funding results in companies failing to produce thus resulting in them failing to meet their existing loan obligations.

### 5.3 Panel Data Analysis Results....

#### 5.3.1 Variables Coefficient, Std. error, T-statistic and Probability

The table below shows summary of the key study findings.

**Table 5.5: Results of the panel data analysis**

Variable	Coefficient
C	-0.27646**
	0.0247
DLOG(VMI)	-0.00896
	0.7469
DLOG(CPI)	0.09396
	0.6993
LOG(TA)	0.014512**
	0.0269
COST	0.02222***
	0.00000
NPL(-1)	0.79676***

		0.0000
	OWNER	0.04617**
		0.0445
	CAP	-0.07739***
		0.0000
	SLOANS	0.014721
		0.4014
	RATES	0.003571
		0.9259
R-squared		0.868834
Adjusted R-squared		0.858666
S.E. of regression		0.060250
Sum squared resid		1.404841
Durbin-Watson stat		1.904284
F-statistic		85.44874
Prob(F-statistic)		0.000000

Source: Author's computations

According to the analysis the coefficient of determination, R-squared of 85.56%, implies that the independent variables explain 85.86% of the variation in non-performing loans in the Zimbabwe banking sector. F value (0.000) indicates that the model is a good fit and the DW – statistic is equal to 1.90 indicates that the residuals are not correlated.

## 5.4 Diagnostics Test

To assess the validity of the estimated model, some diagnostics tests were conducted. The diagnostics tests include the tests for serial correlation using the DW tests.

### 5.4.1 Serial Correlation

The results of the serial correlation are shown in table 5.5 below.

**Table 5.9: Serial Correlation**

Cross-section fixed (dummy variables)			
R-squared	0.868834	Mean dependent var	0.097173
Adjusted R-squared	0.858666	S.D. dependent var	0.160264
S.E. of regression	0.060250	Akaike info criterion	-2.709355
Sum squared resid	1.404841	Schwarz criterion	-2.410073
Log likelihood	597.2552	Hannan-Quinn criter.	-2.591043
F-statistic	85.44874	Durbin-Watson stat	1.904284
Prob(F-statistic)	0.000000		

The results shows the absence of serial correlation as evidenced by the DW statistic which is

closer to 2. If there is no serial correlation, the DW statistic will be around 2. Given a DW statistic of 1.90, we can conclude the absence of serial correlation.

**5.5 Regression/ Panel Data Analysis...**

**5.5.1 Hausman Test**

The hausman tests was applied to choose between the random and fixed effects model. The test assumes the  $H_0$  hypothesis is that the difference of the coefficients obtained from the random effects and the fixed effects is not systematic; in other words, it assumes that  $C_i$  is orthogonal to  $x_{i,t}$ , i.e., the random effects. Thus, if we can reject the  $H_0$  hypothesis, we can use the fixed effects method to determine the threshold. The Hausman test rejects the  $H_0$  hypothesis and shows the evidence of the fixed effects.

**Table 5.10: Hausman Tests**

Correlated Random Effects - Hausman Test				
Equation: Untitled				
Test cross-section random effects				
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.	
Cross-section random	0.000000	9	1.0000	
* Cross-section test variance is invalid. Hausman statistic set to zero.				
** WARNING: estimated cross-section random effects variance is zero.				
Cross-section random effects test comparisons:				
Variable	Fixed	Random	Var(Diff.)	Prob.
DLOG(VMI)	-0.008961	-0.019954	0.000024	0.0237
DLOG(CPI)	0.093969	0.288318	0.004366	0.0033
LOG(TA)	0.014519	-0.002673	0.000031	0.0021
COST	0.022215	0.020451	0.000005	0.4118
NPL(-1)	0.796759	0.851137	0.000227	0.0003
OWNER	0.046174	-0.001858	0.000476	0.0276
CAP	-0.077393	-0.069521	0.000101	0.4339
SLOANS	0.014721	-0.008761	0.000111	0.0257
RATES	0.003571	0.055701	0.000438	0.0127

### 5.5.2 Regression Equation

The regression model was estimated using panel data for quarterly time series data collected for the period March 2009 to December 2013. The estimated model is outlined below.

$$\text{NPL} = -0.2765 - 0.0774*\text{CAP} + 0.0222*\text{COST} - 0.00896*\text{DLOG}(\text{VMI}) + 0.0939*\text{DLOG}(\text{CPI}) + 0.0462*\text{OWNER} + 0.0145*\text{LOG}(\text{TA}) + 0.0036*\text{RATES} + 0.0147*\text{SLOANS} + 0.7967*\text{NPL}(-1) + \varepsilon_{i,t}$$

where: NPL represents the dependent variable, non-performing loans. CAP denotes the level of capitalisation which is the measure of underwriting capacity. COST signifies the management quality and is measured by the cost to income ratio. DLOG(VMI) represents the proxy for GDP which was computed by taking the differenced logarithm of the volume of manufacturing index (VMI). Inflation was derived by taking the differenced logarithm of the consumer price index. Owner represents the shareholding structure of banks. LOG(TA) denotes the size of the institution computed as the logarithm of total assets and measures the risk appetite. Lending rates represent the cost of loans to borrowers. NPL(-1) denotes the lagged NPL ratio, indicating that the previous NPL ratio has an influence on the subsequent NPL ratio. SLOANS denotes the loan tenure which was computed as the ratio of short term loans to total loans and  $\varepsilon_{i,t}$  is the error term which should be normally distributed with zero mean and constant variance.

## 5.6 Discussion of the Results

### 5.6.1 Relationship between NPLs and Macroeconomic Variables

The variable DLOG(VMI) which represents growth rate of manufacturing production, that is, the state of the economy was found to be negative but insignificant. This means that deteriorating economy performance will result in an increase in NPLs. Economic downturns are likely to result in depressed sectoral performance hence retrenchments and company closures, which may culminate into high probability of loan defaults for both individuals and corporates. The job losses and company closures will translate into depressed savings coupled with credit squeeze thus curtailing aggregate demand and thus increasing the levels of NPLs. Conversely, a growing economy is likely to be associated with rising incomes and reduced financial distress thus low levels of NPLs. The study findings are consistent with earlier studies by Keeton and Morris (1987); Fofack (2005) and Salas and Saurina (2002) among other studies. The insignificant coefficient of GDP suggests that the level of economic activity as measured DLOG(VMI) has not been influential in explaining the dynamics of non-performing loans under the multi-currency

regime. This finding confirms earlier postulation by Beck *et al* (2013), that while there is a negative relationship, the strength of the relationship varies across nations.

Inflation was found to be positively related to NPLs levels for banks in Zimbabwe. The results however, indicate that the relation between inflation and levels of NPLs is not statistically significant in our model, thus implying that the level of NPLs of banks in Zimbabwe is not responsive to changes in inflation. The results may be attributed to the lack of robust monetary policy instruments in the country. In the absence of a bank rate/ repo rate/ base rate and the limited government or Central Bank operations, which are Monetary Authorities use to curb inflation, banks lending behaviour has been significantly altered. In addition the changes in CPI have generally been on the low side at an average of around 0.45%. These results support economic theory which alludes that, higher inflation can weaken some borrowers' ability to service debt, especially in instances where wages are sticky upwards, which appears to be the current case in Zimbabwe. The loan tenure which are short, have enabled lenders to adjust their rates with changing inflation, thus resulting in consumers not benefiting from inflation. The results of this study, while confirming results of studies by Brooks, Dicks, and Pradhan (1994); Rinaldi and Sanchis-Arellano (2006); Jappelli, Pagano, and Marco (2008), they however, contradict the purchasing power theory and results that inflation should enhance borrowers' debt servicing capacity.

### **5.6.2 Relationship between NPLs and Idiosyncratic Variables**

The variable Log(TA), which represents the size of the bank is positive and significant at 5% confidence interval in the estimated model. This means that in Zimbabwe, bank size is related to NPLs ratio. This evidence is consistent with previous studies such as Rajan and Dhal, 2003; Salas and Saurina, (2002) and Hu *et al*, (2006). It can be interpreted to mean that large banks are high risk takers and are likely to incur greater levels of non-performing loans. In addition it also reflects that the size of the bank does not necessarily make its credit risk management more effective. Banking institution asset base is positively related to the nature and size of customers the banks will attract. This however, contradicts the theoretical proposition that larger banks have more resources to improve the quality of loans. The results are also inconsistent with Salas and Saurina (2002) who found smaller bank sizes are associated with higher loan default rate with smaller asset base.

Bank ownership variable was found to be positive and statistically significant at 5% confidence level. This indicates that the bank's loan quality was significantly related to its ownership

structures. Resultantly, ownership has an important role to play in driving NPL performance levels in Zimbabwe banking sector. Foreign owned banks were seen to have significantly lower level of NPLs than indigenous owned institutions. These results support or concurs with studies by Bercoff, Giovanniz and Grimardx (2002) and Boubakri et al. (2005) that postulates that foreign controlled banks performed better than domestic ones. Foreign owned institutions have sophisticated credit risk management systems and robust collection methods, which encourage borrowers to pay debts. In addition, the findings imply that government and local banks are vulnerable to overbearing influence, abuse and manipulation by shareholders and politicians. Levels of NPLs in local banking institutions in Zimbabwe were noted to be a reflection of governance weaknesses common in owner managed and government owned institutions. (RBZ, 2014).

The coefficient associated with loan tenure, SLOANS, has a positive sign, suggesting a positive influence on nonperforming loans. The relationship is, however, weak. Shorter loan tenure increases the repayment instalments due from customers and thus significantly affects the ability of borrowers to repay loans and thus resulting in a rapid increase in asset impairment. Most borrowers are business people who require relatively long term money for retooling and working capital, and as such a short tenure impair their ability to repay their loans. The findings are in line with studies by Ranjan and Dhal (2003) and Saurina (2003) who observed that short-term loans had a propensity to default. The p-value, however, point to the fact that the tenure of loans is not of statistical significance in the model. This is largely attributable to the fact that all loans in Zimbabwe are largely short term in nature due to the transitory nature of deposits.

In line with findings from previous studies, the study noted positive relation between lending rate variable (Rates) and NPLs (Fofack, 2005; Stiglitz and Weiss, 1981; Boudriga *et al.* (2009). This indicates that higher lending rates usually translate immediately into higher non-performing loans. A hike in interest rates weakens borrowers' debt servicing capacity and thus results in increased loan delinquency. The panel data model used however, dispels the statistically significance of lending rates thus suggesting that NPLs levels in banks are not responsive to changes in lending interest rates. This finding contradicts Fuentes and Maquieira (2003) who found that interest rates had a greater effect on NPLs than the business cycle. This suggest that banks have been employing some other loan collection methods, regardless of lending interest rates levels. Key

finding is that despite, the high level of lending rates which averaged 18.46%, some borrowers have been able to repay.

The results indicate a significant positive relationship between non-performing loans and the lagged NPL variable indicating that previous period NPLs ratio has a significant bearing on the subsequent NPLs ratio. The results are also consistent with initial hypothesis that higher non-performing loans will exert pressure on bank executives to lend more aggressively thus resulting in more NPLs. This result corroborates studies by Jimenez and Saurina (2006), Manoj K. Dash and Gaurav Kabra (2010), and Misra and Dhal (2010). In addition it affirms the notion that while in some cases high levels non-performing loans reduces bank's appetite and capacity to issue new loans, the fall in total loans coupled with a constant level of NPLs, will result in a high NPL ratio. In addition, as NPLs are charged penal rates which are exorbitant, this further impairs borrowers' ability to repay thus increasing the NPL rate.

Regarding capitalisation levels, as measured by the capital adequacy ratios, the result show a negative, statistically significant relationship. This implies that in terms of our model, capital adequacy can be used to explain NPL ratio. Higher capital ratios give more incentive to increase lending than lower capital ratios when banks have less credit risk in the portfolio. Risk-based capital requirement are found to be a deterrent to excessive risk-taking behaviour, thus resulting in low NPL ratios. This is consistent with letter of the Basel Capital Accord. Capital is the buffer and last line of defense for credit risk; as a result, higher capital level gives banks more appetite to increase loans, which reduces the NPL ratio.

Finally, results in Table 5.7 reveal that bank management, as measured by the efficiency ratio, i.e., cost to income ratio variable had a positive and significant relationship with NPLs. The results (t-value of 4.43) suggest that NPL levels are associated with management. This evidence therefore supports the notion that good management decrease NPLs. The findings concur with earlier studies by Podpiera and Weill (2008) and Berger and DeYoung (1997) who postulates the bad management hypothesis.

## **5.7 Summary**

The chapter presented results of the study and an analysis of the estimated model. The results were obtained from panel regression data analysis estimated using econometrics eviews 7.1. Preliminary tests on the data were conducted using stationarity tests, correlation analysis, serial correlation analysis, normality test and the Hausman test. The Hausman test was applied to

choose between the random and the fixed effects model. The test chose the fixed effects model as the best fit. The findings of the study indicated a negative relationship between NPLs and GDP growth rate and lagged NPL, while positive relationships were noted for Capital adequacy ratio, Inflation rate, Loan tenure, Ownership structure, Management efficiency (cost to income ratio) and Lending rates variables.

The following chapter presents recommendations and conclusions of the study.

## CHAPTER 6: RESEARCH CONCLUSIONS

### 6.0 Introduction

This chapter seeks to present the recommendations and conclusions of the study. The chapter also presents the policy implications of the research. The chapter concludes by presenting areas for future research in line with the study.

### 6.1 Research Conclusions

In the present study, we applied panel regression data analysis to identify bank specific and macroeconomic factors that influenced the rate of non-performing loans in the Zimbabwean banking sector using quarterly bank level data for the period multicurrency, period 2009-13.

To the best of our knowledge, this study is the first empirical study, which explores possible macroeconomic and bank specific drivers that affect nonperforming loans ratio using bank level secondary data in Zimbabwe. Previous literature attempted to study the determinants of non-performing loans through primary data collection, which studies are considered subjective given the fact that bankers who are part of assuming, monitoring and recovery the non-performing loan portfolios. This study provides the information of the systematic and idiosyncratic determinants causing non-performing loans growth in the Zimbabwe banking sector since adoption of the multicurrency regime in 2009.

The research findings are largely consistent with literature, in terms of bank-specific variables, that is, the rate of non-performing loans of the previous year, the capital adequacy ratio, ownership structure, size of institution and management (cost to income) which appear to exert a significant influence on the non-performing loans ratio. In particular, we found that the lag of NPLs has a strong positive association with the level of NPLs reported by banking institutions suggesting that current NPLs will translate into higher future NPLs.

Though the relation between size of banking institution and level of NPLs is significant, the relationship which is positive implies that large banks are not necessarily more effective in screening loan customers when compared to their smaller counterparts, which is contrary to theory.

Regarding other bank specific variables, we found that lending rates and loan tenure, have an insignificant positive associations between NPLs. This implies that lending rates and loans

tenure did not significantly influence NPL build up in Zimbabwe, thus conflicting with previous studies.

The empirical results, however, reveals that the macroeconomic variables, that is, growth of manufacturing production (DLOGVMI) and (DLOGCPI) inflation were not influential in explaining the growth of NPLs in the Zimbabwean banking system during the period under review.

## **6.2 Policy Implications**

Given that bank specific factors are the more significant influence to NPL ratio, it can be argued that banking institutions should consider a host number of issues to curtail the level of NPLs. The research findings have several implications in terms of risk management, regulation and policy, as discussed hereunder.

First, higher CARs results in less credit risk, that is, high levels of NPLs. Resultantly, banking institutions on their part should ensure that they continuously redefine their credit risk appetite and tolerance levels in line with their capital levels. Banks should ensure that they are adequate capitalised through either new injections or curtailing their lending to reduce risk weighted assets. On their part, the Reserve Bank of Zimbabwe should rigorously monitor the capital adequacy ratios to ensure the stability of the sector.

Secondly, although the study did not show evidence for causality, our results, on the ownership variable, suggest foreign participation, in the banking sector, was seen to have advantages in terms of better credit management. Resultantly, the Reserve Bank of Zimbabwe and Government should allow foreign investors' participation in the banking sector as a way of fostering its stability. In addition, given the fact that most indigenous banks are either owner managed or state control, corporate governance standards should be enhanced to reduce agency problems and issue of high insider loans.

Thirdly, the result show that the growth in size of banking institutions led to increased NPLs. Against this backdrop, banks should ensure that their credit risk management methodologies are commensurate with their sizes and complexities. This might entail investments in management information systems and qualified human capital. In addition, there is need for banking institutions to implement measures that ensure conservative credit standards and

tightening of lending policies during instances of economic growth in order to mitigate the effects of increased NPLs during periods of recession. Moreover, Reserve Bank of Zimbabwe, as the supervisory authority should emphasise the need for banks to continuously enhance their risk management systems and procedures. This can be done through issuance from various prudential standards, with compliance to such being monitored through the inspections (onsite examinations).

It can be inferred from the above findings, that the supervisory authorities should pay adequate attention to banking institutions with low operating efficiency as this was found to be playing a role in the increase of NPLs. The supervisory authorities could consider “cease and desist orders” on the level of credit underwriting for institutions beyond a certain threshold of efficiency. Further, performance and inefficiency measures could be employed as leading or early warning indicators for future problem loans.

In order to reduce banking sector wide NPL scourge, the Reserve Bank should expedite the setting up of the credit referencing system to reduce information asymmetry. This is especially so given the fact that lagged NPLs are significantly causing higher future NPLs. A robust credit reference system will reduce adverse selection and moral hazard.

Finally, given the results of the granger test which noted that NPLs were causing a drag to economic performance, there is need for government and banking institutions collaboration in resolving the high NPLs. This might take form of expediting the operationalisation of the asset management company set to purchase NPLs. This will rid the banking institutions of toxic assets and provide them with underwriting capacity.

## CHAPTER 7: RECOMMENDATIONS FOR FUTURE RESEARCH

The study provides numerous opportunities for conducting future in-depth research on the scourge of NPLs, both on a jurisdiction and global basis. The study can be extended in various ways.

- a) NPL Resolution Options in an environment with limited or no fiscal space. Zimbabwe, is currently reviewing the various options of resolving NPLs, in a constrained environment, where Government has no capacity. This area provides an opportunity of study given the fact that most of the resolution mechanisms experienced so far in the world have been largely underwritten by governments.
- b) There is little empirical work that has attempted to assess the impact of NPLs in a multicurrency environment. Given the fact that the multicurrency provides extra peculiarities such as limited or absence of lender of last resort and reference rate, the impact NPLs have had on Zimbabwean banks and the economy in general remains under researched.
- c) The impact of regulation or bank supervision on NPLs could also be researched on. While most research have attempted to study the idiosyncratic and macroeconomic causes of NPLs, little has been done to assess the impact of regulation (supervision) on loan quality. Regulatory guidance on specific matters such as provisioning regimes, capital adequacy and liquidity benchmarks could be employed as proxies of bank supervision.
- d) Assessing the determinants of NPLs on a sectoral basis will be another good approach to researching on NPLs. The current research has attempted to establish the causes of loan delinquency on an aggregate basis, but this can be extended to assessment on a sectoral basis. Explanatory variables are likely to affect the various sectors of the economy differently, thus providing different insight to the causes.
- e) Statistical techniques may be used, such as duration models, to examine the intertemporal relations between loan quality and bank-specific variables, firms' characteristics and macroeconomic developments.
- f) The future studies can be done on the social and political causes of factors of non-performing loans in the Zimbabwean banking sector.

This study thus therefore leaves adequate room for further study on loan asset quality, as the globe seeks for clear insight on how to deal with the scourge.

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## APPENDICES

### UNIT ROOT TESTS

**Table 11: Unit Root Test for Capital Adequacy Ratio**

Panel unit root test: Summary

Series: CAP

Date: 11/21/14 Time: 17:42

Sample: 2009Q1 2013Q4

Exogenous variables: Individual effects

User-specified lags: 1

Newey-West automatic bandwidth selection and Bartlett kernel

Balanced observations for each test

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Method	Statistic	Prob.**	Cross-sections	Obs
<hr/> Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-27.9241	0.0000	22	396
<hr/> Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-15.1081	0.0000	22	396
ADF - Fisher Chi-square	579.653	0.0000	22	396
PP - Fisher Chi-square	392.184	0.0000	22	418

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\*\* Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

**Table 12: Unit Root Test - Cost to Income**

Panel unit root test: Summary

Series: COST

Date: 11/21/14 Time: 17:45

Sample: 2009Q1 2013Q4

Exogenous variables: Individual effects

User-specified lags: 1

Newey-West automatic bandwidth selection and Bartlett kernel

Balanced observations for each test

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Method	Statistic	Prob.**	Cross-sections	Obs
<hr/> Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	11.8311	1.0000	22	396
<hr/> Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-4.37113	0.0000	22	396
ADF - Fisher Chi-square	101.343	0.0000	22	396
PP - Fisher Chi-square	664.858	0.0000	22	418

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\*\* Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

**Table 13: DLOG(CPI)**

Panel unit root test: Summary  
 Series: DLOG(CPI)  
 Date: 11/21/14 Time: 17:47  
 Sample: 2009Q1 2013Q4  
 Exogenous variables: Individual effects  
 User-specified lags: 1  
 Newey-West automatic bandwidth selection and Bartlett kernel  
 Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	19.5656	1.0000	22	374
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-3.83951	0.0001	22	374
ADF - Fisher Chi-square	75.8239	0.0020	22	374
PP - Fisher Chi-square	705.624	0.0000	22	396

\*\* Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

**Table 14: DLOG(VMI)**

Panel unit root test: Summary  
 Series: DLOG(VMI)  
 Date: 11/21/14 Time: 17:48  
 Sample: 2009Q1 2013Q4  
 Exogenous variables: Individual effects  
 User-specified lags: 1  
 Newey-West automatic bandwidth selection and Bartlett kernel  
 Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-20.5895	0.0000	22	374
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-20.5922	0.0000	22	374
ADF - Fisher Chi-square	369.350	0.0000	22	374
PP - Fisher Chi-square	509.112	0.0000	22	396

\*\* Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

**Table 15: UNIT ROOT (OWNERSHIP)**

Null Hypothesis: Unit root (individual unit root process)

Series: D(OWNER)

Date: 11/21/14 Time: 17:51

Sample: 2009Q1 2013Q4

Exogenous variables: Individual effects

User-specified lags: 1

Total (balanced) observations: 34

Cross-sections included: 2 (20 dropped)

Method	Statistic	Prob.**
ADF - Fisher Chi-square	10.9796	0.0268
ADF - Choi Z-stat	-2.14962	0.0158

\*\* Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

**Table 16: UNIT ROOT (LENDING RATES)**

Panel unit root test: Summary

Series: D(RATES)

Date: 11/21/14 Time: 17:53

Sample: 2009Q1 2013Q4

Exogenous variables: Individual effects

User-specified lags: 1

Newey-West automatic bandwidth selection and Bartlett kernel

Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-11.3979	0.0000	21	357
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-10.1546	0.0000	21	357
ADF - Fisher Chi-square	178.623	0.0000	21	357
PP - Fisher Chi-square	451.061	0.0000	21	378

\*\* Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

**Table 17: UNIT ROOT (SHORT TERM LOANS)**

Panel unit root test: Summary

Series: SLOANS

Date: 11/21/14 Time: 17:54

Sample: 2009Q1 2013Q4

Exogenous variables: Individual effects

User-specified lags: 1

Newey-West automatic bandwidth selection and Bartlett kernel

Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-6.39136	0.0000	22	396

Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-5.62774	0.0000	22	396
ADF - Fisher Chi-square	142.278	0.0000	22	396
PP - Fisher Chi-square	146.157	0.0000	22	418

\*\* Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

**Table 18: UNIT ROOT (TOTAL ASSETS)**

Panel unit root test: Summary  
Series: LOG(TA)  
Date: 11/21/14 Time: 17:56  
Sample: 2009Q1 2013Q4  
Exogenous variables: Individual effects  
User-specified lags: 1  
Newey-West automatic bandwidth selection and Bartlett kernel  
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-14.3886	0.0000	22	396
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-7.84171	0.0000	22	396
ADF - Fisher Chi-square	164.336	0.0000	22	396
PP - Fisher Chi-square	598.314	0.0000	22	418

\*\* Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

**Table 19: UNIT ROOT (LAGGED NPLS)**

Panel unit root test: Summary  
Series: NPL(-1)  
Date: 11/21/14 Time: 17:57  
Sample: 2009Q1 2013Q4  
Exogenous variables: Individual effects  
User-specified lags: 1  
Newey-West automatic bandwidth selection and Bartlett kernel  
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-22.3854	0.0000	22	374
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-4.34547	0.0000	22	374
ADF - Fisher Chi-square	286.057	0.0000	22	374
PP - Fisher Chi-square	39.5557	0.6624	22	396

\*\* Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

