



**MIDLANDS STATE UNIVERSITY**

**FACULTY OF COMMERCE**

**DEPARTMENT OF ECONOMICS**

**DETERMINANTS OF NON-PERFORMING LOANS: A CASE OF ZIMBABWE'S  
BANKING SECTOR (2009-2013).**

**BY:**

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Bachelor of Economics Honours Degree

Gweru, Zimbabwe

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**SUPERVISOR’S APPROVAL FORMS**

The undersigned certifies that they have supervised the student, Nyabunze Admire (R114861X) dissertation entitled: **“Determinants of Non-performing Loans: A Case of Zimbabwe’s banking sector (2009-2013)”**.Submitted in partial fulfilment of the requirements of Bachelor of Commerce Economics Honours Degree at the Midlands State University.

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**CHAPTER 1** .....

**CHAPTER 2** .....

**CHAPTER 3** .....

**CHAPTER 4** .....

**CHAPTER 5** .....

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**APPROVAL FORM**

The undersigned certify that they have supervised, read and recommend to the Midlands State University for acceptance of a research project entitled: “**Determinants of Non-performing Loans: A Case of Zimbabwe’s banking sector (2009-2013)**”. Submitted by **Nyabunze Admire**, in partial fulfilment of the requirements for the **Bachelor of Commerce Honours Degree in Economics**.

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Date

**DECLARATION**

I, NYABUNZE ADMIRE, do hereby declare that this is a true and unpublished research which presents my own work, and has never been previously submitted for a degree at this or any other university.

.....

Student signature

.....

Date

## **DEDICATION**

This document is dedicated to the entire family for the confidence they showed in me and for supporting me throughout the duration of the course. To my parents, Cecilia and Biton and my brothers Tendai, Richmond, Ngoni, Progress, Movern, Vhuyo, Brian and also to my lovely sisters Rejoice and Nyasha.

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## LIST OF ACRONYMS

BIS.....	Bank of International Settlement
CRB.....	Credit Reference Bureau
GDP.....	Gross Domestic Product
MPS.....	Monetary Policy Statement
NPLs.....	Non-performing loans
OLS.....	Ordinary List Squares
RBZ.....	Reserve Bank of Zimbabwe
ZEPARU.....	Zimbabwe Economic Policy Analysis and Research Unit
ZIMSTATS.....	Zimbabwe National Statistics Agency

## ABSTRACT

*The research sought to establish the determinants of non-performing loans in the banking sector of Zimbabwe. The study covered the period from 2009 to 2013 using quarterly time series data employing the ordinary least squares method to ascertain the factors that contribute to NPLs. Over the period, the non-performing loans have been on an upward trend despite the use of the multi-currency. The major research findings and conclusions is that inflation, unemployment and interest rates are positively related to the level of non-performing loans. However, the variable Real Gross Domestic Product was found to be inversely related to the level of NPLs. The research concluded by urging the government and the banks to jointly determine the level of interest rates in the economy and the continued use of the multiple currency so as to keep inflation low so as to avert excessive loan defaults.*

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## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.0 Introduction**

The research seeks to establish the factors (determinants) of non-performing loans in the banking sector of Zimbabwe from the first quarter of 2009 up to the fourth quarter of 2013. The banking sector of Zimbabwe comprises of commercial banks, merchant banks, building societies and savings banks. According to the Bank of International Settlement (BIS) (2002), a non-performing loan (NPL) is defined as the sum of borrowed money upon which the debtor has not made his or her planned payment for at least ninety days. It further argued that the ratio of non-performing loans (NPLs) is calculated by dividing the value of the non-performing loans with the value of the total loans in the banking sector multiplied by one hundred. Once a loan has been considered as non-performing, the probabilities that it will be repaid in full are well thought out to be substantively lower. Stated differently, a non-performing loan is either in default or close to being in default. If the debtor starts making payments again on a non-performing loan, it becomes a re-performing loan even if all the missed payments are not caught up.

Non-performing loans in the banking sector of Zimbabwe rose from 0.32% during the first quarter of 2009 up to 15.92% in the fourth quarter of 2013 (RBZ Jan 2014 MPS). The continuous increase in the NPLs ratio reflects credit risk and fading asset quality in the banking sector of Zimbabwe. Data on non-performing loans is issued out on a quarterly basis by the Reserve Bank of Zimbabwe. The aim of this study is to analyse the impact that the macroeconomic indicators in Zimbabwe have on NPLs. The research employs regression analysis and a quarterly data set of non-performing loans covering five years (2009 to 2013) will be used.

#### **1.1 Background to the Study.**

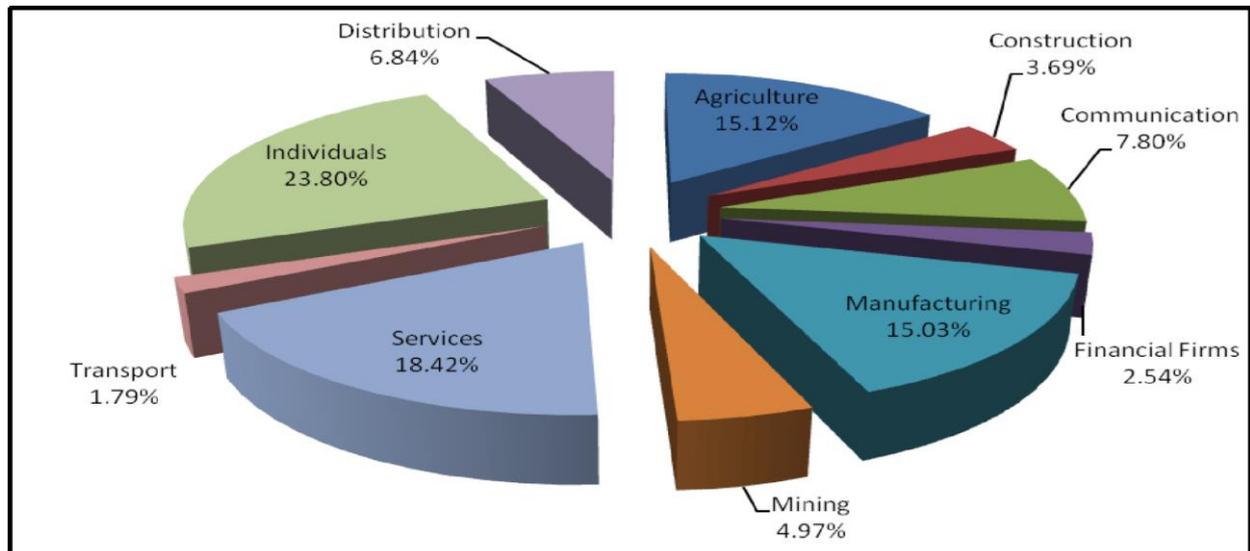
The economy of Zimbabwe is recuperating from an economic crisis and severe humanitarian crisis, which had a dramatic impact on the financial service sector. The inflation rate increased considerably between the years 2000 and 2008. According to Zimstats (2008), the level of inflation stood at 231 million percent in 2008. This was triggered by deliberate government policy of printing more money to finance government expenditure. During the same period (2000 to 2008), the African Development Bank (2011) argued that Zimbabwe experienced a decline in GDP which stood at -17.7% in 2008. The level of exports in 2008

underperformed amounting to US\$1.376 billion and the level of imports stood at US\$ 2 billion during the same period (Ministry of Finance, 2009). The rate of unemployment in Zimbabwe stood at 95% in 2008 placing Zimbabwe as the country with the lowest rate of employment in the world. According to the Zimbabwe Library Development Trust (ZLDT) (2011), 6% of the population in Zimbabwe was formally employed in 2008. This transforms to 480 000 people that had official jobs against a 12 million population.

In 2009, there was increased desire to stimulate economic growth in Zimbabwe and the government adopted the multiple currency regime soon after the formation of the inclusive government between President Robert Mugabe and the then Prime Minister Morgan Tsvangirai. The South African rand, the US dollar and the pula of Botswana are the currencies anchoring the basket. The inclusive government brought sanity into the economy as annual inflation stood at -7.7% in 2009 and at 9.6% in 2010. According to Zimstats (2013), annual inflation averaged between 3 and 4.5% for the greater part of 2012. This was attributed to improvement in supply, repression of costs especially the wage bill and low demand due to constricted liquidity conditions. The growth in the real GDP stood at 5.4% in 2009 and 9.6% in 2010. In 2011, the GDP at market prices stood at 10.6% and its growth rate was poised to decrease in 2012 and 2013 reflecting stagnation and a return to depression economics.

The banking sector of Zimbabwe is made up of commercial banks, building societies, merchant banks and savings banks. According to the RBZ monetary policy statement (2015), nineteen banking institutions are currently operating in Zimbabwe. Amongst them, fourteen are commercial banks, one merchant bank, three building societies as well as one savings bank and 147 microfinance institutions. In this regard, the banking sector has faced a number of challenges under this multiple currency regime. Some of the challenges include lack of adequate capital, the inability of the RBZ to perform its lender of last resort function, inadequate domestic liquidity, and weak asset quality among others. These challenges have led to the decrease in the number of banking institutions in Zimbabwe. According to the RBZ (2010), 27 banking institutions were operating in 2010 and the number has dropped to 19 banking institutions currently operating (RBZ 2015). Some had their licences cancelled by the RBZ and some voluntarily surrendered their operating licences to the RBZ. Some of these banking institutions include Capital bank, Trust Bank and Allied bank limited.

The loan portfolio of the banking sector of Zimbabwe is largely skewed to four sectors of the economy. The sectorial distribution of the loans as articulated by the Jan 2014 monetary policy statement issued by the RBZ is shown belows



**Fig 1.1 :Sectorial distribution of credit as at Jan 2014**

**Source :RBZ (2014)**

The above chart shows that the loan portfolio is dominated by four sectors namely the services, individuals, manufacturing and agriculture. The sectors are accounting for 18.42%, 23.80%, 15.03% and 15.21% of total credit respectively with the remaining sectors accounting for less than 10% each. The above scenario where individuals constitute a significant share of total lending reflects the macroeconomic challenges that are being faced in the economy. In addition, the situation also reveals operational volatilities in the banking sector of Zimbabwe particularly the consumptive nature of the lending activities. In this regard, a greater portion of loans is being channelled to the individuals who mainly use the funds for consumption rather than for investment. The funds do not generate other income hence making it difficult for the households to repay or service their loans.

Non-performing loans have become a prominent feature in the banking sector of Zimbabwe. The ratio stood at 15.92% reflecting deteriorating asset quality in the banking sector of Zimbabwe. The fading asset quality is a reflection of the opposing operating macroeconomic

environment and institution-specific deficiencies. Furthermore, the mismatch between long-term funding requirements for the productive sectors and short-term volatile deposits has intensified asset quality exposures in the banking sector of Zimbabwe. The continued abuse of loans and advances by related parties especially the directors and shareholders has played an influential role in accelerating huge levels of non-performing insider loans.

According to the RBZ Monetary Policy Statement (2014), the puzzling economic conditions and increasing cost of doing business has seriously undermined the capacity of the consumers to repay their debts. Thus, credit risk remains a key factor in the risk profile of the banking sector of Zimbabwe which is reflected by the presence of non-performing loans. Data on non-performing loans in the banking sector of Zimbabwe is published on a quarterly basis by the RBZ. The trend of non-performing loans to total loans is depicted on the graph below.

s



**Fig 1.2: Banking sector non-performing loans (2009Q1-2013Q1)**

**Source: RBZ (September 2013)**

The graph above shows the trends in non-performing loans in the banking sector of Zimbabwe from the first quarter of 2009 up to the first quarter of 2013. As depicted above, non-performing loans stood at 0.3% during the first quarter of 2009 and rose to 13.8% in the first quarter of 2013. The ratio further rose to 15.64% during the third quarter of 2013 and stood at 15.92% in the last quarter of 2013. This is attributed to many factors ranging from lack of client knowledge, multi-borrowing, and weak internal systems of the banks, high lending rates and inadequate supervision by the RBZ. However, this piece of work seeks to establish the influences of macro-economic variables on non-performing loans in

Zimbabwe's banking sector. Thus, the quarterly data of non-performing loans in the banking sector of Zimbabwe that is published by the RBZ will be employed in this research.

### **1.2 Problem Statement.**

The level of non-performing loans in the banking sector of Zimbabwe has been increasing since the introduction of the multiple currency system. The rise in non-performing loans denotes the level of credit risk and deteriorating asset quality in Zimbabwe's banking sector. This research therefore seeks to investigate the determinants of non-performing loans.

### **1.3 Objectives of the Study.**

The objectives of the study are:

- a) To investigate and evaluate the determinants of non-performing loans in the banking sector of Zimbabwe from 2009 up to 2013
- b) To serve as a base for designing real credit risk supervision policies that improves the performance of non-performing loans.

### **1.4 Significance of the Study.**

Non-performing loans reflect the presence of credit risk and deteriorating asset quality in the banking sector. Therefore, this research intends to determine and evaluate the macroeconomic factors contributing to non-performing loans in Zimbabwe's banking sector. Previous studies in Zimbabwe such as the one which was done by Chikoko (2012) emphasised more on firm specific factors as the causes of NPLs in the commercial banks of Zimbabwe. These factors include ethics and corporate governance, multi-borrowing, lack of client knowledge and weak internal systems. Furthermore, another research was conducted by Mabvure (2012) when he looked at the determinants of NPLs focusing on bank specific variables using the Commercial Bank of Zimbabwe (CBZ) as a case study. Thus, this research seeks to cover the gap by looking at the determinants of non-performing loans using the macro economic variables focusing on the entire banking sector of Zimbabwe.

The study will help the local banks to keep an eye on the macroeconomic variables when crafting and amending their credit policies and manuals so as to conform to the changes in the economy. Also, this research broadens the student's knowledge on the macroeconomic factors affecting the level of non-performing loans in the economy. Thus the student's understanding of the financial sector, specifically the banking sector is enriched by this study.

It gives empirical evidence which can be exploited by Midlands State University (MSU) as a reference for future academic purposes.

### **1.5 Hypothesis.**

$H_0$  : Inflation, Unemployment, Interest Rates and Gross Domestic Product do not influence the level of non-performing loans.

$H_1$ : Inflation, Unemployment, Interest Rates and Gross Domestic Product influences the level on non-performing loans

### **1.6 Limitations of the Study.**

The research used secondary data collected from the Reserve Bank of Zimbabwe, Ministry of Finance and Economic Development, Central Statistics Records and the Bankers Association of Zimbabwe. Data from these authorities may not reveal the true picture of the economy due to several data smoothing processes that the data goes through. Some of the figures from these authorities are estimates not actual figures and this constrain valid and sound forecasting for appropriate policy recommendations.

### **1.7 Organisation of the rest of the study.**

Chapter Two consist of literature review which gives empirical and theoretical aspects on the determinants of non-performing loans. Chapter Three has the research methodology while Chapter Four contains presentation and interpretation of results. Chapter Five concludes the study hence policy recommendations and suggestions for future researches are given.

## CHAPTER TWO

### LITERATURE REVIEW

#### **2.0 Introduction.**

There are enormous sources of literature that provide theoretical and empirical evidence on the determinants of non-performing loans. This research therefore encompasses literature which enriches the knowledge on the determinants of non-performing loans in the banking sector of Zimbabwe.

#### **2.1 Theoretical Literature Review.**

##### **2.1.1 Asymmetric Information Theory.**

The theory was first propounded by Akerlof (1970) who reasoned that in many markets, the buyer uses some market dimension to ascertain the value of a class of goods. In this regard, the buyer sees the usual or regular market whilst the seller has more explicit understanding of a definite item. Thus, information asymmetry gives the seller the inspiration to sell goods of less than the average market class.

The idea was borrowed by Auronen (2003) who argued that the information asymmetry theory reveals that it will be difficult to separate the good borrowers from the bad ones which may result into adverse selection and moral hazard problems. He went on to say that if the borrower has more information than the lender on the loan application to be done, he is in a better position to negotiate the ideal terms for the credit than the lender. The party that has less information (the lender) is therefore in a position of making a good or bad decision in that transaction.

Adverse selection and moral hazards have led to momentous growth of non-performing loans in banks (Bester, 1994). Each banking institution has private information about local credit applicants, but has no information about distant applicants. If banks can afford to share information about the credit worthiness of the clients, they can assess the suitability of the distant credit applicants thereby lending prudently to them as they do the local customers. This results in loans being granted to the safe debtors who had been previously priced out of the market causing an increase in total lending

The adverse selection problem signals that when the banks cannot detach the good debtors from the bad ones, all the borrowers are charged a joint normal interest rate. If the interest rate is too high than what the quality borrowers deserve, it will push some of the good borrowers out of the borrowing market. This in turn forces the banks to charge even higher

interest rates to the remaining borrowers which are the bad borrowers. The high interest rate enhances the default rate of the bad borrowers causing an increase in bad loans. The sharing of credit information enable the lenders to analyse the risk of the borrowers and set the terms and conditions accordingly. Quality borrowers with low risk would be given good looking prices (interest rates), inspiring the demand of credit and the fewer high risk borrowers will be crowd out of the market since the interest rates being offered by the lenders will not be accommodating them ( Barron and Staten, 2008).

The theory also implies that the borrower has the reason to default unless there are penalties for his future loan application (Alarh and Goller (2001). This arise from the struggle that the lenders have in assessing the level of wealth that the borrowers would have acquired by the time the loan matures. If the lenders cannot assess the wealth of the borrowers, chances of defaulting are substantially high. In an effort to safe guard themselves, the lenders will increase the interest rates which can lead to high level of non-performing loans if it is too high.

In the context of the Zimbabwean situation, the banking sector has been operating without a functional credit reference bureau since the adoption of the multi-currency regime. A credit reference bureau is a company or an organisation that collects information from various sources and provides consumer credit information on individual consumers for a variety of uses. The absence of this CRB implies that the banking institutions could not safe guard themselves against adverse selection and moral hazard when granting the loans. Stated differently, it means that the banks could not separate the good borrowers from the bad ones. This has made it difficult for the banks to price their loans depending on the type of the borrowers resulting in all the borrowers being charged pooled interest rates. These pooled interest rates are perceived to be higher and have played a leading role in increasing the level of non-performing loans since the borrowers are failing to sustain the high cost of the funds. To add on, the absence of information sharing has made the debtors to settle their dues by more borrowings from other banks. This has led to the debtors to be over borrowed thereby contributing to an increase in the level of NPLs.

However, the credit registry department was set up by the RBZ in 2014 to organise the collection of the credit information from the banking institutions and the microfinance institutions to successfully roll out a CRB (RBZ 2015). According to the RBZ (2012), a credit reference bureau provides the central data base of credit information which helps in

credit risk management. Furthermore, the CRB builds the data bank of quality borrowers (individuals and companies) which facilitates access to credit speeding up the credit application and approvals of the loans. The successful establishment of the CRB will enable adverse selection and moral hazard to be solved thereby contributing in non-performing loans management.

### 2.1.2 The Loanable Funds Theory.

Loanable funds are money available for borrowing in the loanable funds market. The theory postulates that the rate of interest is calculated on the basis of the demand and supply of the loanable funds currently available in the loanable funds market. Thus, the interaction between the demand and supply of these funds determines the level of nominal interest rates. Holding the supply of loanable funds constant, an increase in demand will be accompanied by an increase in the level of interest rates and the opposite is true. Conversely, an increase in supply of loanable funds holding the demand constant will result in a fall in the rate of interest. If both demand and supply of loanable funds change, the resultant level of interest rate will be determined by the size and direction of movement of the forces of demand and supply.

According to Musgrave (1998), the theory itself explains how individuals in an economy save and how these savings are transformed into loans which are then loaned out by the financial institutions. Households and foreign entities constitute suppliers of loanable funds and firms and the governments are borrowers of the funds. The operation of the loanable funds theory is shown below.



**Figure 3: Operation of the loanable funds market.**

**Source: Musgrave (1998)**

The figure above denotes the operation of the loanable funds market. Households and foreign entities supply funds to the loanable funds market which are then loaned out to firms and

individuals by the banking sector. Financial institutions are at the hub of all the savings and borrowings. Households are suppliers of savings and their decision to save is influenced by interest rates among other factors. At the other end of the scale, the interest rate to borrowers (firms and individuals) represents the cost of capital meaning that a negative relationship between interest rates and willingness to borrow exists.

This theory conforms to the current situation in the economy of Zimbabwe that is being troubled by the liquidity crunch. A liquidity crunch is a situation whereby the cash resources are in short supply against a high demand of these cash resources. Local banks are currently offering low interest rates on deposits. The low deposit rates being offered by the banks have combined with the high bank charges that are currently prevailing in the economy. This has significantly led to the decrease in the supply of the loanable funds. Furthermore, the RBZ argues that a total of US\$2 billion is circulating outside the formal banking sector. In other words, the money is not being channelled to the loanable funds market thereby contributing to a reduction in supply of these funds.

Given the low deposit interest rates, the banking sector is currently attracting short term but highly volatile deposits. This means that the long term requirements of credit by the productive sectors of the economy is not fully met since there are no long term deposits flowing into the banking sector. This implies that the demand of the long term credit is high leading to an increase in the level of the interest rates. The RBZ postulates that the local banking institutions are charging lending interest rates averaging between 6% and 35 % per annum with most of the banks quoting an average rate of 20%. Thus, the depressed supply of these loanable funds and the rejuvenated demand of long term credit has led to an increase in the level of interest rates. The punitive interest rates have acted as a catalyst playing a leading role in causing excessive loan defaults thereby contributing to the increase in NPLs. However, the major setback of the loanable funds is that the interest rates that are quoted by the banking institutions are in nominal terms and not in real terms. The nominal rates only provide information on the return on savings and investment without taking into account the effects of inflation. This is based on the argument provided by Kroeger in 2000 where he argued that a saver wanting a real rate of return will take into account the rate of inflation.

### **2.1.3 The Monti-Klein Model.**

The model was propounded by Klein (1971) and Monti (1972) and it is a plagiaristic of the industrial approach to banking. The basic assumption of the model is that the motive of the

banking institutions is to make profit. The shareholders are the major drivers of this motive since they expect the highest possible rate of return on their investments thereby pushing the firm's objective to profit maximization.

The second assumption is that the banks are assumed not to be complete price takers. That is, the banking institutions have some degree of autonomy over the setting of prices of both the deposit and lending rates. According to Linda *et al* (1999), the power of banks to control prices is increased by the market failures such as market power and information asymmetries. The last assumption of this model is that the banking institutions do not have control over the interbank money market rate and bond interest rates. In a nutshell, the interbank market rate affects the rates on deposits and the loans that are loaned out by the banking institutions

The main thrust of the model is that the cost of the funds are the major determinants of the loan prices. The cost of funds is in turn determined by the movement in the interbank market rate. An increase in this rate is accompanied by an increase in the lending rates implying an increase in the price of the loans being loaned out by the banks.

In the case of Zimbabwe, the Memorandum of Understanding (MOU) between the Bankers Association of Zimbabwe (BAZ) and the RBZ partially compelled the banking institutions to be price takers. The MOU became effective in January 2013 and it compelled the banking institutions to charge maximum lending rates of 12.5% per annum which is above the average cost of funding. Some banking institutions equally acted well within the limits of the MOU whilst some did not listen to its requirements. According to the Dailynews (2013), the commercial banks charged lending rates ranging between 13 % and 35% while that of the merchant banks ranged between 13% and 25%. This situation is in line with the second assumption discussed above which argued that the banks have autonomy in determining the lending rates. It is this autonomy that has motivated the local banks to charge high interest rates on their loans. Borrowers are facing difficulties in sustaining the high rates resulting in loan defaults thereby contributing to an increase in NPLs. Moreover, the interbank market in Zimbabwe has not been functional since the onset of the multiple currency. The RBZ has not been performing its lender of last resort function since it is undercapitalized. This has led to the local banking institutions to seek off shore lines of credit in order to strengthen their financial positions. This means that the lending rates in Zimbabwe are not a function of the interbank market rate thereby not conforming to the last assumption of the theory discussed

above. In this regards, the banks are pricing their loans basing on the off shore rates which are apparently higher thereby contributing to an increase in the level of NPLs in Zimbabwe.

## **2.2 Empirical Literature Review.**

Saba *et al* (2012) undertook a research on the determinants of non-performing loans in the banking sector of the United States. The research itself was a blend of the firm level variables and the macroeconomic variables as the determinants of non-performing loans. Real GDP per capita, interest rates and total loans were chosen as the independent variables with non-performing loans as the dependent variable. The study used data of the US banking sector starting from 1985 to 2010 employing the Ordinary Least Squares (OLS) method of regression. To add on, descriptive statistics and the Pearson correlation analysis were also used in the study. Correlation results revealed that real GDP per capita had the strongest relationship with NPLs followed by the Interest Rates and the Total loans. The regression analysis results revealed that a negative relationship between interest rates and non-performing loans exists. Real GDP per capita and the volume of total loans also had negative relationships with the level of non-performing loans.

Moreover, another research was conducted by Bonilla (2012) in two countries namely Italy and Spain. The research employed the Ordinary Least Squares (OLS) method using time series data set ranging from January 2004 to March 2012. The explanatory variables that were chosen were GDP, credit growth, unemployment, inflation and wage. The data for Spain was lagged for 6 months whilst that of Italy was lagged for 12 months.

For Italy, the explanatory power of all the five variables was tested and it was found that these variables explained 85% of the variance of the non-performing loans index. However, the association between the NPL index and inflation was found to be statistically insignificant since its p value was greater than the 5% confidence level. The variable inflation was dropped from the Spanish data and the p value increased and the data was then lagged. The lagged regression results revealed that credit growth and non-performing loans are inversely related. The results also revealed that an increase in the wages will be accompanied by a decrease in the NPLs index. To add on, the level of unemployment and the NPL index was found to be positively related meaning that an increase in unemployment is accompanied by an increase in non-performing loans. Lastly, the GDP also showed a

strong negative relationship with the NPL index. In a nutshell, the overall research concluded that the NPL index in Spain was mostly explained by the wage, the unemployment and the GDP. The credit growth however didn't seem to be a strong explanatory variable.

The results for Spain which included all the five explanatory variables without the lags revealed that the variables explained 62.9% of the variance in the NPLs. However, the association between the NPL and both the Credit Growth and the Wage was found to be statistically not significant. The p values for these two variables were greater than the 5 % level of significance, and therefore, these two variables were excluded in order to improve the model. The exclusion of these variables slightly reduced the r square but the adjusted r square and the F statistic improved. The lagged results for Italy indicated that inflation had a moderate positive relationship with the NPL index. The variable unemployment was found to be with a strong positive relationship with the non-performing loans. Also, a positive relationship was found between the GDP and the NPL index. Conclusively, the non-performing loans index in Italy was mainly explained by unemployment and GDP with the remaining variables having minimal contribution.

Farhan (2012) *et al* did a research on the economic determinants of non-performing loans in the banking sector of Pakistan. The research employed the multiple regression model using a six year time series data set ranging from 2006 up to 2012. The research employed six explanatory variables namely interest rates, energy crisis, unemployment, inflation, GDP and the exchange rate. The research revealed that interest rates and energy crisis had positive relationships with the non-performing loans. The study further revealed that unemployment and inflation had positive relationships with the non-performing loans. An appreciation of the exchange rate was found to be accompanied by an increase in the level of non-performing loans. However, the study revealed that only GDP had a negative relationship with the NPLs with a beta value of (-0.162). Stated differently, all the variables employed in this analysis revealed positive relationships with the level of NPLs with the exception of the GDP.

Apart from the above, another research on the determinants of non-performing loans was carried out in Kenya by Muriithi in 2013. The research focused on the commercial banks of Kenya and used the multiple linear regression method of estimation. Time series data covering the period 2008-2012 was used with interest rates, inflation and the total loans being the explanatory variables. The results from the research revealed that non-performing

loans and the inflation rate have a negative impact with each other. The growth rate in total loans had an inverse relationship with the level of non-performing loans. Lastly the study revealed that the non-performing loans and the interest rates also had a negative relationship. To sum up, all the three explanatory variables impacted negatively on the level on non-performing loans.

To add on, Fofack, (2005) did a research on non-performing loans in Sub-Saharan Africa covering 16 countries. Two sub panels were used with the first one consisting of countries with fixed exchange rates (CFA countries) and the second panel comprising countries using flexible exchange rates (non-CFA countries). The research used the causality and pseudo-panel econometric method of estimation using annual data starting from 1993 up to 2002 with the minimum length of the panel being three years. The macro economic variables chosen for the study included GDP per capita, Inflation, Interest rates, real exchange rates, interest rate spread and broad money supply (M2). For the full model, the results obtained revealed that real interest rates, broad money supply, changes in real effective exchange rates had positive relations with the level of non-performing loans. The remaining variables (GDP per capita, Inflation and interest rate spread) are inversely related to the level of non-performing loans

### **2.3 Conclusion**

The chapter discussed theoretical and empirical literature review on the determinants of the non-performing loans. The first section of the chapter looked at theoretical literature review and the discussed theories included the Information Asymmetry theory, Loanable Funds theory and the Monti-Klein Model. The second section of this chapter looked at the empirical literature review. From the results of the empirics, the variable GDP per capita produced consistent results of a negative association with the NPLs. However, the other variables such as interest rates and the inflation rate had different signs in different researches discussed above. The research methodology is discussed in the next chapter.

## CHAPTER THREE

### RESEACH METHODOLOGY

#### 3.0 Introduction.

Literature review gives a researcher a better understanding of the theoretical and empirical determinants of the non-performing loans. The research methodology is the organised technique of answering a research difficulty and it focuses on aspects such as model specification, data type to be used and the justification of variables included in the model.

#### 3.1 Model Specification.

This research will adopt the model used by Bonilla (2012) in evaluating the macroeconomic determinants of non-performing loans in Spain and Italy. The research employed the OLS regression method of estimation and the model used is shown below.

$$NPL_t = \alpha + \beta_1 \Delta Credit + \beta_2 \Delta Wage + \beta_3 Infla + \beta_4 Unemplo + \beta_5 GDP + \varepsilon_i \dots \dots \dots (1)$$

From the model used by Bonilla above, the NPLs is the endogenous (dependent) variable. The exogenous (independent) variables used are Credit Growth, Wage (Cost of labour), Inflation, Unemployment and the Gross Domestic Product. However, due to the unavailability of data, two variables namely Credit Growth and Wage will be dropped from the above model. A new variable (interest rates) is incorporated into the study thereby making a total of four explanatory variables. Salas and Saurina (2006) argue that the level of interest rates in an economy plays a crucial role in influencing the level of NPLs. Thus the model in this study is specified as shown below.

$$NPLs = \alpha + \beta_1 Infl + \beta_2 Unemplo + \beta_3 GDP + \beta_4 Rint + \varepsilon_i \dots \dots \dots (2)$$

Where:

*NPLs*: Non performing loans as a percentage of total loans.

*Infl*: Inflation Rate as a percentage

*Unemp*: Unemployment Rate as a percentage total economically active population

*GDP*: Gross Domestic Product as a percentage

*Rint*: Real Interest Rates represented by the lending rates expressed as a percentage.

$\alpha$ : Is the intercept term

$\beta_1, \beta_2, \beta_3, \beta_4$ : Coefficients of the structural parameters

$\epsilon_i$ : Is the error term which captures omitted variables in specification of the model.

### **3.2 Justification of the Variables.**

#### **3.2.1 Inflation Rate (IR).**

Hoag and Hoag (2006) defined inflation as the continuous increase in the price level of goods and services in the economy. It erodes the purchasing power of the country's currency hence it redistributes income of the society. Inflation increases the cost of borrowing which would later on deteriorate the loan portfolios of financial institutions. According to Bonila (2012), higher inflation can enhance the loan repayment capacity of the borrowers by reducing the real value of the outstanding debt. Contrary, it can also weaken the loan payment capacity of the borrowers by reducing the real income when the wages are stagnant. This is so because the banking institutions adjust the lending interest rates to the real return. Based on that argument, the variable inflation in this research is expected to carry a positive sign since the inflation rate in Zimbabwe is low and the wages are stagnant. Inflation will be measured by the consumer price index (CPI) as it is easy to understand and use.

#### **3.2.2 Unemployment (UN).**

Morr (2007) argued that unemployment occurs when a person who is actively searching for employment is unable to find work. It is often used as a measure of the health of the economy and the most frequently cited measure of unemployment is the unemployment rate. An increase in unemployment in the economy affects negatively the incomes of the individuals which later on increase their debt burden. In other words, the unemployed will be left without an income to use in repaying the money that they borrowed. It is against this background that unemployment is expected to carry positive sign. Data on unemployment will be obtained from the central statistics (Zimstat) publications.

#### **3.2.3 Gross Domestic Product (RGDP).**

Gross Domestic Product represents the monetary value of all goods and services produced in an economy. An increase in the GDP represents a source of liquidity in the market and the general economy at large. This therefore allows the borrowers to settle their debts hence the NPL ratio would remain stable under the growth of the GDP. Fofak (2005) argued that an increase in the GDP increases the income of the borrowers which ultimately enhances the loan repayment capacity of the borrowers. This later on plays a significant role in reducing the bad loans and the opposite equally holds. In other words, GDP and non-performing loans are inversely related. In this study, this variable is expected to carry a negative sign.

### **3.2.4 Real Interest Rates (RINT).**

Real interest rates are the interest rates adjusted for inflation and it measures the cost of borrowing. An increase in the interest rate weakens the loan repayment capacity of borrowers meaning that non-performing loans and interest rates are positively related. According to Hoque and Hossain (2008), a positive correlation exists between the two such that high interest rates increase the debt burden of the borrowers thereby causing loan defaults. The loan defaults result in the deterioration of the bank assets and consequently lead to the erosion of the capital. In this research, the lending rate by the banks is going to be used representing the real interest rate. The variable real interest rate is expected to carry a positive sign conforming to other previous studies such as the one which was done by Farhan, *etal* (2012).

### **3.3 Data Sources and Characteristics.**

The research is based on secondary time series data. The main sources of the secondary data are the published reports and journals from Zimstat, Reserve Bank of Zimbabwe, Bankers Association of Zimbabwe and the Ministry of Finance. The internet is used as a source of published data especially with regards to empirical support on the determinants of the non-performing loans. The data obtained from these organisations is annual data with the exception of NPLs data which is issued as quarterly data by the RBZ. The annual data will be spliced or disaggregated into quarters using the Lisman and Sande (1957) methodology. Data disaggregation is a way of data interpolation hence it constrains valid and sound forecasting for appropriate policy recommendations.

### **3.4 Diagnostic Tests.**

#### **3.4.1 Unit Root Test.**

It is conducted to test for the stationarity of the time series data that is being used in the study. Gujarati (2004) postulates that a time series is said to be stationary if the mean and variance are perpetual over time. He further argued that the covariance between the two time periods should be dependent upon the two periods not the actual time it is computed. It is of much significance to carry out the unit root test on time series data so as to avoid the possibility of practicing dubious regression analysis.

The Augmented Dickey Fuller test is going to be used to test for stationarity of the variables. The hypothesis to be tested is that series is stationary (null hypothesis) against the alternative hypothesis that the series is non stationary

The decision rule is not to reject the null hypothesis if the ADF statistic is greater than the critical values especially at 5% level of significance.

#### **3.4.2 Cointegration Test.**

It shows the long term relationship amongst the variables used in the model. Cointegration implies that the variables should move together in the same or opposite direction. The Engler Granger methodology is going to be used to test for the cointegration in the model. The method tests for the stationarity of the residuals generated in the model therefore it is hinged on the ADF test. A cointegrated model means that the method of Ordinary Least Squares is applicable. The hypothesis to be tested is that the model is cointegrated against the alternative one which says that there is no cointegration in the model.

The decision rule is not to reject the null hypothesis if the ADF statistic of the generated residual is greater than the critical values especially at the 5% level of significance.

#### **3.4.3 Normality Test.**

The normality test is used to test whether the generated residuals are technically white noise. Technically white noise implies that the mean of the residuals is zero while the variance is the same across all observations. The Jargue Bera statistic is going to be used to test for normality. The hypothesis to be tested is that the residuals are normally distributed against the alternative that they are not distributed normally. The decision rule is not to reject the null hypothesis if the probability value is greater than 0.05.

#### **3.4.4 Multicollinearity Test.**

According to Andren (2008), multicollinearity represents the presents of a linear relationship amongst the explanatory variables in the model. Its presence makes it difficult to separate the the impact of the individual variables on the endogenous variable. The correlation matrix is used to detect the presence of multicollinearity. A correlation coefficient greater or equal to 0.8 reflects the presence of multicollinearity. Gujarati (2004) ascertain that it is corrected by dropping the least important variable amongst the correlated ones.

### **3.4.5 Autocorrelation.**

The classical linear regression model assumes that autocorrelation does not exist in the disturbance terms. It occurs when there is a link between the error terms of successive observations. Thus, the error term relating to any observation should not be influenced by the error term relating to any other period. In this study, the Bruesch-Godfrey will be used to test or detect the presence of autocorrelation.

The null hypothesis to be tested is that there is no autocorrelation against the alternative hypothesis that the model suffers from autocorrelation

The decision rule to be used is not to reject the null hypothesis if the probability value is greater than 0.05.

### **3.4.6 Model Specification Test.**

A correctly specified model is of great significance in explaining the determinants of non-performing loans in the banking sector of Zimbabwe. A model is said to be correctly specified if it can encompass the weaknesses of rival models. The Ramsey Regression Error Specification test (Ramsey RESET) test will be used. The significance of the variables in the model is going to be determined by the t-statistic values obtained after running the regression. If t-statistic values are greater than 2, then it means that the variables are significant the opposite is true.

The null hypothesis is that the model is correctly specified against the alternative that the model is incorrectly specified.

The decision rule is not to reject the null hypothesis if the probability value is greater than 0.05

### **3.5 Conclusion.**

This chapter specified the model on the determinants on non-performing loans in the banking sector of Zimbabwe. The proposed method to be used is the Ordinary Least Squares. The variables interest rates, inflation and unemployment are expected to be positively related with NPLs with the GDP being inversely related to the NPLs.

## CHAPTER FOUR

### PRESENTATION AND INTERPRETATION OF RESULTS

#### 4.0 Introduction.

This chapter seeks to articulate and interpret the results that explain the determinants of non-performing loans in the banking sector of Zimbabwe from 2009 -2013. Using the OLS, diagnostic tests and the estimations were carried out. All will be shown in this chapter together with the interpretation of the results.

#### 4.1 Results for the Diagnostic Tests.

##### 4.1.1 Stationarity Test Results.

All the variables were tested for stationarity using the ADF test statistic and the following results were obtained.

**Table 4.1- Summary of the Unit Root Test.**

Variable	ADF Statistic	Critical Value	Intercept	Order of Integration
NPLs	2.134537**	1% -2.6968	NO	I(0)
		5% -1.9602		
		10% -1.6251		
Infl	-4.209881***	1% -2.6968	NO	I(0)
		5% -1.9602		
		10% -1.6251		
Unemp	-6.353045***	1% -3.8572	YES	I(1)
		5% -3.0400		
		10% -2.6608		
RGDP	-3.523250**	1% -3.8304	YES	I(1)
		5% -3.0294		
		10% -2.6552		

Rint	-7.814962***	1%	-2.6968	NO	I(0)
		5%	-1.9602		
		10%	-1.6251		

*\*means significant at 10% \*\*significant at 5% and \*\*\*means significant at 1% and at all levels.*

Table 4.1 shows that two variables Unemployment and GDP are stationary after first differencing and the rest are stationary at level. Thus, the above table shows that the data is free from the unit root problems.

#### 4.1.2 Cointegration Test.

The model was found to be cointegrated since the residual that was generated was found to be stationary at level. This is based on the Engel and Granger methodology and the residual is of integration of order zero based on the ADF statistic

**Table 4.2- Summary of the Cointegration test Results.**

Variable	ADF Statistic	Critical Values	Intercept	Order of Integration
Residual	-2.534724**	1% -2.6968 5% -1.9602 10% -1.6251	Yes	I(0)

*\*\*means significant at 5%*

#### 4.1.3 Multicollinearity Test.

The correlation matrix was used to test for multicollinearity and the null hypothesis is accepted if there is a variable that has a correlation greater than 0.8. Thus table 4.3 shows that there is no multicollinearity amongst the variables.

**Table 4.3-Correlation Matrix.**

	NPLs	INL	RINT	UN	RGDP
NPLs	1.000000	0.089070	-0.097226	-0.211059	-0.088881
INL	0.089070	1.000000	-0.742849	-0.219731	0.393323
RINT	-0.097226	-0.742849	1.000000	0.152547	-0.355471
UN	-0.211059	-0.219731	0.152547	1.000000	0.092376
RGDP	-0.088881	0.393323	-0.355471	0.092376	1.000000

From the table above, it can be noted that there is no relationship between the variables that exceeds 0.8 hence there is no severe multicollinearity and linear association among variables in the model.

#### 4.1.4 Autocorrelation Test Results.

The Breusch-Godfrey test was employed to detect the possibility of autocorrelation in the model. The results in the table below shows that the series is not correlated.

**Table 4.4 - Autocorrelation Test Results**

F-Statistic	Probability	Obs* R-Squared	Probability
0.902159	0.429642	0.937557	0.295591

From the table above, the probability value was 0.429642 which is greater than 0.05 therefore it can be concluded that the model does not suffer from autocorrelation.

#### 4.1.5 Normality Test Results

The generated residuals were tested for normality using the Jargue Bera test. The results revealed that the statistic of the Jargue Bera was 0.55042 which is greater than 0.05. This implies that the null hypothesis is not rejected meaning that the residuals are normally distributed

**Table 4.5 - Normality Test Results.**

Mean	Skewness	Kurtosis	Jarque-Bera Statistic	Probability
-1.20E-15	0.571188	2.640604	1.195158	0.55042

#### 4.1.6 Ramsey Reset test

**Table 4.6- Ramsey Reset test for Model Specification.**

Probability	D.W statistic	$R^2$	Adjusted $R^2$	F-Statistic
0.554968	1.010280	0.381450	0.160540	1.726719

The probability value of the Ramsey Reset test was found to be 0.554968 which is above 0.05 meaning that the model is specified correctly. Furthermore, the DW statistic is greater than both the both  $R^2$  and adjusted  $R^2$  ruling out the probability of spurious regression.

## 4.2-Regression Results

**Table 4.7- Summary of Regression Results**

Variable	Coefficient	Std Error	t-statistic	Prob
C	3.707752	5.308129	0.698504	0.4955
INF	0.617307	0.245830	2.511113	0.0240
RINT	0.100898	0.030960	3.258979	0.0152
UN	0.755275	0.119734	6.307940	0.0003
`RGDP	-0.826853	0.186028	-4.444774	0.0007

$R^2 = 0.738517$

Adjusted  $R^2 = 0.682121$ s

D W statistic = 1.845755

F statistic = 8.919078

Probability (F-value) = 0.000008

After running the OLS regression, the model is therefore specified as

$$NPL = 3.707752 + 0.617307INF + 0.100898RINT + 0.755275UN - 0.826853RGDP$$

## 4.3 Interpretation of Results.

A high  $R^2$  of 0.738517 specifies that about 73.85% of the non-performing loans in the banking sector of Zimbabwe are described by the exogenous variables in the model and the remaining percentage (26.15%) is explained by other factors incorporated by the error term. The adjusted  $R^2$  specifies that, after correcting for the degrees of freedom, about 68.21% of the non-performing loans are determined by the model and the other factors account for 31.79%. The possibility of nonsense regression is ruled out since the D.W statistic is larger than the  $R^2$  and close to 2. Thus the adjusted  $R^2$  value indicates the high explanatory power of the model. The other rule of thumb (F-statistic greater than five) is being satisfied since the one obtained in the model has a value of 8.919078.

### 4.3.1 Inflation (INF).

From the obtained results, inflation was found to be significant with a  $t$ -statistic value of 2.511113. A positive relationship between inflation and the non-performing loans was found as expected which is indicated by the positive sign of the coefficient of 0.617307. This means that a unit percent increase in the rate of inflation is accompanied by an increase in the level

of non-performing loans by approximately 0.617307%. This is due to the fact that inflation weakens the loan repayment capacity of the borrowers since the banks adjust the lending rates to the real return. The borrowers will not be able to repay their loans if their wages and salaries remain stagnant since their real income would have been reduced. Khemraj and Pasha (2009) also found a positive relationship between inflation and the non-performing loans in Pakistan.

#### **4.3.2 Interest Rates (RINT).**

This variable was also significant since it had a *t*-statistic value of 3.258998. A positive relationship between the interest rates and the NPLs came out as expected which is shown by the positive sign of the coefficient of 0.100898. A one percent increase in the level of interest rates is accompanied by approximately 0.100898% increase in the level of NPLs. This is so because an increase in interest rates raises the cost of borrowing thereby increasing the debt burden of the borrowers. This eventually leads to the high loan defaults thereby contributing to an increase in the NPLs. A positive relationship between interest rates and NPLs was also found by Salas and Saurina (2006) when they investigated non-performing loans in Spain.

#### **4.3.3 Unemployment (UN).**

The variable unemployment was found to be significant since it had a *t*-statistic value of 6.307940. A positive relationship was found between unemployment and the non-performing loans. This is supported by a positive coefficient (0.755275) of the variable. If the level of unemployment increase by once percent, NPLs will increase by 0.755275%. An increase in unemployment affects negatively the incomes of the individuals thereby increasing their debt burden. The unemployed people will be left with no money to repay their loans thereby causing an increase in loan defaults. Furthermore, an increase in unemployment affects the demand of the final products produced by the firms negatively. This eventually affects the sales of the firms leading to the decline in the revenues of the firms thereby by affecting debt servicing by firms. This positive relationship between unemployment and NPLs conforms to other previous studies such as the one which was done by Bonila (2012) in Spain.

#### **4.3.4 Gross Domestic Product (RGDP)**

A *t*-statistic value of -4.444777 was obtained for Gross Domestic Product indicating that it is a significant factor in explaining the NPLs in Zimbabwe. The results show an inverse relationship between RGDP and NPLs indicated by a negative coefficient of -0.826853. A unit percent increase in the level of RGDP is accompanied by 0.826853% decrease in the

level of the NPLs. This is so because an increase in GDP represents an improvement of liquidity in the economy. This usually translate to an increase in income thereby augmenting the loan repayment capacity of the borrowers. This in turn contributes to lower bad asset quality and the opposite equally holds. This relationship conforms to the study which was done by Shingjerg (2013) when he analysed the NPLs in the banking sector of Albania.

#### **4.4 Conclusion.**

This chapter presented the results of the study. The methodology outlined in chapter three was used to process the data. The obtained results are in line with the hypothesis formulated in the previous chapter. Chapter five will therefore highlight the policy recommendations to the stakeholders based on the obtained results.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION AND POLICY RECOMMENDATIONS**

#### **5.0 Introduction.**

This chapter encloses the research on the determinants of non-performing loans in the banking sector of Zimbabwe. In this regard, the summary of the findings and policy recommendations are presented. Moreover, areas for future studies are highlighted regarding the same concept and conclusion of the chapter is given thereafter.

#### **5.1 Summary of the Study.**

The chief aim of the study was to examine and identify the determinants of non-performing loans in the banking sector of Zimbabwe. In th An econometric model was used in the study and it used a quarterly time series data set from 2009-2013. Empirical results from the study revealed that inflation, unemployment and interest rates are positively related with the non-performing loans. However, the empirical results revealed that an inverse relationship exists between the Gross Domestic Product and the NPLs.

#### **5.2 Conclusions**

The fundamental target of the study was to investigate the determinants of non-performing loans in the banking sector of Zimbabwe using quarterly time series data set starting from 2009 up to 2013. Hence, there is need to keep inflation at a lower rate so as to reduce the loan defaults. The rate of unemployment should also be kept at a substantially lower rate with the

interest rates having to be jointly determined by the RBZ and the banks. The Gross Domestic Product has to be boosted through prudent policy intervention measures.

### **5.3 Policy Implications and Recommendations.**

The empirical results from this research found out that there is a positive relationship between inflation and NPLs. Given the current situation of stagnant salaries and wages in Zimbabwe, an increase in inflation affects the capacity of the borrowers to repay the borrowed amount. This is so because the banks will simply adjust the lending rates to the real return so as to protect their profitability margins. The government has to keep the inflation rate relatively low as to avert the ballooning of the NPLs. Economic theory argues that the monetary policy can be used to control the level of inflation. However, since the adoption of the multicurrency regime, the RBZ cannot fully implement all the instruments the monetary policy. This means that the RBZ cannot manipulate the interest rates and money supply to control inflation. This research therefore advocates for the continued use of the multi-currency system since it guarantees price stability. A relatively low level of inflation will help to reduce any further increases in the non-performing loans in the banking sector of Zimbabwe. To add on, the rate of inflation can be kept low by keeping the salaries of the workers especially the public sector workers stagnant. This is so because the local retailers have a tendency of inflating the prices when the salaries of the civil servants are increased. This helps to keep the rate of inflation low since they will be not having any incentive to increase the prices thereby retarding excessive loan defaults.

To add on, the research also found a positive relationship between the non-performing loans and interest rates. The interest rate is the cost of borrowing money hence its increase will mean that the borrowers will face difficulties in repaying their loans. It therefore means that the rates should be kept fairly low so that the borrowers will be able to pay back when they borrow the money from the banks. Therefore, what it means is that the monetary authorities must come up with interest rate policies that are aimed at averting excessive loan defaults. Zimbabwe lost the monetary policy independence after adopting the multiple currency in 2009 meaning that the central bank cannot use the monetary policy to influence interest rates in the economy. However, the government through the RBZ, can engross banks so as to reach a covenant on the fair lending rates that the banks should charge. The rates must strike a balance between the borrowers and the banks meaning that they have to be fair enough to

allow banks to make economically reasonable profits at the same time being fair to the borrowers.

Furthermore, this study also advocates for the recapitalisation of the RBZ so as to keep the lending rates fairly low. The recapitalisation of the RBZ will enable it to perform its lender of last resort function. This means that when the local banks are short of funds, they will approach the central bank rather than seeking the off shore lines of credit. Recapitalisation of the central bank enables a fair bank rate to be charged by the RBZ implying that the local banks will be in a position to borrow at lower rates. A fair bank rate will automatically translate into lower lending rates that will be charged by the banks to the borrowers.

Moreover, the empirical results revealed that a positive relationship exists between the NPLs and unemployment. This calls for the government of Zimbabwe to reduce the unemployment if the asset quality in the banking sector is to be improved. This piece of paper calls for the government to stimulate demand in the economy through the use of the fiscal policy. The government can lower the taxation level in the economy as it will allow the consumers to spend more. This leads to an improvement in the sales level of the firms which in turn allows more labour to be employed by the firms since labour has a derived demand. When people are working, they have the money to use in repaying the loans hence bad loans will be reduced. Also, the government can craft or align its existing policies to be friendly to foreign investors so as to unlock foreign direct investment. Foreign direct investment helps in reducing unemployment via the multiplier effects since more and more income will be generated in the economy. This enhances the loan repayment capacities of the borrowers since they will be having the income at their disposal to repay the debts. This goes a long way in reducing the level of non-performing loans in Zimbabwe.

Lastly, the observed results revealed an inverse relationship between the NPLs and the level of GDP. This means that an increase in the level of Gross Domestic Product is accompanied by a decrease in the in the level of NPLs. This compels the government of Zimbabwe to boost the GDP so as to increase liquidity in the economy. An increase in liquidity represents the availability of income in the economy. This calls for resilient and prudent policy intervention measures so as to boost the total output of the economy. The government can attract foreign direct investment and at the same time formulate policies that enhance value addition so as to avoid the exportation of unprocessed raw materials. This helps in increasing the level of GDP in the Zimbabwean economy at the same time increasing the liquidity.

### 5.3 Suggestions for Future Studies.

The study left out a number variables that determine the level of non-performing loans. Some of the omitted variables include exchange rates, credit growth, wage rate, total loans among others. Thus, the future studies can be hinged upon these variables since they have not been incorporated in this model.

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## APPENDICES

### Appendix 1

Data set used in the regression model.

<b>Year</b>	<b>NPLs</b>	<b>INF</b>	<b>RINT</b>	<b>UN</b>	<b>RGDP</b>
2009:1	0.32	-6.1	165.65	2.8	-0.45
2009:2	1.62	-5.7	-20.18	2.96	1.35
2009:3	3.55	8	-90.12	2.83	2.25
2009:4	1.8	3.2	-45.91	0.95	0.64
2010:1	2.43	-0.03	2.97	1.85	3.32
2010:2	3.2	0.84	2.87	2.42	2.77
2010:3	3.16	1.23	3.1	1.29	2.97
2010:4	4.24	0.44	1.33	0.88	1.19
2011:1	4.72	1.14	2.86	1.59	2.95
2011:2	6.17	1.33	2.76	2.62	3.05
2011:3	8.21	1.32	2.8	1.69	3.05
2011:4	7.35	0.69	1.03	0.02	1.35
2012:1	9.92	0.92	3.09	1.99	2.96
2012:2	12.28	0.55	3.08	2.15	3
2012:3	11.59	0.67	3.4	2.15	2.78
2012:4	13.47	0.45	0.98	0.4	1.6
2013:1	14.51	0.29	4.53	1.94	1.63
2013:2	13.81	0.1	5.69	1.93	1.12
2013:3	15.64	0.04	5.27	1.74	0.87
2014:4	15.92	0.04	2.24	0.88	0.33

Source (RESERVE BANK OF ZIMBABWE, ZIMSTATS)

## Appendix 2: Diagnostic test

### 2.1 Results of unit root tests

#### 2.1.1 NPLs unit root test results

ADF Test Statistic	2.134537	1% Critical Value*	-2.6968
		5% Critical Value	-1.9602
		10% Critical Value	-1.6251

\*MacKinnon critical values for rejection of hypothesis of a unit root.

#### Augmented Dickey-Fuller Test Equation

Dependent Variable: D(NPL)

Method: Least Squares

Date: 04/01/15 Time: 15:18

Sample(adjusted): 2009:2 2013:4

Included observations: 19 after adjusting endpoints

Variable	Coefficien t	Std. Error	t-Statistic	Prob.
NPL(-1)	0.073625	0.034492	2.134537	0.0468
R-squared	-0.187461	Mean dependent var		0.821053
Adjusted R-squared	-0.187461	S.D. dependent var		1.207495
S.E. of regression	1.315815	Akaike info criterion		3.437986
Sum squared resid	31.16465	Schwarz criterion		3.487693

Log likelihood      -31.66086      Durbin-Watson stat      2.485680

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### 2.1.2 INF unit root test results

ADF Test Statistic	-4.209881	1% Critical Value*	-2.6968
		5% Critical Value	-1.9602
		10% Critical Value	-1.6251

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\*MacKinnon critical values for rejection of hypothesis of a unit root.

#### Augmented Dickey-Fuller Test Equation

Dependent Variable: D(INF)

Method: Least Squares

Date: 04/01/15 Time: 15:40

Sample(adjusted): 2009:2 2013:4

Included observations: 19 after adjusting endpoints

---

Variable	Coefficien	Std. Error	t-Statistic	Prob.
	t			
INF(-1)	-0.850958	0.202134	-4.209881	0.0005
R-squared	0.491623	Mean dependent var		0.323158
Adjusted R-squared	0.491623	S.D. dependent var		3.512777
S.E. of regression	2.504629	Akaike info criterion		4.725355
Sum squared resid	112.9170	Schwarz criterion		4.775062
Log likelihood	-43.89087	Durbin-Watson stat		2.154510

---

### 2.1.3 RINT unit root test results

ADF Test Statistic	-7.814962	1% Critical Value*	-2.6968
		5% Critical Value	-1.9602
		10% Critical Value	-1.6251

\*MacKinnon critical values for rejection of hypothesis of a unit root.

#### Augmented Dickey-Fuller Test Equation

Dependent Variable: D(RINT)

Method: Least Squares

Date: 04/09/15 Time: 13:47

Sample(adjusted): 2009:2 2013:4

Included observations: 19 after adjusting endpoints

Variable	Coefficien	Std. Error	t-Statistic	Prob.
	t			
RINT(-1)	-0.929127	0.118891	-7.814962	0.0000
R-squared	0.764352	Mean dependent var		-
				8.575263
Adjusted R-squared	0.764352	S.D. dependent var		46.96151
S.E. of regression	22.79679	Akaike info criterion		9.142313
Sum squared resid	9354.489	Schwarz criterion		9.192020
Log likelihood	-85.85197	Durbin-Watson stat		0.777748

### 2.1.4 Unit root test for UN

ADF Test Statistic	-6.353045	1% Critical Value*	-3.8572
		5% Critical Value	-3.0400
		10% Critical Value	-2.6608

\*MacKinnon critical values for rejection of hypothesis of a unit root.

#### Augmented Dickey-Fuller Test Equation

Dependent Variable: D(UN,2)

Method: Least Squares

Date: 04/01/15 Time: 15:57

Sample(adjusted): 2009:3 2013:4

Included observations: 18 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(UN(-1))	-1.447501	0.227844	-6.353045	0.0000
C	-0.141908	0.224223	-0.632891	0.5357
R-squared	0.716117	Mean dependent var		-
Adjusted R-squared	0.698374	S.D. dependent var		0.056667
S.E. of regression	0.949591	Akaike info criterion		1.729029
Sum squared resid	14.42758	Schwarz criterion		2.838869
Log likelihood	-23.54982	F-statistic		2.937799
Durbin-Watson stat	2.203411	Prob(F-statistic)		40.36118
				0.000010

### 2.1.5 RGDP unit root test results.

ADF Test Statistic	-3.523250	1% Critical Value*	-3.8304
		5% Critical Value	-3.0294
		10% Critical Value	-2.6552

\*MacKinnon critical values for rejection of hypothesis of a unit root.

#### Augmented Dickey-Fuller Test Equation

Dependent Variable: D(RGDP)

Method: Least Squares

Date: 04/09/15 Time: 13:57

Sample(adjusted): 2009:2 2013:4

Included observations: 19 after adjusting endpoints

Variable	Coefficien t	Std. Error	t-Statistic	Prob.
RGDP(-1)	-0.755450	0.214418	-3.523250	0.0026
C	1.567856	0.487655	3.215094	0.0051
R-squared	0.422030	Mean dependent var		0.041053
Adjusted R-squared	0.388032	S.D. dependent var		1.246118
S.E. of regression	0.974818	Akaike info criterion		2.886169
Sum squared resid	16.15460	Schwarz criterion		2.985584
Log likelihood	-25.41861	F-statistic		12.41329
Durbin-Watson stat	1.974753	Prob(F-statistic)		0.002609

## 2.2 Cointegration test results

ADF Test Statistic	-2.534724	1% Critical Value*	-2.6968
		5% Critical Value	-1.9602
		10% Critical Value	-1.6251

\*MacKinnon critical values for rejection of hypothesis of a unit root.

### Augmented Dickey-Fuller Test Equation

Dependent Variable: D(E)

Method: Least Squares

Date: 04/05/15 Time: 12:38

Sample(adjusted): 2009:2 2013:4

Included observations: 19 after adjusting endpoints

Variable	Coefficien	Std. Error	t-Statistic	Prob.
	t			
E(-1)	-0.531655	0.209749	-2.534724	0.0208
R-squared	0.250038	Mean dependent var	0.546176	
Adjusted R-squared	0.250038	S.D. dependent var	4.223887	
S.E. of regression	3.657900	Akaike info criterion	5.482851	
Sum squared resid	240.8441	Schwarz criterion	5.532559	
Log likelihood	-51.08709	Durbin-Watson stat	2.039687	

### 2.3 Autocorrelation test results

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.902159	Probability	0.429642
Obs*R-squared	0.937557	Probability	0.295591

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 04/05/15 Time: 14:56

Presample missing value lagged residuals set to zero.

Variable	Coefficien	Std. Error	t-Statistic	Prob.
C(1)	3.010137	3.999852	0.752562	0.4651
C(2)	-0.097055	0.130202	-0.745415	0.4693
C(3)	-0.012237	0.023160	-0.528391	0.6061
C(4)	-0.794020	1.390601	-0.570991	0.5777
C(5)	0.062697	1.402143	0.044715	0.9650
RESID(-1)	0.403314	0.358628	1.124603	0.2811
RESID(-2)	0.330990	0.367929	0.899603	0.3847

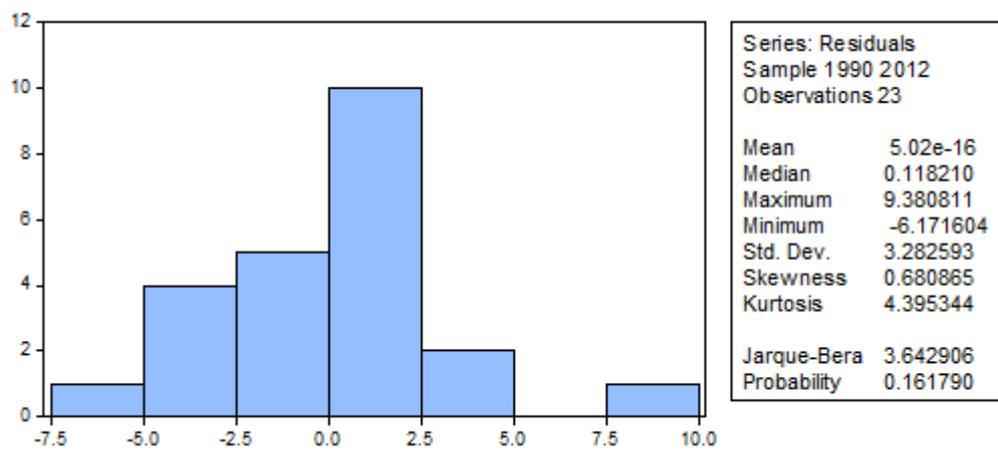
R-squared	0.121878	Mean dependent var	-1.47E-15
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Adjusted R-squared	-0.283409	S.D. dependent var	2.858178
S.E. of regression	3.237962	Akaike info criterion	5.456983
Sum squared resid	136.2972	Schwarz criterion	5.805489

Log likelihood      -47.56983      Durbin-Watson stat      1.476452

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## 2.4 Normality test results



## 2.5 Multicollinearity test results

	NPLs	INF	RINT	UR	RGDP
NPLs	1.000000	0.089070	-0.097226	-0.211059	-0.088881
INF	0.089070	1.000000	-0.742849	-0.219731	0.393323
RINT	-0.097226	-0.742849	1.000000	0.152547	-0.355471
UN	-0.211059	-0.219731	0.152547	1.000000	0.092376
RGDP	-0.088881	-0.393323	0.355471	0.092376	1.000000

## 2.6 Model specification test results

Ramsey RESET Test:

F-statistic	0.365822	Probability	0.554968
Log likelihood ratio	0.515891	Probability	0.472600

Test Equation:

Dependent Variable: NPL

Method: Least Squares

Date: 04/06/15 Time: 08:30

Sample: 2009:1 2013:4

Included observations: 20

Variable	Coefficien	Std. Error	t-Statistic	Prob.
C	2.758081	9.219685	0.299151	0.7692
INF	0.323591	1.330819	0.243151	0.8114
RINT	0.017247	0.035393	0.487303	0.6336
UN	-0.210218	2.371396	-0.088647	0.9306
RGDP	-0.051538	5.212927	-0.009887	0.9923
FITTED^2	0.061617	0.101874	0.604832	0.5550

R-squared	0.381450	Mean dependent var	7.695500
Adjusted R-squared	0.160540	S.D. dependent var	5.253184
S.E. of regression	4.813075	Akaike info criterion	6.223875
Sum squared resid	324.3197	Schwarz criterion	6.522594
Log likelihood	-56.23875	F-statistic	1.726719

Durbin-Watson stat 1.010280 Prob(F-statistic)i 0.193216

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### Appendix 3 Model estimation results

Dependent Variable: NPL  
Method: Least Squares  
Date: 04/06/15 Time: 09:19  
Sample: 2009:1 2013:4  
Included observations: 20

Variable	Coefficien	Std. Error	t-Statistic	Prob.
C	3.707752	5.308129	0.698504	0.4955
INF	0.617307	0.245830	2.511113	0.0240
RINT	0.100898	0.030960	3.258979	0.0152
UN	0.755275	0.119734	6.307940	0.0003
RGDP	-0.826853	0.186028	-4.444777	0.0007
R-squared	0.738517	Mean dependent var	7.695500	
Adjusted R-squared	0.682121	S.D. dependent var	5.253184	
S.E. of regression	4.808540	Akaike info criterion	6.190982	
Sum squared resid	346.8308	Schwarz criterion	6.439915	
Log likelihood	-56.90982	F-statistic	8.919078	
Durbin-Watson stat	1.845755	Prob(F-statistic)	0.000008	

