**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**COLLEGE OF HUMANITIES AND SOCIAL SCIENCES**

**DEPARTMENT OF ECONOMICS**



# "ASSESSING THE FACTORS INFLUENCING THE PERFORMANCE OF LOANS OF COMMERCIAL BANKS IN GHANA"

## CASE STUDY OF HFC BANK

**BY ERIC OPARE**

**THESIS SUBMITTED TO THE DEPARTMENT OF ECONOMICS OF THE COLLEGE OF SOCIAL SCIENCES AND HUMANITIES, KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR AWARD OF MASTER OF SCIENCE DEGREE IN ECONOMICS.**

**MAY, 2016.**

## DECLARATION

I hereby declare that this thesis is my own original work towards the award of master of science in Economics and that, to the best of my knowledge, it contains no material published by another person nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been in my work.



Eric Opare (PG 2728714) ……..…… ……..

(Student & PG) Signature Date

**Certified by:**

Mrs. Grace Ofori-Abebrese (PhD) ……..…… ……..

(Supervisor) Signature Date

**Certified by:**

Appiah-Nkrumah Joseph (Mr) ……..…… ……..

(Internal Supervisor) Signature Date

**Certified by:**

Hadrat, Mohammed Yusif (PhD) ……..…… ……..

(Head of Department) Signature Date

**DEDICATION**

I dedicate this work to My Jehovah and all My Siblings (Miss Gifty Amoako-Tuffour, Vivian Antwi, Janet Opare-Addo, Emmanuel Opare-Addo and Blessing Annor)



**ACKNOWLEDGEMENTS:**

I thank Yaweh for His Grace, Love and Guidance which has enabled me to come this far.

I express my deepest cheers to my supervisor in the person of Mrs Grace Ofori Abebrese (PhD) for her guidance, encouragement, time spent and the necessary corrections and many useful suggestions for the successful preparation and completion of this project work.

I also thank my Mother (Cecilia Ankomah) and my Aunty (Monica Amoako) for their encouragement and support shared with me.

## ABSTRACT

This study assessed the factors that influence loan performance of commercial banks in Ghana using HFC as a case study. The sample period used for the study was based on a quarterly data from 2008 to 2015. Two separate models were used to determine the effects of banks' specific factors and macroeconomic variables on loan performance. Using the ARDL bounds test of co-integration as an estimation technique, the results showed evidence of long run relationship among the variables. The results suggest that macroeconomic factors that influence loan performance are inflation and T-bill whiles banks' specific factors are, bank's loan interest rate, loan to asset ratio and banks loan loss provision over reserve. These therefore show that macroeconomic instabilities and banks specific factors do have significant impact on loan performance. Hence there is the need for bank management and policy makers to undertake policies that can ensure efficiency in banks loan performance.

## TABLE OF CONTENTS

**LIST OF TABLES**

**TABLES** **PAGE**

# CHAPTER ONE

# INTRODUCTION

## 1.1 Background of the study

The Agricultural sector after independence was the back bone of the economy, contributing greater share of Gross Domestic Product (GDP) as well as employing greater portion of its labour force. It was the largest single contributor to GDP and its contribution to GDP improved from 1960. However, after the 1980s, its proportionate contribution to GDP declined to less than 50 percent of the country's total GDP and this has continued to decline, while per capita GDP continued to increase. According to Ghana Statistical service the rapid increases in per capita GDP after 2000 may reflect the development of the service sector.

Figures for GDP in 2013 explain that the highest growth was recorded by the service sector with 8.9% (a reduction from 11% in 2012), industry with 7.0% and 5.2% to the agricultural sector. In terms of GDP figures, the service sector remained as the largest contributor with 49.5% in 2013 from 48.4% in the previous year. Financial & insurance activities; Information & communication activities recorded the highest growth rates of 23.2 percent and 24.7 percent respectively.

According to Schumpeter (1934), the financial sector plays certain key roles in economic growth by means of financial-intermediary-service provisions which includes savings mobilization, risk management, projects evaluation and facilitating transactions.

Channelling of funds from depositors (surplus units) to investors (deficit spending units) is a key role played by commercial banks. This is possible so long as commercial banks can generate enough income to cover operational cost incurred.

Thus for sustainable intermediation to function well, there is the need for financial performance (profitable) in the banking industry.

A standardized and widely employed statistic measure of financial performance of a banking institution is the ratio of non-performing loans (NPLs) to total loans. This ratio is often used to evaluate and compare bank loans portfolio quality (Festic et al, 2009; Mendoza and Terrones, 2008), to analyze banking sectors' efficiency (Podpiera, 2006; Lízal and Svejnar, 2002), to foretell forthcoming failures of banks (Jin et al, 2011).

In every economy, it is believed that non-performing loans mostly are linked to failures of some banks and in general financial crisis. Khemraj and Pasha (2009) explain that high non-performing loans were responsible for the financial crisis in East Asia and Sub-Saharan Africa.

**1.2 Statement of Problem**

Keeton and Morris (1987) brought one of the first empirical studies on the subject of non-performing loans (NPLs) examining the causes of loan loss diversity of banks in USA. The study indicated that, part of the changes in loan losses was significantly due to differences in local economic situations and also owing to poor performance in industries such as agriculture and energy, with a minor part of the remaining variation in loan loss associated to bank-specific factors, such as banks intentionally embarking on greater risks and granting loans that knowingly have a high default probability.

Many studies and findings consider non-performing loans (NPLs) as toxic with injurious effects on both economic development and social welfare (Shihong Zeng, 2011; Brenda Gonzales-Hermosillo, 1999; Levon Barseghyan, 2010).

Banks, according to Pasha et al (2009), must be circumspect in providing loans and take into consideration several factors in controlling the level of impaired loans.

Amuakwa & Boakye (2014) in their study found that both bank-specific factors (previous year's NPL, bank size, net interest margin and current year's loan growth) and macroeconomic factors (past inflation, real GDP, per capita growth and real effective exchange rate) significantly affect non-performing loans of large banks but not necessarily applicable in explaining NPLs for small banks in the banking industry.Individual bank level analysis for Ghana is lacking, in this regard, this study seeks to empirically investigate the determinants of loan performance of HFC Bank considering both internal and external factors, so as to increase profitability.

### 1.3 Objectives of the study

The main objective is to examine the loan performance of Commercial banks in Kumasi metropolis, to ensure profitability. The specific objectives are;

1. To examine the internal factors affecting bank loan performance.
2. To examine the external /macroeconomic factors affecting bank loan performance.

The study is therefore guided with the following research questions to address its objectives.

1. What internal factors significantly affect bank loan performance?
2. What external factors significantly affect bank loan performance?

**Hypothesis:**

The following hypotheses were to be tested:

**$H_0$:** The internal / Bank-specific variables do not affect loan performance.

**$H_1$:** The internal / Bank-specific variables affect loan performance.

**$H_0$:** The External variables do not affect loan performance.

**$H_1$:** The External variables affect loan performance.

### 1.4 Research Methodology and Scope

According to Al-Tamimi (2010) and Aburime (2005), the performance of banks can be affected by both bank-specific (internal) and macroeconomic (external) factors.

The bank-specific factors are variables that affect the bank's profitability. Some of these factors that are within the scope of the bank are capital size and composition of credit portfolio, policies on interest rate, productivity of labour, management quality, size of deposit liabilities, and bank size. The external factors on the other hand, are variables which the banks have no control over it. Such is money supply and Treasury bill rate but does influence the profitability of bank.

The CAMEL system analyses the five traditional aspects considered to be most important in the operation of a financial intermediary. The set five areas reflect the financial condition and general operational strength of the financial institutions are capital adequacy, asset quality, earnings, liquidity and management. From the camel framework; capital adequacy and earnings, served as a proxy to bank specific factors (Dang, 2011).

Secondary data for bank specific factors was obtained from Banks record archives and non-bank specific data was obtained from Ghana Statistical Service, IMF and World Bank which are quarterly data from 2008 to 2015.

This study employed a modified version of Messai and Jouini (2013) model for its regression analysis. Since, regressing time series data tends to yield spurious regression,

the study used Augmented Dickey Fuller for stationarity test in order to ascertain stationarity and order of cointegration.

### 1.5 Significance of the Study

Various literatures about loan performance of banks have focused on factors that are specific to the banking sector and its overall effect on the sector's performances but does not consider external variables. This study fits in key macroeconomic variables, such as exchange rate, inflation rate, Treasury bill rate, GDP and money supply in its analysis.

Bank failures may usually be attributed to fat sums of bad loans in the financial system. Non-performing loans is one of the key roots of the associated problems of stagnation in the economy as each of these loans in the banking industry raises the likelihood of difficulties and unprofitability of banks. The minimization of nonperforming loans is therefore crucial for improving banks efficiency and profitability which will further grease economic growth and development. For every nonperforming loan that is retained for good will have an effect on economic resources that are sealed off in less useful areas. Non-performing loans are hence likely to obstruct growth in the economy and also shrinking economic efficiency (Hou, 2007). This study will not only fill the gap of knowledge lacking for bank specific analysis, but also serve commercial banks especially HFC bank with empirical knowledge to help lower non-performing loans so as to increase its profitability.

### 1.6 Organisation of the study

The study has five chapters. Chapter one, introduction to the study comprises background to the study, statement of problem, research objectives, methodology and significance of the study.

Chapter two reviews related literature and chapter three presents the methodology of the study. Chapter four estimates and analyses collected data for the study and finally, chapter five concludes the study and suggests policy recommendations.



# CHAPTER TWO

# LITERATURE REVIEW

## 2.0 Introduction

The study is concerned with a review of literature on commercial banks loan performance, overview of loan performance in Ghana, determinants of bank loans performance, empirical findings and building an empirical framework.

## 2.1 Theoretical Review

In recent times the banking system has experienced crisis and in both developed and developing countries and this can be attributed largely to the fall in the quality of loan portfolio. The numbers of loans that go bad continue to increase in the banking sector which generally results in bank failures. As these non - performing loans rises it may have a rippling effect on the economy as a whole and in the financial sector, leads the institution to difficulty and affects its ability to make profit. There is a positive relationship between NPL and banking crisis. Sorge (2004) explains and continues to argue that using NPL and loan losses provisions easily assesses the excessively susceptible manner of the financial system.

Various literatures has explained the relationship between macroeconomic environment and the quality of loans in relation to the business cycle and banking stability. In a situation where the economy is expanding, it is obvious that the number of bad loans is relatively small since consumers and institutions have enough revenue to fulfill their obligations of repayment in due time.

As the economy continues to expand then financial institutions grant credit with little or no considerations given to the quality of monies to be received. However, when the economy is in recession then a rise in bad debt adversely affects the economy in general, and the financial sector.

According to Williamson (1987), models in theory that explains the business cycle with a financial explicit role is a good basis to model non-performing loans since emphasis are placed on the cyclical nature and failures associated with business. It is obvious that there is a link between many macroeconomic variables and non-performing loans. Literature cites real interest rate, annual inflation, real exchange rate, GDP growth rate, unemployment rate, loans growth and Money supply as the significant determinants. These determinants affect non-performing loans in diverse ways. For instance, real GDP and employment rate are inversely related to NPL since a growing economy is a favorable ground to increase income and a decrease in financial distress. Works done by Salas and Saurina et al (2002), Khemraj et al (2009) and Dash et al (2010) have all concluded that there is a positive relationship between unemployment and NPL and an inverse relationship between NPL and real GDP growth rate. A higher GDP growth means that the economy is doing well and therefore a higher level of income. Borrowers in such an economy have a higher capacity to pay their debt and eventually a reduction in bad debts. Borrowers in an economy that is experiencing negative growth in GDP are highly unlikely to repay their debt and in such instance the level of bad debt increasing.

Interest rate is positively related to NPL. A rise in interest rate makes the payment of debt very difficult and leads to a rise in debt and eventually a rise in non-performing loans Bofondi and Ropele (2011).

### 2.1.1 Loan Portfolio and Performance

Loan Portfolios can simple be defined as loans that have been made or are held for repayment. It is one of the key assets of a financial institution.

The worth of a bank's loan portfolio does not rest only on the earned interest but also relies on the quality of the loan and possibility of repaying both interest and principal amounts.

Loan portfolio is usually a major asset and most probably the dominant source of revenue which makes it an ultimate source of risk to the safeness and soundness of a bank. The level of banks interest risk that is usually assigned to the bank's loaning undertakings rests on the structure of the banks' loan portfolio, as well as on the loans' terms such as maturity, rate structure, and other loan options all influence the banks' revenue stream (Comptroller's hand book, 1998).

Loan portfolio performance is the profitability (i.e. the rate of return for an investment) that the numerous loan products offer. Generally, this considers the customers that apply for loans, amount borrowed, loan collateral, timeliness of installments payment and other factors (Puxty and Dodds, 1991). Commercial banks are driven to grant loans to customers with credit risk as their main source of risk, there is uncertainty related with debtors' repayment of these offered-out loans.

According to Greenidge and Grosvenor (2010), non-performing loans are loans that have not been paid for 90 days. Such unpaid loans affect the performance of banks' loan portfolio. Banks must be circumspect and take several factors into consideration when providing loans so as to reduce the level of impaired loans and to effectively manage loan portfolio performance (Khemraj and Pasha, 2009).

Commercial banks must take into consideration, the influence of global competitiveness on the local economy since this may go a long way to influence the debtors' ability (form the key export oriented sectors) to repay and ultimately causing more non-performing loans.

Thus, financial institutions must give out loans with the performance of the domestic economy in mind since the loan delinquencies are potentially high during periods of economic slump (Kateregga, 2013).

### 2.1.2 Banks Performance Indicators

Commercial banks have many goals which could be social or economic, with which strategies are designed and implemented, and activities performed to help realize the set objectives. This research is interconnected with profitability and in determining commercial banks profitability, it is necessary to know the various measures of ratios employed for the purpose of this study. These are; Return on Asset, Return on Equity and Net Interest Margin.

#### 2.1.2.1 Return on Asset (ROA)

Return on Asset is defined as the ratio of Income to its total asset and hence a key ratio that serves as an indicator of banks' profitability. This is used to assess banks' management ability to generate income by utilizing its asset. It therefore expresses the efficiency of the bank in terms of its resources used to generate the obtained income (Khrawish, 2011; Wen, 2010).

#### 2.1.2.2 Return on Equity (ROE)

Return on Equity is the ratio of Net Income after Taxes divided by Total Equity Capital. It therefore shows the Rate of Return gotten on invested funds in the bank by its stockholders. Return on Equity typifies the efficiency of banks' management in its use of shareholders' funds. This financial ratio therefore shows how much profit the bank earns comparable to the total value of shareholder's equity that is invested. Thus, ROE is what is considered by shareholders for their investment.

A bank with a higher ROE is seen as one more capable of generating cash internally. This means that, the greater the banks ROE, the greater the profit margin generation of the bank. Ceteris Paribus.

#### 2.1.2.3 Net Interest Margin (NIM)

Net Interest Margin in simple terms is defined as the difference between interest-income generated and the interest amount paid out to depositors relative to interest-earning assets. Mathematically, it is net interest income over total earning assets. Since NIM reveals the cost of banking intermediation services it is therefore the interest income received on loans and securities and interest cost of loaned out deposit funds gap. A higher net interest margin means that the profit to the bank is higher and it is more stable in terms of survival. Consequently, this is one of the principal measures of the profitability of a bank. However, a greater NIM is a reflection of riskier lending attitudes which is associated with loan loss provisions (Khrawish, 2011).

### 2.1.3 Non-Performing Loans

A standardized and widely employed statistic measure of financial performance of a banking institution is the ratio of non-performing loans (NPLs) to total loans. This ratio is often used to evaluate and compare bank loans portfolio quality (Festic et al., 2009;
Mendoza and Terrones, 2008), to analyze banking sectors' efficiency (Podpiera, 2006; Lízal and Svejnar, 2002), to foretell forthcoming failures of banks (Jin et al., 2011).

### 2.1.4 Determinants of Bank Loans Performance

It is agreeable that, a tough economic condition affects both small and medium scale business organisations as well as households.

According to the Government Budget Statement for 2010, the services sector (the second largest contributor to Ghana's GDP, 31.8 percent) with a growth rate of 9.3 percent in 2008 fell drastically to 4.6 percent in 2009, marking lowest growth rate for over the past 5 year period.

According to the 2010 Budget, this decline originated from the restaurants, wholesale and retail, and hotels sub-sector. Also, Industry had a growth rate falling from 8 percent to 3.8 percent in 2008 to 2009. Such industries largely depends on loans from banks for commercial activities thus, for both sectors to experience a drastic fall in growth rate over same period, then this can be linked to explaining why loans default increased over the same period.

Al-Tamimi (2010) and Aburime (2005) explains that both external and internal factors do affect the performance of banks. It can also be seen as bank specific/internal variables or macroeconomic variables. These are random variable are factors that influence banks output measured as loan performance. For efficacious performance of banks loan portfolio, one need take into consideration of several other factors when giving out loans so as to minimize impaired loans losses (Khemraj and Pasha, 2009). In this regard, this study wishes to empirically investigate the determinants of loan performance of commercial banks considering both internal and external factors, so as to increase profitability.

#### 2.1.4.1 Bank Specific / Internal Factors

The bank-specific factors are variables which affect bank's profitability. These factors are bank specific and include capital size and composition of credit portfolio, interest rate policy, labour productivity, management quality, size of deposit liabilities, and bank size.

The CAMEL model is what scholars often employ to proxy bank specific factors (Dang, 2011).

**Revenue-Earnings Stream**: Here, the main gears of revenues and expenses are examined using the level of operational efficiency and the bank loan interest rate as well as the overall results as measured by return on equity (ROE) and return on assets (ROA).

$$\textbf{Return on assets (ROA)} = \frac{\text{Net income from operations}}{\text{Average assets}}$$

$$\textbf{Return on equity (ROE)} = \frac{\text{Net income from operations}}{\text{Average equity}}$$

**Management Efficiency:** This is a major internal factor that influence banks' profitability and can be proxied by diverse financial ratios such as loan growth rate, earnings growth rate and total asset growth. This is a multifaceted subject to capture using financial ratios. Furthermore, operational efficiency in handling operating expenses is another dimension for management quality. Here management performance is regularly communicated qualitatively through subjective evaluation of management systems, quality of staff, control systems and organizational discipline. The ability of management to use its current resources effectively so as to maximize income as well as reducing operational costs can be used as a measure. The ratio employed to measure management quality is the degree of its inefficiency which is generally expressed as operating expense to income ratio (Ilhomovich, 2009). According to Athanasoglou et al. (2005) as operating expense rises to total income, then management is inefficient in terms of operational efficiency and in its ability to generate income. Management quality in this regard, is measured as;

$$\textbf{Banks inefficiency (InEff)} = \frac{\text{Operational expenses}}{\text{Operatimg Income}}$$

### 2.1.4.2 External Factors/ Macroeconomic Factors

External factors are those that are outside the control of the bank. GDP, Inflation, Interest Rate and Political instability are some of these factors that affect banks performances.
For example, demand for banks assets was affected as a result of the declining trend of GDP. During declining GDP growth, there is a fall in credit with its negative effect on the profit of banks. In addition, lowering income statement adversely affects debtors' ability to meet their loan obligations. In a situation where there is growth in the economy posited by positive GDP growth, credit demand will rise in response to the business cycle. This will be higher

during boom and lower in recession (Athanasoglou et al., 2008). Same can be said about Money supply (M2) since both M2 and GDP are pro-cyclical from economic theory.

On the Contrary, it still remains controversial the relationship between banks profitability and inflation rate. There is no clear relationship according to Vong and Chan (2009). High prices (inflationary periods) are expected to be profit signals to firms, but this also negatively affects households as cost of living rises. Thus, the net impact on banks profitability is uncertain.

## 2.2 Empirical Review

Fofack (2005) argues that in the sub-Saharan African countries, interest rate and economic growth are important determinants of non-performing loans. Increasing interest rate makes the cost of borrowing expensive and the ability to repay also falls thereby increasing nonperforming loans. Banks giving out loans excessively and charging high level of interest rate are most likely to have higher bad debts. Pasha et al (2009)

Saurina (2006) presents evidence from Spain and explains that GDP growth, real interest rate and a credit condition explains NPL. In terms of real exchange rate Pasha et al (2009) from the Guyanese banking sector explains that it is positively related to bad loans.

When local currency appreciates; or a falls in exchange rate; NPL portfolios of financial institutions will increase. Their results also confirm the inverse relationship GDP growth and NPL.

With evidence from Islamic bank in Malaysia, Adebola et al (2011) used ARDL in exploring the factors that explain NPL concluded that long run relationship between variables and that of interest rate has a positive long term effect on bad loans. The writers further state that the producer prices are inversely related to bad loans.

These results can be likened to the study of Bofondi and Ropele (2011) that looked at conventional banks in Italy. Analyzing the relationship between nature of borrowers and loan quality, they concluded that macroeconomic variables do affect borrowers either individuals or businesses. With evidence from the first quarter in 1990 to the second quarter in 2010, Bofondi and Ropele said the quality of loans to both households and businesses may be attributed to a limited number of mainly macroeconomic variables of the economy, the important level of debt and to the cost of borrowing. In effect, macroeconomic variable changes do actually affect the quality of loans.

From Brazil, Vazquez et al (2012) did a good job with 78 banks and 21 credit categories between 2001 and 2009 and found that the pro-cyclical behavior of loan quality depends on the type of credit. When an economy is in recession, banks that are largely exposed to high credit types are affected most since the quality of their credit deteriorates.

Using dynamic panel data, Louzis et al (2010) examined the determinants of NPLs for each category of loan in the Greek banking sector.

Studying real gross domestic product growth rate, rate of unemployment and real interest rate for each type of loan from 2003 to 2009, the study concluded that bad or doubtful loans are related to these macroeconomic factors and to how well they are managed.

They further explained that the sensitivity of non-performing loans on mortgages is less to macroeconomic conditions.

It is very necessary to note that not only macroeconomic factors but also bank specific factors do affect NPL. Size of the institution, efficiency and credit terms, market power and the risk profile are essential determinants of NPL since such factors can cause risky loans. Quagliariello (2007) clearly states that the inclusion of macroeconomic indicators serve as control variables and are treated as exogenous.

Salas et al (2002) from the case of banks in the Spanish economy states that Credit growth, capital ratio, bank size, market power and real GDP growth are the explanatory variables in the variations in bad debts. Hu et al (2004) explained the relationship between the ownership structure and bad loans in banks in Taiwan and concludes that the size of banks is inversely related to non-performing loans. It was also made clear that in a bank where a greater portion of their capital is state owned, there exist a significant reduction in NPLs

The primary aim of a financial institution is to make profit and its profitability may be used to explain the efforts put in by risk managers in the institution. Weak monitoring as a result of mismanagement for both costs of operation and the quality of loans may induce high level of capital losses. Ineffectiveness on the part of management may have a positive impact on NPL and this was made clearer by Podpiera and Weill (2008) after analysing banking in the Czech Republic. The research finished by saying that there is positive relationship between inefficiencies and future increases in non-performing loans. When managerial performance is being regulated, it will lead to a stable financial system.

When loans are granted to new customers, it may be difficult for managers to assess and control risk associated with such loans. It is very necessary for due diligence to be done before loans are granted to either new and old customers of a bank

Using return on assets, Godlewski (2004) explained that there is an inverse relationship between banks' profitability and NPL. Evidence from Spain according to Fernandez (2008) also showed that higher levels of return on equity are most likely to be followed with greater risk in the future.

One of the main problems that face financial institutions is the risk that loans may not be paid back. In a situation where banks anticipate capital losses to rise, they may make provisions to reduce the variations in earnings and in effect strengthen their medium term

solvency. Pesola (2007).The attitude of the bank towards risk is very crucial. The financial strength of their bank may be indicated by managers with loss provisions. In most cases moral hazard and information asymmetry make granting loans quite risky in the sense that it becomes difficult for managers to decide who is in a good position to pay back a loan. It is a good practice when managers make provision for loan losses. As Boudriga et al (2009) states it, "a higher provision appears to reduce the level of impaired loans." It was also established that there is a relationship between bank-specific factors such as the ratio of total equity assets weighted by risk and non-performing loans. A key bank-specific factor that affects non-performing loans is credit growth since various studies have shown that rapid credit growth is often related to bad loans.

### 2.3 A Review of the Banking Sector in Ghana

The banking industry in Ghana has gone through rapid changes. Since 2003, there have been a paradigm shift from the banking model of; development, merchant and commercial to Universal banking (BOG, 2011; Mensah, 2015).

The introduction of the Universal Banking License in 2003has brought about competition among the various banks in the country for limited shares and customers.

Universal banking means that there is no restriction or limitation to the operations or activities of a bank in terms of agriculture, development, merchant and commercial (Incoom, 2010). Thus, there are no limits pertaining to the kind of service each bank can offer in as much as such activities are in line with the permissible activities of banks stipulated by the Central Bank (Addison, 2003).

It is difficult to differentiate between a merchant, development and commercial bank in recent times and this increased the level of competition in the industry. There is a strong indication that demand capacities still exist in the growing banking industry, as banks

executives are positive about the future for the next five years, Ghana Banking survey – PWC (2014) and Acquah (2006).

Ghana as part of its comprehensive strategy has seen certain financial sector restructuring and transformation processes. Acquah (2006), states that Ghana is said to have moved from an era of serious distressed dis-functioning banking system, interest rate controls, lack of financial resources, illiquidity and credit rationing to a new era known as the market-based regime. In addition, various measures are being implemented to strengthen bank's supervision, improve the regulatory framework and ensuring an increase in bank's profit. Acquah (2006).

In Ghana, the financial services industry is embraced with various establishments that are concerned with undertakings of financial management. We can classify the financial sector in the country into three groups namely; Banking and Finance (including Non-Bank Financial Services and Forex Bureau), Insurance, Financial / Capital markets. The Government of Ghana in its commitment to developing the nation's financial sector approved the Financial Sector Strategic Plan (FINSSP) in 2003, with the aim of widening and intensifying this sector.

In the financial sector, the key operators include banks and supporting institutions; foreign banks, local banks, Rural and Community Banks, Savings and Loans Enterprises, and other financial-leasing corporations. Ghana Investment and Promotion Centre (GIPC) reported in December 2012 that in various categories, there were 26 Banks, 133 Rural and Community Banks, 52 Non-Bank Financial Institutions, 273 Forex Bureaux, 18 Insurance Companies, 2 Re-insurance Companies, 35 Insurance Brokers, 36 GSE Listed Companies and 18 GSE Licensed Stockbrokers.

The period, 2013 is regarded as one of most problematic era over the past periods in the banking sector. Although the industry in the year recorded total assets growth of 33% compared to average growth rate of 26% over the five year history of 2008 to 2012, deposit mobilisation by the industry slowed down. The 2013 era, marked the period where competition among banks increased strongly in growing deposits and keeping profits.

The competition was not only among banks but also in the customer deposits market. Banks were threatened by the activities of government, savings and loans companies and finance houses. It is an undeniable fact that the banking sector is the most affected by the changing trends and policy actions in the global economy.

### 2.3.1 **HFC Bank**

HFC bank which is the acronym for Home Finance Company bank is a licensed commercial bank in Ghana. It was established in 1990 as it operated as a shell company within Merchant Bank Ghana. HFC became a publicly traded company enlisted in Ghana Stock Exchange in 1995. Having its headquarters situated in Accra, HFC as at ending 2015 can boast of 43 branches across Ghana. It is one of the leading Universal Banking
Institution in the country.

## 2.4 Overview of Loan Performance in Ghana

In last decade, the banking sector suffered a rugged period in 2013. Regardless of the fact that, in 2013 the industry experienced a growth in total assets by 33 percent as compared to average growth rate of 26 percent over the past decade, the industry suffered a slowdown in deposit mobilization. The banking sector also got plagued in that same period in its customer-deposits market, with the most prominent sources coming from government, savings and loans companies, and other finance houses considered as the non-traditional sources. This was evident in banks contending sternly with each other to grow their individual deposits. Another source of the competition in the last ten years can be attributed to the influx of

foreign banks in the sub region especially, Nigeria as they came in with ground-breaking and innovative ways of banking experience into the economy (Awuah, 2008; PWC 2014; Huang et al., 2003).

Yet, there is this striking struggle by banks to attract the large number of the unbanked population which is evidently seen by banks spreading out sales personnel to go out in search for prospective customers, opening of more branch networks and the mobile phone banking services. As bank clients grew, so did their respective deposits and hence a growth in the need to grant loans to firms and households who are customers to the bank. For banks to make more profit and out-compete the other, numerous banks granted loans and advances to clients but not all granted got re-paid. This has acquainted itself with the incidence of Non-Performing Loans into banks' record books and has gradually fetched a major concern to banks and financial regulators equally (Ghana Banking Survey Report PWC, 2014). High non-performing loans portfolio reduce banks' profits and their capacity to advance as well as lend to debtors; this adversely affect the economy.

According to the Ghana Banking Survey (2010) reported that the total income of the banking industry got a twice fold amounting GHC 1.5 billion in 2009. Nonetheless, the speedy weakening of Ghana's banking industry's loan portfolio adversely struck profit margins. Non-performing loans increased from GH¢ 60 million in 2007 to GH¢ 266 million in 2009. The Central Bank also experienced a worsening non-performing loans ratio of 16 percent in 2009 to 17 percent by the end 2010. Non-performing loans ratio has caused the top five banks in the country to reduce their market share from 50 percent in 2009 to 45% in 2010 (Bank of Ghana report 2010).

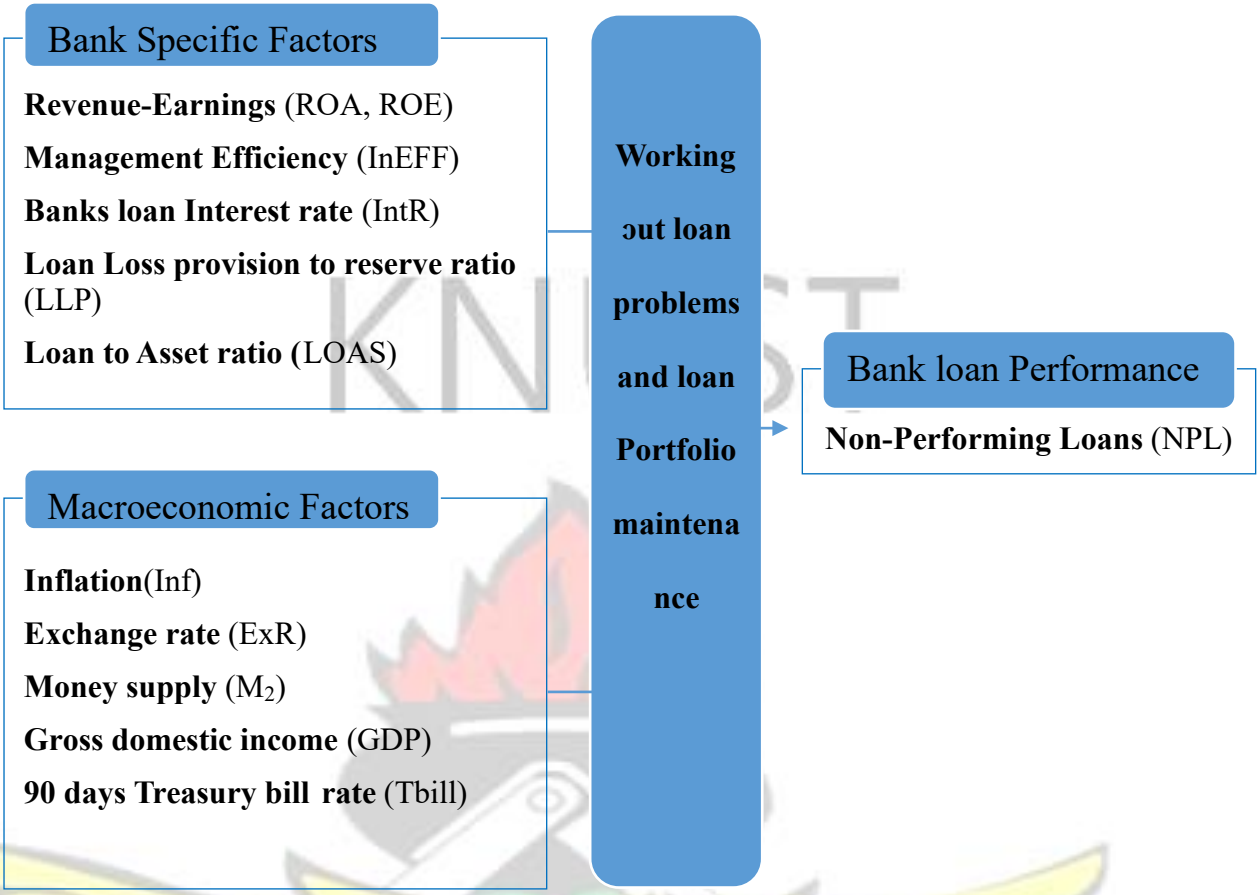
## 2.5 Brief Overview of Credit Reference Bureau in Ghana

The Credit Reference Bureau is regulated by the Credit Reporting Act 2007 (Act726) and it lays down laws and conditions governing credit bureaus and credit reporting in Ghana. The Credit Reporting Act 726 is intended to implement credit reporting system that will help reduce risks associated with lending and also to make information available on the debt profile of customers and a history of their repayment without infringing on their rights.

Financial organizations which put forward credit information to the credit bureau has presented evidence showing the client's/borrowers prior inscribed consent will be eligible to access a credit bureau's data. Clients have the right to examine and contest their own file in the Act. Currently only XDS Data Ghana Limited has been licensed to operate seems to be the only signatory on some observed banks in Ghana. The credit reference Bureau is licensed to help track and collect debts from debtors so as to complement bank efforts as it helps banks to focus on their central objectives.

## 2.6 Summary of Conceptual / Empirical Framework

The following conceptual framework has been developed for this study to give a better understanding of issues regarding bank specific factors, macroeconomic factors and bank loan performance.




Source: Author (2015)

# CHAPTER THREE

# METHODOLOGY

## 3.0 Introduction

This chapter discusses the methods employed for the study. The first section explains the variables used for the study. Section two describes the sources of data used for the study. Model specified for the study is presented in the third section. Definition of variables and

expected signs are discussed in sections four. The last section gives details of the various estimation techniques used for the study.

### 3.1 Variables

According to Al-Tamimi (2010) and Aburime (2005), the performance of banks can be affected by both bank-specific and macroeconomic factors. The bank-specific factors are variables which include capital size and composition of credit portfolio, interest rate policy, labour productivity, management quality, size of deposit liabilities, and bank size. The external factors on the other hand are variables which the bank has no control of such as money supply, Treasury bill rate and other macroeconomic variables. These do influence the profitability of a specific bank.

The variables for the study are selected on the basis of the CAMEL model. The CAMEL system analyses the five traditional aspects considered in a financial intermediary to be most essential in its operations.

The set five areas that reflect the financial condition and general operational strength of financial institutions are capital adequacy, liquidity, management, asset quality and earnings. From the camel framework; capital adequacy and earnings, were used to proxy for bank specific factors (Dang, 2011).

### 3.2 Data source

Secondary data was used for the study, with quarterly data spanning from 2008 to 2015.

Banks specific data such as performing loans, bank's loan interest rate, banks' efficiency ratio, return on assets, and return on equity, loan to asset ratio and banks loan loss provision over reserve were sourced from Banks' records and books. Data for 91 day Treasury bill was sourced from the Ghana Statistical Service. Macroeconomic factors such as GDP, exchange rate, money supply and inflation were sourced from the International Monetary Fund (IMF).

### 3.3 Model Specification

Constructing existing efficiency specifications, this study reflects the real banking technology and precisely models the connection between desirable and undesirable outputs. Precisely, the undesirable output is non-performing loans which captures credit risk, and is connected only to the relevant dimension of the output set. The model used by Messai and Jouini (2013) was adopted for the study;

$$\frac{PL}{Tl} i,t = \beta_0 + \beta_1 \Delta\, GDP_{t-1} + \beta_2 Un_t + \beta_3 RIR_t + \beta_4 ROA_{i,t-1} + \beta_5 \left(\frac{LLR}{TL}\right)_{i,t} + \beta_5 \Delta Loans_{i,t} + \epsilon_{i,t}$$

Where;

PL / $TL_{i,t}$: the ratio of non-performing loans to total loans for bank *i*, in year t.

$\Delta$ $GDP_{t-1}$: the annual growth in real GDP at period t-1.

UN t: the rate of unemployment at period t .

RIRt: is the real interest rate at year t.

LLR / $TL_{i,t}$: loan losses reserves for bank *i* in year t.

$\Delta$Loans i, t: represents loan growth for the bank i in year t

This study modified Messai and Jouini (2013) model by proxing unemployment rate data with money supply and adding inflation (CPI), exchange rate and 90 day treasury bill rate as these are other relevant variables that also do affect banks operations as well as debtors ability to meet loan obligations. The study employed two different models.

The model to determine the effect of macroeconomic variables on loan performance is depicted below;

*LP = f (INF, EXR, M2, GDP, TBILL)* (1)

This model is transformed into an econometric model as:

$$LP = \beta_0 + \beta_1 INF + \beta_2 EXR + \beta_3 M2 + \beta_4 GDP + \beta_5 TBILL + e \quad (2)$$

Where

INF= Inflation, measured by consumer price index

ExR= exchange rate (GHC to $)

M2= Money supply (measured by $M_2$)

GDP= gross domestic income

Tbill= 90 days Treasury bill

The model to determine the effect of internal factors on loan performance is shown below:

$$LP = f(INTR, INEFF, ROA, ROE, LOAS, LLP) \quad (3)$$

This model is further transformed into an econometric model as below;

$$LP = \alpha_0 + \alpha_1 INTR + \alpha_2 INEFF + \alpha_3 R0A + \alpha_4 ROE + \alpha_5 LOAS + \alpha_6 LLP + v \quad (4)$$

Where

IntR= banks' loan interest rate

InEff= banks inefficiency ratio (measured as Operating Expense / Operating Income)

ROA=Return on Assets

ROE=Return on Equity (measured as Net income from operations over Average equity)

LOAS=Loan to Asset Ratio.

LLP= banks loan loss provision over reserve.

### 3.4 Definition of Variables and Expected Signs

#### 3.4.1. Loan Performance

Loan Performance is the profitability (i.e. the rate of return for an investment) that the numerous loan products offer. Generally, this considers the customers that apply for loans, amount borrowed, loan collateral, timeliness of installments payment and other factors (Puxty and Dodds, 1991). Loan performance is measured based on macroeconomic factors like INF, ExR, M2, GDP and Tbill and bank specific factors like IntR, InEff, ROA, ROE, LOAS and LLP.

***Inflation*** (measured by CPI) is expected to be positive. This is because, as prices of goods and services increases, it increases economic hardships for the consumer thus increasing risk of loan default. Per the forgoing, $\beta_1$ is expected to be positive as indicated.

***Exchange rate (ExR)***. It is measured by real exchange rate. As the domestic currency appreciates imports become less expensive and thus lower the cost of inputs. Profits of firms increase and their ability to meet loan obligations rises. Currency appreciation can lead imports to increase and exports to fall. Ceteris Paribus.

From another perspective appreciation increase import demand and decrease export demand resulting in negative net exports and a fall in national output. $\beta_2$ is therefore expected to be varied.

***Money supply ($M^s$).*** An increase in $M_2$ reflects an expansionary monetary policy that leads to increase in output. Increase in national output increases the capacity for borrowers to pay their debts. $\beta_3$ is expected to be positive.

***Gross domestic income (GDP)***. This is measured by real GDP which is explained as the measure of the value of economic output adjusted for price changes. $\beta_4$ is expected to be

positively related to loan performance. This is because as income increase, one's ability to command goods and services increases and this raises one's ability to pay loans.

***Treasury bill (91 day) (T-bill)***. A rise in the 91 day T-bill reflects a rise in the opportunity cost of giving out loan to customers. When T-bill rate is high it would be relatively profitable to invest deposit into T-bill compared to giving loans. Hence, banks would be more efficient in their loan operational managements so as to minimise loan loss. Therefore $\beta_5$ is expected to be positive.

***Banks' loan interest rate (IntR)*** According to Jimenez et al (2006), Pacha (2009) and Dash et al (2010), a rise in the interest rate on loan makes the loan expensive. This reduces the borrower's ability to meet loans obligations. Therefore when bank's interest rate is high, loan performance deteriorates obligations. $\alpha_1$ is thus expected to be positive.

**Banks Inefficiency Ratio (InEff)**, an increase in InEff would mean either the operating expense has increased more relatively to income, or income has fallen more relatively to operating expense. A fall in income could be a reflection of loan loss and would lead to more inefficiency on the part of the bank. Thus $\alpha_2$ is expected to be positive.

***Return on Assets (ROA).*** A bank that has greater profitability tends to be lowly motivated to engage in risky activities such as granting risky loans. When ROA is high banks give less loans and therefore loan performance improves. $\alpha_3$ is expected to be positive.

***Return on Equity*** **(ROE)** and ***Loan to Asset Ratio*** (LOAS) are expected to have similar intuitions as ROA.

***Banks loan loss provision/reserve (LLP).*** Banks that anticipate a higher level of loss may make stringent policies so as to minimise the anticipated loss. Hence providing a low provision amount improves loan performance. $\alpha_5$ is therefore expected to be positive.

### 3.5 Sampling Technique

#### 3.5.1 Unit root test

Regressing time series data tends to exhibit econometrics problems. The regression of a non-stationary time series on other non-stationary time series data tends to yield spurious results. In order to avoid this issue, the study used the Augmented Dickey Fuller for stationarity test in order to ascertain stationarity and order of co-integration and to transform non-stationary time series to make them stationary for apt economic analysis.

## CHAPTER FOUR

## RESULTS AND DISCUSSION

### 4.0 Introduction

This chapter deals with the results and discussions of the models in chapter three. The first section entails the results of the unit root test. The next section deals with the ARDL bounds test of co-integration, short run and long run impacts of macroeconomic variables on loans performance. This was followed by the co-integration test, short run and long run impacts of bank specific factors on loan performance. The final section focused on the diagnostic test for the models estimated.

### 4.1 Test for Stationarity

The unit root test was used to test for stationarity of the variables used in the study. The results are shown in Table 4.1



**Table 4.1 Unit root test using ADF**

| Variable | Constant | Constant and trend | Decision |
|---|---|---|---|
| | **Levels** | | |
| LP | -3.368840** | -3.422572* | Series is stationary |
| INF | -1.435216 | -1.914796 | Series is not stationary |
| GDP | 0.470785 | -2.258324 | Series is not stationary |
| TBILL | -2.033944 | -1.699255 | Series is not stationary |
| M2 | 1.591417 | 0.566488 | Series is not stationary |
| EXR | -0.335314 | 0.119861 | Series is not stationary |
| INTR | -8.350397*** | -6.255359*** | Series is stationary |
| INEFF | -5.375751*** | -5.748434*** | Series is stationary |
| ROA | -0.002423 | -1.505755 | Series is not stationary |
| ROE | -1.509463 | -1.828757 | Series is not stationary |
| LOAS | 1.939383 | -0.217444 | Series is not stationary |
| LLP | -1.835519 | -0.612073 | Series is not stationary |
| | **First difference** | | |
| INF | -5.471455*** | -5.524325*** | Series is stationary |
| GDP | -6.158975*** | -5.977155*** | Series is stationary |
| TBILL | -3.895353*** | -3.810083** | Series is stationary |
| M2 | 3.207865** | -3.309511* | Series is stationary |
| EXR | -3.202508** | -3.717009** | Series is stationary |
| ROA | -14.89713*** | -14.95431*** | Series is stationary |
| ROE | -9.376127*** | -3.377720* | Series is stationary |
| LOAS | -7.618116*** | -9.531510*** | Series is stationary |
| LLP | -4.302635*** | -4.870515*** | Series is stationary |

Note: *, ** and *** denotes rejecting the null hypothesis at 10%, 5% and 1% level respectively

From the ADF test, series such as LP, INTR and INEFF are all stationary at the levels hence integrated of order zero: I (0), whiles the rest of the series are all stationary after the first difference hence integrated of order one: I (1).

Since the series are integrated of orders zero and one. It is therefore appropriate to estimate the model in chapter three using the ARDL bounds tests specification. Two different estimations were done to assess the effect of firm's characteristics and macroeconomic variables on loan performance in separate models.

### 4.2 Test for long-run relationship

The ARDL bounds test procedure was used in determining long run relationship hence cointegration among the variables employed in the study. The results are presented in Table 4.2

**Table 4.2 Bounds test results for co-integration relationship**

| F – statistic | Significance | Lower bound | Upper bound | Decision |
|---|---|---|---|---|
| 3.993523 | 10% | 2.26 | 3.35 | Evidence of cointegration |
| | 5% | 2.62 | 3.79 | |

The F – statistic from above is greater than the upper bound test. As a result the joint null hypothesis of no co-integration is rejected at 5% level. That is since the F – statistic (3.993523) is greater than the upper bound critical value (3.79) at 5% significant level, there is evidence of co-integration and hence long run relationship among the variables in the study.

### 4.3 Long Run Results

The study proceeded to estimate the long run effect of the independent variables on the dependent variable after establishing the existence of co-integration from the bounds test and the results are presented in Table 4.3;

**Table 4.3 Estimated ARDL long run coefficients Dependent variable: LP**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| INF | -0.001050 | 0.000389 | -2.698148 | 0.0135 |
| TBILL | 0.024151 | 0.012003 | 2.012049 | 0.0572 |

| | | | | |
|---|---|---|---|---|
| M2 | 0.000005 | 0.000015 | 0.312553 | 0.7577 |
| GDP | -0.000024 | 0.000019 | -1.297925 | 0.2084 |
| EXR | -0.030237 | 0.033624 | -0.899279 | 0.3787 |
| C | 1.804357 | 0.449808 | 4.011392 | 0.0006 |

From Table 4.3, the effect of inflation on loan performance is inverse and statistically significant at 5 percent level of significance. Hence an increase of inflation by 1 percent, would improve loan performance by 0.0010550. This implies that an increase in inflation would rather enhance loan performance. Although the study does not meet the priori expectation, it supports the findings of Adebola et al. (2011) whose study posits a negative relationship between inflation and the performance of loans.

Another factor that significantly affects loan performance is Treasury bill rates. The effect of TBILL on loan performance is positive and significant at 10 per cent level. Hence increasing Treasury bill rates worsen loan performance by 0.024151. This implies that as the TBILL rate increases, it increases the lending rates in the economy since the government is the largest borrower in the money market. High lending rates increase debts of customers and ultimately increase non-performing loans. This meets the period expectation of the study and confirms the work of Bofondi and Ropele (2011).

Money supply on the other hand did not have a significant effect on loan performance though the relationship between loan performance and money supply was found to be positive. Hence increase in money supply does not affect loan performance. Evidence of a positive relationship between M2 and LP is found in previous work by Rajan and Dhal (2003).

In addition, the level of economic growth showed insignificant impact on loan performance. An increase in economic growth insignificantly leads to a decrease in LP by 0.000024. This could be attributed to the fact that growth of GDP in the economy has been slow and has therefore increased the level of bad debts. The results obtained are also confirmed in the works of Salas and Saurina (2002).

Finally, the effect of exchange rate on LP is also negative and insignificant. As a result although, appreciation of the cedi reduces LP by 0.030237, the effect is not statistically significant. This is possible because in spite of the continuous fall in the value of the domestic currency, import demand has been increasing. Net exports (trade balance) have been negative. This reduces the national output and makes it difficult for borrowers to redeem their loans. Evidence of a negative impact of exchange rate on LP is found in the works of Jimenez and Saurina (2006), Quagliariello (2007) and Louzis et al. (2010).

From the results obtained, the external variables (M2, GDP and EXR) are statistically insignificant hence; the null hypothesis is not rejected, implying that some external variables do not affect loan performance in Ghana.

### 4.4 Short run results

The short run effects of macroeconomic variables on loan performance are shown in table 4.4.

**Table 4.4 Estimated ARDL short run coefficients and the error correction estimate**

Dependent Variable: LP
Selected Model: ARDL(1, 0, 0, 0, 0, 1) Obs = 29

Co-integrating Form

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| D(INF) | -0.000939 | 0.000316 | -2.969808 | 0.0073 |
| D(TBILL) | 0.021582 | 0.008648 | 2.495602 | 0.0210 |
| D(M2) | 0.000004 | 0.000013 | 0.325960 | 0.7477 |
| D(GDP) | -0.000022 | 0.000015 | -1.498544 | 0.1489 |
| D(EXR) | -0.065463 | 0.049810 | -1.314249 | 0.2029 |
| CointEq(-1) | -0.893633 | 0.198483 | -4.502309 | 0.0002 |

The results obtained for the short run estimates do not differ from the long run estimates. The short run effect of inflation on loan performance is inverse and significant at 1%. Again, this implies that high level of inflation would improve loan performance.

Treasury bill rates also affect loan performance positively and significantly at 5 per cent level. Hence increasing the Treasury bill rates would increase non-performing loans in the short run.

However, GDP and exchange rate affect loan performance negatively whiles money supply affects loan performance positively but the effects are insignificant. Hence GDP, exchange rate and money supply do not influence loan performance in the short run.

The error correction coefficient (CointEq (-1) was however negative and statistically significant at -0.893633, implying that the adjustment process of the system would restore equilibrium quickly and effectively. Hence it will take 89% of any shock on the dependent variable caused by the independent variables to be corrected within a year and per the figure obtained, the convergence to equilibrium would be fast to ensure long run equilibrium.

### 4.5 Effect of Internal factors on loan performance

In order to determine the effect of bank's internal factors on loan performance, the ARDL test was used and the results of the bounds test, long run relationship, short run relationship and the error correction model are presented as follows;

### 4.6 Test for Co-integration

The ARDL bounds test procedure was used to determine the presence of long run relationship hence co-integration among the variables in the study. The results are presented in Table 4.5

**Table 4.5 Bounds test results for co-integration relationship**

| F – statistic | Significance | Lower bound | Upper bound | Decision |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| 4.151118 | 10% | 2.12 | 33.23 | Evidence of cointegration |
| | 5% | 2.45 | 3.61 | |

From Table 4.5, the F – statistic is greater than the upper bound test. As a result the joint null hypothesis of no co-integration is rejected at 5% level. That is since the F – statistic (4.151118) is greater than the upper bound critical value (3.61) at 5% significant level, there is evidence of co-integration and hence long run relationship among the variables in the study.

### 4.7 Long Run results

The study proceeded to estimate the long run effect of the independent variables on the dependent variable after establishing the existence of co-integration from the bounds test and the results are presented in Table 4.6.

**Table 4.6 Estimated ARDL long run coefficients Dependent variable: LP**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| INTR | 1.379911 | 0.501199 | 2.753219 | 0.0123 |
| INEFF | -0.397688 | 0.258140 | -1.540589 | 0.1391 |
| ROA | -2.036232 | 5.342503 | -0.381138 | 0.7071 |
| ROE | -0.346651 | 0.881242 | -0.393366 | 0.6982 |
| LLP | 0.024231 | 0.006751 | 3.589196 | 0.0018 |
| LOAS | -13.356108 | 7.118395 | -1.876281 | 0.0753 |
| C | 1.219597 | 0.221806 | 5.498496 | 0.0000 |

From Table 4.6, the effect of bank's loan interest rate (INTR) on loan performance is positive and significant at 5 percent level. This implies that increasing bank's loan interest rate would significantly worsen loan performance by 1.379911. The results obtained was as expected

since a rise in interest rate on loan makes the loan expensive, thus imposing higher risk on borrower's ability to pay the interest. Similar studies by Kabra (2010) have shown a significant positive association between loan performance and banks interest rate.

Another important bank factor that influence loan performance is banks' loan loss provision over reserve (LLP). This is because a unit increase in banks' loan loss provision over reserve would lead to a significant increase in loan performance by 0.024231.

Therefore there is a positive relationship between loan performance and banks' loan loss provision over reserve. This is because when banks expect their capital losses to be so high, they strengthen their medium-term solvency and reduce earnings volatility by creating higher provisions. As a result, management indicating the financial strength of their banks can also use loss provisions. Hence loan performance is banks' loan loss provision over reserve can reflect a general attitude by banks' management to control risks. The findings are confirmed by Ahmad et al. (1999), Hasan and Wall (2004), Boudriga et al. (2009) and Pesola (2007).

The study found the effect of loan to asset ratio (LOAS) on loan performance to be negatively significant at 10 percent level such that a unit increase in loan to asset ratio would improve loan performance by 13.356108. The results obtained were as expected since loan to asset ratio works as return on assets in generating profits. As a result, greater profitability tend to have less enticements in generating revenue and are not likely to engage in activities that are risky, hence affecting loan performance negatively. Previous studies by Godlewski (2004), Robles-Fernandez (2008) and Boudriga et al. (2009) also confirm the results obtained.

On the contrary, bank specific factor such as banks' inefficient ratio (INEFF) negatively affect loan performance. That is, a unit increase in banks' inefficient ratio would reduce loan performance by 0.397688. This is contrary to expectations since inefficient management rather increases non-performing loans as a result of managers' inability to skilfully assess

loans that are granted to new clients. This is however not significant. Hence the findings obtained in this study are also contrary to empirical findings by Berger and DeYoung (1997).

Finally, Return on Assets and Return on Equity inversely affect loan performance. This implies that, increasing Return on Assets and Return on Equity would ameliorate loan performance by 2.036232 and 0.346651 respectively. This is possible because policies of profit maximization are mostly of high risk, hence affecting non-performance loans negatively. The results are however not significant. These findings are confirmed in previous studies by Godlewski (2004) who used Return on Assets as a performance indicator and found a negative impact of Return on Assets on non-performance loans. Also, Garciya-Marco et al. (2008) posits that higher levels of ROE are followed by a greater risk in the future.

From the results obtained, it could be said that, the internal variables (INTR, LLP and LOAS) are statistically significant. Hence we reject the null hypothesis implying that internal variables do affect loan performance.

### 4.8 Short-run results

The short run effects of bank's internal factors on loan performance are shown in table 4.7.

**Table 4.7 Estimated ARDL short run coefficients and the error correction estimate**

| Dependent Variable: LP<br>Selected Model: ARDL(1, 0, 0, 0, 0, 0, 1) Obs = 29 |
|---|
| Co-integrating Form |

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| D(INTR) | 1.053988 | 0.352829 | 2.987246 | 0.0073 |
| D(INEFF) | -0.303758 | 0.182554 | -1.663930 | 0.1117 |
| D(ROA) | -1.555293 | 4.074205 | -0.381741 | 0.7067 |
| D(ROE) | -0.264775 | 0.665036 | -0.398136 | 0.6947 |
| D(LLP) | 0.018508 | 0.006977 | 2.652772 | 0.0153 |
| D(LOAS) | -0.030925 | 3.298708 | -0.009375 | 0.9926 |
| CointEq(-1) | -0.763809 | 0.150760 | -5.066389 | 0.0001 |

Table 4.7 depicts the short run effects of bank specific factors on loan performance. All things being equal, the short run results showed that only bank's loan interest rate and loan to asset ratio significantly influence loan performance.

The short run effect of bank's loan interest rate on loan performance is positive and significant at 1%. This implies that when bank's loan interest rate increases by a unit, it would worsen loan performance by 1.053988.

Also, there exists a positive and significant impact of bank's loan loss provision over reserve ratio on loan performance at 5 per cent level, such that an increase in bank's loan loss provision over reserve would lead to an increase in loan performance by 0.018508.

Other bank specific factors such as bank's inefficiency ratio, ROA, ROE and loan on asset ratio do not have significant impact on loan performance in the short run.

However, the relationships between loan performance and bank's inefficiency ratio, ROA, ROE and loan to asset ratio are all negative but insignificant in the short run.

The error correction term was also negative and statically significant at -0.763809. This implies that the adjustment process of the system would restore equilibrium quickly and effectively, hence it will take about 76% of any shock on the dependent variable caused by the independent variables to be corrected within a year.

### 4.9 Diagnostic Tests (macroeconomic variables effect on loan performance)

**Table 4.8 Diagnostic test results**

| Test Statistics | Statistics | Probability | Decision |
|---|---|---|---|
| Serial Correlation | 2.858378 | 0.1064 | No serial correlation |
| Normality | 0.901372 | 0.637191 | Normally distributed |
| Heteroscedasticity | 0.769496 | 0.6190 | No heteroscedasticity |
| Ramsey reset test | 1.377070 | 0.8137 | Stable |

Table 4.8 shows the diagnostic test conducted for model (1) which deals with the macroeconomic variable effects on loan performance. The results showed there was no problem with serial correlation. Hence the residuals do not correlate. This is shown by a probability value of 0.1064 which is higher than 0.05. This implies that the null hypothesis of no serial correlation is not rejected. Again, at a p-value of 0.6190, the study failed to reject the null hypothesis of no heteroscedasticity.

Also both normality test and the Ramsey reset test indicates that the model estimated is multivariate normal hence normally distributed and stable respectively.

### 4.10 Diagnostic Tests (bank specific factor effect on loan performance) Table 4.9 Diagnostic test results

| Test Statistics | LM Version | Probability | Decision |
|---|---|---|---|
| Serial Correlation | 2.111054 | 0.1626 | No serial correlation |
| Normality | 0.514523 | 0.773166 | Normally distributed |

| | | | |
|---|---|---|---|
| Heteroscedasticity | 0.202625 | 0.9870 | No heteroscedasticity |
| Ramsey reset test | 0.096292 | 0.9243 | Stable |

Table 4.9 also shows the diagnostic test conducted for model (2) which deals with the bank specific factor effects on loan performance. The results also shows evidence of no serial correlation and no heteroscedasticity since their probability values are higher than 0.05 hence we fail to reject the null hypothesis of no serial correlation and no heteroscedasticity. Again, both normality test and the Ramsey reset test indicated that the model estimated is multivariate normal hence normally distributed and stable respectively.

# CHAPTER FIVE

# SUMMARY, RECOMMENDATION AND CONCLUSION

## 5.0 Introduction

This chapter summarizes the findings of the study, makes recommendations based on the results obtained and the conclusion of the study.

## 5.1 Summary

This study investigated the factors that influence bank's loan performance by examining both bank's specific factors and macroeconomic variables in separate models. Using the ARDL bounds test of Cointegration for both models, the study found evidence of long run relationship between the dependent and independent variables in the study.

With regard to the model of macroeconomic variables effect on loan performance, both long run and short run results did not differ from each other. This is because the results from the long run and short run showed that inflation and Treasury bill rates significantly affect loan performance negatively and positively, respectively whiles other factors such as money supply, GDP and exchange rate does not have any significant effect on loan performance.

Also, the outcome from the model of banks' specific factors showed that in the long run bank's loan interest rate, loan to asset ratio and banks loan loss provision over reserve significantly influence loan performance whiles factors such as banks' inefficiency, return on assets and return on equity insignificantly influence loan performance.

However, the short run results showed that only banks' loan interest rate and loan to asset ratio have significant impact on loan performance.

## 5.2 Recommendations

With respect to the macroeconomic variables, there is the need to embark on both short and long term policies to reduce inflation. Reducing prices of goods and services can help reduce economic hardships for the consumers who are not resource endowed (the poor in society) so as to reduce risk of loan default and hence improve loan performance.

Secondly, there is the need to reduce Treasury bill rates in order to improve loan performance, since higher rates encourages people to invest and hence the rate of defaulting

loans taken would be reduced to help boast loan performance. A rise in the Tbill reflects a rise in the opportunity cost of given out loan to customers since it would be relatively profitable to invest deposit into Tbill compared to giving loans. Hence, banks would be more efficient in their loan operational managements so as to minimise loan loss, as the opportunity cost of a unit currency given out as loan, would be higher.

Also, with respect to banks specific factors, bank's loan interest rate should be reduced. Reducing interest rate on loans make loans less expensive; thus reducing the risk on borrower's ability to pay the interest due to an increased ability of borrowers to meet their obligations. This reduces the number of loan default and hence boasts loan performance.

Bank managers should also try to anticipate higher level of losses (bank's loan loss provision) by making stringent policies so as to minimise anticipated loss. Thus, the provision of high loan loss provision reflects high losses. As a result bank managers would always try to minimize the expected loss so as to boost loan performance.

Finally, loan to asset ratio should be reduced. Reducing ratio of loan to asset would help banks generate greater profitability and enhance loan performance. This may be done by increasing banks reserves so that banks can engage in risky activities.

### 5.3 Conclusion

This study sought to assess the factors that influence loan performance of commercial banks in Ghana using HFC Bank as a case study. This was assessed from two different models: a model that presents the effects of macroeconomic variables on loan performance and another model that depicts the effects of banks' specific factors on loan performance. The Augmented Dickey Fuller (ADF) test was used in testing for the order of stationarity among the variables of which were integrated of orders zero and one. That is, a mixture of I (0) and I (1). As a result, the study employed the ARDL bounds test of co-integration as an estimation

technique. The study employed a quarterly data from 2008 to 2015 and found evidence of co-integration in the two models.

The results suggest that the macroeconomic factors that influence loan performance are inflation and T-bill whiles banks' specific factors are, bank's loan interest rate, loan to asset ratio and banks loan loss provision over reserve. These therefore show that macroeconomic instabilities and banks specific factors do have significant impact on loan performance. Hence there is the need for bank management and policy makers to ensure an increase in loan performance.

Further research can also assess the factors that influence loan performance in a single model as well as employ large data size for future analysis.

## REFERENCE


Aburime, U. (2005) Determinants of Bank Profitability: Company-Level Evidence from Nigeria: University of Nigeria, Enugu Campus.

Acquah, P. (2006). Evaluating the Banking System in Ghana. Fith Banking Award Ceremony, Accra, 6th May, 2006.

Amuakwa–Mensah, F., & Boakye–Adjei, A. (2014). Determinants of non–performing loans in Ghana banking industry. *International Journal of Computational Economics and Econometrics*, *5*(1), 35-54.

Alexandru, C. G., & Romanescu, M. L. (2008). The Assessment of Banking Performances-Indicators of Performance in Bank Area. University Library of Munich, Germany.

Al-Tamimi, H., Hassan, A. (2010). Factors Influencing Performance of the UAE Islamic and Conventional National Banks. Department of Accounting, Finance and Economics, College of Business Administration, University of Sharjah.

Athanasoglou, P. P., Brissimis, S. N., & Delis, M. D. (2008). Bank-specific, industryspecific and macroeconomic determinants of bank profitability. *Journal of international financial Markets, Institutions and Money*, 18(2), 121-136.

Awuah, L. (2008). An evaluation of strategies for achieving competitive advantage in the banking industry. The case of Ghana Commercial Bank Limited.

Barseghyan, L. (2010). Non-performing loans, prospective bailouts, and Japan's slowdown. *Journal of Monetary Economics*, 57(7), 873-890.

Bofondi, M., & Ropele, T. (2011). Macroeconomic determinants of bad loans: evidence from Italian banks. Bank of Italy Occasional Paper, (89).

Charnes A., Cooper W. W., & Rhodes E. (1978). Measuring the Efficiency of Decision Making Units.*European Journal of Operational Research*, 2: 429-44.

Comptroller hand book ((1998). Loan portfolio management Currency). Office of the Comptroller of the Currency

Dang, U. (2011). The CAMEL Rating System in Banking Supervision: a Case Study of Arcada University of Applied Sciences. International Business.

Dash, M. K., & Kabra, G. (2010). The determinants of non-performing assets in Indian commercial bank: An econometric study. *Middle Eastern Finance and Economics*, 7, 94-106.

Duygun-Fethi, M., & Pasiouras, F. (2009). Assessing bank performance with operational research and artificial intelligence techniques: a survey. University of Bath School of Management Working Paper, 2009, 1-65.

Festić, M., Repina, S., & Kavkler, A. (2009). The Up-Coming Crisis and the Banking Sector in the Baltic States. *Swiss Journal of Economics and Statistics,* 145, 269291.

Fofack, H. (2005). Nonperforming loans in Sub-Saharan Africa: causal analysis and macroeconomic implications. World Bank Policy Research Working Paper, (3769).

Ghana Banking Survey (2014). The Future of Banking in Ghana...What's next? PWC, Accra

Ghana, GSS (Ghana Statistical Service). 2010. Ghana's Economic Performance 2009. Accra.

Quagliariello, M. (2007). Macroeconomic Uncertainty and Banks' Lending decisions: The case of Italy. *Economic Working Paper*. 615 bank of Italy. Economic Research and Institutional Relations Area.

Godlewiski M. (2004). Excess Credit Risk and Banks' Default Risk: *An Application of Default Prediction Models to Banks from emerging Market Economies. Finance 0409028*, Econ WPA. France

González-Hermosillo, B. (1999). Developing indicators to provide early warnings of banking crises. *Finance and Development*, 36, 36-39.

Greenidge, K., & Grosvenor, T. (2010). Forecasting non-performing loans in Barbados. *Journal of Business, Finance and Economics in Emerging Economies*, 5, 80-107.

Gul, S., Irshad, F., & Zaman, K. (2011). Factors affecting bank profitability in Pakistan. *The Romanian Economic Journal*, 39(14), 61-89.

Hou, Y., & Dickinson, D. (2007). The non-performing loans: some bank-level evidences.

In 4th International Conference on Applied Financial Economics, Samos Island, Greece.

Huang, J., Makoju, E., Newell, S., & Galliers, R. D. (2003). Opportunities to learn from' failure 'with electronic commerce: a case study of electronic banking. *Journal of Information Technology*, 18(1), 17-26.

Ilhomovich, S. E. (2009). Factors Affecting the Performance of Foreign Bank in Malaysia (Doctoral dissertation, Universiti Utara Malaysia).

Incoom S.E. (2010). The Monetary and Financial System. Second edition. The Chartered Institute of Bankers(GH).

Jalloh, A., Nelson, G. C., Thomas, T. S., Zougmoré, R. B., & Roy-Macauley, H. (Eds.). (2013). West African agriculture and climate change: a comprehensive analysis. Intl Food Policy Res Inst.

Jesus, S., & Gabriel, J. (2006). Credit cycles, credit risk, and prudential regulation.

Jimenez et al. (2006). Credit Cycles, Credit Risk and Prudential Regulation. Bank de ESpana.

Jin, J. Y., Kanagaretnam, K., & Lobo, G. J. (2011). Ability of accounting and audit quality variables to predict bank failure during the financial crisis. *Journal of Banking & Finance*, 35(11), 2811-2819.

Kateregga, S. K. (2013). Interest rates and loan portfolio performance in commercial banks: a case study of Centenary Bank Entebbe Road Branch Uganda.

Keeton, W. R., & Morris, C. S. (1987). Why Do Banks7 Loan Losses Differ?. *Economic Review*, 3-21.

Khemraj, T., & Pasha, S. (2009). The Determinants of Nonperforming Loans: An Econometric Case Study of Guyana, presented at the Caribbean Centre for Banking and Finance Bi-annual Conference on Banking and Finance, St. Augustine, Trinidad.

Khrawish, H. A. (2011). Determinants of commercial banks performance: evidence from Jordan. *International Research Journal of Finance and Economics,* 81, 148-159.

Lizal, L., & Svejnar, J. (2002). Investment, credit rationing, and the soft budget constraint: evidence from Czech panel data. *Review of Economics and Statistics*, 84(2), 353370.

Mendoza, E. G., & Terrones, M. E. (2008). An anatomy of credit booms: evidence from macro aggregates and micro data (No. w14049). National Bureau of Economic Research.

Mensah, J. M. K. (2015). Universal Banking and Basel III in Ghana. Australian Journal of Commerce Study.

Messai, A. S., & Jouini, F. (2013). Micro and macro determinants of non-performing loans. *International Journal of Economics and Financial Issues*, 3(4), 852-860.

Murthy, Y., & Sree, R. (2003). A Study on Financial Ratios of major Commercial Banks. Research Studies, College of Banking & Financial Studies, Sultanate of Oman.

Nazir, T. (2010). Analyzing Financial Performance of Commercial Banks in India: Application of CAMEL Model. *Pakistan Journal of Commerce & Social Sciences*, 4(1)

Pasha S. (2009). The Determinants of Non-Performing loans. An Econometric Case Study of Guyana.

Pesola L. (2007). Financial Fragility, Macroeconomic Shock and Banks Loans Losses: Evidence from Europe. *Bank of Finland Research Discussion Papers 15.2007*

Podpiera, R. (2006). Does compliance with Basel Core Principles bring any measurable benefits?. *IMF staff papers*, 306-325.

Puxty Anthony, G., & Dodds Colin, I. (1991). Financial management: Method and meaning. by RMS Wilson. x 2nd ed. x London: Chapman Hall.

Salas, V., & Saurina, J. (2002). Credit risk in two institutional regimes: Spanish commercial and savings banks. *Journal of Financial Services Research*, 22(3), 203-224.

Schumpeter, J. (1934). The fundamental phenomenon of economic development. Schumpeter*, The Theory of Economic Development*, 57-94.

Sorge, M. (2004). Stress-testing financial systems: an overview of current methodologies.

Vong, P. I., & Chan, H. S. (2009). Determinants of bank profitability in Macao. *Macau Monetary Research Bulletin*, 12(6), 93-113.

Wen, W. (2010). Ownership Structure and Banking Performance: New Evidence in China. Universitat Autònoma de Barcelona Departament D'economia de L'empresa.

Williamson, S. D. (1987). Financial intermediation, business failures, and real business cycles. The Journal of Political *Economy*, 1196-1216

Zeng, S. (2012). Bank non-performing loans (NPLS): A dynamic model and analysis in China.

## APPENDIX

### EFFECT OF MACROECONOMIC VARIABLES ON LOAN PERFORMANCE

ARDL Bounds Test
Sample: 2008Q2 2015Q2
Included observations: 29
Null Hypothesis: No long-run relationships exist

| Test Statistic | Value | k |
|---|---|---|
| F-statistic | 3.993523 | 5 |

| Critical Value Bounds | | |
|---|---|---|
| Significance | I0 Bound | I1 Bound |
| 10% | 2.26 | 3.35 |
| 5% | 2.62 | 3.79 |
| 2.5% | 2.96 | 4.18 |
| 1% | 3.41 | 4.68 |

Test Equation:
Dependent Variable: D
Method: Least Squares LP)
Sample: 2008Q2 2015
Included observations:Q2
29

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| D(EXR) | 0.010582 | 0.034462 | 0.307055 | 0.7618 |
| C | 1.531976 | 0.547616 | 2.797536 | 0.0108 |
| INF(-1) | -0.000694 | 0.000423 | -1.638736 | 0.1162 |
| TBILL(-1) | 0.016491 | 0.009230 | 1.786618 | 0.0884 |
| M2(-1) | 3.57E-06 | 1.41E-05 | 0.252849 | 0.8028 |
| GDP(-1) | -2.24E-05 | 1.66E-05 | -1.351474 | 0.1909 |
| EXR(-1) | -0.013557 | 0.029136 | -0.465308 | 0.6465 |
| LP(-1) | -0.981828 | 0.230625 | -4.257244 | 0.0004 |

| | | | |
|---|---|---|---|
| R-squared | 0.548352 | Mean dependent var | -0.017011 |
| Adjusted R-squared | 0.397802 | S.D. dependent var | 0.155918 |
| S.E. of regression | 0.120994 | Akaike info criterion | -1.157198 |
| Sum squared resid | 0.307431 | Schwarz criterion | -0.780013 |
| Log likelihood | 24.77937 | Hannan-Quinn criter. | -1.039068 |
| F-statistic | 3.642337 | Durbin-Watson stat | 2.165873 |
| Prob(F-statistic) | 0.009964 | | |

ARDL Cointegrating And Long
Dependent Variable: LP
Selected Model: ARDL(1, 0, 0,
Sample: 2008Q1 2015Q2
Included observations: 29

Cointegrating Form

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| D(INF) | -0.000939 | 0.000316 | -2.969808 | 0.0073 |

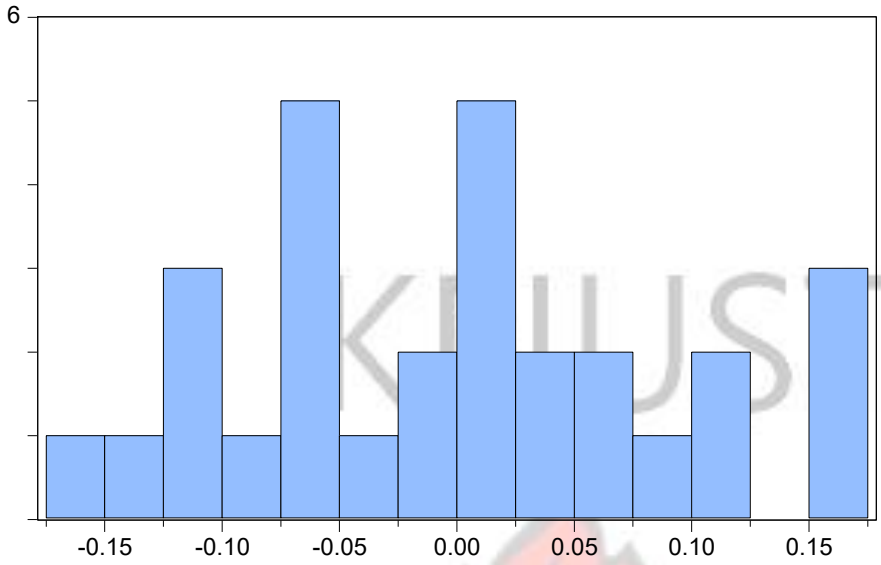
| | | | | |
|---|---|---|---|---|
| D(TBILL) | 0.021582 | 0.008648 | 2.495602 | 0.0210 |
| D(M2) | 0.000004 | 0.000013 | 0.325960 | 0.7477 |
| D(GDP) | -0.000022 | 0.000015 | -1.498544 | 0.1489 |
| D(EXR) | -0.065463 | 0.049810 | -1.314249 | 0.2029 |
| CointEq(-1) | -0.893633 | 0.198483 | -4.502309 | 0.0002 |

Cointeq = LP - (-0.0011*INF + 0.0242*TBILL + 0.0000*M 2 -0.0000*GDP -0.0302 *EXR + 1.8044 )



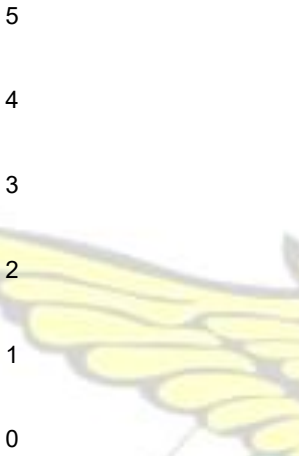
Long Run Coefficients

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| INF | -0.001050 | 0.000389 | -2.698148 | 0.0135 |
| TBILL | 0.024151 | 0.012003 | 2.012049 | 0.0572 |
| M2 | 0.000005 | 0.000015 | 0.312553 | 0.7577 |
| GDP | -0.000024 | 0.000019 | -1.297925 | 0.2084 |
| EXR | -0.030237 | 0.033624 | -0.899279 | 0.3787 |
| C | 1.804357 | 0.449808 | 4.011392 | 0.0006 |




| | |
|---|---|
| Series: Residuals | |
| Sample 2008Q2 2015Q2 | |
| Observations 29 | |
| Mean | 3.58e-16 |
| Median | 0.002112 |
| Maximum | 0.171714 |
| Minimum | -0.159920 |
| Std. Dev. | 0.091799 |
| Skewness | 0.226205 |
| Kurtosis | 2.264277 |
| Jarque-Bera | 0.901372 |
| Probability | 0.637191 |

Breusch-Godfrey Serial Correlation LM Test:




| | | | |
|---|---|---|---|
| F-statistic | 2.858378 | Prob. F(1,20) | 0.1064 |
| Obs*R-squared | 3.626371 | Prob. Chi-Square(1) | 0.0569 |

Test Equation:
Dependent Variable: RESID
Method: ARDL
Sample: 2008Q2 2015Q2 Included observations: 29
Presample missing value lagged residuals set to zero.

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| LP(-1) | 0.296226 | 0.258635 | 1.145344 | 0.2656 |
| INF | 4.93E-05 | 0.000304 | 0.162136 | 0.8728 |
| TBILL | 0.002868 | 0.008461 | 0.338977 | 0.7382 |
| M2 | 6.16E-06 | 1.30E-05 | 0.473232 | 0.6412 |
| GDP | -1.68E-06 | 1.40E-05 | -0.120176 | 0.9055 |

| | | | | |
|---|---|---|---|---|
| EXR | -0.020625 | 0.049276 | -0.418558 | 0.6800 |
| EXR(-1) | 0.002682 | 0.029854 | 0.089846 | 0.9293 |
| C | -0.223056 | 0.385589 | -0.578480 | 0.5694 |
| RESID(-1) | -0.523794 | 0.309814 | -1.690674 | 0.1064 |

| | | | |
|---|---|---|---|
| R-squared | 0.125047 | Mean dependent var | 3.58E-16 |
| Adjusted R-squared | -0.224934 | S.D. dependent var | 0.091799 |
| S.E. of regression | 0.101600 | Akaike info criterion | -1.486424 |
| Sum squared resid | 0.206450 | Schwarz criterion | -1.062091 |
| Log likelihood | 30.55315 | Hannan-Quinn criter. | -1.353528 |
| F-statistic | 0.357297 | Durbin-Watson stat | 2.125150 |
| Prob(F-statistic) | 0.930961 | | |

Heteroskedasticity Test: Breusch-Pagan-Godfrey

| | | | |
|---|---|---|---|
| F-statistic | 0.769496 | Prob. F(7,21) | 0.6190 |
| Obs*R-squared | 5.919991 | Prob. Chi-Square(7) | 0.5491 |
| Scaled explained SS | 1.962348 | Prob. Chi-Square(7) | 0.9619 |

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Sample: 2008Q2 2015Q2
Included observations: 29

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.018228 | 0.034202 | 0.532932 | 0.5997 |
| NPL(-1) | 0.029834 | 0.017959 | 1.661232 | 0.1115 |
| INF | -2.58E-05 | 2.86E-05 | -0.902212 | 0.3772 |
| TBILL | 0.000640 | 0.000782 | 0.818277 | 0.4224 |
| M2 | 1.95E-06 | 1.18E-06 | 1.654457 | 0.1129 |
| GDP | -2.01E-06 | 1.32E-06 | -1.529570 | 0.1410 |
| EXR | -0.004856 | 0.004507 | -1.077569 | 0.2934 |
| EXR(-1) | 0.001442 | 0.002814 | 0.512267 | 0.6138 |

| | | | |
|---|---|---|---|
| R-squared | 0.204138 | Mean dependent var | 0.008136 |
| Adjusted R-squared | -0.061150 | S.D. dependent var | 0.009311 |
| S.E. of regression | 0.009591 | Akaike info criterion | -6.227038 |
| Sum squared resid | 0.001932 | Schwarz criterion | -5.849853 |
| Log likelihood | 98.29205 | Hannan-Quinn criter. | -6.108908 |
| F-statistic | 0.769496 | Durbin-Watson stat | 1.575585 |

| | |
|---|---|
| Prob(F-statistic) | 0.618959 |

Ramsey RESET Test
Equation: UNTITLED
Specification: LP LP(-1) INF TBILL M2 GDP EXR EXR(-1) C
Omitted Variables: Squares of fitted values

| | Value | df | Probability |
|---|---|---|---|
| t-statistic | 1.377070 | 20 | 0.1837 |
| F-statistic | 1.896321 | (1, 20) | 0.1837 |

F-test summary:

| | Sum of Sq. | df | Mean Squares |
|---|---|---|---|
| Test SSR | 0.020435 | 1 | 0.020435 |
| Restricted SSR | 0.235956 | 21 | 0.011236 |
| Unrestricted SSR | 0.215521 | 20 | 0.010776 |

Unrestricted Test Equation:

Dependent Variable: LP

Method: ARDL
Sample: 2008Q2 2015Q2

Included observations: 29

Maximum dependent lags: 1 (Automatic selection) Model selection method: Akaike info criterion (AIC)
Dynamic regressors (1 lag, automatic):
Fixed regressors: C

| | | | | |
|---|---|---|---|---|
| LP(-1) | -0.297766 | 0.352008 | -0.845908 | 0.4076 |
| INF | 0.002528 | 0.002537 | 0.996713 | 0.3308 |
| TBILL | -0.061448 | 0.060887 | -1.009217 | 0.3249 |
| M2 | -1.23E-05 | 1.75E-05 | -0.700527 | 0.4917 |
| GDP | 6.28E-05 | 6.30E-05 | 0.995585 | 0.3313 |
| EXR | 0.171598 | 0.178927 | 0.959044 | 0.3490 |
| EXR(-1) | -0.093574 | 0.100589 | -0.930254 | 0.3633 |
| C | -2.240679 | 2.822434 | -0.793882 | 0.4366 |
| FITTED^2 | 1.561202 | 1.133713 | 1.377070 | 0.1837 |

| | | | |
|---|---|---|---|
| R-squared | 0.731171 | Mean dependent var | 1.180052 |

| | | | | |
|---|---|---|---|---|
| Adjusted R-squared | 0.623639 | S.D. dependent var | 0.169211 | Variable |
| S.E. of regression | 0.103808 | Akaike info criterion | -1.443425 | |
| Sum squared resid | 0.215521 | Schwarz criterion | -1.019092 | |
| Log likelihood | 29.92967 | Hannan-Quinn criter. | -1.310529 | |
| F-statistic | 6.799588 | Durbin-Watson stat | 2.236969 | |
| Prob(F-statistic) | 0.000244 | | | |

*Note: p-values and any subsequent tests do not account for model selection.

Coefficient Std. Error t-Statistic Prob.* **Effect of Bank specific factors on loan performance**

ARDL Bounds Test
Sample: 2008Q2 2015Q2
Included observations: 29
Null Hypothesis: No long-run relationships exist

| Test Statistic | Value | k |
|---|---|---|
| F-statistic | 4.151118 | 6 |

Critical Value Bounds

| Significance | I0 Bound | I1 Bound |
|---|---|---|
| 10% | 2.12 | 3.23 |
| 5% | 2.45 | 3.61 |
| 2.5% | 2.75 | 3.99 |
| 1% | 3.15 | 4.43 |

Test Equation:
Dependent Variable: D(LQDTY)
Method: Least Squares
Sample: 2008Q2 2015Q2
Included observations: 29

Variable

| D(LOAS) | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| | -2.047554 | 3.332031 | -0.614506 | 0.5458 |
| C | 0.627767 | 0.218754 | 2.869744 | 0.0095 |
| INTR | 0.938639 | 0.327238 | 2.868367 | 0.0095 |
| INEFF(-1) | 0.039985 | 0.192431 | 0.207788 | 0.8375 |
| ROA(-1) | 2.138080 | 4.424835 | 0.483200 | 0.6342 |
| ROE(-1) | -0.696949 | 0.601054 | -1.159543 | 0.2599 |
| LLP(-1) | 0.018843 | 0.007172 | 2.627319 | 0.0161 |
| LOAS(-1) | -5.049430 | 7.938651 | -0.636056 | 0.5320 |
| LP(-1) | -0.744989 | 0.155506 | -4.790740 | 0.0001 |

| | | | |
|---|---|---|---|
| R-squared | 0.636505 | Mean dependent var | -0.017011 |
| Adjusted R-squared | 0.491107 | S.D. dependent var | 0.155918 |
| S.E. of regression | 0.111227 | Akaike info criterion | -1.305369 |
| Sum squared resid | 0.247427 | Schwarz criterion | -0.881036 |
| Log likelihood | 27.92786 | Hannan-Quinn criter. | -1.172473 |
| F-statistic | 4.377667 | Durbin-Watson stat | 2.409686 |
| Prob(F-statistic) | 0.003479 | | |

ARDL Cointegrating And Long Run Form

Dependent Variable: LP

Selected Model: ARDL(1, 0, 0, 0, 0, 0, 1)

Sample: 2008Q1 2015Q2

Included observations: 29

Cointegrating Form

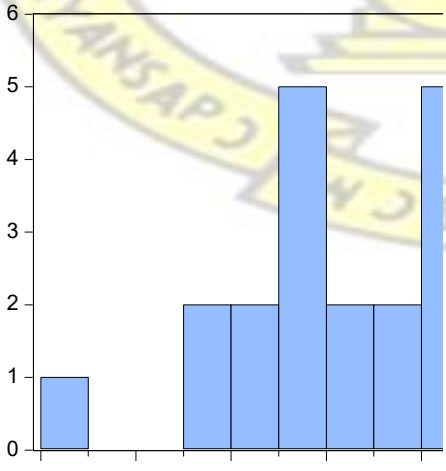
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| D(INTR | 1.053988 | 0.352829 | 2.987246 | 0.0073 |
| D(INEFF) | -0.303758 | 0.182554 | -1.663930 | 0.1117 |
| D(ROA) | -1.555293 | 4.074205 | -0.381741 | 0.7067 |
| D(ROE) | -0.264775 | 0.665036 | -0.398136 | 0.6947 |

| | | | | |
|---|---|---|---|---|
| D(LLP) | 0.018508 | 0.006977 | 2.652772 | 0.0153 |
| D(LOAS) | -0.030925 | 3.298708 | -0.009375 | 0.9926 |
| CointEq(-1) | -0.763809 | 0.150760 | -5.066389 | 0.0001 |

Cointeq = LP - (1.3799*INTR -0.3977*INEFF -2.0362*ROA -0.3467*ROE + 0.0242*LLP -13.3561*LOAS + 1.2196 )

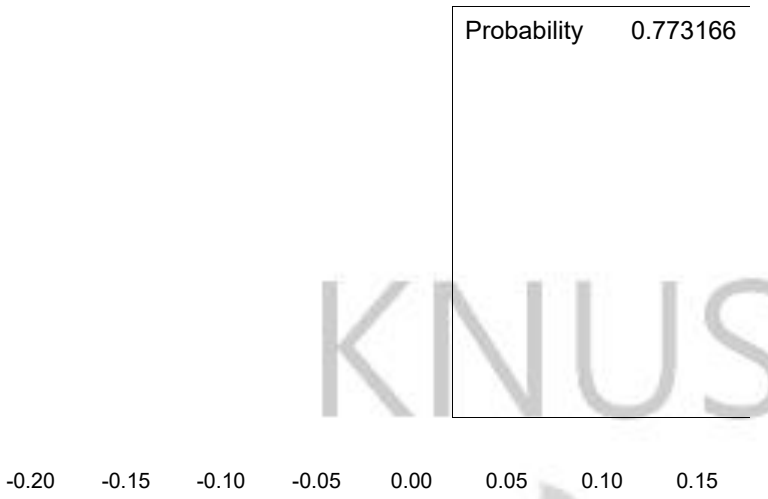
Long Run Coefficients

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| INTR | 1.379911 | 0.501199 | 2.753219 | 0.0123 |
| INEFF | -0.397688 | 0.258140 | -1.540589 | 0.1391 |
| ROA | -2.036232 | 5.342503 | -0.381138 | 0.7071 |
| ROE | -0.346651 | 0.881242 | -0.393366 | 0.6982 |
| LLP | 0.024231 | 0.006751 | 3.589196 | 0.0018 |
| LOAS | -13.356108 | 7.118395 | -1.876281 | 0.0753 |
| C | 1.219597 | 0.221806 | 5.498496 | 0.0000 |




Series: Residuals
Sample 2008Q2 2015Q2 Observations 29

| | |
|---|---|
| Mean | 1.94e-16 |
| Median | 0.001929 |
| Maximum | 0.157110 |
| Minimum | -0.184947 |
| Std. Dev. | 0.084672 |
| Skewness | 0.060423 |
| Kurtosis | 2.358745 |
| Jarque-Bera | 0.514523 |






Breusch-Godfrey Serial Correlation LM Test:

| | | | |
|---|---|---|---|
| F-statistic | 2.111054 | Prob. F(1,19) | 0.1626 |
| Obs*R-squared | 2.899929 | Prob. Chi-Square(1) | 0.0886 |

Test Equation:
Dependent Variable: RESID
Method: ARDL
Sample: 2008Q2 2015Q2 Included observations: 29
Presample missing value lagged residuals set to zero.

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| LP(-1) | 0.148858 | 0.178966 | 0.831767 | 0.4159 |
| INTR | 0.052932 | 0.345346 | 0.153272 | 0.8798 |
| INEFF | -0.010719 | 0.177839 | -0.060276 | 0.9526 |
| ROA | -0.837251 | 4.007195 | -0.208937 | 0.8367 |
| ROE | 0.225184 | 0.665595 | 0.338320 | 0.7388 |
| LLP | -0.005641 | 0.007822 | -0.721195 | 0.4796 |
| LOAS | 0.567067 | 3.234365 | 0.175326 | 0.8627 |
| LOAS(-1) | 1.848242 | 4.034937 | 0.458060 | 0.6521 |
| C | -0.132280 | 0.204598 | -0.646534 | 0.5257 |
| RESID(-1) | -0.464212 | 0.319497 | -1.452947 | 0.1626 |

| | | | |
|---|---|---|---|
| R-squared | 0.099998 | Mean dependent var | 1.94E-16 |
| Adjusted R-squared | -0.326319 | S.D. dependent var | 0.084672 |
| S.E. of regression | 0.097513 | Akaike info criterion | -1.550856 |

| | | | |
|---|---|---|---|
| Sum squared resid | 0.180668 | Schwarz criterion | -1.079375 |
| Log likelihood | 32.48742 | Hannan-Quinn criter. | -1.403194 |
| F-statistic | 0.234562 | Durbin-Watson stat | 1.775420 |
| Prob(F-statistic) | 0.984598 | | |

Heteroskedasticity Test: Breusch-Pagan-Godfrey

| | | | |
|---|---|---|---|
| F-statistic | 0.202625 | Prob. F(8,20) | 0.9870 |
| Obs*R-squared | 2.174233 | Prob. Chi-Square(8) | 0.9752 |
| Scaled explained SS | 0.702551 | Prob. Chi-Square(8) | 0.9995 |

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Sample: 2008Q2 2015Q2
Included observations: 29

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.014702 | 0.017559 | 0.837306 | 0.4123 |
| LP(-1) | -0.004228 | 0.014062 | -0.300670 | 0.7668 |
| INTR | -0.022833 | 0.032910 | -0.693805 | 0.4958 |
| INEFF | -0.000248 | 0.017028 | -0.014535 | 0.9885 |
| ROA | -0.167295 | 0.380022 | -0.440224 | 0.6645 |
| ROE | 0.030985 | 0.062031 | 0.499508 | 0.6229 |
| LLP | -0.000134 | 0.000651 | -0.205871 | 0.8390 |
| LOAS | 0.168237 | 0.307688 | 0.546778 | 0.5906 |
| LOAS(-1) | -0.133503 | 0.366954 | -0.363814 | 0.7198 |

| | | | |
|---|---|---|---|
| R-squared | 0.074974 | Mean dependent var | 0.006922 |
| Adjusted R-squared | -0.295037 | S.D. dependent var | 0.008212 |
| S.E. of regression | 0.009345 | Akaike info criterion | -6.258867 |
| Sum squared resid | 0.001747 | Schwarz criterion | -5.834533 |
| Log likelihood | 99.75356 | Hannan-Quinn criter. | -6.125971 |
| F-statistic | 0.202625 | Durbin-Watson stat | 2.014162 |
| Prob(F-statistic) | 0.986971 | | |

Ramsey RESET Test
Equation: UNTITLED
Specification: LP LP(-1) INTR INEFF ROA ROE LLP LOAS LOAS(-1) C
Omitted Variables: Squares of fitted values

| Value | Probability | | | |
|---|---|---|---|---|
| t-statistic | 0.096292 | 0.9243 | df | 19 |
| F-statistic | 0.009272 | (1, 19) | 0.9243 | |

F-test summary:

| | Sum of Sq. | df | Mean Squares |
|---|---|---|---|
| Test SSR | 9.79E-05 | 1 | 9.79E-05 |
| Restricted SSR | 0.200742 | 20 | 0.010037 |
| Unrestricted SSR | 0.200644 | 19 | 0.010560 |

Unrestricted Test Equation:

Dependent Variable: LP

Method: ARDL

Sample: 2008Q2 2015Q2

Included observations: 29

Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (1 lag, automatic):
Fixed regressors: C

| Variable | Coefficient | Std. Error | t-Statistic | Prob.* |
|---|---|---|---|---|
| LP(-1) | 0.148766 | 0.920984 | 0.161530 | 0.8734 |
| INTR | 0.585455 | 4.879173 | 0.119991 | 0.9058 |
| INEFF | -0.195469 | 1.140057 | -0.171456 | 0.8657 |
| ROA | -0.777849 | 9.091208 | -0.085561 | 0.9327 |
| ROE | -0.184075 | 1.080597 | -0.170345 | 0.8665 |
| LLP | 0.011417 | 0.073983 | 0.154321 | 0.8790 |
| LOAS | 0.066200 | 3.530718 | 0.018750 | 0.9852 |
| LOAS(-1) | -6.409097 | 39.27110 | -0.163201 | 0.8721 |
| C | 0.810069 | 1.276163 | 0.634769 | 0.5331 |
| FITTED^2 | 0.156589 | 1.626180 | 0.096292 | 0.9243 |

| | | | |
|---|---|---|---|
| R-squared | 0.749728 | Mean dependent var | 1.180052 |

| | | | |
|---|---|---|---|
| Adjusted R-squared | 0.631178 | S.D. dependent var | 0.169211 |
| S.E. of regression | 0.102763 | Akaike info criterion | -1.445987 |
| Sum squared resid | 0.200644 | Schwarz criterion | -0.974505 |
| Log likelihood | 30.96680 | Hannan-Quinn criter. | -1.298324 |
| F-statistic | 6.324150 | Durbin-Watson stat | 2.374872 |
| Prob(F-statistic) | 0.000372 | | |

*Note: p-values and any subsequent tests do not account for model selection.

Dependent Variable: LP
Method: ARDL
Sample (adjusted): 2008Q2 2015Q2
Included observations: 29 after adjustments
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (1 lag, automatic): INTR INEFF ROA ROE LLP LOAS
Fixed regressors: C
Number of models evalulated: 64
Selected Model: ARDL(1, 0, 0, 0, 0, 0, 1)

| Variable | Coefficient | Std. Error | t-Statistic | Prob.* |
|---|---|---|---|---|
| LP(-1) | 0.236191 | 0.150760 | 1.566668 | 0.1329 |
| INTR | 1.053988 | 0.352829 | 2.987246 | 0.0073 |
| INEFF | -0.303758 | 0.182554 | -1.663930 | 0.1117 |
| ROA | -1.555293 | 4.074205 | -0.381741 | 0.7067 |
| ROE | -0.264775 | 0.665036 | -0.398136 | 0.6947 |
| LLP | 0.018508 | 0.006977 | 2.652772 | 0.0153 |
| LOAS | -0.030925 | 3.298708 | -0.009375 | 0.9926 |
| LOAS(-1) | -10.17059 | 3.934096 | -2.585242 | 0.0177 |
| C | 0.931539 | 0.188247 | 4.948506 | 0.0001 |

| | | | |
|---|---|---|---|
| R-squared | 0.749606 | Mean dependent var | 1.180052 |
| Adjusted R-squared | 0.649448 | S.D. dependent var | 0.169211 |
| S.E. of regression | 0.100185 | Akaike info criterion | -1.514464 |
| Sum squared resid | 0.200742 | Schwarz criterion | -1.090131 |
| Log likelihood | 30.95973 | Hannan-Quinn criter. | -1.381568 |
| F-statistic | 7.484252 | Durbin-Watson stat | 2.387608 |
| Prob(F-statistic) | 0.000128 | | |

*Note: p-values and any subsequent tests do n ot account for model selection.

Dependent Variable: LP
Method: ARDL
Sample (adjusted): 2008Q2 2015Q2
Included observations: 29 after adjustments
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (1 lag, automatic): INTR INEFF ROA ROE LOAS LLP
Fixed regressors: C
Number of models evalulated: 64
Selected Model: ARDL(1, 0, 0, 0, 0, 1, 0)

| Variable | Coefficient | Std. Error | t-Statistic | Prob.* |
|---|---|---|---|---|
| LP(-1) | 0.236191 | 0.150760 | .566668 | 0.1329 |
| INTR | 1.053988 | 0.352829 | 2.987246 | 0.0073 |
| INEFF | -0.303758 | 0.182554 | -1.663930 | 0.1117 |
| ROA | -1.555293 | 4.074205 | -0.381741 | 0.7067 |
| ROE | -0.264775 | 0.665036 | -0.398136 | 0.6947 |
| LOAS | -0.030925 | 3.298708 | -0.009375 | 0.9926 |
| LOAS(-1) | -10.17059 | 3.934096 | -2.585242 | 0.0177 |
| LLP | 0.018508 | 0.006977 | 2.652772 | 0.0153 |
| C | 0.931539 | 0.188247 | 4.948506 | 0.0001 |

| | | | |
|---|---|---|---|
| R-squared | 0.749606 | Mean dependent var | 1.180052 |
| Adjusted R-squared | 0.649448 | S.D. dependent var | 0.169211 |
| S.E. of regression | 0.100185 | Akaike info criterion | -1.514464 |
| Sum squared resid | 0.200742 | Schwarz criterion | -1.090131 |
| Log likelihood | 30.95973 | Hannan-Quinn criter. | -1.381568 |
| F-statistic | 7.484252 | Durbin-Watson stat | 2.387608 |
| Prob(F-statistic) | 0.000128 | | |

*Note: p-values and any subsequent tests do not account for model selection.