

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY (KNUST)

COLLEGE OF HUMANITIES AND SOCIAL SCIENCES

DEPARTMENT OF ECONOMICS

**EXCHANGE RATE, NON-PERFORMING LOANS AND ECONOMIC GROWTH IN
AFRICA**

BY

PETER KWAME KUUTOL

OCTOBER 2016

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**A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES, KWAME
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FULFILLMENT OF THE AWARD OF MSC. ECONOMICS (MONEY, BANKING
AND FINANCE OPTION)**

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DECLARATION

I hereby declare that this submission is my own work towards the Msc and that to the best of my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any other university, except where due acknowledgment has been made in the text.

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DEDICATION

To God Almighty and my Mother

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I am most grateful to God for his protection and guidance throughout my life. His unmerited grace, favour and love remains magnanimous in all my endeavours; He never forsakes me in times of troubles, bringing the right people in my life to support and provide things I need. Secondly, I am grateful to Dr. Oteng-Abeyie for his supervision who valuably contributed to enriching this study. My profound appreciation goes to Dr. Micheal Kwame Asiedu for his conscious efforts towards nurturing my academic capabilities in the field of economics. I am also thankful to Mr. Ebenezer Agyemang Badu and Mr, Paul Kwakwa of the department of Business Administration- Presbyterian University College for their insightful comments made and critiques were very useful for this study. Moreover, I am grateful to Ramseyer Training Centre for the opportunity offered me to do further studies most especially Rev. Dr. William Kwabena Ofori-Addo [the Director] for his advice and of course the entire staff of the Centre. Indeed I so much indebted to the Jacobian group for their unfailing supporting during times of difficulties especially Thomas Tekyi-Yeboah and Shalom Djokoto and entire course mate.

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ABSTRACT

The existing controversy in literature surrounding depreciation of exchange rate is whether it is contractionary or expansionary to economic growth and also the fact that nonperforming loan is believed in literature to contract growth necessitated this study as Africa is in tabulate time. As currencies in Africa continue to depreciate against major currencies and nonperforming loan is also on a high side. Therefore, this study was mainly to examine empirically what effect does the interaction term (nonperforming loan and exchange rate) has on economic growth. Using 15 countries in Africa with data spanning from 2002-2014 with the aid system GMM estimator, the following findings were drawn.

The results show that exchange rate, nonperforming loan and the interaction term, all have contractionary impact on economic growth in Africa. Also, the study reveals that exchange rate, inflation, economic growth, and unemployment are significant factors that determine nonperforming loans in Africa. The study proposes that in Africa exchange rate depreciation passes through nonperforming loan to retard economic growth. Therefore, Africa authorities (fiscal and monetary) should anchor policy around exchange rate with precision, this will stabilize the economy and banking assets quality shocks. In addition, in the implementation of Basel II or III requirements of credit assessment process, this study suggests that banks should take into account the level of economic activity (real GDP) when granting loans.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

One of the significant constituents in financial intermediation in every country is the banking sector which makes essential contribution to the global economy. Thus, the failure of financial intermediations or ineffectiveness in a country creates fundamental problems that have strong economic implications on the whole economy. Therefore, Rodriguez-Moreno and Pena (2013) advanced that interest groups should pay close attention to the financial system and seek to ensure its soundness and stability as it is critical to the survival of every economy. In emerging countries, the increasing expansion of financial intermediation such as banks was usually regarded as a sign of catching-up with the advanced countries just about a decade before the 2008 financial crisis and its eventual global meltdown. An effective and efficient financial system works to ensure and secure economic efficiency. The financial intermediaries in the financial system have a core responsibility to serve as transferring loanable funds as well as economic resources into investment areas which are profitable. But, it is always observed that, this perfect functioning of financial intermediaries can't always be guaranteed during fund transfers (İslamoğlu, 2015). Today, there is a global dilemma that societies are concerned of; the world is getting itself into unsustainable credit growth or with financial deepening which led to and will continue to lead to crisis.

Isarescu (2007) believes, without other stabilizers, as income policy and fiscal policy stance as pro-cyclical and the attitude of central bank was highlighted as the potential vulnerability by supplementing the limited space to exercising monetary policy with the adoption of a range of prudential measures. Georgescu (2010) argues that these measures put in place over time have lost it relevance (effectiveness) particularly financial integration given a strong demand for loans. As Modigliani-Miller theory (1958) suggest efficiency of financial markets, and no availability of information asymmetry; business cycle development is neutral to credit market development where recent literatures have shown evidence based clues to support the bi-directional nature of the association between gross domestic product growth and credit.

The global financial crisis, it has been observed that external funding sources can induce macroeconomic variables instability. As a result, Ouhibi and Hammami, (2015) have stated, the potential risk of financial system vulnerability in economy is assessed on the basis of the levels of nonperforming loans(NPLs) and off-balance sheet trade activities (derivatives) which create credit risk and foreign exchange risk respectively in the banking sector. The banking activity is constantly determined by several factors that root different kinds of risks. Therefore, banks main concern is the risk management. There are two main sources of risks-facing financial institutions: systematic (undiversifiable or market) and non-systematic (diversifiable or specific) risk. The undiversifiable risk factors are risks associated with activities that are beyond the banks' control for example exchange rate instability which continue to be a major challenge in the banking sector as a result of international business financing. The non-systematic are the risks of bank specific related activities. Banks today

are troubled with growing non-performing loans (NPLs) which are attributed to bank specific and market factors, such as macro-economic imbalances as in depreciation of currency, growing inflation and risk management quality among others. Notwithstanding, theories in economic suggest that commercial banks play the role of lending and fund mobilizations as its core mandate. To support this argument, Joseph et al, (2012) stated emphatically that the traditional role of commercial banks is credit lending (loans).

If the financial sector is properly functioning and efficient, it essentially leads to achieving and sustaining economic growth in the short run and eventually lead to economic development in the long run. Hence, high qualities of loan asset serve as the healthy financial sector in the economy and high level of NPLs indicate unhealthy financial sector within a country (high default rate with multi-dimensional) in both advanced and emerging nations and retire economic growth. According to Negera (2012), in theory there are several reasons why loans fail to perform. Among them are inflation, credit orientation, risk appetite, poor monitoring and among several of them. Therefore, NPLs are caused by macro-economic conditions and bank specific conditions (Bercoff et al., 2002). Nevertheless, two main major risks on a bank balance sheet today remain the credit risk (NPLs) and exchange rate risk, without doubt that these risks have excessive power on the path of economic growth.

1.2 Problem Statement

Nonperforming Loans (NPLs) and deteriorating exchange rate are two key variables that have gained growing attention in recent economic policy debate since the global financial crisis. The global economic crisis as it were, continue to contribute to deteriorating banks'

assets significantly and affect credit quality indicators (NPLs) due to adverse changes in macro-economic variables in the world (Prasanna, 2014). Therefore, several studies have focused on the impact of NPLs on economic growth, and exchange rate on economic growth (e.g Ahlem and Bashir, 2013; Klein, 2013; Sheefeni, 2015; Osei-Assibey and Asenso, 2015). However, an interesting observation reveals that existing studies concentrate on direct impact without observing the transmission mechanism (the mediating and moderating role) from exchange rate through to NPLs to affect economic growth, because the banking sector is the anchor of every economy. Therefore, following the nature of Africa economies, adverse changes of exchange rate and NPLs risk do not operate in isolation in the banking sector but happen concurrently or have some interdependence. Hence, because Africa economies are import driven and couple with the fact the private sector are the most beneficiary of credit facilities of the banking sector, any adverse changes of exchange rate affect the responsiveness of the private sector to honour their loan obligation leading to nonperforming loans. This is because as the currency continuous to deteriorates, as the case have been in Africa, its cost the private sector more local currency to import, since it would be converted into international currency in order to trade in the global market. Now, once import becomes expensive it feeds into pricing of the good and service, and all things being equal demand for goods and services thereby affecting revenue generation negatively. So, as enough revenue cannot be raised to finance economic activities of the private sector and also honour their loan obligation to the banks creates the problem of nonperforming loans. Again, dollarization of loans in the banking sector is contributing to the growing nonperforming loans since adverse changes of exchange rate affects the loan repayment. In the case of Africa because the deteriorating of exchange increase amount payable and since the private sector is

challenged in revenue generation because of high price, this may lead to increase in default of loan repayment hence nonperforming loans.

Therefore, the potential role of exchange rate increasing nonperforming loan through to adverse economic growth cannot be underestimated. Hence, given the detrimental effect of adverse changes of exchange rate beyond its equilibrium level may lead to increasing NPL ratio of banks, makes it indispensable to examine how the transmission mechanism affects economic growth in Africa. Because Africa economies are import driven, whatever happens to the exchange rate, have direct and indirect effects on growth through the banking sector. Again, the digression from the direct estimation of impact of exchange rate on growth will be particularly useful for understanding taken the choice regarding methodologies which have been employed in the applied study.

1.3 Objectives of the Study

1.3.1 General Objective

As Africa economies attempt to continue to recover from shocks of global crisis, it is therefore prudent to determine the potential impact of increasing levels NPL, and exchange rate instability on economic growth over time as strong evidence of slowing the grow of Africa economy. The general objective is to examine how nonperforming loans, and exchange rate plays out in the growth agenda of Africa.

1.3.2 Specific Objectives

On account of the general objective for the study, the following specific objectives are posed;

1. To examine the extent to which nonperforming loans, and exchange rate impact on economic growth.
2. To examine the impact of the interaction effect of NPLs and exchange rate on economic growth .
3. To examine the impact of exchange rate on Nonperforming Loan

1.4 Research Hypotheses

In this study, the researcher developed testable hypothesis to investigate the relationships between the chosen variables. Hence, based on the related literature review, the researcher developed hypotheses to estimate the sign relationship, since the hypotheses are statements that are to be tested (Brooks, 2008). The following below are the null hypotheses to be tested.

- H₁. There is negative relationship between NPLs and economic growth in Africa.
- H₂. There is positive relationship between exchange rate and economic growth in Africa.
- H₃. There is a negative relationship between the interaction term (nonperforming loans and exchange rate) and economic growth in Africa.
- H₄. There is direct relationship between nonperforming loans and exchange rate in Africa

1.5 Significance of the Study

The economic recession in several developed nations and spread over effect to emerging and developing nations as a result of recent global financial crisis have caused continue

increasing of firms and household defaults in banks loans causing significant losses hence NPLs. This has awakened financial sector regulators to consistently observing banks loan quality, possibilities of prompt detection and warning system capable of notifying them to warrant a sound financial system and prevent systemic crises. Managing risk prudently with emphasis to credit risk and exchange rate risk is very important since banks are too important to fail. Each one of these risk can cause a potential havoc to banking sector of an economy. This study will bring to policymakers and regulatory authorities the need for special attention to proper management of credit and exchange rate and improving loan assets quality to avoid calamities befalling on the banking sector which can spread over to the entire economy. To bring to bear how NPLs and exchange rate deteriorating might potentially contribute negatively to projected economic growth that nation is anticipating.

This study thus would help Central Banks and the commercial banks understand on the significance of improving loan asset qualities to their businesses and economy, to the extent that it will help central banks to examine its banking supervision policy pertaining to ensuring asset quality and exchange rate stability. In addition to the above, the study contributes to literature concerning NPLs and exchange rate by controlling for economic shocks and immunization of economic growth as growth cannot go on indefinitely with cost which has not also been seen in contemporary

1.6 Limitation and Scope of the Study

The study adjusts to fit core objectives in examining the interest variables in Africa within the limited time space. The research focused on fifteen (15) Africa countries because of non-

availability of data for the time period considered for this study, thus from 2001-2015 to analyze the effect of NPL and exchange rate on economic growth and the impact due to the peculiar situation in the in Africa. Again, this study considers only two key macroeconomic variables and how they influence the banks performance as in loan quality. And of course the study covers and limited to Africa continent.

1.7 Study Organization

This research works is organized into five (5) chapters. Chapter one presents the background of the study, problem statement, objectives of the study, research hypothesis, significance of the study and the limitation and scope of the study. The next chapter considered related literature review for both theoretical and empirical. The third chapter works on the methodology of the research. The chapter with analysis of data and presentation of findings, while the final chapter contains the conclusion out of the findings, recommendation of the study and give future directions for further studies.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter summarizes various works done by previous researchers on nonperforming loans and exchange rates in Ghana. It reviews literatures specifically on theoretical, empirical and conceptualizes the study.

2.1 Theoretical Review on Nonperforming Loans

The theoretical review of nonperforming loans are based on the portfolio theory in light of credit risk management and delegated monitoring theory of borrowers to account theories underpinning this study.

2.1.1 Portfolio Theory in Light of Credit Risk Management

Drake and Fabozzi (2010) advance that there are creditors who own the financial assets which the bank is holding in trust for them and there are debtors who exploit gains from creditors' financial assets through banks and agree to make payment for replacement of the financial assets with cost of using the assets. And such activities create credit risk hence NPLs. Successful banks since 1980's have applied Modern Portfolio Theory (MPT) to management of market risk. Several banks manage their interest rate and market risk exposure by using value at risk. Margrabe (2007) argues notwithstanding the fact that credit risk remains the biggest risk that financial institutions faces, yet the practicality of MPT to credit risk has lagged.

The financial institutions are much aware of concentration of credit cripples and adversely affect the financial performance. Even though data problem remain the core challenge, yet complex institutions are actively pursuing quantitative approach to management of credit risk. So far there seems to be significant progress toward developing a strategy to measure portfolio credit risk as well as transferring efficiently through credit derivatives at the same time protecting client relationships. The application of these two approaches have brought about increased progress in credit risk management within the context of portfolio.

Usually, financial institutions take credit risk management as asset-by-asset approach. This approach involves periodical evaluation of credit quality of loan and further credit exposures by using credit rating and aggregating the final results to determine the expected losses of the portfolio. Internal credit risk rating system and loan review is the bedrock of asset-by-asset approach, which enables management to identify changes in individual credit and portfolio trend and take action when the need be.

As asset-by-asset is one significant element to managing credit risk, its application fails to give absolute view on portfolio credit risk. Therefore to understand credit risk, banks are searching for alternative approach to replace or complement the asset-by-asset approach that has problem in measuring concentration. Hence the quantitative portfolio review to credit model has been adopted to complement the asset-by-asset approach.

Banks at all-time assess the risk level of each customer and come to conclusion or decision as to finance the application or not. Even though the banks could grant the loan application to a customer base on the current risk level which may be at acceptable level such risk could change going into the future due to idiosyncratic and systematic risk. History of firm is taken to assess the level of risk and to determine the risk categories as an indicator risk dynamics, (Chan et al., 2012) put it, if a downgraded firm move from AA to BB, indicate that the level of risk of such firm has increased significantly. The difference between idiosyncratic and systematic risk, while idiosyncratic risk factors are inherent to individual customers, systematic risk factors are significant to the NPLs portfolio level (Koopman and Lucas, 2005) which is usually to associate with macroeconomic conditions. The loan portfolio is link to assets value and counterparty credit risk which is occasion by credit default. In period of economic recession (downturns) while the rate of defaults increase, asset values decrease because both have interdependence and this increases loan lost rate (Rosch and Scheule, 2010).

2.1.2 Delegated Monitoring of Borrowers Theory

In literature one of the theories that influence the existence of banks is theory of delegated monitoring of borrowers. In broad context ‘monitoring’ of bank borrowers is the information gathered before and after loans are granted to the extent that it includes examinations of borrowers creditworthiness, screening of loan application and making sure that the borrowers buy into the terms of the loan contract. As Drzik (2005) stated these processes are significant in small and medium firms as well as linked to payment system as banks role.

Drake & Fabozzi (2010) argues that every economy involves around the element of financial system, including the capital markets, financial regulations and financial intermediaries. Hence, the capital market creates the enabling environment that the transaction happens but in the capital market, financial intermediaries exist, which facilitates transactions. One of the financial intermediaries is bank. The banking sector operates mostly on credit which turns to affect the financial performance of the bank. And regulations are primary use for fair transaction insurance.

As banks accept deposits from customers, such funds are transforms into loans to earn returns with the aid of labour and physical capital. As credit advance to customers to form a loan portfolio of the banks and trying to manage it such portfolio run the banks into problems of NPLs which is very important factor that affect the efficiency of the banks. Because debtors of the banks are unable or incapacitated to honour their debt obligation as it falls due. Banks plays the role of intermediation between the saver unit and deficit unit, as it sources fund from the savers unit to lend to the deficit unit. They must therefore monitor to ensure that the savers unit financial resources are safeguarded. This is not always the case due to default in the repayment by the deficit unit hence NPLs. This creates the opportunity cost of losing economic resource that could have put into productive investment which translates into economic growth.

2.2 Theoretical Review on Exchange Rate

The traditional open economy model by Keynesian and internal and external balances can be achieved by two set of policies. The expenditure-switching policies and expenditure-reducing policies. The former policies are influence by tradable and non-tradable expenditure composition of the countries and the later use to control and monitor aggregate expenditures. In an economy fiscal and monetary policies are used alternatively as classical instruments of second policy option whereas exchange rate remains the first or main option. The conventional model proposed by Fleming (1962) stated that rise in exchange rate be it depreciation or devaluation of currency is expansionary as it assumes that the Marshall-Lerner conditions are met. On the basis of this aggregate demand is boosted by depreciation of exchange rate and encouraging exports and substituting export for import into the domestic market. The orthodox Keynesian Model of money-less by Meade (1951) was further expanded by Dornbusch (1986) in the monetary approach. In this theory it is believe that when the export sector is stimulated the real depreciation or devaluations of currency aid economies to skip financial crisis and provide the path to sustained economic growth. In support of Fleming model, Obstfeld and Rogoff (1995) gave evidence that due to devaluation; there is expansion of aggregate demand. Therefore, since 1950s exchange rate has been used as a stabilizer in developing economies under the watch of IMF.

Up until 1970's there was no contradictory view the effect on exchange rate devaluation or depreciation on growth. Contrarily to the traditional view, depreciation can lead to a fall economic growth. The proponents of this view argued mainly on the negative real balance effect and depreciation/devaluation effect which is supply-sided. Cooper (1971) is among the

principal actors who first suggested a contradictory view for developing economies. He and among others argued theoretical ways through which economic activities can be affected negatively by devaluation. They mentioned demand-side, supply-side and balance sheet channels. While demand-side and supply-side channels try to contradict the mechanism of devaluation, the balance sheet channel deal with real exchange rate depreciation. After the recession and currency crisis in 1990's which was followed by devaluation, Frankel (2005) points out the balance sheet effects and stated that the positive effect of devaluation can be out weight by the negative effects which sidelines the eventual expected gains. The balance sheet effect is the main reason that explains the occurrence of the recession after the devaluation in 1990's rather than the pass through effect from exchange rate changes to prices of import (Frankel, 2005).

2.2.1 Financial Stability and Exchange Rate Regime

The crisis that bedevils the world recently has stimulated a lot of discussion about the link between financial stability and exchange rate. The initial literature advance argument in support of both floating and pegged exchange rates, the current trends of argument seems to undermine the existing ones and economies are pushed toward corner solutions (Domac and Peria, 2000). It is contended that financial crises are as a result of one or combine of the following factors, the lack of ability of developing nation to borrow in local currency for long term ('original sin' originally call by the authors), weak institutions and moral hazard problem (Eichengreen and Hausmann, 1999). They argued that in a situation where regulations are relax and continues moral hazards, fixed exchange rate are detrimental because of implicit assurance against exchange rate risk, so economic agent like bank have

unattractive exposure to hedge their foreign risk exposures. Therefore, countries can choose to peg or float the exchange rate. Furthermore, Eichengreen and Hausmann (1999), argues that currency maturity mismatch as a result of original sin creates problems for exchange rate policy. In such case banks can either be affected by serious currency mismatch or suffer self-fulfilling runs which will be activated by investors fear that government reserve will be exhausted before they get there. Any of such actions may result from the action of the government to peg or float. Dollarization is preferred given the dilemma.

2.2.2 Exchange Rate Regime (Pegged or Fixed)

Fixed exchange rate proponents contend a currency that is fixed has propensity of reducing banking crisis, because policy makers would be discipline. To achieve a constant maintenance of fixed exchange rate would reduce the occurrences of domestic shocks that could eventually lead to banking crisis in a country and dampen the probability of variable policies (Mishkin and Savastano, 2000).

Normally, the existence of dollar debt is seen as an argument to support the fixed exchange rate (Velasco and Cespedes, 1999). There is a growing argument that debtors faced a sharp increase in burden when a normal devaluation is taken place in a country which could lead to corporate insolvency. This by far will lead banking crisis hence growing stock of nonperforming loans of banks in such economy. To support this argument Calvo (1999) claims that “liability-dollarized economies are highly vulnerable to devaluation”.

A number of researches have given huge support to exchange rate stability in developing economies (see e.g. Calvo, 1999; Calvo and Reinhart, 2000). These studies argue that the kind of exchange rate regime in advanced economies is different from the developing economies. Because developing economies lacks access to international markets and credibility, dollarization liability is high, exchange rate pass-through effect on inflation and the fact that exchange rate volatility on trade, makes it imperative for developing economies to choose fixed exchange rate regime hence flexible exchange rate will not be favorable to such economies. Perhaps, it is on the bases of these authorities in developing nations strong resist movement in the exchange rate, be it depreciation or devaluation. The pass through effect is huge and could cause banking crisis eventually.

2.2.3 Exchange Rate Regime (Flexible or Float)

Traditionally, the argument supporting the adoption of float exchange rate regime is because of possible stability of monetary policy as the exchange rate is used as a tool to absorb some of the fundamental economic shocks in an economy as well as possible reducing the interest rate burden. In an event of negative shocks, flexible exchange rate bears the impact of adjustment so that rate of interest is not to be increased, which seems to protect output through competitiveness and good financial conditions. Proponents of flexible exchange rates regime argue that in such regime it gives room for an economy to adjust in response to external shocks with small output losses, however, the impact on both foreign and domestic economies differs (Edwards and Yeyati, 2005; Hoffmann, 2007). There is tendency countering negative pressure on output due to sticky prices and wages.

Also, there is further argument by the proponents of float exchange rate which state that fixed exchange rates give guarantees implicitly for those looking forward to borrow in foreign currencies which bring about moral hazard troubles. Because government offer the private sector exchange rate risk insurance, authorities will always insist that there will be no prospect when exchange rate is change so as to sustain the peg exchange rate. This makes such economy vulnerable to external shocks, though it may attract or activate inflow of capital into the economy. Eichengreen and Hausmann (1999) contend that under peg exchange rate regime there is no motivation to hedge exchange rate exposures. Instead, float exchange rate has incentive for hedging hence aid to control inflows.

Velasco (1999) believes that in peg exchange rate regime seriously restrict lender of last resort operations and as local credit grows it may weaken the confidence in the peg currency. Given the flexible exchange rate regime, the existence of lender of last resort creates room for banker to take in more risks because they know during crisis authorities will bail them out. Hence banking giving out more loans to clients' high level of risk will permeate through the banking sector which could lead to growing nonperforming loans.

2.3 Africa Economic Growth, Exchange Rate and Nonperforming Loans Outlook

In 2015 growth was 3.1% and is expected to modestly remain same in 2016 at 3.2% before it will eventually pick up in 2017 at 3.6%. It is observed global growth remain largely unaffected but Africa has become less favorable in the composition of global growth. Lower oil prices together with slowdown and rebalancing of Chinese economy has brought about

strong global financing conditions, this have triggered adverse consequences to Africa growth posing serious challenges to policymakers in Africa (world economic outlook, 2016).

The Africa region growth has slowed down remarkable already as it is estimated that to fall from 5.1% in 2014 to 3.4% in 2015 which account for 1/3 fall in growth. Decline in prices of commodity has equally adversely affected the some countries in Africa major exports of non-oil and nonrenewable resources in 2015, to the extent that it has offset the gains from decline in oil balances of oil trade leading to increase the current account deficit.

The U.S. dollar has appreciated significantly against many currencies in Africa hence limiting the decline in prices of oil in currencies (domestic) terms thereby increasing inflation which is built into the cost of borrowing. Given oil exporting economies and resource intensive economies, commodity prices have declined as a result of fiscal expansion which indeed have increased fiscal gaps dynamics with debt creating flows. However, the rise in debt in some resource-intensive economies was relatively smaller with some exception like Ghana and Zambia. Also, in some Africa countries, the depreciating exchange rate have accounted for rising debt levels like Angola and Tanzania. Notwithstanding, poor growth, unsustainable policies and exchange rate have also play role in rising debt level in Africa. 2016 world economic outlook further suggest that the increase in domestic debt has triggered higher exposure of commercial banks to government in Africa. This has led to increase in borrowing cost in both domestic and foreign markets. The continuous decline in commodity prices and increase in risk aversion investors has cause cost of external debts to increase

sharply just about close to double digits. Treasury bill rate has equally increase above the rate of inflation increase and it is expected that the external environment will continue to be unfavorable.

Also, the external shocks leading to severe pressure on exchange rate has resulted in varying monetary policy responses. Generally, Africa countries have allowed their currencies to adjust, but exchange rate depreciation have been smoothen by further withdrawal from already depleted international reserves by many countries. In the central and east Africa, which still maintain peg exchange rate to Euro, has equally seen a substantial fall in international reserves despite the appreciation of U.S. dollar against the Euro. Additional, the nominal exchange rate depreciation pass-through effect has increase inflation in most Africa economies. In dealing with the situation, growths in monetary aggregates have been lowered and increased in policy rates by monetary authorities. Some countries have also central banks have sought to use administrative to restrict the forex markets (such as Ghana Nigeria and Angola). Apparently, these administrative policies did increase the spread of exchange rate in the parallel market and further triggered excessive pressures on commercial banks' foreign asset net balances, as they try to meet demand for foreign assets by use of their foreign assets or increasing liabilities through the use of counterparty foreign (abroad).

The domestic financing of government and the tighter monetary policy have impacted private sector borrowing activities by amplifying the shocks. The fiscal deficit has increased and tighter monetary policies have led to increase in cost of borrowing in the private sector and

foreign exchange administrative measures have equally widened the spread rate in the parallel market as well as limiting imports of major inputs. This has led to decline and contraction growth in private sector credit supply and slow financial deepening and as well as increase in excessive credit growth in a broader perspective. Given financial soundness deterioration has led to significant increase in nonperforming loans in most Africa countries given rise to recapitalization. The economic shocks that the region is facing following the nonperforming loan significantly affect macroeconomic conditions.

2.4 Theoretical Linkage between Exchange Rate, Nonperforming Loans and Economic Growth

As customers of banks are challenged in paying their loan obligations as a result of worsening macroeconomics variables such as exchange rate and increase in NPLs since the start of global financial crisis in 2008, is a cause for worry in Africa. In Africa banks dollar pegged credit to private sector is gradually growing and at high interest rate with the aim of mitigating risk of depreciating exchange rate. But as the currency depreciates the cost of borrowing increase to the point that customers are not able to honor the credit facilities as and when it falls due thereby creating the window of opportunity for customer to default. Also, in some cases because it is observed that loan to private sector are mostly to commerce and manufacturing industry, these businesses are involve in international trade which need foreign currency to import either raw material or finish goods into the region. Now, because of constant depreciating of exchange rate the commerce industries after importing and selling, given the exchange rate circumstance importers are not able to exchange the local currency to international currency to get the same quantity of good earlier bought not to talk

of servicing the loan which eventually will leave the credit facilities to be nonperforming. Also, to the manufacturing industry, due to the high cost involve in production, price of such output are higher given them competitive disadvantage to counterpart abroad. This pushes a lot of local industries out of business and/or insolvent making them unable to honor credit obligation hence NPLs. Because they either sell at a competitive price which is lesser than cost of production or sell at a competitive disadvantage price (higher than market average price) which will see them fade out of business and unable to make revenue to service the credit facility. Therefore, the use of foreign currencies in Africa as a medium of exchange and store of value is increasingly element under the macroeconomic weak conditions and continuous to a continual feature in the region, NPLs in the banking sector remain high as borrowers are not able to pay loans because highly volatile exchange rate (Mecagni et al., 2015). Again, banks in Africa, in attempt to mitigate or hedge risk, grant loan in foreign currencies (particularly dollar) because of the continue deteriorating of currency which increase the book value of such loans and given the poor marco-economic environment creates the environment leading to rising nonperforming loans. Also, borrowers may be out of business or the inability to honour their loan obligations to banks make banks unable to further advance money to the private sector to gear up economic activities which would retire growth. The eventual effect is output will fall short of demand which require import to augment the demand. This put further pressure on the local currency to depreciate more because demand for foreign currency would outweigh in attempt to close demand and supply gap and this will put more pressure on the few borrowers who are paying the loans to default because of dollarization of loan in Africa these days.

There is sufficient both theoretical and empirical evidence that suggest negative relationship between nonperforming loans and growth rate in GDP (Salas and Surina, 2002; Fofack, 2005; Khemraj and Pasha, 2009; Louzis et al., 2011; Kurti, 2016). Literature explains; as GDP grows, it increases the income of households and businesses which eventually improve loan payment capacity of the borrowers which lead to reduction of default, on the other hand, all things being equal, the reverse is the case when GDP falls.

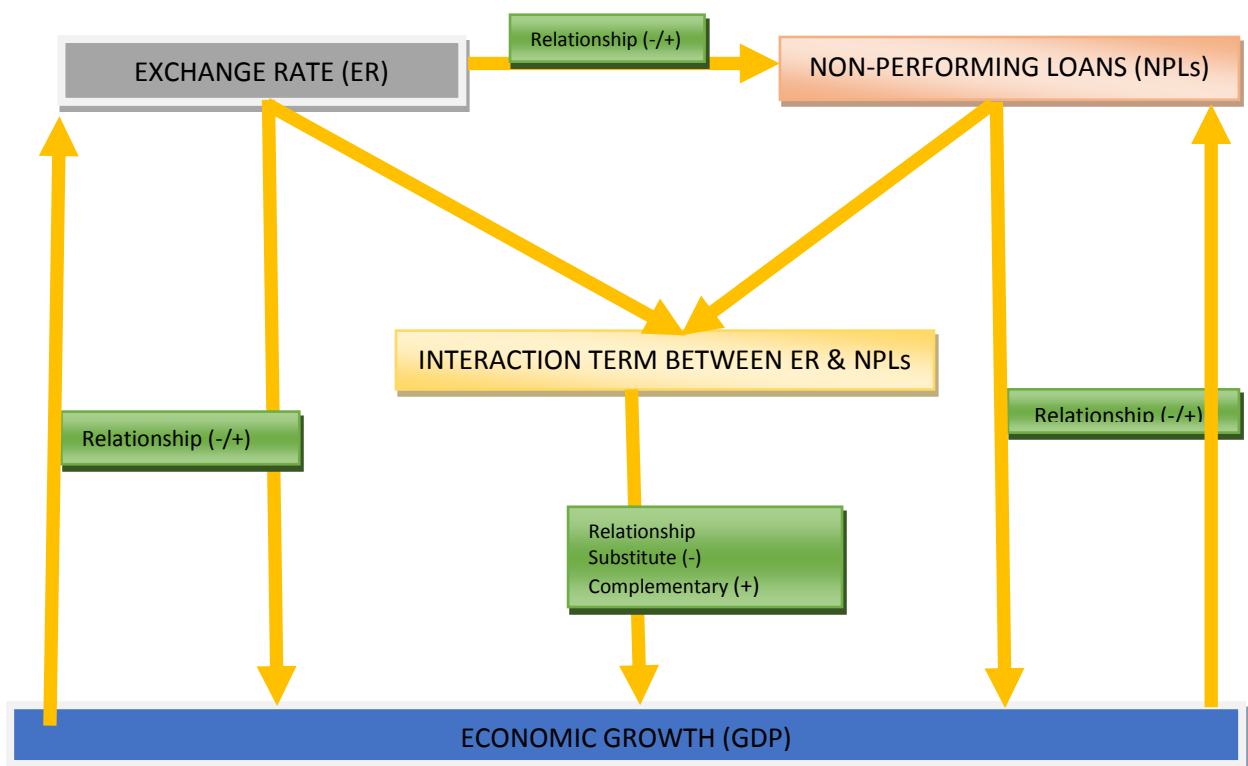
Stability of exchange rate market and the favorable terms of trade couple with basic capital stock to trigger stable long time economic growth. However, following economic theory, exchange rate as a monetary tool/variable should effect growth positively in the long run but this is seen as a puzzle, as some evidence suggest negative effect on growth (Miles, 2006).

Therefore, following Africa growth trend, it is believe that growth pattern have not been consistent in the region with NPLs and exchange rate. Furthermore, NPLs relationship could be negative or positive depending on the strength of growth in GDP given the fact that in some Africa economies, as NPLs increased, growth also did and the visa versa. And equally, while other countries increase in growth as exchange rate was depreciating; other saw fall in growth as exchange rate depreciates. Additionally, theory suggests that there is contradictory view as the impact of exchange rate on growth and this has been confirmed in empirical studies (Kogid et al., undated). Now since NPLs and Exchange rates do not operate in isolation in an economic rather operates concurrently in the determination of growth in an economy, the interaction of these two variables could produce substitute effect (Join-Force/

Pull-Force Effect or complementary effect (Mitigate-Force or Push Effect). However, in Africa the effect will be join-force effect which will retard economic progress in the region.

Kurti (2016) advanced that the relationship between exchange rate and nonperforming loans in literature have given mixed results. Exchange rates appreciation may have different implications. In the first instance it could adversely impact the capacity of loan payment on firm that are export oriented (Fofack, 2005; Kurti, 2016), on the other hand, in the case borrowers of foreign currency it can have a positive impact on their loan payment capacity. Following, the above argument, the reverse is the case when exchange rate depreciation occurs.

Figure 1: Conceptual framework



2.5 Empirical Review

In the past two decades, various researchers have examined the role of bank loan quality to economic growth. A number of studies have observed that as much as macroeconomic conditions matter in managing credit risk (nonperforming loans), so does credit risk matter in economic growth. Evidence from literature show studies that find the linkage between macroeconomic variables like GDP, inflation , exchange rate, interest rate, unemployment and among other with nonperforming loans. Due to the significance of bank failure, a lot of researchers have examined the macroeconomic determinant of nonperforming loan. This study therefore seeks to review works made on single nation and cross nations.

2.5.1 Economic Growth Rate and Nonperforming Loans

There is a lot of empirical evidence that establish negative relationship between GDP growth rate and nonperforming loan in both country specific level and cross countries studies (Salas and Saurina, 2002; Hyun and Zhang,2012; Saba et al., 2012; Jordan and Tucker, 2013; Ahmed and Bashir, 2013; Sahbaz and Inkaya, 2014; Akinlo and Emmanuel,2014; Sheefeni, 2015; Islamoglu, 2015; Amuakwa-Mensah and Boakye-Adjei, 2015) for country specific studies and (Fofack, 2005; Skarica, 2013; Beck et al.,2013; Klein, 2013; Marijana et al., 2013; Messai and Jouini, 2013; Marri et al., 2014; Ouhibi and Hammami, 2015; Kurti, 2016) for cross countries studies. In examining the explanations give to the negative relationship in literature, the review observed that GDP growth normally increase the income of businesses and households thus improving loan payment capacity of borrowers and the eventual minimizing bad loans or default rate (Khemraj and Pasha, 2009,). In the study by Fofack (2005) in Africa, strongly finds evidence that economic growth is a significant factor in

determining nonperforming loans in Africa countries and attributed it to undiversified nature of African economies. Salas and Saurina (2002) observed that banks risks are more rapid in economic boom and in the period of economic recession some of these assets quality deteriorate rapidly. Therefore, economic environment determine the ability of debtors to honor their debt obligations (Marijana et al., 2013) and ability of a country to improve its real economy generate a reduction in the nonperforming loan portfolio in commercial banks (Messai and Jouini, 2013). Some studies find evidence of feedback effect between nonperforming loan and GDP growth rate (Jordan and Tucker, 2013; Sheefeni, 2015). Thus given indication that while weak economic environment might lead to rising nonperforming, equally, growing nonperforming loan portfolio lead to decline economic growth.

Amuakwa-Mensah and Boakye-Adjei (2015) states that failure of clients to pay their credit facility on due time results in nonperforming loans and its consequential adverse effect on economic growth. The private sector in Africa has made series of losses on account of deteriorating currency, making importers lose money since the Africa economy is becoming dependent of foreign goods and this has given rise to inability of the private sector to pay its credit facilities due to dollarization.

On the basis of this Osei-Assibey and Asenso (2015) opine that while supply of credit to the private sector has increased significantly, lending rates and the NPL ratios also remain high, intensifying concerns about the quality of bank assets and the macroeconomic implications. This according to Sheefeni (2015) the development is in line with the general overall downward trend in NPLs observed since 2009. Therefore, Amuakwa-Mensah and Boakye-Adjei (2015) posit that the effect of these NPLs and deteriorating exchange rate, often are

damaging to banks' books and threatens the sustainability of the banking industry and the economy at large.

2.5.2 Exchange Rate and Nonperforming Loans

The relationship between nonperforming loan and exchange rate in literature has provided mixed results. While studies like (Khemraraj and Pasha, 2009; Washington, 2014; Sheefeni, 2015; Amuakwa-Mensah and Boakye-Adjei, 2015) in both the country level specific and cross countries find a negative relationship, studies by (Kurti, 2016; Klein, 2013; Jakubik and Reininger, 2013; Prasanna et al., 2014) finds positive relationship at both country and cross countries level. Strengthen currency (appreciation in exchange rates) may have diverse economic implications in an economy. While it can negatively affect export oriented firms loan repayment capacity (Fofack, 2005), alternatively, it can positively affect the loan payment capacity of low borrowers in foreign currency (Kurti, 2016). Further Kurti (2016) advance that the relationship between nominal effective exchange rate (including inflation) and nonperforming loan is indeterminate and that so what happens in macro level effect banking stability and vice versa because they are closely linked to each other. Given several evidence from many countries which shows that, except in a situation where the banks are strongly controlled by the state, instability ignite from the macroeconomic level and spread or spill over to financial sector (including the banking sector). The feedback response feedback and increase the instability (Kurti, 2016). Washington (2014) in conclusion explains that since most loans are granted in local currency to borrower of money, the exchange rates fluctuations do not affect the bank credit risk. In some Africa countries, loans do not perform well and which give rises to growing nonperforming loan in Africa because

continue increase deteriorating local currency. Which is consistent with ESRB (2011) observation “ In some countries, foreign currency loan have higher nonperforming loan (NPL) ratios and higher levels of loan restructuring.....” while other countries evidence shows that foreign currency loan perform better than local currency which could be explained as appreciation of local currency or stability of currency (ESRB, 2011; Jakubik and Reininger, 2013).

The nonperforming of foreign currency loans can be significantly influenced by materialization of foreign currency interest rate risk (Jakubik and Reininger, 2013). In economies like those in Africa with the floating exchange rate, risk materialization can substantially mitigate changes in exchange rate but might come with a cost to the industry, since as it was observed that the depreciation of local currencies were partly offset by decline in interest rate in some European countries (ESRB, 2011). In other economies with peg exchange rate regime, foreign currency borrowers did not suffer following devaluation of currency, instead were a beneficiary of foreign interest rate cut as a result of the global crisis (Jakubik and Reininger, 2013). Therefore, because of the feedback effect between economies and banking sector, it is crucial to pursue overall stability at the macroeconomic level, hence pursuing successful contra cyclical macroeconomic policy, creates the enabling environment to reduce the fragility of the banking sector relative to the magnitude of macroeconomic shocks that is expected in a particular economy (Tandon committee, 1998 as cited in Kurti, 2016).

According Kurti (2016), observed that there exist sufficient empirical studies that shows convincing evidence that, given a favorable macroeconomic conditions, such as, low

unemployment, low interest rate and sustained economic growth is inclined to be related to better quality of bank loans. Borrowers are in position to receive or earn streams of income that gives the opportunity to meet their loan obligation because favorable macroeconomic conditions.

2.5.3 Exchange Rate and Economic Growth

Up to now there is no consensus on most suitable exchange rate to maintain stability of macroeconomic variables. The choice of exchange rate regime should or must depend on each country characteristics. As it is argued that the flexible exchange rate used by advanced economies might not be okay for developing economies because market insurance in the developing economies are not well developed to absorb the risk from exchange rate volatility. Hence the right choice of exchange rate regime could propel an economy prosperous business environment and sufficiently place the economy into growth path. Early studies on the exchange rate regime and economic growth, attempt to examine whether different regimes of exchange rates have different effects on economic growth.

Huang and Maltora (2004) found that the choice of exchange rate regime did not show any significant impact on economic growth in advance economies though more float exchange rate is linked to growth. Contrary, in developing economies which adopted managed float regime were seemed to have outperformed other economies which have adopted flexible regimes. Therefore, they concluded that depending on how developed economy is, determine whether exchange rate will impact on growth or otherwise. According to Sokolov et al.

(2011) observed that flexible exchange rate regime has positive effect on growth while on the other hand fixed exchange rate regime has negative effect on economic growth (Levy-Yeyati and Sturzenegger, 2003). But in advanced countries there is no significant relationship between growth and floating exchange rate regime. Ma and McCauley (2011) suggest that intermediate exchange rate regime has direct association with economic growth in emerging economies but could suffer from flexibility. In another related studies Harms and Kretschmenn (2009) in arguing for advance industrial economies showed that classification of exchange rates policy give almost same results but these economies have higher growth rate under floating exchange rate regimes. On the other hand, developing and emerging economies when US currency peg by announcement and de facto stability in exchange rate usually have some significant level of positive effect on economic growth, however, the pegged current would eventually undermine economic development. Benhima (2012) stated that higher level of dollarization lead to adverse effect on economic growth. But, another thought believe that the choice of exchange rate regime would have direct effect on economic growth in developing economies in the long run.

Regarding the link between exchange rate and economic growth, existing studies show positive relationship between economic growth and exchange rate, but the link in developing economies is much stronger (Rodrik, 2008). The impact on growth could be negative or positive if the exchange rate fluctuates around its equilibrium level. However, Vieira (2013) concludes that highly fluctuated exchange rate has a negative effect on economic growth, while moderate volatile exchange rate has a positive impact on economic growth. Whatever it may be, currencies in developing and emerging economies are either overvalued or

undervalued which the market forces will either trigger currency appreciation or depreciation. Depending on the circumstance it could either affect economic growth positively or negatively, the depreciation of currency would positively impact on economic growth (Rodrik, 2008) and overvaluation reduces economic growth (Elbadawi and Kaltani, 2011). In a different view presented in by Gluzmann (2012) on exchange rate depreciation effect on different aspects of economic growth, argued that depreciation of exchange rate in developing economies enhances saving, employment and investment in the domestic economy but do not affect the export sector of the economy.

2.6 Studies on Nonperforming Loans, Exchange Rate and Economic Growth and the Knowledge Gap

Several studies have been carried out on account of the nonperforming loans, economic growth and exchange rate at country level and cross country level. This thesis reviews studies on both single economy studies and cross country studies and then identify knowledge gap in literature.

2.6.1 Nonperforming Loans in Single Economy Studies

Louzis and Metaxas (2011) using the panel data methods (dynamic) to examine the factors that causes NPLs in the banking sector of Greek by disjointing each class of loan, thus, mortgages, business loans, and consumer loans. The study shows that, for all loan classes, macroeconomics variables can be used to explain the NPLs in the banking system. Among the macroeconomics variables includes interest rate, unemployment public debt, GDP, and

exchange rate. Differences in NPLs categorization shows that mortgage NPLs was seen to be the least responsive to quantitative impact of macroeconomic factors.

In US during the financial crisis period Hyun and Zhang (2012) examined the impact of macroeconomic and bank specific factors of nonperforming loan in a pre-financial crisis (2002-2006) and during financial crisis (2007-2010). Using macroeconomic factors like GDP growth rate, unemployment and lending rate and bank specific factors like solvency ratio, inefficiency, bank size, non-interest income and return on equity. Before the financial crisis period, GDP growth lending rate and unemployment had inverse effect on nonperforming loans. Which they explained had inverse effect on lending rate, indicating that of lending rate reduces ability of household and firms to borrow. But during the crisis period GDP growth rate and unemployment have a negative impact on nonperforming loan.

Saba et al.,(2012) examine the determinants of NPLs using data from 1985 to 2010 in the US Banking Sector by utilizing correlation and OLS regression approach. The study considers macroeconomic variables of inflation, total loan, and Real GDP per Capita independent variables and NPLs Ratio as dependent variable. Macroeconomic variables selected have significant impact on NPLs ratio but the coefficients values were not much high. They suggested the need for banks to control and revise their credit spread policy with reference to macroeconomic variables to have lower NPL ratio.

A study by Jordan and Tucker (2013) they examine economic output and variables affect NPLs with data spanned from September 2002 to December 2011 in The Bahamas using a Vector Error Correction model (VEC). As the study also seeks to determine if there is any feedback response from NPLs to economic growth. The main findings reveal that economic growth activity tends to lead to a fall in NPLs, and also found a feedback effect from NPLs to output.

Also, Ahmed and Bashir (2013) carried out a study on macroeconomic determinants of nonperforming loans in Pakistan banking sector. Using 30 commercial banks from 1990 to 2011. The study aim was to examine the impact of GDP growth rate, credit growth, unemployment rate, inflation, lending rate and consumer price index on nonperforming loan. The finding shows that there were negative impact of GDP growth rate and lending rate on nonperforming loans. In justifying the negative relationship between lending rate and nonperforming loan they argued that as lending rate increase, individual with funds start saving with banks to gain returns on the funds but investors are reluctant to borrow to invest.

Şahbaz and İnkaya (2014) analyzed the correlation between non-performing loans and macroeconomic variables (GDP growth, individual fixed capital expenditures, domestic loan volume of banking sector and total personal consumption expenditures) with quarterly data in the period of 1998Q2-2012Q3 using VAR and Granger causality test. In the co-integration analysis, a relationship (long-run) was found between NPLs and macro-economic variables and there was bilateral relationship.

Sheefeni (2015) examined the macroeconomic determinants of NPLs in Namibia by using quarterly data from 2001Q1 to 2014Q4 and employing the Granger causality, co-integration, technique of unit root, forecast error variance decomposition and impulse response functions. The results found a relationship (long run) between NPLs and log of interest rate, GDP and inflation rate. And there seems to be unidirectional causality from interest rate to NPLs in the long run. Besides, in the short run there was unidirectional causality running from all the macroeconomic determinants to non-performing loans. Hence given indication that macroeconomic variables play a role in determining non-performing loans in the long run, while log of GDP and exchange rate are involved in the short run.

Islamoglu (2015), in his study in Turkey, he analyzes the effect of macro-economic variables on NPL Ratio of publicly traded banks by quarterly data from the period of 2002Q4 and 2013Q3. Using Wald Test, Granger causality and VAR. It was found that public debt stock/GDP ratio and loan interest have a causality relationship (short run) with the ratio of NPLs. The Granger Causality revealed that a bilateral relationship between change in loan interest rates, and Public Debt Stock/GDP ratios and change in NPL ratio. The econometric examination shows that changes in NPL ratio can be explained by macro-economic variables. Amuakwa-Mensah and Boakye-Adjei (2015) studied the determinants of NPLs in Ghanaian banking sector, spanning from 1998-2009 with the aid of panel regression model. It was discovered that macro-economic variables of growth in previous year's inflation, real GDP per capital growth and real effective exchange rate had significant effect on NPLs in the Ghanaian banking sector. In addition, sub sample estimations disclosed that macro-economic factors used in the study affect NPLs of large banks. But, specific bank variables such as

previous year's NPLs and current year's loan growth are important in explaining NPLs for small banks this is not the case of macroeconomic factors.

2.6.2 Nonperforming Loan in Cross Economies Studies

Skarica (2013) look at the determinants of nonperforming loans in central and eastern European countries, by considering 7 central and eastern European countries from 2007 to 2012 with fixed effect model. The study used GDP growth rate, market interest rate, loan growth rate, unemployment and inflation as a determinant of nonperforming loans. The result shows that unemployment rate and GDP growth rate have significant negative impact on nonperforming loan. It was explained that a falling during expansion and rising during recession influence the level of nonperforming loans.

In the study carried out by Beck et al. (2013) using a novel panel data set with 75 countries to examine macroeconomic determinants of NPLs. According to their dynamic panel estimates, share price, exchange rate, real GDP and the lending interest rate were established to affect NPLs ratio significantly.

Also, Jakubik and Reininger (2013) in their survey study in European countries banks through the utilization of Panel data analysis by examining economic variables that affect nonperforming loans ratio. The study observed that the economic growth is the leading economic variable that affects NPLs ratios of banks, which signaled a negative correlation. Additionally, the study observed factors like exchange rate and high degree of lending in foreign currencies to explaining the change in NPLs ratios of banks. The survey further

discovered that the high growth of loan and the degree of which foreign currencies lending are growing would pose a threat in terms of bank asset quality, depending on the rate of lending in foreign currencies loans. There was evidence of local currency depreciation had a negative significant impact on assets quality.

In a related studies Klein (2013) investigated NPLs and impact on macroeconomic performance in Europe using data from 1998 to 2011 and utilizing fixed effect, difference GMM and system GMM. The study observed that the level of NPLs can be credited to macroeconomic conditions like GDP, inflation, exchange rate and unemployment and specific bank factors. Though the specific bank factors had relatively low explanatory powers. The study concluded that there was a broad confirmation of strong macro financial linkage to NPL in the region after feedback effect examination. As it is observed, NPLs found to respond to changes in inflation, GDP growth, exchange rate and unemployment, the finding shows that there are strong evidence of feedback effects to the real economy from the banking system, thus signifying that the increase in NPLs in Europe currently face adversely affect the speed of economic recovery.

Marijana et al., (2013) investigated the determinants of NPLs, evidence from Southeastern European banking systems, data covering 2003-2010 aided by Generalized Method of Moments estimator for dynamic panel models. The study covers both macroeconomic and specific bank factors. The finding reveals that slow economic growth, rising inflation and continue increasing in interest rate are associated with higher NPLs. Additionally, NPLs is affected by variables of specific bank factors like bank size, Return on Asset and solvency.

Messai and Jouini (2013) investigated 85 banks from Italy, Greece and Spain from 2004 to 2008 to find out micro and macro determinants of NPLs, using panel data analysis. The macro-economic variables were the unemployment rate, GDP growth rate, and real interest rate and specific bank variables were return on assets, the change in loans and the loan loss reserves to total loans ratio. The study found that NPLs vary negatively with the growth rate of GDP, the profitability of banks' assets, however, positively related with unemployment rate, the loan loss reserves to total loans and the real interest rate.

Makri et al. (2014) in their study in the Euro zone, identify factors affecting nonperforming loan from 2000 to 2008 before the recession started by using 14 countries. The study used difference Generalized method of the movement (GMM) method of estimation. The macroeconomic variables used include; budget deficit, GDP growth rate, public debt, lending rate and unemployment rate. While GDP growth rate have negative significant impact on nonperforming loans, lending rate and unemployment had positive significant impact on nonperforming loans.

2.6.3 Exchange Rate and Economic Growth In Cross Countries Studies

In economic literature, fluctuations of exchange rate and economic growth relationship have shown a mix results thus inconclusive. Some evidence in the studies has proved that fluctuation in exchange rate is good to promote economic growth. While others see it as a necessary evil to economic growth.

Analyzing data of 183 economies from 1974-2000, Edward and Yeyati (2003) concluded that countries with flexible exchange rate, economic growth is faster than countries with rigid exchange rate. They argue that nations with flexible exchange adapt faster and better to negative shocks than rigid exchange rate.

Schnabl (2007) examine exchange rate stability and economic growth in emerging European monetary union from 1994-2005 in 41 countries. The study concluded that exchange rate stability aid in the economic growth process of the nations under consideration especially economies that have maintain stable exchange rate to the Euro.

Bahmani-Oskooee and Hajilee (2013) analyzed the exchange rate volatility and components of aggregate demand from 1975-2008 in 36 economies by applying error corrected model. They observed that exchange rate volatility can disturb the path to economic growth.

Kandil (2015) examined exchange rate volatility and economic growth in developing economies in Latin America and the Caribbean from 1981-2000. The findings show that higher rate exchange rate unpredictability is associated with real growth.

In a similar study for 10 emerging economies with quarterly data from 1995 to 2014, Bahmani-Oskooee, Kutan and Xi (2015) find short term and long term effects of exchange

rate volatility on private consumption for 8 and 5 countries respectively, 4 from the 5 long term relationships were negative. Bahmani-Oskooee et al. (2015) examined long run and short run relationship of exchange rate volatility and growth from 10 emerging countries from 1995-2014. The study found that in the long run exchange rate volatility has effect on economic growth. While others were seen to have a positive relationship some were negative relationship.

2.6.4 Conclusion and Literature Gap

A lot of researches have been conducted on determinants and the impact of NPL of Banks, given evidence that bank specific and macroeconomic factors influence the occurrence of NPLs. Similarly, there are increasing dozens of studies showing the determinants and impact of exchange rates on economic growth. There are quite empirical evidences showing convincingly, favorable macro-economic environments, such as interest rates, exchange rates, sustained economic growth and low unemployment tend to be connected with a better loan quality of bank. We have seen a mix result in the association between economic growth and NPLs, owing to the fact that various studies have used different indicators of economic growth and as well as methodology in analyzing the data. The literature reviewed in this study covers studies on both developing (Merging) and developed countries' banking industry. Notwithstanding, several studies on the subject, there are only few available literature in this area of research in African. A further evaluation of the works reviewed above using exchange rate as a control variable suggest that work on the association between exchange rate and economic growth is still scarce in Africa even though exchange rate volatility is prevalent in Africa.

Again, works on exchange rate volatility and economic growth is fairly inconclusive and depending on the economy and the region in which the study is carried out, shows the direction of the result. Even though there are several time series as well as country-specific studies, these studies are based on different measures of economic growth, NPLs and exchange rate.

Several studies on the impact of NPL, and exchange rate on economic growth (e.g. Ahlem et al., 2013; Beck et al., 2013; Klein, 2013; Sheefeni, 2015; Osei-Assibey and Asenso, 2015), however, so far it seems no study has been carried out to examine the interactive effect of exchange rate deteriorating and NPLs on the economic growth. As it is known that in an economy these two variables do not operate in isolation. While existing research in Africa may directly relate to NPL, exchange rate and economic growth, the interaction effect of NPLs and deteriorating exchange rates is new to the knowledge of the researcher in global research. This study attempts to address this gap by adding to the current discussion on exchange rate and NPL contribution to economic growth in Africa.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter of the study discusses the theoretical and empirical model used in the study to examine the impact of exchange rate, nonperforming and the interaction of these two variables on economic growth in Africa. It equally discusses statistical methods and the needed diagnostic tests within panel regression models in the examination of the variables impact.

3.1 Data Scope and Source

The study employs secondary data chiefly drawn from world Development Indicators (WDI) from the World Bank database, 2016. Africa is made up of 52 countries but due to lack of data availability on key variables from some of the countries, 15 countries with annual data was used for empirical analysis.

The study covers the year period of 2002-2014 that is 13 years which account the period of global financial crisis arising from the 2008 and economic downturn in the Africa. However, non-availability of data for some variables and countries serves as a barrier for choosing the time period of 14 years and 15 countries.

3.2 Data Analysis

The study uses both econometric and descriptive analysis based on the panel data set from 2002 to 2014 to examine the relationship between the interest variables in Africa. The collected data from the different sources were checked, coded and entered into excel to make data ready for analysis. It would be exported in Stata 12/IC version software packages for the analysis.

3.3 Model Specification

The traditional solow growth model tries to account for endogenous growth theory and the gap models seem to have offered advancements over the H-D model. According to Bogunjoko (2004), in literature several growth models have been advanced in response to policy needs and to account for the missing variables in the neoclassical paradigm. Given the finding of Levine and Renelt (1992), they suggested human capital, investment and population as prime explanatory variables for economic growth. Therefore recognizing the contribution of government policies on economic growth, nascent empirical growth models make inclusions of some significant policy variables. Since this study is interested in the policy variables, some of these growth variables are controlled by some known traditional variables that explain growth.

Also, normally, economic growth is model empirically to include economic activities and policy variables. In the modelling of economic growth the study includes variables that are known to impact on growth (capital and labour) in literature as control variables in the

traditional production function. To account for economic growth, it is a traditional to relate the level of output to factor inputs. This permit to specify the production function as follows,

$$Y = f(K, L, A) \quad (1)$$

Where

Y= Economic growth

K = Capital

L = Labour

A = total factor productivity

$$A = h(E, C) \quad (2)$$

Where:

$$E = (NPL, EXR, NPL * EXR) \quad (3)$$

$$C = (INF, UNE, TDE) \quad (4)$$

Where:

NPL = nonperforming loans

EXR = Exchange rate

NPL*EXR = Interaction term

INF = Inflation

UNE = Unemployment

TDE = Trade

$$Y = f(K, L, E, C) \quad (5)$$

Remodeling the production function in equation (5)

$$Y_{it} = B_0 + B_1 K_{it} + B_2 L_{it} + B_3 E_{it} + B_4 C_{it} + e_{it} \quad (6)$$

Transforming the form equation (6) into log form gives

$$\ln Y_{it} = B_0 + B_1 \ln K_{it} + B_2 \ln L_{it} + B_3 \ln E_{it} + B_4 \ln C_{it} + e_{it} \quad (7)$$

A natural starting point for a theory of growth is the aggregate production function, which relates the total output of a country to the country's aggregate inputs of the factors of production. Consider the neoclassical production function above in equation (1). Output depends on the aggregate labour input (L_t), the aggregate capital input (K_t) and a productivity parameter (A_t). Of course, it is a simplification to consider only three determinants of output. The study account for other factors like nonperforming loans and exchange rate, and our factors could be further subdivided, for example by distinguishing labour of different quality. It turns out, however, that a production function of the simple form all we need to match the stylized facts of economic growth. The production function exhibits above shows constant returns to scale, which means that if we double both inputs, output also doubles. Our choice of a constant-returns-to-scale production function is not by accident: most results in this section hinge on this assumption, indicating the potential sources of growth in output Y_t . Either the inputs L_t and K_t if we want to explain economic growth, we need a theory that explains how the population (i.e., labour), the capital stock, and productivity change over time. Therefore, the inclusion of capital and labour in the model was dependent of the fact

that capital and labour have a long standing theoretical basis of determine growth (Nnanna et al., 2004)

3.3.1 Panel Estimation (Static)

The study first measure the effect of nonperforming loans and exchange rate on RGDP per capita using fixed effects estimations so as to account for time-constant unobserved heterogeneity between counties. More so, because regression analysis is restricted to specific number of countries and all variables are varying with time, it is reasonable to apply this estimation technique as one of the methods. The application of fixed effects estimations permits the unobserved country specifics to be corrected arbitrarily with the determinant of growth or nonperforming loans as the case maybe use as a dependent variable. Under the assumption of strict endogeneity also considers country specific differences. Additional, it corrects the possible omitted-variables bias problem by controlling for country specific effects.

It is also possible to use random effects method so as to deal with the unobserved heterogeneity issues but the additional orthogonality assumptions between the unobserved country specifics and the determinants of growth and/or nonperforming loan may not hold. It is therefore appropriate to apply Hausman test suggests that there is a strong evidence supporting fixed effect estimation. So as a robust check this study runs both the fixed effect and random effect.

3.3.2 Panel Estimation (Dynamic)

The study employs dynamic panel regression model to estimate the effect of nonperforming loans, exchange rate and the interaction term on economic growth in Africa. And also the effect of exchange rate on nonperforming loans in Africa. The main independent variables for economic growth are primary modelling are (exchange rate and nonperforming loans and the interaction term). And the principal independent variable of nonperforming loans is exchange rate. The addition of lagged of RGDP per capita is geared towards incorporating the persistence of the variables in the estimation. Also, the application of dynamic panel model would aid account for temporary serial correction and minimizes the possibility of estimating spurious regression model.

In more general form, dynamic panel regression is specified as:

$$Y_{it} = hY_{it-1} + bX_{it} + u_i + v_{it} \dots\dots\dots(8)$$

in equation (8), Y denotes GDP per capital, X is all the possible independent variables introduce in the model, v_{it} account for stochastic error term, u_i represents unobserved country-specific time variant effect, β , η are the parameters that would be estimated in the model, 't' is time and 'i' is stand for a particular country.

In recent literature, the commonest method for examining the nonperforming loans and macro-economic variables nexus are cross-country regressions with a panel dataset. As the estimates of β (the independent variables) can be biased for a number of reasons, these may include omitted variable, reverse causation and measurement error. Hence there is the need

for a suitable estimation method to be applied so as to obtain unbiased, efficient and consistent results of the coefficient. To deal with these biases studies have used dynamic panel regressions with lagged values of the independent variables as instruments which is shown in equation (8).

In literature two main estimation techniques are identified as effective tools as the GMM, called the instrumental (IV) and two stage least square estimation (2SLS) methods but because they use external instruments it has weaknesses. The approach uses external variables to correct for possible endogeneity among variables as instruments, but the instrument hardly passes the test of relevance and validity of good instruments and are mostly weak. Indeed both IV and 2SLS techniques rely on getting another variable that is correlated with the independent variable causing and is not correlated with the error term. Given the presence of heteroskedasticity, the GMM estimation techniques produce efficient estimates than that of the IV and 2SLS.

As the errors become heteroscedastic, the IV estimators that employ linear mixture of the instrument become inefficient instead GMM is an efficient estimator (Stock and Watson, 2007). Using GMM, the lag of the endogenous variables are used as instruments, in the case the endogenous variables are predetermined therefore are uncorrelated with the error term. In any case the GMM technique gives efficient and consistent estimates of the parameters.

To account for the persistence of GDP per capita, the study employs dynamic panel specification which includes the lagged logarithmic difference of the dependent variables in

the models, which bring about autocorrelation problem. This means that the lagged dependent variable is expected to be correlated with the error term in the model. In such a case, using Ordinary Least Square of the fixed effects to estimating equation (8), the results would provide inefficient and biased estimate. In order to address this problem and use OLS to estimate the model, the within-group estimator is applied to transform equation (8) by differencing the time series of each variable for each country.

Again, there are two types of GMM estimators as shown in literature, called the difference GMM and the system GMM. Given the difference GMM as provided by Arellano and Bond (1991), they sought to solve the inconsistency problem because of the endogeneity among the model variables by applying the first differencing of the estimated equation (8) to gain the relational function of the form in (9) below.

$$Y_{i,t} - Y_{i,t-1} = \eta_1 (Y_{i,t-1} - Y_{i,t-2}) + \beta_1 (X_{it} - X_{i,t-1}) + (v_{it} - v_{i,t-1}) \dots \dots \dots (9)$$

The equation (9) drops the country specific effect hereby addressing the inconsistency and biases due to endogeneity with the aid of lagging the endogenous variables as instruments. The difference estimator leaves on moment condition given the assumption that, there are weak exogeneity of the explanatory variables and also no serial correlation as specify in the equations stated below:

$$E\{Y_{i,t-1}(v_{i,t} - v_{i,t-1})\} = 0, t = 3, 4, \dots, T \dots \dots \dots (9.1)$$

$$E\{X_{i,t-1}(v_{i,t} - v_{i,t-1})\} = 0, t = 3, 4, \dots, T \dots \dots \dots (9.2)$$

Difference GMM aids in addressing endogeneity among variables but with limitations. As the difference GMM truly remove time-variant country-specific effect which may cause misspecification of the model. But the difference GMM may produce weak instruments problems if the regressand is most likely to be highly persistent given the difference method anchor strong biases. The asymptotic properties of the difference estimator are undermine by weak instrument and as such is harmful to a sample size which is small in the way that it increases variance of the coefficient and as well bias the small samples coefficient.

However, in the wake of the shortfalls in the difference GMM, Arellano and Bover (1995) and Blundell and Bond (1998) model system GMM to address the problem of weak instrument provided in the difference GMM technique using difference and level equations. The effectiveness or the efficiency under estimation equation is improved if moment conditions of its level form and the differenced form are combined (Roodman, 2009). The system GMM takes into account additional moments conditions as shown below:

$$E\{(Y_{i,t-1} - Y_{i,t-2})(u_i + v_{it})\} = 0, t = 3, 4, \dots, T \dots \dots \dots (9.3)$$

$$E\{(X_{i,t-1} - X_{i,t-2})(u_i + v_{it})\} = 0, t = 3, 4, \dots, T \dots \dots \dots (9.4)$$

Lagged differences are employed as instruments for the endogenous variables in the level equations since these values become the appropriate instruments in the light of the supplementary moment conditions. The additional moment conditions are working on underlining assumptions, that there is a possible correlation between the country-specific

fixed effects and the predetermined variables of the equation and also there aren't correlation between the lagged differences and the specific- country fixed effects. By so doing it is able to solve the endogeneity problems by the use of lagged values of the independent variables as instrument thereby, producing consistent and unbiased parameters even with small time period (T) and large countries (N).

It is known that dynamic panel GMM estimator is able resolve the issues of endogeneity, measurement error with OLS estimation and omitted variables biases, however, it depicts weak instrument problem (Roodman, 2009). But alternatively, Kumar and Woo (2010) opine that system GMM is the technique mostly preferred in spite of the fact that it sometimes shows weak instruments drawbacks. To validity of the instruments within the system GMM, the Sargan test of over-identifying restriction is use to ensure the validity of the apply instrument in the model if the null hypothesis is not rejected which will assures that the over-identifying restrictions are valid. Moreover, AR (1) and AR (2) will be used to test the autocorrelation in the error term. It is believe that Blundell and Bond's estimator is an independent idiosyncratic error term, in that the AR (1) test would reject the null hypothesis, while the AR (2) test would not reject the hypothesis of no or zero correlation.

3.4 Diagnostic Tests

The study run some sensitivity tests to guarantee that the model is free from issues of biases with the regression analysis (panel) are eliminated. Priori estimation diagnostic test like unit root test and the after estimation test such as autocorrelation, mulicolinearity,

heteroskedasticity and endogeneity test are performed to guarantee the appropriateness of the model and variables.

3.4.1 Unit Root Test

The stochastic process is stationary if its mean, and variance are constant overtime and the covariance value between two time periods depends purely on the distance between the two time period but not the time covariance was computed at it actual time. To make sure that the use variables are stationery and to avoid the manifestation of spurious regression results, unit root test is carried. Amid the various most popular ways of testing unit root in panel regression analysis are Im, Pesaranans Shin (IPS) test (2003), Levin-Lin-Chu test (2002) and he Fisher test. In light of these various techniques, the study employ Fisher test to examine the stability of the variables as per the reason cited by Wu (1999). Compare to others Fisher test does not need a balanced panel to generate robust output. Also, the Fisher test do not ask for simulation adjustment factors that perhaps are unique to specifications and sample size.

3.4.2 Autocorrelation

The situation where random error term u_{it} is correlated over time for a countries, then is referred to as Autocorrelation. Error term is auto-correlated if and only if

$$\text{Cov}(u_i, u_j) \neq 0, \text{ for } i \neq j. \dots\dots\dots (10.1)$$

Autocorrelation is as a result of model misspecification, manipulation of data spatial ordering and event inertia. In equation 1 dynamic panel model is connected to persistence because dependent lagged variable is introduced as explanatory variable and the existence of heterogeneity among countries as a result of individual country specific effects. Additionally, the instituting of lagged dependent value as independent variables bring about the autocorrelation bias in the model. In that the dependent variable is a function of a segment of the error term and also its lag is a function of the error term. Therefore, when first lag is taken in equation 1, it is given below:

$$Y_{it-1} = \eta Y_{it-2} + \beta X_{it-1} + \nu_i + \nu_{it-1} \dots \dots \dots (10.2)$$

From equation 1 and 10.1 above, it is observed that the response variable and its lag are all functions of the specific-country time variant segment of the error term. Hence $Y_{it} = f(u_i)$ and also $Y_{it-1} = f(u_i)$ suggesting that the lagged response variable is correlated with the error term in the model. Following the specific-country time-variant effect in panel data set it may account for autocorrelation in the model. So, in the light of the existence of serial correlation it renders OLS parameter inconsistent and biased estimates.

3.4.3 Heteroscedasticity

In OLS one underlying assumption is homoscedasticity. Thus, variance and error term are constant but within the panel regression this assumption breaks down because of the existence of unobserved variables that are constant over time but vary across countries within the data. Heteroscedasticity occurs when the variance of the unobservable error μ_{it} varies, then

the conditional on the regressors is not constant and the variance may be a function of explanatory variables as specified below;

$$\text{Var}(u_{it} / X_{it}) = \sigma^2 h(X_{it}) \dots\dots\dots(10.3)$$

Although, the unbiasedness of OLS is not affected by heteroscedsticity instead it runs variance and parameters inefficient.

3.4.4 Endogeneity

Endogeneity arises in multiple regression model if there is a correlation between error term and any of the exogenous variables.

That is $\text{Cov}(X_j, u_{it}) \neq 0$ for some $j=1 \dots\dots\dots k$.

The endogeneity is as a result of omitted variable, simultaneity in the regression model and error in measurement. The biasedness of omitted occurs when OLS is use in a regression model that excluded key variable due to data unobtainability and the excluded variable has correlation with either one of the regressors and in part which determine the response variable. In the case of measurement error, it arises because of reporting or coding error. However, when the error is associated with the dependent variable, the zero mean assumption is violated which means there isn't any endogeneity but in the case of explanatory variables then endogeneity problem occurs.

Simultaneity occurs if either one or more than one regressors has/have jointly determined the response variable by way of equilibrium mechanism. Causality between the endogenous and

exogenous variables can potentially bring about endogeneity problem. There is a suspicion of causality between DGP per capita and nonperforming loans and this by far may violate OLS exogeneity weak assumption making parameters estimates non-robust. The study adopted Durbin-Wu-Hausman test to investigate the residual if there exist endogeneity or otherwise to aid in choosing appropriate estimation method.

3.5 Description of Main Variables

Going ahead to embark on the empirical investigations to show the impact of exchange rate and nonperforming loan on economic growth and the impact of exchange rate on nonperforming loan in Africa, the following principal variables of interest are described to bring a preliminary explanation for the relationship between key regressors.

3.5.1 Economic Growth [Real Gross Domestic Product (RGDP)]

Lipsey (1956) defined economic growth as constant positive movement in an economy's output (total) over a long time period. Therefore, by the definition it implies economic growth is a sustained increase in output in a given economy over a period of time. Evidence adduced from empirical investigations show growth is mostly measured by real GDP, GDP growth, GDP per capita growth.

GDP is the final market value of all goods and services that a country produces during a specific time period normal one year. GDP growth is seen as a symbol of a country's progress, which is calculated with the sum of public and private consumption and with

investment both public and private if the expenditure approach is applied. A stagnant economy is seen as an economy which growth rate is slow hence such economy is suffering from recession where output, prices and employment level is not maintained up to a preferred level. GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Therefore, in this study adopts GDP per capita consistent with (Amuakwa-Mensah and Boakye-Adjei, 2015; Saba et al., 2012) as a measure of economic growth.

3.5.2 Exchange Rate

Exchange rate is the rate used to exchange one currency with another one. Exchange rates are determined by the continuous foreign exchange markets which remain open for 24 hours a day except weekends which takes into account different kinds of currency traders. The exchange rate is mostly influenced by exchange of capital goods and services across boarder that is international trade. A fall in home currency results in costly imported products which mount more pressure on financial letters of credits issued to traders commercial banks and the possible risk of default rises. Following the measurement of Amuakwa-Mensah and Boakye-Adjei, (2015), real effective exchange rate is the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs.

The interpretation of the effective exchange rate is that if the index rises, other things being equal, the purchasing power of that currency also rises (the currency strengthened against

those of the country's or area's trading partners). That will reduce the cost of imports but will undermine the competitiveness of exports.

3.5.3 Nonperforming Loans

The primary source banks income is loans which form a significant percentage of their income, therefore expanding credit, may eventually leads to profit maximization. Since loan is seen to be more viable area of trade than other assets, banks are more willing to grant much of it available resources as loan, but the safety of some of these loans is what concerns the bankers. Bankers try maximizes profit at the same time managing risk of possible default as it will reduce profit as well as capital. Loan losses and defaults put banks in a tight situation even though security are held against such loan, they cannot guarantee fully payment in the event of default such security can take of it. Only when such risk comes to past that loan turns into nonperforming loans. This is a default loan that banks are not able to make profit from and cannot be recovered as per the loan agreement. Loan that has gone pass 90 days without payment. In Africa countries, the reasons for loan default have a multidimensional phase and various studies have concluded various reasons for loan default. Nonperforming loan is proxy by the accumulated nonperforming loan to total gross loan for the year, consistent with the studies of (Amuakwa-Mensah and Boakye-Adjei, 2015; Beck et al., 2013).

Table 3.1: Summary Of Variables

Acronym	Variables	Description and measurement	Expectation
RGDP	Real Gross Domestic product Per capita	Natural log real gross domestic product at time t GDP per capita is gross domestic product divided by midyear population. Both dependent and independent variable	If use against NPL (-)
NPL	Nonperforming Loan	Percentage nonperforming loan to gross loans at time t Both dependent and independent variable	If use against GDP (-)
EXR	Exchange Rate	Is the natural log real effective exchange rate at time t	If use against GDP (+) If use against NPL(+)
UNE	Unemployment	The percentage of labour force unemployed to total labour force at time t	If use against GDP (-) If use against NPL(+)
INF	Inflation	The inflation at time t. The rate of inflation is measured by the annual percentage change in consumer prices.	If use against GDP (+) If use against NPL(+)
FDI	Foreign Direct Investment	It is measure by FDI to GDP at time t Foreign direct investment are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating	If use against NPL(-)

Acronym	Variables	Description and measurement	Expectation
		in an economy other than that of the investor.	
POP	Labour	It is proxy by the total labour force at time t. This is the number of people who find themselves in the employable bracket as per the national estimate. It is measured by taken natural log of the labour force at time t.	If use against GDP (+)
TDE	Trade	It is the total export and import as a percentage of GDP at time t. It is measure as the percentage of the sum of export plus import to GDP.	If use against GDP (+)
KAP	Capital	Is proxy by fixed capital formation at time t. it is measure by the value of acquisitions of new or existing fixed assets by the business sector, governments and pure households (excluding their unincorporated enterprises) less disposal of fixed assets. It is a component of the expenditure on gross domestic product and thus shows something about how much of the new value added in the economy is invested rather than consumed.	If use against GDP (+)

CHAPTER FOUR

PRESENTATION AND DISCUSSION OF RESULTS

4.0 Introduction

The result from the estimation, on the effect of exchange rate, and nonperforming loan on economic growth in Africa and the effect of exchange rate on nonperforming loans are obtained, presented and analyzed in this chapter. The empirical findings covers the period from 2002-2014 (13years period) in Africa. This study presented finding from both static and dynamic estimated coefficients and the t-statistic as well as showing their statistical significance.

This study therefore prefers the outcome from the system GMM to the others because it is better place to produce consistent and unbiased results than the other because of the nature of the data.

4.1 Descriptive Statistics

This aspect of the study show the descriptive statistics of the response and independent variables applied in the study. The response variables were Real Gross Domestic Product per capita (RGDP) and nonperforming loans (NPL) and in each case one serve as independent variable to other in addition to other regressors in each model. The explanatory variables were exchange rate (EXR), inflation (INF), Labour (POP), Capital (KAP), Trade(TDE), lag of RGDP, Unemployment (UNE), lag of EXR, The descriptive statistics present the mean,

standard deviation, minimum and maximum values of the used variables. Below table 4.1 shows the descriptive statistics.

Table 4.1: Descriptive Statistics

Variable	Mean	Standard Dev.	Minimum	Maximum
RGDP	3.282	0.423	2.565	4.024
EXR	1.678	1.092	-0.101	3.656
NPL	0.111	0.089	0.008	0.57
INF	0.068	0.066	-0.358	0.338
TDE	0.775	0.344	0.307	2.099
POP	6.670	0.603	5.654	7.734
KAP	11.234	1.019	8.963	13.250
UNE	0.119	0.086	0.006	0.386

From the table 4.1 , real GDP per capita in the selected countries used in the empirical analysis average around 3.282 for the period under consideration with minimum of 2.565 and maximum of 4.024. The differences in real GDP per capita may be as a result of rate of growth in population and the domestic activities of the economies and external operators like falling prices of commodities and of course the global crisis which led to the economic downturn.

Real exchange rate account for an average of 1.68 percent depreciation per annum with minimum of 0.10 percent appreciation and a maximum of 3.66 percent depreciation with standard deviation of 1.10 percent. Also, the real exchange rate differences Africa governments and monetary authorities' policy direction for the countries used in this study. Most governments in Africa policies turn to weakness the local currency against the major trading currency which is the bases for the differences in real exchange rate.

In the same period nonperforming loan averaged around 11.10 percent with the minimum of 0.8 percent and maximum of 57.00 percent. Since the year 2000 nonperforming in the Africa continent has been increasing and the situation was worse by the global financial crisis. Even after the world exits from the crisis still Africa nations' loans are not performing and it is not surprising that some countries would experience as high as 57 percent.

Inflation was averaging around 6.80 percent per year for the economies under consideration in this study. While other economies recorded a minimum inflation rate of -35.8 percent which is deflation instead and the maximum of 33.8 percent per year. Some countries experience deflation in prices because of the unique nature of their economies and it is suspected that goods and services were overpriced and the economy rebalanced in the period of the deflation. Again, the high level of inflation shows that most of the inflation in Africa is imported because of the importing nature of the Africa economies and the volatility of the exchange rate in Africa.

Trade as a percentage of GDP stood at an average of 77.50 percent per annum with the maximum of 209.90 percent and minimum of 30.70 percent. Trade in Africa has been tremendously growing at a faster pace since Africa cannot operate to achieve its deserved growth without trade.

Population is represented as the labour force for the period and it showed an average of 6.670 per year for the countries under consideration and given a maximum of 7.734 and minimum of 5.654. The rate of growth in labour force in Africa is high.

Again, fixed capital formation during the period account for 11.234 on average with a standard deviation 1.019 and the minimum and maximum of 8.963 and 13.250 respectively.

The unemployment is given by the percentage of unemployed labour force and it showed average of 11.90 percent per annum for the selected Africa countries consideration. The minimum unemployed labour force for the period was 0.6 percent with the maximum of 38.6 percent. The rate of unemployment in Africa is still high given the people who are willing to work but still cannot find job to do as estimated by International Labour Organization (ILO).

4.2 Diagnostic Tests Result

To validate whether the model is suitable for estimation of the results in model, the study conducted unit root, hetroscedasticity, autocorrection and Sargan test. Further, Hausman test was carried out to choose between the fixed effect and random effect estimation based on the characteristics of the data. On the base of which the preference for the system estimation model will be justified.

4.2.1 Unit Root Test

Normally, unit root is a phenomenon of time series but testing for stationarity for panel might aid avoid unrelated regressions estimation. The Augmented Dicky Fuller (ADF) test for stationarity testing of variables was employed. It is argued that the inverse Chi-square test is most appropriate and efficient when testing for panel dataset (Choi, 2001).

Therefore this study adopts the inverse chi-square as the basis of decision making. The rule is that if the chi-squared probability of each variable is not greater than the level of significance, then null hypothesis is rejected with the conclusion that the variable is stationary or no unit root. On account of the unit root test below in table 4.2, the inverse chi-squared test show that some panels contain no unit root (stationary) in favor of the alternative hypothesis suggesting that the null hypothesis is rejected. Additionally, the modified inverse chi-squared, inverse logits and inverse normal affirm the potency of the inverse chi-squared result.

Table 4.2 Unit Root Test (Fisher Type)

Variables	Inverse Squared		Chi- Inverse Normal		Inverse Logits		Modified Inverse Chi-Squared	
	Statistic	p-value	Statistic	p-value	Statistic	p-value	Statistic	p-value
RGDP	39.7307	0.1102	1.2891	0.9013	1.2284	0.8885	1.2567	0.45
EXR	74.6753	0.0000	-1.5144	0.0650	-2.5493	0.0064	5.7676	0.0000
NPL	41.6841	0.0761	-0.4658	0.3207	-0.9171	0.1809	1.5084	0.0657
INF	125.1129	0.0000	-7.3066	0.0000	-8.7345	0.0000	12.2790	0.0000
TDE	26.8059	0.6334	-0.4135	0.3396	-0.3681	0.3569	-0.4124	0.6600
POP	27.0546	0.6204	0.9613	0.8318	0.6622	0.7445	-0.3803	0.6481
KAP	5.5840	1.0000	4.8664	1.0000	4.9026	1.0000	-3.1521	0.9992
UNE	64.0051	0.0003	-2.4696	0.0068	-3.3003	0.0007	4.3900	0.0000

4.2.2 Autocorrelation

Further, the study carried out test for autocorrelation among the first difference error term using Arellano and Bond test. The test result that there are no presence of auto-correction in AR (2) [second order] in table 4.6 and 4.7 show that the error term are not corrected with one another. Hence, the system GMM is most appropriate if no autocorrelation is presence since the technique is condition on the assumption of no autocorrelation. Additionally, the system GMM is in the capacity to yield consistent and unbiased even in the presence of autocorrelation and heteroskedasticity in the dataset.

4.2.3 Sargan Test (Over-Identification Restrictions)

To ensure the robustness of system GMM model, it call for instruments validity was employed in the estimation. The study therefore, using Sargan test, to test for the hypothesis that the over-identifying restrictions are valid. Following the result of Sargan test in tables 4.6 and 4.7 the study accept the null hypothesis and advances that the over-identifying restriction are valid for the model, hence the system GMM technique produces unbiased and consistent estimation output.

4.2.4 Test for Heteroskedasticity

In the event of existence of heteroskedasticity disturbs the unbiasedness of OLS property and the consistency of the parameters estimations are questioned. This implies that the results generated from OLS estimation given the presence of heteroskedasticity makes the outcomes unreliable and false. The study employs Breusch-Pagan/Cook-Weisberg test and the null hypothesis is that the error variances are all equal against the alternative hypothesis increase

(decrease) as the predicted values of the dependent variable increase. Following the result in table 4.3 below it shows there is presence of heteroskedasticity in the case of real RGDP per capita variable, the test reject the null hypothesis of no heteroskedasticity at 1 percent level of significance in each case.

Table 4.3: Breusch-Pagan / Cook-Weisberg Test For Heteroskedasticity

Real Gdp Per Capita (Rgdp)	
Chi2(1)	12.1
Prob>Chi2	0.0005

4.2.5 Choosing Between Fixed Effect and Random Effect

The assumption of fixed model which states that unobserved country specific effects differ across countries and on the basis of which the system GMM technique is usually suitable for dataset that fits the estimation of fixed effect model. Thus, the hausman test is performed to determine as to whether the data fits fixed effects or random effects model. We operate on the null hypothesis that the data follows random effects model. The result below in table 4.4 shows that the null hypothesis is rejected hence the data follows fixed effect model.

Table 4.4: Hausman Test For Fixed Or Random Effects

Chi2(7)	$= (b-B)'[(V_b - V_B)^{-1}](b-B) = 23.85$
Prob>Chi2	0.0045

4.2.6 Conclusion

Following the sensitivity tests conducted, it is evidence that system GMM estimation would provide reliable and consistent estimates for the model under consideration in this study.

4.3 Regression Results and Discussions

The outcome of various techniques used in this study for the empirical analysis are presented in this section. It shows the static panel estimations (fixed effect and Random effect) and dynamic panel estimations (difference GMM and system GMM). The results of the regression are based on the 15 Africa countries and data spanning from 2002-2014. Besides, the regression result discussion is done on the basis of the system GMM model estimation which is the preferred estimator for this study.

4.4 Economic Growth Model

4.4.1 Static Panel Analysis

Table 4.5 Results of Random Effect and Fixed Effect Estimation

Variable	Random Effect		Fixed Effect	
	(a)	(b)	(c)	(d)
NPL	-0.0211 (-1.60)		-0.0055 (-0.32)	
EXR	-0.0325 (-1.36)		-0.0555 (-2.13)**	
NPL*EXR		-0.0058 (-1.00)		-0.0072 (-1.05)
INF	-0.0109 (-0.65)	-0.0072 (-0.42)	-0.0137 (-0.75)	-0.0040 (-0.23)
TDE	0.0088 (1.57)	0.0090 (1.56)	0.0173 (1.84)*	0.0150 (1.58)
POP	0.0149 (3.19)***	0.0136 (2.80)***	0.0953 (1.68)*	0.0950 (1.66)*
KAP	-0.0136 (-3.17)***	-0.0124 (-2.82)***	0.0045 (0.55)	0.0021 (0.25)
UNE	-0.0558 (-3.31)***	-0.0489 (-2.82)***	-0.1869 (-3.91)***	-0.1762 (-3.68)***
GDP _{T-1}	1.0081 (191)***	1.0075 (183.18)***	0.8671 (27.63)***	0.8616 (27.45)***

EXR _{T-1}	0.0448 (1.8)*	0.01233 (2.68)***	0.0609 (2.36)**	0.0184 (1.16)
CONS	0.0221 (0.77)	0.0174 (0.58)	-0.2370 (-0.81)	0.2145 (3.17)***
R ²	0.9991	0.9990	0.9729	0.9718
Prob>Chi2	[0.0000]	[0.0000]	[0.0000]	[0.0000]

***denotes significance at 1% level, ** denotes significance at 5% level and * denotes significance at 10%. Values in () and [] are the *t*-statistics and probability values respectively.

Dependent variable is the log of real gross domestic product per person spanning over the period 2002-2014. Independent variables consist of percentage non-performing loans (NPL), real normal exchange rate (EXR) and the interaction term refers to the interaction of nonperforming loan and exchange rate (NPL*EXR).

Control variables includes, inflation(INF), Labour (POP) lag of real gross domestic product (GDP_{T-1}), lag of real exchange rate (EXR_{T-1}), Capital (KAP), unemployment(UNE) and trade (TDE)

RANDOM EFFECTS ESTIMATION

The outcome of the random effect estimations show that nonperforming loans has a negative relationship with RGDP per capita but insignificant. Therefore, the evidence show that a one percent point increase in RGDP per capita lead to a reduction in nonperforming loans. In the case of exchange rate, the findings show that it has negative relationship with real GDP per capita but insignificant. The interaction term of nonperforming loan and exchange rate has negative impact on RGDP per capita. The evidence shows that as exchange rate increase (depreciate) and nonperforming increases both contribute the reducing economic growth. Furthermore, the lag of real GDP per capita improves growth at 1 percent level of significance. Also, there is evidence that population is positively related to RGDP per capita at 1 percent level significance.

Again, fixed gross capital formation and unemployment are negatively related to economic growth at 1 percent level of significance in each case. This implying that as unemployment increases it retard RGDP per capita so it is for fixed gross capital formation.

FEXED EFFECTS ESTIMATION

The result from the fixed effect in the estimations of exchange rate, nonperforming loans and the interaction term is not different from the random effect in terms of sign and the level of significance except the EXR which became significant at 5 percent but there are slight differences in the magnitude of the coefficients. Same in the case of lag of RGDP per capita and the population and lag of EXR except the significant level changing from 1 percent level of significance to 10 percent in the case of population from 10 percent in (a) to 5 percent in (c) in the case of lag of EXR. FGCF which was significant under the random effect became insignificant and sign changed to positive. Generally, the interest variables remain the same in signs and significant levels with the exception of exchange rate in (c) which was significant at 5 percent. In the case of control variables, there were variations in the level of significance, magnitudes of coefficients and signs.

4.4.2 Dynamic Panel Analysis

DIFFERENCE GMM ESTIMATION

Table 4.6 Difference GMM And System GMM Estimations

Variable	Difference GMM		System GMM	
	(a)	(b)	(c)	(d)
NPL	0.0033 (0.10)		-0.0474 (-2.12)**	
EXR	-0.0201 (-0.55)		-0.0633 (-2.10)**	
NPL*EXR		0.0367 (2.59)**		-0.0227 (-2.19)**
INF	-0.0098 (-0.54)	-0.0191 (-1.05)	-0.0190 (-1.06)	-0.0092 (-0.51)
TDE	0.0044 (0.24)	0.0302 (1.45)	0.0288 (3.04)***	0.0317 (3.12)***
POP	0.3713 (4.44)***	0.4723 (4.94)***	0.0218 (4.07)***	0.0232 (4.18)***
KAP	0.0421 (3.31)***	0.0500 (3.86)***	-0.0131 (-2.87)***	-0.0145 (-3.01)***
UNE	-0.1421 (-5.53)**	-0.1082 (-1.84)*	-0.0902 (-4.56)***	-0.0804 (-4.18)***
GDP _{T-1}	0.4514 (8.15)***	0.3623 (5.95)***	1.0088 (189.9)***	1.0112 (186.47)***
EXR _{T-1}	0.0034 (0.13)	-0.0133 (-0.59)	0.0772 (2.56)**	0.0192 (3.6)***
CONS			0.0419 (-1.00)	-0.0572 (-1.30)
SARGAN TEST (OIR)			[0.344]	[0.150]
AR (1)	[0.000]	[0.000]	[0.000]	[0.000]
(AR(2)			[0.766]	[0.934]

***denotes significance at 1% level, ** denotes significance at 5% level and * denotes significance at 10%. Values in () and [] are the *t*-statistics and probability values respectively.

Dependent variable is the log of real gross domestic product per person spanning over the period 2002-2014. Independent variables consist of percentage non-performing loans (NPL), real normal exchange rate (EXR) and the interaction term refers to the interaction of nonperforming loan and exchange rate (NPL*EXR).

Control variables includes, inflation(INF), Labour (POP) lag of real gross domestic product (GDP_{T-1}), lag of real exchange rate (EXR_{T-1}), Capital (KAP), unemployment(UNE) and trade (TDE)

In the difference GMM estimation the findings in table 4.6 show that there is no significant evidence that exchange rate, nonperforming loans have impact on growth but the interaction term has significant influence on economic growth at 5 percent level of significance. Even though the signs remain the same as the case of random effect and fixed effect estimations. However, some variables have shown evidence positive significant effect on economic growth. These are the lag of RGDP per capita, population and fixed gross capital formation at 1 percent level of significance in each case. Additionally, unemployment has a negative effect on economic growth at 5 percent level of significance under (a) and 10 percent level of significance under (b). Also, the signs for the control variables remain almost the same as the case of fixed effect and random effect estimations.

The result of system GMM estimations are provided in table 4.6. Generally, the model is moderately successful in relation to spurious to the dynamics of the fatality rate since the specification tests of Sargan test of over-identifying restrictions is satisfactory and as well as the second order serial correlation [AR(2)] verifying the validity of the moment conditions and the absence of autocorrelation. Hence the instrumental variables applied in these models estimations are valid since there is no correlation between the instruments and the residuals.

SYSTEM-GMM ESTIMATION

From table 4.6 (c) above, prior to the expectations and consistent with theory, the results show a significant negative relationship between nonperforming loan and economic growth (RGDP per capita) at 5 percent level of significance. This confirms the finding of (Saba et al., 2012; Jordan and Tucker, 2013; Ahmed and Bashir, 2013; Sahbaz and Inkaya, 2014; Akinlo and Emmanuel, 2014; Sheefeni, 2015; Islamoglu, 2015; Amuakwa-Mensah and Boakye-Adjei, 2015) in their studies they found a negative relationship between nonperforming loan and economic growth. The increasing rate of nonperforming loans portfolio in Africa is generating economic contraction in the region. As Messai and Jouini (2013) put it, when there is economic improvement it generates a fall or reduction in nonperforming loan portfolio of the banking sector. This result suggests that the ability of debtors to honor their loan obligation is explained by the rate of economic growth in Africa. Further, when there is a strong continuous increase in nonperforming loan, it translates into reduction of investment which eventually retards economic growth. Hence economic growth reacts negatively to activities of household and corporate if their loan obligations are defaulted.

In Africa the foreign exchange rate market that is the dollar and other major trading currencies have been quite volatile. Therefore, inconsistent with expectation, the study found a significant negative relationship between exchange rate and economic growth (RGDP per capita) at 5 percent level of significance. The result suggests that increase in exchange rate brings about a fall in real GDP, consistent with (Slottje, 2000; Serven, 2003; Oleka et al., 2014). This is an indication that, higher exchange rate (depreciation) reduces investment in

the importation of equipment and raw materials that are needed to stimulate production which is a condition under which GDP will grow. As Serven (2003) argues, the negative relationship in developing and emerging countries is as a result of highly open economies with less developed financial sector, which is not far fetch in Africa. The volatility element in exchange rate beyond its equilibrium level as the case has been in Africa generally reduces economic growth in both short and long run (Alagidede and Muazu, 2016). In Africa exchange rate have been volatile following the abolishment fixed exchange rate regime and by far currencies are mostly overvalued. The result supports Vieira (2013) who concludes that highly fluctuated exchange rate has a negative effect on economic growth as the case has been in Africa. Whatever it may be, currencies in developing and emerging economies are either overvalued or undervalued, hence, the market forces either trigger currency appreciation or depreciation which have some sort of influence on growth. Following the result of the study weak exchange rate in Africa signal economic or national recession and the growth rate is responsive to the volatility or changes in exchange rate.

In table 4.6 (d), as it was anticipated that initially that exchange rate would have had positive impact on economic growth and nonperforming loan to have negative impact on economic growth, then the interaction term which would have captured the belief that depreciation in exchange rate would mitigate effect on the negative impact of nonperforming loan on the economic growth in Africa. The finding of the results shows that interaction is negative and strongly significant at 5 percent level of significance. This shows that a one unit depreciation of currency (for a given level of exchange rate) increases the negative impact of nonperforming loan on growth (RGDP). Supporting this study theory, which suggests that

there is contradictory view as to the impact of exchange rate on growth and this has been confirmed in empirical study. Nonperforming loans and Exchange rates in an economy do not operate in isolation but instead operate concurrently in the determination of growth in an economy. Hence, the interaction of these two variables produced substitute effect (Join-Force effect). Which means that exchange rate contribute to the growing nonperforming loans which produces economic contraction in Africa. Whatever, it is, this study have shown a strong evidence that in Africa depreciation exchange as it is widely belief to boast economic growth and eventually reduce rate of loan default instead contribute to increase in nonperforming loan which then causes reduction in economic growth.

Also, trade (c) and (d) in table 4.6 estimations show a positive relationship with growth at 1 percent level of significance. The positive relationship shows that trade bring about growth through expansion of economic activities such as employment, valuation addition, increase in output and among others.

Lag of real GDP per capita was included in the model with the believe that the previous year's real GDP per capita promote growth in the current year and also a measure of convergence in the traditional solo growth model. It is established that the previous year's RGDP per capita impact the current RGDP per capita at 1 percent level of significance. The study finds evidence that previous year's economic growth indeed promotes current year economic growth in Africa.

Again, contrary to the study expectation, there is negative relationship between inflation and economic growth (RGDP per capita) but was not significant. Therefore, inflation reduces real GDP per capita and therefore supporting the claim that beyond certain threshold inflation is harmful to economic growth (Quartey, 2010). Inflation reduces amount of good and serves that one can give the same level of nominal income. In the case of Africa inflation increase more than the rate at which normal income increases which effect demand for normal good hence the reduction in the output.

The study observed a positive relationship between population and economic growth in Africa at 1 percent level of significance. Suggesting that as population increase economic growth equally increase. Given the level of population in Africa, it shows population boom in Africa impact on growth. However, each economy must respond to Africa population boom with appropriate policies to achieve the kind of growth it needs. The policy action and choice over the years have indeed transform the population into healthy, educated somehow, empowered labour force that contribute to real sustained economic growth. Population which proxy labour confirm the classical tradition production function that labour is a key element in economic growth. Again, it has been predicted that the population changes in Africa particular the labour force bracket will have substantial impact on economic growth (Fougere and Merette, 1999) and we are just observing evidence to that effect from this study.

Furthermore, the study finds a negative relationship between capital and economic growth (RGDP per capita) at 1 percent level of significance. And also, negative relationship between

unemployment and economic growth (RGDP per capita) at 1 percent significant level. Clearly, from this estimations in both (c) and (d) show that unemployment and capital contract economic growth. In the case of capital formation, the study observed negative relationship because it might be on account wasteful economic resources by various governments in Africa. Such resources are but in capital assets which are never used putting such resource in jeopardy like building markets in Ghana which are never used. Governments in Africa would have to ensure capital formation contributes to economic growth not the case where capital expenditure is insured for political expediency as it seems to suggest in this study. This finding is in support of Albiman and Suleiman (2016) who find a negative relationship between capital formation and economic growth. The argued on the basis of time period and shocks on domestic investments. Therefore, because Africa countries have open economies and to ensure effective utilization of local resources, governments need to come with new reforms and policies to ensure capital formation do not retard economic growth.

4.5 Nonperforming Loans Model

The Arellano and Bond (1991) Autocorrelation [AR (1)] test for the existence of first order serial autocorrelation is not rejected following the significant p-value of table 4.7. However, AR (2) test shows insignificant p-value, therefore revealing nonexistence of second order serial autocorrelation.

Further, a robustness check of over identifying restrictions by Sargan suggests that the choice of instrument for the system GMM model is validated. Thus, ensuring that the procedure for the hypothesis is supported. The finding of this result is discussed with reference to system GMM which is the preferred estimator and estimation technique that produces consistent and unbiased resulting following the nature of the dataset.

Table 4.7: Nonperforming Loans and Exchange Rate Estimation

Variable	Static Estimation		Dynamic Estimation	
	Random Effect	Fixed Effect	Difference GMM	System GMM
NPL _{T-1}	0.3568 (7.17)***	0.2921 (4.88)***	0.6921 (6.05)***	0.7279 (13.45)***
EXR	0.0039 (0.45)	-0.0340 (-0.63)	0.1129 (0.99)	0.0113 (2.64)***
GDP	-0.0191 (-0.80)	-0.1572 (-1.83)*	-0.0952 (-0.77)	-0.0074 (-1.66)*
INF	0.0862 (1.18)	0.0620 (0.83)	0.2669 (1.41)	0.1746 (2.12)**
FDI	0.0575 (0.43)	0.1035 (0.76)	-0.1161 (-0.70)	0.1270 (1.18)
UNE	-0.0262 (-0.25)	0.0174 (0.10)	0.1264 (0.54)	0.0867 (1.69)*
CONS	0.1133 (1.39)	0.6369 (2.41)**	0.3546 (2.78)***	0.3879 (2.89)***
R ²	0.3944	0.1324		
PROB>CHI2	[0.0000]	[0.0000]		
SARGAN TEST (OIR)				[0.110]
AR (1)	[0.000]	[0.000]	[0.000]	[0.000]
(AR(2)				[0.196]

***denotes significance at 1% level, ** denotes significance at 5% level and * denotes significance at 10%. Values in () and [] are the *t*-statistics and probability values respectively.

Dependent variable is the nonperforming loans (NPL) spanning over the period 2002-2014.

Independent variables consist log real normal exchange rate (EXR)

Control variables includes, inflation(INF), foreign direct investment (FDI), population (POP), real gross domestic product, lag of nonperforming loans(NPL_{T-1})

Supporting hypothesis (H₄), the study found positive significant relationship between nonperforming loan and exchange rate at 1% level of significance. This finding agrees with findings of previous studies which show positive relationship at both country and cross countries level (Kurti, 2016; Klein, 2013; Jakubik and Reininger, 2013; Prasanna et al., 2014). Strengthen currency (appreciation in exchange rates) reduces export oriented firms loan repayment capacity (Fofack, 2005) and also affect import driven economy firm by reducing loan repayment capacity in the period of depreciating exchange rate. Alternatively, exchange rate depreciation declines the loan payment capacity of borrowers in foreign currency (Kurti, 2016). Washington (2014) explains that since most loans are not granted in local currency to borrower of money, the exchange rates fluctuations do affect the bank credit risk. In some Africa countries, loans do not perform well because of continued deteriorating of local currency amid growing pegged dollarization of loan. This happen when financial institutions convert loan in foreign currency into domestic current when they are about to be nonperforming or being restructured. The finding is really interesting in the mist of growing dollarization of loans in attempt to hedge risk.

Consistent with the findings of previous empirical studies that found significant effect of real GDPper capita and nonperforming loan, the study found a significant positive relationship between real GDP per capita and nonperforming loan at 1% level of significance. There is empirical evidence of significant negative relationship between real GDP per capita and nonperforming loan to this study supports (Salas and Saurina, 2002; Hyun and Zhang,2012; Saba et al., 2012; Jordan and TucKer, 2013; Ahmed and Bashir, 2013; Sahbaz and Inkaya, 2014; Akinlo and Emmanuel,2014; Sheefeni, 2015; Islamoglu, 2015; Amuakwa-Mensah and

Boakye-Adjei, 2015) for country specific studies and (Fofack, 2005; Skarica, 2013; Beck et al., 2013; Klein, 2013; Marijana et al., 2013; Messai and Jouini, 2013; Marri et al., 2014; Ouhibi and Hammami, 2015; Kurti, 2016) in cross country studies. As real GDP per capita is translated improving income, this equally, improves the debt servicing capacity of the debtors thereby reducing the rate of default of loans.

Again, the finding confirmed a positive relationship between unemployment and nonperforming loan (Nkusu, 2011; Bofondi and Ropele, 2011; Berge and Boye, 2007) at 10% level of significance. Given the theoretical explanation of relationship between nonperforming and unemployment which suggest an increase in unemployment lead to increase in individual debt burden hence inability to service. It is clear that when a person becomes unemployed it automatically reduce or losses his income sources, it increases the propensity of defaulting in repayment loan. Alternatively, banks unemployed customers wouldn't be able to honor their loan repayment commitments which will lead to growing nonperforming loans. Furthermore, unemployment impact negatively on the demand for goods and services of firms, which eventual reduces sales or production hence reduction in revenue generation of firms, given rise to fragility of debt conditions hence nonperforming loan (Louzis et al., 2010; Bofondi and Ropele, 2011; Messai and Jouini, 2013).

Furthermore, consistent with theory and study expectation, the study observed a negative relationship between real GDP per capita and nonperforming loan at 10 percent level of significance. A rise in GDP normally creates opportunity for a greater flows of income for households and firms. As their income increases firms and households are in better positions to service loans hence the ability to default loan obligations are minimal. Therefore, improvement in the economy generates reduction in nonperforming loan in Africa.

Inflation, and previous year nonperforming loan also significantly affect current nonperforming loan at 10 percent and 1 percent level of significance respectively. As inflation of the selected countries increases so is nonperforming loans and this finding contract (Fofack, 2005; Skarica, 2013) who observe a negative relationship in a cross country studies.

Table 4.8: Decisions On Hypotheses

Hypothesis	Expected	Outcome	Decision
H ₁	Negative relationship	Negative relationship	Accepted
H ₂	Positive relationship	Negative relationship	Rejected
H ₃	Negative relationship	Negative relationship	Accepted
H ₄	Positive Relationship	Positive relationship	Accepted

From the table 4.8 above, the evidence from table 4.6 and 4.7 indicate that hypotheses H₁, H₃, and H₄ is accepted on the basis of the finding using the system GMM as the estimator while the H₂ is rejected.

CHAPTER FIVE

SUMMARY OF FINDING, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter sums up the major findings of the study. The first aspect presents the brief finding with conclusions of the study and then policy recommendations following the key finding of the study and further highlights direction of future studies.

5.1 Summary of Findings

Given the mixed results of empirical literature usually on cross-country evidence, the study estimated the impact of exchange rate on economic growth in Africa. The result shows that exchange rate has a contractionary effect on economic growth. Again, this contractionary impact for Africa countries is with the degree of dollarization, consistent with literature which hammers on currency mismatch problem due to borrowing in foreign currency by most Africa countries. Therefore, this study concludes that weak exchange rate in Africa signals economic or national recession and the growth rate is responsive to the changes in exchange rate. By the finding of the study, hypothesis (H_2) was rejected.

Additionally, following the finding regarding the relationship between nonperforming loans and economic growth, the study observes inverse relationship. This suggests that growing nonperforming loans retards economic progress. The rapid growth rate of nonperforming during and after the financial crisis in Africa, is becoming cause for worry. Therefore, given the growth rate in nonperforming loans in some Africa nations, may trigger economic crisis.

Again, this study concludes that improvement in economic bring about households and firms repaying their loan as and when it falls due which generate a fall in nonperforming loans.

Also, the study draws evidence that the interaction term of nonperforming loans and exchange has negative impact on growth. Theoretical and empirical evidence show that exchange rate has both significant positive and inverse relationship with growth. Theoretically, this study proposes that in Africa exchange rate depreciation passes through nonperforming loan to retard growth because of the nature of economic activities particularly the dollarization of loan portfolio.

Furthermore, the empirical results confirm the theoretical prediction relationship between inflation and growth as well as unemployment and growth. We find some evidence that rising unemployment reduces growth while increase in consumer price index causes growth to decrease.

Also, the study concludes exchange rate is a determinant of nonperforming loan performing loan in Africa together with real GDP per capita, unemployment, inflation and previous years nonperforming loan.

5.2 Conclusion

The main aim of this study was to examine the impact of exchange rate interacting with nonperforming loan on economic growth agenda of Africa. There is contradiction as to whether exchange rate depreciation is contractionary or expansionary to economic growth. Given this contradiction set the study in motion to test and see if the interaction gives a mitigating strength or substituting power. Following the nature of the data on the time period from 2002-2014 for 15 countries, the data was analyzed with the use of dynamic panel estimator (system GMM model). Recognizing the contribution of government policies on economic growth, the models make inclusions of some significant policy variables to account for economic growth, since the study was interested in the policy variables.

In the light of the finding above, the study concludes that, there is a partial mediating role played through the banking sector from exchange rate to nonperforming to eventually impact growth negatively when the exchange rate is beyond the equilibrium level. In the face of this observation, it is important for fiscal and monetary authorities to pursue growth strategies by keeping a close eye on the local currency. Besides, the study concludes that nonperforming loan mediates between the impacts of exchange rate on economic growth in Africa.

Again, this study contradicts the conclusion by Beck et al., (2013) that the exchange rate depreciation of local currency could have a sizeable negative effect on nonperforming loan. Instead, this study concludes that exchange rate deprecation is associated with less quality of banks assets because of dollarization of loans and the import driven economies of Africa.

Therefore, following this result, the conclusion is that exchange rate and nonperforming loan is pro-cyclical. Once exchange rate becomes volatile (in the case of Africa mostly depreciating) it feeds into the banking sector which will react to all macro variables and the cycle continues until fiscal and monetary authorities arrest the situation.

5.3 Recommendations and Policy Direction

The study recommends that macroeconomic environment variables is an influential factor such as GDP should constantly be followed as it is linked to banking sector performance. Therefore, in the implementation of Basel II or III requirements of credit assessment process, this study suggest that banks should take into account the level of real GDP when granting loans. Furthermore, since impairment of loans is expected to be vital during economic recession, commercial banks should widen their macroeconomics surveillance.

Additionally, following the negative effect of nonperforming loan on growth by extension broad economy, this study recommends strengthening supervision to avoid quick buildup of nonperforming loans into the future and ensuring foreign currency lending is minimized to borrowers who are un-hedged.

Also, normally, the healthier an economy is the better its national currency will perform against major currencies. Such growth will be shown in the level of productivity of the economy, which by far will have a positive on currency. Hence policy objectives of Africa countries should be reformulated to be more of agriculture and manufacturing driven; this

will aid to increase production of raw materials and food of relevant goods to reduce import and increase export as well as reduced inflation (import inflation) and unemployment. The effect when it plays out well lead to economic buoyancy.

Further, because of distribution nature of exchange rate, Africa authorities should anchor policy around exchange rate and once this is done with precision, it will stabilize economic shocks and banking assets quality shocks. Notwithstanding, there is the need for contra cyclical macroeconomic policy and also reduce banking fragility relative to the expected economic shocks amid the growing dollarization of loans in the local economy.

Additionally, following the negative relationship between capital and economic growth, this study therefore concludes that governments in Africa forms capital for political expediency not to champion economic progress. Though investment may be made in capital but sure expenditure may not be prudent to support the case of economic growth. again, following the negative relationship between capital and growth and the fact that Africa countries have open economies, the study recommends that to ensure effective utilization of local resources, governments need to come with new reforms and policies to ensure capital formation do not retard economic growth.

5.4 Further Studies

Following the finding of this study, there is the need for further studies to be carried out on regional block in the Africa region particularly separating data to analysis pre, during and post financial crisis period to aid capture and help direct policy direction regarding nonperforming loans in the Africa continent. And further disaggregating data for detail examinations of the determinants various sectors of the economy will bring an immense contribution to the current development in literature.

Interestingly, the study observed a negative relationship between capital economic growth, to the extent that relationship is negative, the study recommend further investigation in the relationship between fixed capital formation and economic growth in Africa by doing sectorial analysis to establish which sector is contributing negatively to growth.

REFERENCES

- Akinlo, O & Emmanuel, M 2014, 'Determinants of Non-Performing Loans in Nigeria', *Accounting and Taxation*, vol. 6, no.2, pp. 21-27
- Ahmed, F & Bashir, T 2013, 'Explanatory Power of Macroeconomic Variables as Determinants of Non-Performing Loans: Evidence Form Pakistan', *World Applied Sciences Journal*, vol. 22, no. 2, pp. 243-255.
- Amuakwa-Mensah, F & Boakye-Adjei, A 2015, 'Determinants of non-performing loans in Ghana banking industry', *Int. J. Computational Economics and Econometrics*, vol. 5, no. 1, pp.35-54.
- Arellano, M & Bond, S 1991, 'Some tests of specification for panel data: Monte Carlo Evidence and an application to employment equations', *Review of Economic Studies*, vol. 58, no. 2, pp. 277-297.
- Arellano, M & Bover, O 1995, 'Another Look at the Instrumental Variable Estimation of Error-Components Models', *Journal of Econometrics*, vol. 68, no.1, pp. 29-51.
- Badar M & Javid AY 2014, "Impact of Macroeconomic Forces on Nonperforming Loans: An Empirical Study of Commercial Banks in Pakistan", *WSEAS Transactions on Business and Economics*, vol.10, no. 1, pp. 40-48.
- Bahmani-Oskooee, M & Hajilee, M 2013, 'Exchange rate volatility and its impact on domestic investment. *Research in Economics*, vol. 67, pp. 1-12.
- Bahmani-Oskooee, M, Kutan, AM & Xi, D 2015, 'Does exchange rate volatility hurt domestic consumption? Evidence from emerging economies. *International Economics*.
- Beck, R, Jakubik, P & Piloju, A 2013, 'Non-performing loans: what matters in addition to the economic cycle?' ECB Working Paper Series, No. 1515.
- Bercoff, JJ Giovanni, J & Grimard F 2002, 'Argentinean Banks, Credit Growth and the Tequila Crisis: A Duration Analysis' (Unpublished).
- Bogunjoko, JO 2004, 'Growth Performance in Nigeria: Empirical Evidence in the 20th Century' In *Leading Issues in Macroeconomic Management and Development*; Ibadan: Nigerian Economic Society, Daily Graphics Nigeria Limited.
- Blundell, R & Bond, S 1998, 'Initial conditions and moment restrictions in dynamic panel data models', *Journal of Econometrics*, vol. 87, pp. 115-143.
- Calvo, G 1999, 'Fixed versus Flexible Exchange Rates: Preliminaries of a Turn-of-Millennium Rematch', www.bsos.umd.edu/econ/ciecalvo.htm [16th July, 2016]
- Calvo, G & Reinhart, C 2000, 'Fear of Floating, mimeo', University of Maryland.

- Cooper, RN 1971, 'An Assessment of Currency Devaluation in Developing Countries', *Essays in International Finance*, No. 86. New Jersey, Princeton University
- Dornbusch, R 1987, 'Exchange Rate and Prices', *American Economic Review*, vol. 77, pp. 93-106.
- Drzik, J 2005, 'CFO Survey: Moving Towards Comprehensive Risk Management', *Bank Management*, vol. 71, pp.40.
- Edwards, S & Levy-Yeyati, E 2005, 'Flexible Exchange Rates as Shock Absorbers', *European Economic Review*, pp. 49: 2079–2105.
- Eichengreen, R & Hausmann, R 1999, 'Exchange Rates and Financial Fragility', NBER Working Paper, No7418.
- Fofack, H 2005, 'Non-performing Loans in Sub-Saharan Africa: Causal Analysis and Macroeconomic Implications', World Bank Policy Research Working Paper No. 3769.
- Frankel, JA 2005, 'Mundell-Fleming Lecture: Contractionary Currency Crashes in Developing Countries', *IMF Staff Papers*, Vol. 55(2), pp. 149-192.
- Hausman, JA 1978, 'Specification Test in Econometrics', *Econometrica*, vol. 46: pp. 125 – 1272.
- Hoffmann, M 2007, 'Fixed versus Flexible Exchange Rates: Evidence from Developing Countries' *Economica*, vol.74, no. 295, pp. 425–449.
- Hyun-Jung, P & Zhang, L 2012, 'Macroeconomic and Bank-Specific Determinants of the U.S. Non-Performing Loans. Before and during the Recent Crisis', Published thesis (MSc), Simon Fraser University.
- İslamoğlu, M 2015, 'The Effect of Macroeconomic Variables on Non-performing Loan Ratio of Publicly Traded Banks in Turkey', *WSEAS Transactions on Business and Economics*, vol. 12.
- Joseph, CN 2011, 'The Effects of Interest Rate Spread on the Level of Non-Performing Assets, A Case of Commercial Banks in Kenya', *International Journal of Business and Public Management*, vol. 1, no.1, pp. 58-65.
- Kandil, M 2015, 'The adverse effects of real exchange rate variability in Latin America and the Caribbean'. *Journal of Applied Economics*, vol. 18, no.1, pp. 99-120.
- Khemraj, T & Pasha, S. 2009, 'The determinants of non-performing loans: An econometric case study of Guyana' The Caribbean Centre for Banking and Finance Bi-annual Conference on Banking and Finance, St. Augustine, Trinidad.

Klein, N 2013, 'Non-Performing Loans in CESEE: Determinants and Macroeconomic Performance', IMF Working Paper, 72.

Kurti, L 2016, 'Determinants of Non-Performing Loans in Albania, The *Macrotheme Review*, vol. 5, no.1, pp. 60-72.

Levy-Yeyati, E & Sturzenegger, F 2003, 'To Float or to Fix: Evidence on the Impact of Exchange Rate Regimes on Growth', *American Economic Review*, vol. 93, no. 4, pp. 1173-1193.

Louzis DP, Vouldis AT & Metaxas VL 2011, 'Macroeconomic and bank-specific determinants of non-performing loans in Greece: A comparative study of mortgage, business and consumer loan portfolios', *Journal of Banking & Finance*, vol. 36, no. 4, pp. 1012-1027.

Makri, V, Tsagkanos, A & Bellas A 2014, 'Determinants of Nonperforming Loans: The Case of Eurozone', *Panoeconomicus*, vol. 2, Pp. 193-206.

Marijana, C, Pepur, S & Poposki K 2013, 'Determinants of non-performing loans – evidence from Southeastern European banking systems', *Banks and Bank Systems*, vol. 8, no.1, pp. 45-53.

Meade, J 1951, 'The Balance of Payments', 'The Theory of International Economic Policy, vol.1, London and New York: Oxford University Press.

Messai AS & Jouini F 2013, 'Micro and Macro Determinants of Non-performing Loans', *International Journal of Economics and Financial Issues*, vol. 3, no.4, pp.852-860.

Mishkin, F & Savastano, M 2000, 'Monetary Policy Strategies for Latin America, NBER Working Paper, no: 7617.

Nkusu, M 2011, 'Nonperforming Loans and Macrofinancial Vulnerabilities in Advanced Economies', IMF Working Paper WP/11/161.

Nnanna, O, Englama, A & Odoko, F 2004), 'Finance Investment & Growth in Nigeria', A Central Bank of Nigeria Publication (CBN: Abuja).

Obstfeld, M & Rogoff, K 1995, 'The Mirage of Fixed Exchange Rates, *The Journal of Economic Perspectives*, vol. 9, pp.73–96.

Osei-Assibey, E & Asenso, JK 2015, 'Regulatory capital and its effect on credit growth, non-performing loans and bank efficiency', *Journal of Financial Economic Policy*, vol. 7, no.4, pp. 401- 420.

Ouhibi, S & Hammami, S 2015, 'Determinants of Non-performing Loans in the Southern Mediterranean Countries', *International Journal of Accounting and Economic Studies*, vol. 3, no. 1, 50-53.

- Prasanna, KP 2014, 'Determinants of Non-Performing Loans in Indian Banking System', 3rd International Conference on Management, Behavioral Sciences and Economics Issues. Singapore.
- Rodriguez-Moreno, M & Pena, JI 2013, 'Systemic risk measures: the simpler the better?', *Journal of Banking & Finance*, Vol. 37, pp. 1817–1831.
- Rodrik, D 2008, 'The Real Exchange Rate and Economic Growth, Brookings Papers on Economic Activity', Fall, 365-412.
- Rogoff, K & Maurice, O. 1995, 'The Mirage of Fixed Exchange Rate, *Journal of Economic Perspectives*, vol. 9, no. 12, pp. 73-96.
- Roodman, D 2009, 'How to do xtabond2: An introduction to difference and system GMM in Stata', *Stata Journal*, vol. 9, no. 1, pp. 86–136.
- Saba, I, Kouser, R & Azeem, M 2012, 'Determinants of nonperforming Loans: Case of US Banking Sector', *International Journal of Banking and Finance*, no. 44, Pp 479-88.
- Salas, V & Saurina, J 2002, 'Credit risk in two institutional regimes: Spanish commercial and savings banks', *Journal of Financial Services Research*, vol. 22, no.3, pp. 203-224.
- Schnabl, G 2007, 'Exchange rate volatility and growth in small open economies at the EMU periphery', European Central Bank Working Paper Series, (773).
- Sheefeni, JPS 2015, 'Evaluating the Impact of Bank Specific Determinants of Non-performing Loans in Namibia, Journal of Emerging Issues in Economics', *Finance and Banking*, vol. 4, no.2, pp. 1525-1541.
- Skarica B 2013, 'Determinants of Non-Performing Loans in Central and Eastern European Countries' Working Paper. No. 13-07.
- Warjio, P 2013, 'Indonesia: Stabilising the exchange rate along its fundamental, In market volatility and foreign exchange rate intervention in EMEs: what has changed', BIS Papers 73, Monetary and Economic Department.
- Washington GK 2014, 'Effects of Macroeconomic Variables on Credit Risk in the Kenyan banking system', *International Journal of Business and Commerce*, vol. 3, no.9, pp. 01-26.

APENDIX

COUNTRIES UDED FOR THE STUDY

<i>S/N</i>	<i>COUNTRIES</i>
<i>1</i>	<i>Egypt</i>
<i>2</i>	<i>Gabon</i>
<i>3</i>	<i>Ghana</i>
<i>4</i>	<i>Kenya</i>
<i>5</i>	<i>Lesotho</i>
<i>6</i>	<i>Morocco</i>
<i>7</i>	<i>Mauritius</i>
<i>8</i>	<i>Namibia</i>
<i>9</i>	<i>Nigeria</i>
<i>10</i>	<i>Rwanda</i>
<i>11</i>	<i>Sierra Leone</i>
<i>12</i>	<i>Senegal</i>
<i>13</i>	<i>South Africa</i>
<i>14</i>	<i>Tunisia</i>
<i>15</i>	<i>Uganda</i>