

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI

INSTITUTE OF DISTANCE LEARNING

SCHOOL OF BUSINESS

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**BANK SPECIFIC AND MACROECONOMIC DETERMINANTS OF PROFITABILITY
OF GHANAIAN COMMERCIAL BANKS: A PANEL DATA APPROACH**

By

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the Requirements for the degree of**

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DECLARATION

I hereby declare that this submission is my own work towards the award of the Master of Science in Accounting and Finance and that, to the best of my knowledge, it contains no material previously by another person or any material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

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DEDICATION

I dedicate this work to my husband -Mr. Zac Awuye, mother (Mrs. Olivia Ellis) and baby boys for their continuous support throughout my study. We are a family and could not have climbed this ladder without them aside the Grace of God.

I also dedicated this piece of work to Institute of Distance Learning, KNUST School of Business.

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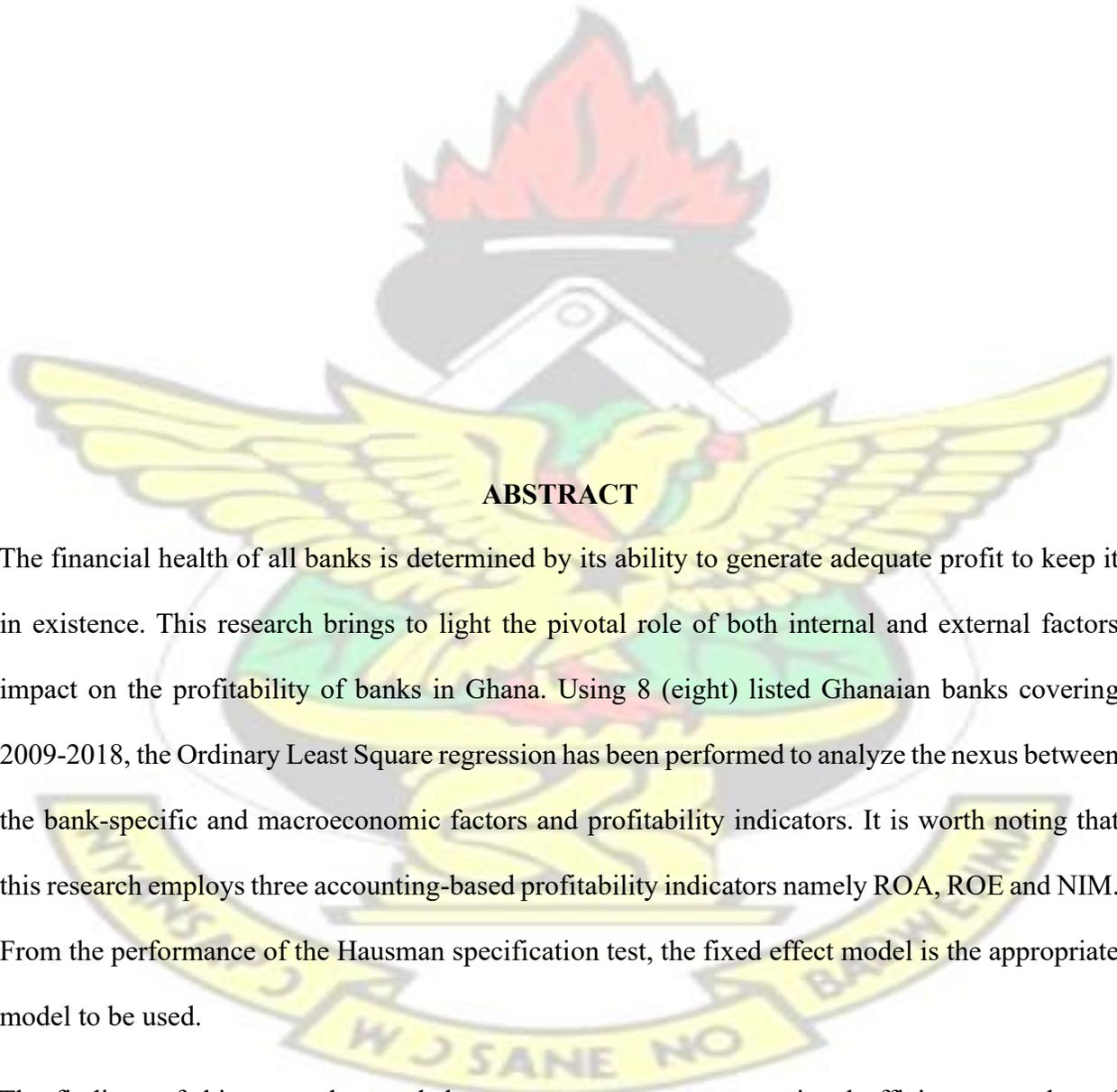
I wish to express my profound gratitude to the good Lord for His care and marvelous provisions for seeing me through this programme successfully.

A heartfelt appreciation also goes to my supervisor, Prof. Kingsley Opoku Appiah who has been very instrumental through guidance and constructive criticism throughout the research period.

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Finally, to all who contributed in diverse ways, I thank you.

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ABSTRACT

The financial health of all banks is determined by its ability to generate adequate profit to keep it in existence. This research brings to light the pivotal role of both internal and external factors impact on the profitability of banks in Ghana. Using 8 (eight) listed Ghanaian banks covering 2009-2018, the Ordinary Least Square regression has been performed to analyze the nexus between the bank-specific and macroeconomic factors and profitability indicators. It is worth noting that this research employs three accounting-based profitability indicators namely ROA, ROE and NIM. From the performance of the Hausman specification test, the fixed effect model is the appropriate model to be used.

The findings of this research reveal that asset management, operational efficiency, number of branches and inflation are the key factors that influence the profitability of Ghanaian banks. All

other factors exhibited an insignificant influence on the profitability of Ghanaian banks, all other things being equal. Also, from the descriptive statistics, it was observed that listed banks are highly geared and that has the tendency of reducing profits.

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Key words: Bank-Specific, macroeconomic determinants, profitability

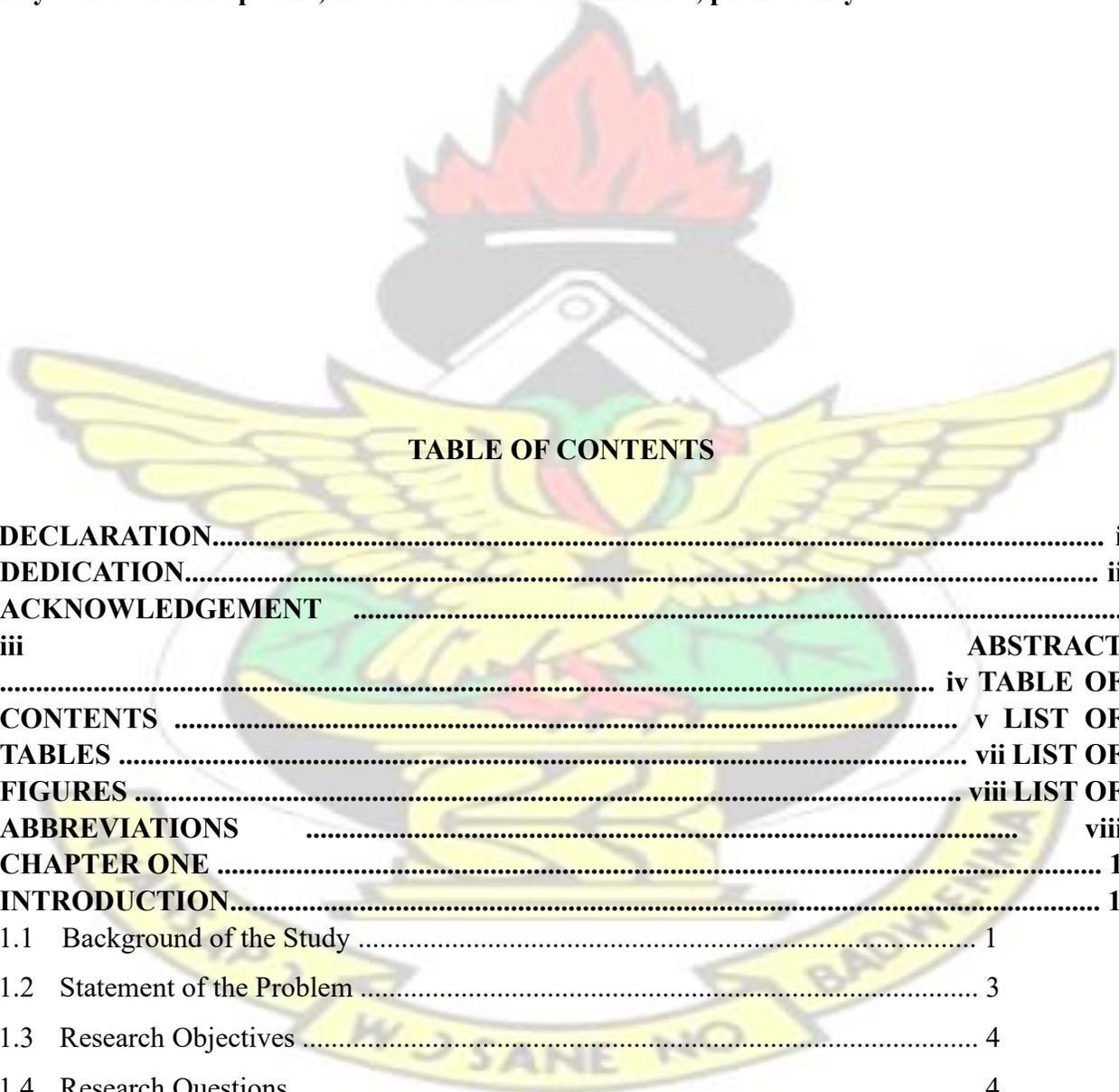


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The logo of KNUST (Kwame Ninsin University of Science and Technology) is centered in the background. It features a yellow eagle with its wings spread, perched on a green shield. Above the eagle is a black mortar and pestle with a red flame rising from it. Below the eagle is a yellow banner with the text 'WJ SANE NO BADWENMA' in black. The entire logo is rendered in a light, semi-transparent style.

LIST OF ABBREVIATIONS

ROA -Return on Assets

ROE -Return on Equity

NIM -Net Interest Margin

GDP -Gross Domestic Product

CIR -Cost to Income Ratio

SCP -Structure-Conduct-Performance

GSE -Ghana Stock Exchange

VIF -Variance Inflation Factor

S -Bank Size

Q -Asset Quality

D -Deposit

M -Asset Management

OE -Operational Efficiency

L -Leverage

B -Branches

L -Liquidity B

-Branches

Inf -Inflation

IR -Interest Rate

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The Ghanaian banking sector suffered a loss in confidence due to the reforms which took place in 2018, figures show that some gains were made the following year, thereby restoring some confidence in the industry. The banking sector report for March 2019 shows that the industry is rebounding in many areas. The report indicates that profitability for the banking industry improved during the first two months of 2019 compared with the same period in the previous year 2018. (Bank of Ghana Report, 2019).

Levine et al. (2000), Tabash and Dhankar (2014) and Tabash (2016) purport undoubtedly that the banking firms convert deposit into investment that is productive as a means of facilitating growth economically. Efficiency and reliability in the banks can be attained through; superior service delivery, adequate liquidity to extend to deficit units and an optimal profit. Economic growth cannot be achieved in isolation without the pivotal role of banks. Drawing support from this, there is the need to investigate the impact of internal and external factors on the profitability of Ghanaian banks. Through the lens of firm-level factors, the goal of every banking institution is to be profitable, otherwise competitive edge is lost. With this as their core mandate, the race begins and the chase to be profitable is fought at all fronts. From the firm level perspective, a profit-making banking division is expected to reduce, if not alleviate externalities which are unfavourable whilst maintaining a stable sector. The banking sector is currently composed of twenty-three (23) universal banks out of which Ten (10) are listed on the stock exchange, and the other Thirteen (13)

unlisted banks. Bank's profitability is a key element of the health of the banks, it is how efficient the assets of the firm are converted in its delivery of products or services at a profit margin. The Ghanaian banking sector usually express their profitability as a function of inner and outer dynamics. The internal determinants of profitability are also known as financial statement variables whereas as the outer determinants of profitability are known as non-financial statement variables.

Development and growth of an economy is promoted by the banking sector profitability and efficiency in its role play within the economy. However, Ghana an emerging economy has not witness a lot of research that focuses on the profitability of commercial banks. In this context, the study of profitability of commercial banks in Ghana will be of greater interest for policy makers and finance scholars. This indicates that having knowledge of the determinants of bank profitability is vital and necessary to the stability of the economy because the well-being of the banking sector is very crucial to the welfare of the economy at large.

Ghana is undergoing strengthening of the regulatory and supervisory framework and the justended recapitalization exercise has re-positioned the banking sector as better capitalized, liquid, stronger and more resilient. The banks available in Ghana is a mixture of public-owned, ownership by the private sector and individuals, foreign ownership, rural banks, Savings and loans, Micro finance, and money lenders. Commercial banks in Ghana dominate the financial system and play a major role in economic development.

1.2 Statement of the Problem

The existing study concentrates on a very crucial sector, banking sector, in an emerging economy like Ghana. Banking sector serves as an engrossing context to study the factors influencing banks' profitability. Many structural modifications over the decades have affected the banking sectors'

competitiveness taking into accounts some new governmental policies such as the reform process as published by the Bank of Ghana in January 2019 that has influenced profitability of the Ghanaian bank. Report showed that annual deposit growth of banks saw a continuous drop in the last three months of 2018, ending the year with 17.4 percent. The data adds that banks' deposits dropped from 26.2 percent in September to 20.7 percent in October, and further dropped to 18.4 percent and 17.4 percent in November and December respectively, a clear sign that confidence in the industry was lost. Total assets growth also declined in the same period, hitting 14.7 percent in December from 26.2 in September 2018 (Bank of Ghana, 2019).

In Almaqtari et al (2018) assert that literature on factors influencing profitability of banks is at the mature stage such that there is literature in all markets, developed and developing market alike. Taking a closer look within the Ghanaian setting, there are just a few studies that investigate this issue. Gyamerah and Amoah (2015) investigated the relationship between profitability and a set of bank-specific characteristics and macroeconomic factors on foreign and local banks in Ghana between 1999 and 2010. Also, Adusei (2015) analyzed the profitability of 112 rural banks (special unit banks created to promote rural financial intermediation in Ghana). They found that bank size, funding risk, diversification, liquidity risk and bank stability are significant predictors of rural bank profitability. Furthermore, cost management has an inverse relationship with profitability, bank size and credit risk show a positive association with profitability.

Studies in Ghana either ignore net interest margin as a profitability indicator or do not exhaust a comprehensive list of internal and external factors in the examination of profitability determinants (Yakubu, 2019; Mireku et al, 2018; Appiah et al, 2015). It is against this background this research seeks to fill these gap by comprehensively by analyzing Ghanaian commercial banks' profitability determinants. More especially, it empirically assesses bank-specific and macroeconomic

determinants that may have an impact on Ghanaian commercial banks' profitability as measured by return on asset, return on equity, and net interest margin. The present study bridges the gap in the Ghanaian banks' profitability literature. In addition, the current study extends, contributes and build on the work of Gyamerah and Amoah (2015) who ignored a major proxy of banks' profitability namely, Net Interest Margin NIM and comprehensively investigated bank-specific and macroeconomic determinants of Ghanaian banks.

1.3 Research Objectives

The general objective of this study was to investigate the determinants of listed banks profitability in Ghana. The research was guided by the following specific objectives;

1. To analyze the effects of internal determinants on Ghanaian commercial bank profitability.
2. To investigate the effects of external determinants on Ghanaian commercial bank profitability.

1.4 Research Questions

This research seeks to find answers to the following research questions:

1. What are the effects of external determinants on Ghanaian commercial bank profitability?
2. What are the effects of internal determinants of profitability of Ghanaian commercial bank?

1.5 Significance of the Study

The results of the study would be useful to bankers, bankers' associations, and other professional and to finance scholars. Bankers, bank managers, and other professionals will focus on the bankspecific determinants for efficient utilizing of banks' resources in such a way that they can influence significantly and positively the Ghanaian commercial banks' financial performance. To finance Scholars, the study of profitability of commercial banks in Ghana will be of greater interest this means the understanding of the determinants of bank profitability is essential and pivotal to the stability of the economy because the well-being of the banking sector is very critical to the welfare of the economy at large.

The investigation of this topic will also be very important and interesting and will provide empirical evidence for Regulators and policymakers. Regulators and policy makers will consider the macroeconomic determinants especially industry-specific factors in such a way that can enhance the profitability of the Ghanaian commercial banks.

1.6 Scope of the Study

The scope of this study is limited to studying the determinants of listed Ghanaian commercial banks profitability operationalized using return on assets, return on equity and net interest margin and also the impact of independent variables such as internal parameters which include bank size, assets quality, capital adequacy, liquidity, operating efficiency, deposits, leverage, assets management and the number of branches. The study also considers gross domestic product, inflation rate and interest rate as macroeconomic determinants.

It is acknowledged that there are other factors that may impact on profitability of banks but not included in this study. These other factors may include but not limited to corporate governance, political stability, taxation, regulation indicators, quality of service and technological advancement. This study covers 8 listed commercial banks on the stock exchange over the period 2009 to 2018.

1.7 Overview of Methodology

This section involves the data collection, sampling procedure, models and econometric tools used by this study. The database of the reserve bank of Ghana provides all the information concerning the Ghanaian banking system. The commercial banks comprise of 23 licensed banks out of which Ten (10) banks are listed on the stock exchange and the other thirteen (13) are unlisted. Purposive sampling is used to select eight (8) banks based on the availability of the data for the time period of this study and also two (2) banks outside Ghana (Ecobank Transactional, and Trust bank of Gambia) that are listed on the Ghana stock exchange excluded from the study due to presentation of currency not reported in Ghana cedis. A panel data set of 80 bank-year observation over a period of 10 years from 2009 to 2018 is employed.

The data source used in the study is secondary data from annual audited report of commercial banks listed on the Ghana stock exchange market. The data analysis technique employed in this study is the pooled, fixed and random effect model.

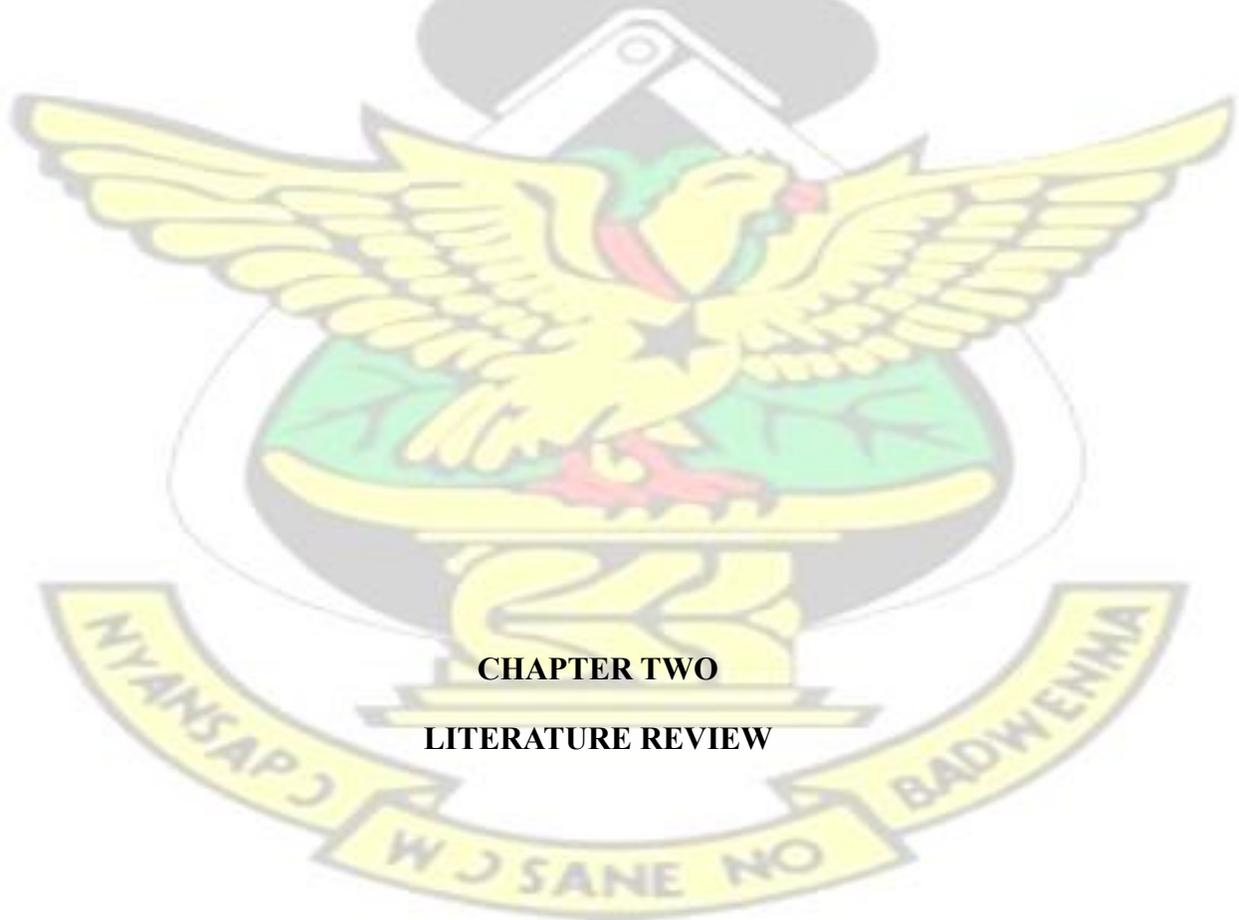
1.8 Limitation of the Study

The study is limited to secondary data from 8 listed commercial banks of 8 covering a period from 2009 to 2018. The banks chosen for the purpose of this study were purely based on the availability

of data. The present paper would investigate the impact of bank-specific and macroeconomic determinants on banks' profitability. Banks' profitability would be measured by ROA, ROE, and NIM as a function of both bank-specific and macroeconomic determinants.

1.9 Organization of thesis

The study is structured as follows: chapter one captures the introduction. Chapter two presents the related literature review of banking profitability. Chapter 3 presents an outline of methodology used in achieving the stated objectives. Chapter 4 covers interpretation of data and findings and the last chapter which is 5 concludes this paper with recommendations.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This arm helps you create a sense of rapport with your audience or readers so they can trust that you have done your homework. As a result, it is a critical component of any research as it empowers the researcher to circumvent reinventing past contributions and results, thereby contributing to existing knowledge. Due to its critical nature, this arm seeks to address existing thoughts under review of concepts, theories, empirical evidence so far and the conceptual framework which is the four main umbrellas. To simplify, the review of concepts highlights why profitability, the ingredients or elements of profitability, an outline of profitability in Ghana's banking system, a snapshot of the banking system as well as channels to boost profitability.

2.2 Conceptual Review

This section delves into the underlying concepts of profitability. It gives an overview of the profile of Ghana's banking industry profitability, factors affecting banks' profitability, snapshot of the banking system and the channel to boost profitability of banks.

2.2.1 Why Profitability?

Profitability denotes the portion of compensation or profits attributed to investors -both internal and external- as their wealth or worth. How profitable the banking industry is, can either make or break the economy. This is deeply rooted in their unequivocal role as financial intermediaries and partly owed to the underdeveloped capital market, thus the conversion of excess funds from surplus units to constructive investments as a catalyst for growth in the economy cannot be downplayed. Three fundamental goals propel the banking industry to achieve efficiency and trust and they are

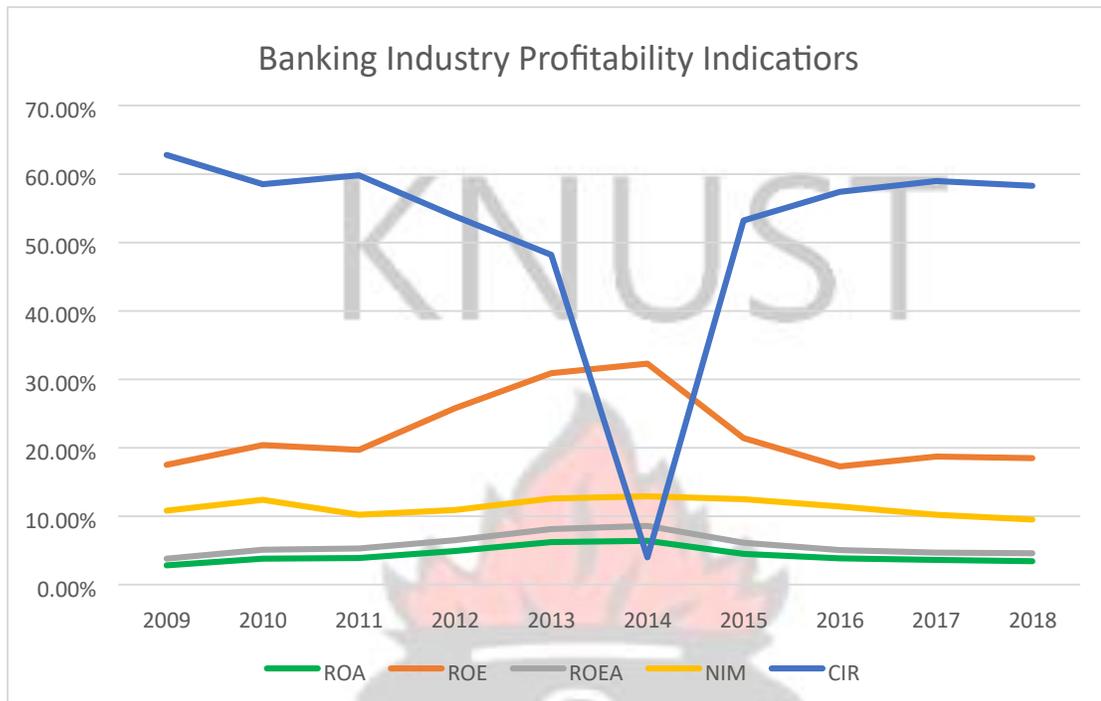
giving adequate returns, offering superior services to consumers as well as having adequate resources to offer deficit units (Al-Homaidi et al, 2018).

Consequently, the relevance of how profitable banks are can be resolved under firm and macro based. With respect to the micro or firm ambit, profitability is viewed as being able to make profits and surviving in the harsh and competitive environment whereas through the macro lens, profitability is seen as having the ability to take in unfavourable outside shake ups whilst achieving stable fiscal system (Al-Homaidi et al, 2018). Prior studies have operationalized profitability using one, a combination or all of Return on Assets (ROA), Return on Equity (ROE) and Net Interest Margin (NIM) (Garcia & Trindade, 2019; Sufian & Habibullah, 2009; Sufian, 2012; Sufian, 2009; Al-Homaidi et al, 2018; Saona and Azad, 2018; Zarrouk, Jedidia & Moualhi, 2016; Ali & Puah, 2018; Bucevska & Misheva, 2017; Sarpong-Kumankoma et al, 2018; Adusei, 2015).

2.2.2 Profile of Ghana's Banking Industry Profitability

Fiscal soundness of the banking industry cannot be highlighted without giving reference to profitability as one of the indicators. Within the scope of profitability from the Ghanaian context, the Bank of Ghana uses six measures as its determinants namely, Return on Assets (ROA), Return on Equity (ROE), Return on Earning Assets (ROEA), Net Interest Margin (NIM), Net Interest Spread and Cost to Income Ratio.

Figure 2.1: Profile of Ghana's banking industry profitability



Source; Bank of Ghana (2018, 2013 & 2012)

From the diagram it can be observed that ROA, ROE, NIM and ROEA saw a soaring in growth during the first 6 years covering 2009-2014, then saw a downturn from the years that followed to 2018.

The decline was owed to the fact that the bank's policy to tighten credit to industry stemming from inability to service credits and the falling rates of treasury bills and other governmental securities whereas attributing the upturn to interest rates (Ghana Banking Survey, 2019). Using the CIR indicator there was a persistent decline for the first 5 years (2009-2013) then saw a steady growth from 2014 and since then recorded consistent ratio of above 0.50.

2.2.3 Factors Affecting Banks' Profitability

Comprehensive studies have been conducted on the profitability drivers or determinants in economics and finance literature. As evident from the comprehensive research on the drivers of profitability there seems to be consensus ad idem on intrinsic forces and extrinsic forces (Adelopo, Lloydking & Tauringana, 2018; Singh, 2010; Flamini, Schumacher and McDonald, 2009; Adusei, 2015, Athanasoglou et al, 2006). Contemporary studies have opined that legal forces also play a key role in the determination of profitability of the banking industry (Garcia & Trindade, 2018; Arshad and Rizvi, 2013; Bougatef, 2017; Aburime, 2010).

2.2.3.1 Intrinsic Drivers

Intrinsic drivers are synonymous to internal factors or bank-specific determinants and they represent all those drivers within management's control which brings about a difference in the profits of banks. Thus, management of firms, in this context banks, can exert control over and influence its effects on performance. A lot of intrinsic drivers has been identified in literature to affect profitability but key and notable among them are bank size, capital adequacy, liquidity, deposits, assets management, operational efficiency, leverage, and the number of branches. These eight outlined represents the intrinsic drivers used for this research.

2.2.3.1.1 Bank Size

Bank size as a driver of profitability stems from the prospect of economies of scale. Extant literature has operationalized bank size as the natural logarithm of total assets (Adelopo, Lloydking & Tauringana, 2018; Singh, 2010; Flamini, Schumacher and McDonald, 2009; Adusei, 2015, Athanasoglou et al, 2006; Garcia & Trindade, 2018; Arshad and Rizvi, 2013; Bougatef, 2017;

Aburime, 2010; Chowdhury and Rasid, 2017). Bourke (1989) opines that a positive association should be expected between bank size and profitability on the account of cost benefits from economies of scale. Akhavein et al (1997), Molyneux and Thornton (1992), Bikker and Hu (2012) echoes this view. Whilst Ali and Puaah (2018), Al-Homaidi et al (2018) and Adelojo, Lloydking & Tauringana (2018) found significant relationship, Singh (2010), Bucevska & Misheva (2017), Sarpong-Kumankoma et al (2018), found an insignificant association between bank size and profitability.

In terms of impact, Sufian and Habibullah (2009), Al-Homaidi et al (2018), Sufian (2009), Masood and Ashraf (2012) observed a positive impact on profitability. In contrast, a negative impact has been found (Singh and Sharma, 2016; Sufian and Habibullah, 2009; Gul, Irshad and Zaman, 2011).

2.2.3.1.2 Capital Adequacy

Capital adequacy gives an indication of the capital solidity of banks. Some researchers also call this indicator capitalization. Usually the proxy for capital adequacy is the value of shareholder's equity to total assets. Most thoughts on the significance of capital adequacy found it to be positive and significant (Sufian & Habibullah, 2009; Sufian, 2009; Saona and Azad, 2018; Zarrouk, Jedidia & Moualhi, 2016; Ali & Puaah, 2018; Bucevska & Misheva, 2017; Adelojo, Lloydking & Tauringana, 2018). Yet Sarpong-Kumankoma et al (2018), Garcia & Trindade (2018) and Sufian (2012) found an insignificant relation for capital adequacy and profitability. It should be noted that, in all instances the insignificance was associated with ROA as a measure of profitability.

2.2.3.1.3 Asset Quality

Asset quality or Loans intensity gives an indication of how management regulates and pays close attention to its credit risk effect on assets efficiently. Earlier in time researchers measures this variable as the ratio of total loans or non-performing assets to total assets. Rani and Zergaw (2017)

presupposes that there is an inverse influence on how profitable banks are unless the banks have reached an abnormal level of risk. Sufian (2009) echoes this assertion and finds a negatively significant impact on Malaysian banks. However, some researchers found contradictory evidence in relation to asset quality on profitability of banks, with a positive and significant impact (Sufian & Habibullah, 2009; Sufian, 2012; Sufian (2009) Al-Homaidi et al, 2018; Singh, 2010; Zarrouk, Jedidia & Moualhi, 2016; Adusei, 2015).

2.2.3.1.4 Liquidity

Liquidity as a characteristic of bank's profitability connotes how banks can convert their liquid assets to cash absent of a major modification in the value of assets. Without efficient management of this, banks' faces a challenge in honouring intermediation. Al-Homaidi et al (2018) and Adusei (2015) reports a positive and significant association whereas Adelopo, Lloydking & Tauringana (2018) reports an inverse and negative relationship. Nonetheless, Ali & Puah (2018) reported no relationship on the researchers' analysis on Pakistan banking sector.

2.2.3.1.5 Asset Management

Asset management has been referred to by other researchers as Bank diversification into nontraditional activities (Sufian & Habibullah, 2009; Sufian, 2012). It is defined as how management of banks monitor and invest customers' funds in the financial markets. The proxy for this indicator is operating income over total assets. Evidence on the association with profitability is missed. Whilst Sufian & Habibullah (2009) and Zarrouk, Jedidia & Moualhi (2016) reported a negative impact, Sufian (2012), Sufian (2009), Singh (2010), Bucevska & Misheva (2017) and Adusei (2015) documented a positive and significant association.

2.2.3.1.6 Leverage

Leverage or financial risk is the volume of debt a firm uses to fund its assets. Mathematically, it is represented as the ratio of total liabilities to total assets. Due to its key benefit of freeing capital and positioning the firm to large markets or area. In literature, there is an assertion that ROA increase at the expense of ROE from the effect of a low financial risk (Athanasoglou et al., 2018). Al-Homaidi et al (2018) reported an inverse relation with profitability within the Indian commercial banks. Contrasting this view, Zarrouk, Jedidia & Moualhi (2016) found no significant relation.

2.2.3.1.7 Operational Efficiency

Operational efficiency or bank operating cost refers to the all the administrative expenses incurred in getting the desired output. Sufian and Habibullah (2012) and Yeh (1996) contend that it covers all commissions and levies on services, wages and salaries, the amount incurred in setting up a branch, among others. It is expressed as non-interest expense divided by total assets. Prior studies like Bourke (1989) documents an inverse association with profitability. Currently, Sufian (2012) and Al-Homaidi et al (2018) corroborate this by having similar results. Notwithstanding, there is contradicting evidence suggesting a positive and significant relationship (Sufian & Habibullah, 2009; Singh, 2010; Zarrouk, Jedidia & Moualhi, 2016).

2.2.3.1.8 Deposits/Markets Power of Banks

Deposit with respect to this study is measured as total deposits over total assets in line with AlHomaidi et al (2018), Garcia & Trindade (2018) and Sufian (2012). A vast network of branches

is likely to entice large volume of deposits. Sufian (2012) documents a positive impact between deposits and profitability in Bangladeshi and Pakistan setting, yet no impact in Sri Lanka. Garcia & Trindade (2018) finds an insignificant relation with profitability upon investigation in 17 Angolan banks. Surprisingly, Al-Homaidi et al (2018) finds a negative relationship between deposits and NIM as a measure of profitability and a positively significant association with ROA and ROE.

2.2.3.1.9 Branches

Al-Homaidi et al (2018) defines branches as the absolute number of branches attributable to a bank. Put simply, it denotes the portion of market owned by banks and how dispersed they are from each other. Al-Homaidi et al (2018) documents that the relationship between branches and profitability measured by NIM is insignificant.

2.2.3.2 Extrinsic Drivers

Extrinsic or macroeconomic drivers mirror the surroundings of the economy where firms' activities take place. To simplify, these forces give an image of account of the economic system in the general sense. Though there are outside the control of management, management can still minimise the effects from these drivers through the employment of policies to accommodate this change. Emanating out of literature are real GDP, inflation, exchange rate, effective tax rate which are the most common indicators which used within the context of determinants of profitability of the banking industry.

2.2.3.2.1 Real Domestic Product

Real GDP reflects how the economy in totality performs in terms of output for a given period. Real GDP growth rate is commonly used as a proxy for real GDP (Garcia & Trindade, 2018; Sufian &

Habibullah, 2009; Sufian, 2012; Zarrouk, Jedidia & Moualhi, 2016; Al-Homaidi et al., 2018; Bucevska & Misheva, 2017; Adelopo, Lloydking & Tauringana, 2018). Sufian & Habibullah (2009) and Sufian (2009) reported an inverse and significant association between real GDP and profitability. Even though, Al-Homaidi et al (2018) finds an inversely significant relation with NIM and ROA as a proxy of profitability, the researchers documents a positive and significant relationship with ROE as a proxy for profitability.

On the other hand, Sufian (2012), Singh (2010), Zarrouk, Jedidia & Moualhi (2016) and Adelopo, Lloydking & Tauringana (2018) found a positively significant relationship with profitability. Contrary to the two evidence above, Bucevska & Misheva (2017) and Sufian & Habibullah (2009) found an insignificant and no effect on profitability measures.

2.2.3.2.2 Inflation

Inflation has been globally accepted as one of the extrinsic drivers of profitability. Consumer price index is the common proxy for this indicator. Some prior research documents a positive and significant relation between inflation and profitability (Bourke, 1989; Molyneux & Thomson, 1992). Presently, Garcia & Trindade (2018) and Adelopo, Lloydking & Tauringana (2018) affirms this evidence between inflation and profitability. Contending this result is the studies of Zarrouk, Jedidia & Moualhi (2016), Al-Homaidi et al (2018) and Sufian & Habibullah (2009) who found a negatively significant relation. However, Sufian (2012) found an insignificant and no impact with the profitability of 77 banks extracted from Bangladeshi, Sri Lanka and Pakistan. Similarly, Bucevska & Misheva (2017) reported an insignificant and no effect on profitability of 127 commercial banks in six Balkan counties.

2.2.3.2.3 Effective Tax Rate (Interest Rate)

Championing an influence on banks using monetary policies is the effective tax rate. A widespread measure of interest rate is the lending interest rate, or the tax rate paid by the banks to the government. Results so far documented on the association between effective tax rate and profitability is mixed. Demirguc-Kunt and Huizinga (2000) and Yahya, Aktar and Tabash (2017) find a positive relationship whereas Garcia & Trindade (2018) and Al-Homaidi et al (2018) find a negative and statistically significant relation.

2.2.3.2.4 Exchange Rate

Exchange rate represent how one country's denomination can be expressed in a different countries' denomination. Average exchange rate is the measure mostly used for this variable. Whilst Garcia & Trindade (2018) report a positive and significant relation, Al-Homaidi et al (2018) report an inverse and significant relation.

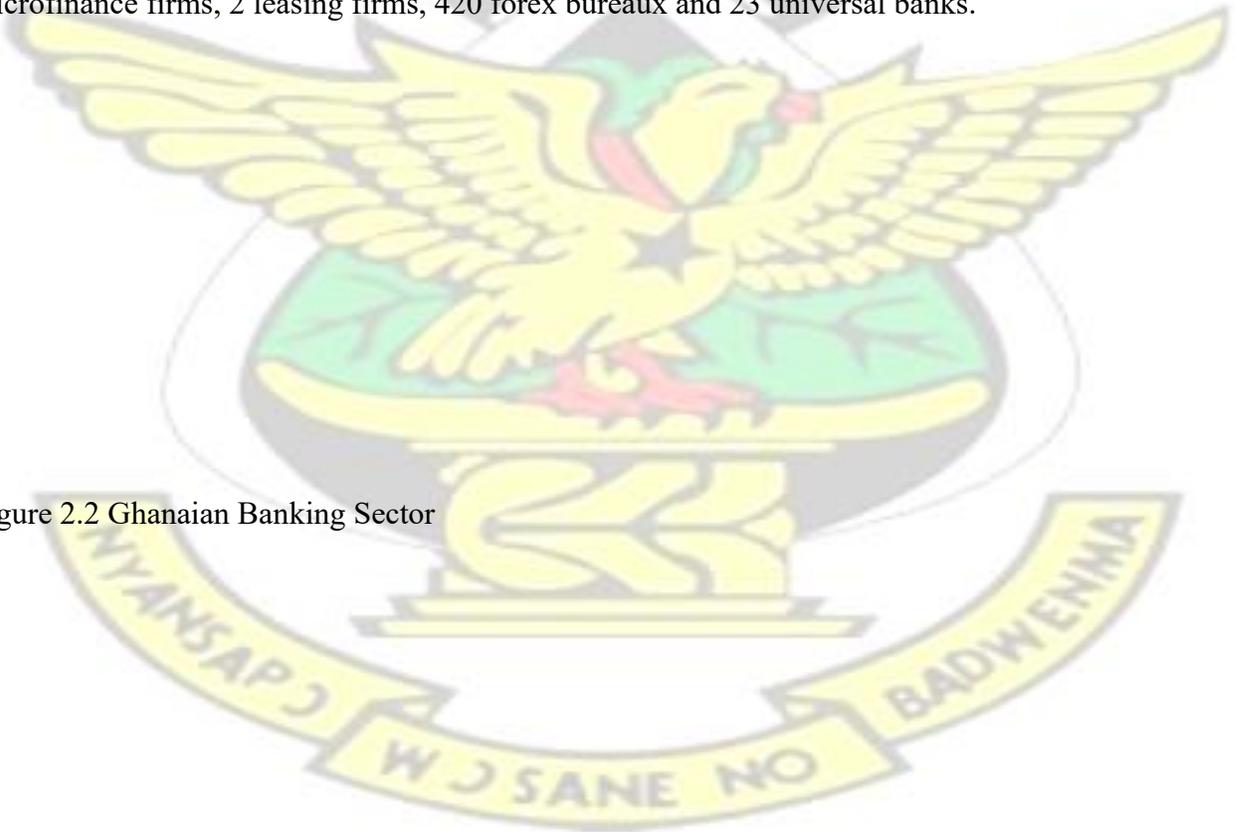
2.2.4 Snapshot of the Banking System

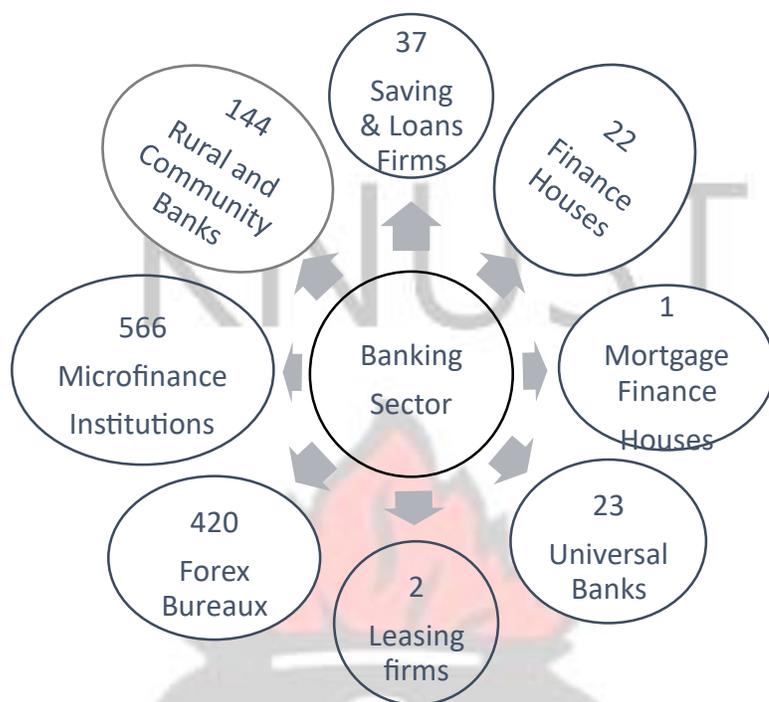
Within the Ghanaian environment, the private sector has dominance in the fiscal system. Put simply, the financial system kept up in Ghana is one of managerial ownership. At an earlier time around 1800's, the Ghanaian setting was functioning without a system of bank. Standard Chartered Bank, then British Bank of West Africa, set up a division in the capital city charged with the responsibility of preparing governmental accounts and the introduction of cheques to settle government related transactions. The period leading to 1953 saw Ghana establishing indigenous private banks, - thus, the Bank of Gold Coast- as well as its first and subsequent mergers in the economy. Few years after, the Bank of Gold Coast was split into two the Bank of Ghana and GCB

Bank Limited (then Ghana Commercial Bank) with the former having an exclusive duty to act as a bank of issue whilst efforts are being put in place to make it an established central bank and the later groomed into the largest monopolist commercial bank for government-dominated institutions.

The Bank of Ghana which is the central bank is duty bound to supervise monetary policies as well as give counsel to the government from the outcome of implementing. Again, it is also responsible for controlling and governing of financial firms. In such duties, there has been many reforms instituted by the central bank since its establishment in 1957 to increase stability and confidence in the financial system of the country. Currently the Ghanaian banking system is comprised of 37 savings and loans, 22 finance houses, 1 mortgage house, 144 rural and community banks, 566 microfinance firms, 2 leasing firms, 420 forex bureaux and 23 universal banks.

Figure 2.2 Ghanaian Banking Sector





Source – *Extracted from Bank of Ghana annual report, 2018.*

2.2.5 Channels to Boost Profitability of Banks

It is undisputed truth that at the core of growth and development of an economy, one will find the banking sector contributing immensely towards that efforts. It is in support of this that there is the need to find avenues or channels which can increase how profitable banks can be and these are described below;

1. Attaining an Efficient statement of financial position

One step towards banks increasing their profitability is to attain an efficient statement of financial position. In view of increasing profitability, the Bank of Ghana called for an increase in the minimum capital requirement as noted in the Banking Survey (2019). This necessitated the revamping of deposits as well as assets to meet the requirements whilst not compromising on being

profitable. Strategies such as enhancing customer relationship as well as beefing up cross-selling was some of the options opted for.

2. Growth Strategies

As evident in the last few years, the banking industry has witnessed a drop down in profits as highlighted in the Banking Survey, (2019). Though the reforms was a barrier to growth, a couple of executives of Ghanaian banks commented that the reform created virgin areas which prior to the reform they could not access due to their capital state (Banking Survey, 2019). In effect, strategies should be set in motion to capitalize on the new opportunities available which is necessary to boost up their state of profitability.

3. Improvement in Cyber security

Cyber and information security is gaining dominance in meetings of board members partly due to its ascendance in occurrence. This phenomenon is so worrying that it brings operational activities and roles of banks to a standstill. At present, banks rely mostly on internet related systems and networks as these are good facilitators for the processing of transactions and disbursements of funds which makes them highly vulnerable to attacks.

It is important to note that from the interview conducted by the banking survey, 2019 revealed that 69 percent of executives of banks have made investment on cyber-risk associated threats a key issue such that upon its occurrence there will be able to quickly prevent it as it came. This when done properly, translate into reduction of losses and increase in profitability.

4. Compliance with Corporate Governance directives

As part of the minimum capital requirement reform, the central bank also issued a corporate governance initiative to boost investor confidence as well as ensure a stable financial market. According to highlights in the Banking Survey, 2019 some of the corporate governance are welcoming whilst others are not. A case in point, is the need to have a fixed tenure system on key appointments of banks CEOs and MDs as well as the compulsion to have an independent board chairperson. The later has the effect of increasing the overall profitability of banks as the separation of ownership and control as evidence in agency theory will be observed.

2.3 Theoretical Review

Having exhausted the drivers of commercial banks profitability, the researcher adds on by explaining the underlying theories of profitability. For this research, the structure-conductperformance hypothesis and the efficient structure hypothesis are considered.

2.3.1 Structure-Conduct-Performance Hypothesis

According to Grygorenko (2009), the structure-conduct-performance serves as one of the oldest theories used to investigate the factors influencing how banks are profitable. Structure connotes technological drivers and the market environment concentration. The second terminology, conduct is the behaviour of respective institutions in the market, generally associated with price-related decisions. Performance simply is the consequence of an outcome, thus returns which stems from the market.

SCP hypotheses contend that there are linkages among the three variables namely structure, conduct and performance, such that they influence themselves to either contribute to efficiency or inefficiency. In Stigler (1964) view, this hypothesis is borne out of the nature of institutions exhibiting characteristics of oligopoly. Data from manufacturing institutions pioneered this hypothesis and dominated the banking hemisphere around 1960s. Prior studies have affirmed profitability to be positively associated with concentration (Piper and Weiss, 1974; Bain, 1951; Hannan, 1991). At present, Sathye (2005), Samad, (2008), Piloof et al. (2002) and Rzaa and Farooq (2011) have also documented similar evidence supporting the assertions in prior research on the relationship between profitability and concentration.

However, there is a key weakness evident in research related to bank market structure, which is the failure to consider regulations of bank (Gilbert, 1984; Whalen, 1988; Clark and Speaker, 1992).

The evidence documented from the researchers' works indicates that an increased actual and the likely competition coming because of deregulation of the fiscal sector can limit non-competitive prices regardless of a high concentration on the market. In effect, there is existence of weak and no significance association simply because there is absence of theoretical lens on bank regulation.

2.3.2 Efficient Structure Hypothesis

Through the theoretical lens of efficient structure hypothesis pioneered by Demsetz (1973) postulate that profits are not borne out of institutions creating 'artificial shortages' via reduced output, nor borne out of collusion evident in SCP hypothesis, but rather is as a result of the mix between a high level of uncertainty and managerial insight. Consequently, institutions having an edge in manufacturing tend to grow larger and expand to acquire large market shares which results

in often a concentration in the market. It is worth noting that this model is an alternative to SCP hypothesis.

Smirlock (1985) has been credited with the first adoption of this model in the banking fraternity. The findings indicated that market share had positively significant impact on profitability of banks as opposed to concentration. Notwithstanding, this Clark (1988) constructively disapprove of Smirlock's findings in terms of generalisation and how valid it is based on the uniqueness of the dataset. His first contention was the unexplained association between market share and profitability whether their long term or transitional. The researcher further added that almost all the sample of Smirlock's sample was dominated by rural bank and as such was biased. However, there has been findings in favour of efficient structure hypothesis (Mamatzakis et al., 2003; Naceur, 2003).

2.4 Empirical Review

Banks' profitability drivers are far-reaching in terms of literature as evident in various provinces as well as regions worldwide. Previous research conducted on the profitability drivers can be categorized into two groups namely, national and international research.

2.4.1 Cross-Country Studies

This comprises of research done on a number of countries either within the same region or different regions. Adelopo, Lloydking & Tauringana (2018) examined 123 banks from 15 countries with a sample period of ten years ending in 2013. The authors found capital adequacy and bank size to be significant whereas credit risk recorded an insignificant relation before the crisis and a negative significant relation after the crisis. Liquidity and cost-income ratio to be inversely significant. Extrinsic forces for the study namely real GDP and inflation had a positively significant relation with profitability.

Sarpong-Kumankoma et al (2018) analysed the profitability of 139 banks from 11 Sub-African countries from 2006-2012. The findings reveal that capital adequacy, bank size, credit risk and cost-income ratio are insignificant determiners of profitability.

Also, Bucevska & Misheva (2017) explored the profitability of 127 commercial banks out of six Balkan countries spanning from 2005-2009. The results for the internal drivers showed that capital adequacy, credit risk, asset management, ownership structure is significant whereas bank size was insignificant. On the other hand, external factors such as real GDP and inflation were insignificant and had no impact on profitability.

2.4.2 Single-Country Studies

This research is focused on a single-country's banks profitability drivers. Garcia and Trindade (2018) who studied 17 Angolan banks covering a seven-year period from 2010 found capital adequacy, cost-income ratio and deposit over total assets to be an insignificant intrinsic determinants of profitability whereas ownership was the only intrinsic driver of profitability to be positively significant. On extrinsic drivers real GDP and interest rate were found to be negative and statistically significant whereas inflation and exchange rate to be positively significant. However, other extrinsic drivers such as term structure of interest rates. Index of banking of the economy and fuel were insignificant. The researchers further added a legal driver measured as corruption index which was found to be positively significant to influencing profitability. The measure of profitability adopted by the researchers was return on average assets and return on average equity.

Sufian & Habibullah (2009) examined 37 Bangladeshi commercial banks within the period of 1997-2004 with evidence of intrinsic drivers such as capitalization, asset quality, credit risk exhibiting a significantly positive relation with all the three measures of profitability. Bank size

which is also another intrinsic drive has a negative impact on return on average equity whilst exhibiting a positive impact on return on average assets and net interest margin. On the other hand, asset management another intrinsic driver had a negative impact on profitability measures. Through the eyes of the extrinsic forces, real GDP has no impacts on profitability. However, there is a negative relation between inflation and profitability measures.

In the Ghanaian context research into the forces behind profitability of banks are at its infancy. Adusei (2015) investigated how profitable rural banks in Ghana are, with a sample size of 112 using quarterly annual report from 2009-2013. The researcher found evidence that intrinsic drivers such as bank size, diversification, liquidity risk and stability as positively related to return on assets and return on equity whilst funding risk showed an inverse significant relation. Credit risk was insignificant.

Mireku et al (2018) examined whether the presence of commercial banks improves profitability of banks for an eight-year period starting from 2007 using 25 sampled commercial banks. The evidence documented was that an increased banks presence does not automatically reflect in profitability. The results also reveal that market concentration, cost management, capital adequacy and combination of operations are positively significant predictors of commercial banks profitability. Again, the extrinsic drivers were also positively related with profitability.

Yakubu (2019) also examined whether corruption induces a reduction or increment of banks' in Ghana for an unbalanced panel of 11 commercial banks. The study period was a ten-year period from 2008. The findings showed that corruption to be negatively significant to bank's profitability. From a careful review of the literatures in the Ghanaian economy, most of the studies ignored a major determinant of profitability which is net interest margin and also did not consider a

comprehensive list of intrinsic and extrinsic drivers of profitability and hence the purpose of this study.

Fatao et al (2019) examined the factors that influence non-performing loans of 9 banks over 18 year period from 1997. The findings indicated that lagged nonperforming loans, capital adequacy and return on equity affect non-performing loans positively while firm size is insignificantly related with non-performing loans. Also, inflation impacts non-performing loans positively while gross domestic product exhibited an inverse relationship with non-performing loans.

Amene and Alemu (2019) investigated the factors influencing financial performance of Ethiopian private commercial banks over a 10-year period from 2006 using OLS estimation technique. The findings suggest that capital adequacy and liquidity impacts positively return on assets and return on equity whereas asset quality impacts return on assets and return on equity negatively. Also, only liquidity impacts economic value added positively. Capital adequacy and asset quality reports a negatively significant effect on economic value added.

Caliskan et al (2020) investigated the determinants of Turkish banking sector over a 38-year period using pooled OLS regression technique. The findings suggest that bank size, liquidity and deposit conversion rate impact return on assets positively while only deposit conversion rate exhibits an insignificant relationship with return on equity as a profitability indicator. Moreover, gross domestic product and exchange rate impacts both return on assets and return on equity positively while interest rates exhibit an insignificant effect on both return on assets and return on equity.

Almaqtri et al (2018) examined the determinants of profitability of 69 Indian commercial banks over a ten-year period from 2008 using OLS estimation technique. The findings suggest asset management, asset quality and operational efficiency impacts return on assets positively whereas leverage impacts return on assets negatively. All of the bank-specific factors impact return on

equity positively. Also, only exchange rate and demonetization have a significantly positive effect on return on assets as a profitability indicator. Inflation exhibits a positively significant effect on return on equity whereas gross domestic product and exchange rate exhibit a negatively significant effect on return on equity.

Abate and Mesfin (2019) examines the determinants of nine Ethiopian commercial banks over a ten-year period from 2007 using OLS estimation technique. The findings suggest that capital adequacy, leverage, liquidity and ownership concentration have a positively significant impact on return on assets whereas interest rates, gross domestic product and exchange rates exhibit a negatively significant effect on return on assets.

Rahman et al (2020) examined the nexus between advertising efficiency and profitability of pharmaceutical U.S.A industries using data envelopment analysis. The findings suggest that efficiency is positively related with performance levels.

Islam and Rana (2019) investigated the factors influence the profitability of 23 Bangladesh commercial banks over a five-year period from 2013 using the fixed effect model. The findings indicate that earning variable and asset structure is positively related to return on assets whereas asset quality is negatively related with return on assets. All but asset quality impacts return on equity negatively. All external factors exhibit an insignificant impact on all profitability indicators.

Boateng (2019) examined the effect efficiency and productivity has on performance of Ghanaian commercial banks. The findings suggest that operational efficiency, profit per employee and noninterest income are significant factors that influence performance of commercial banks whereas capital adequacy and managerial expenses are insignificant factors that influence performance.

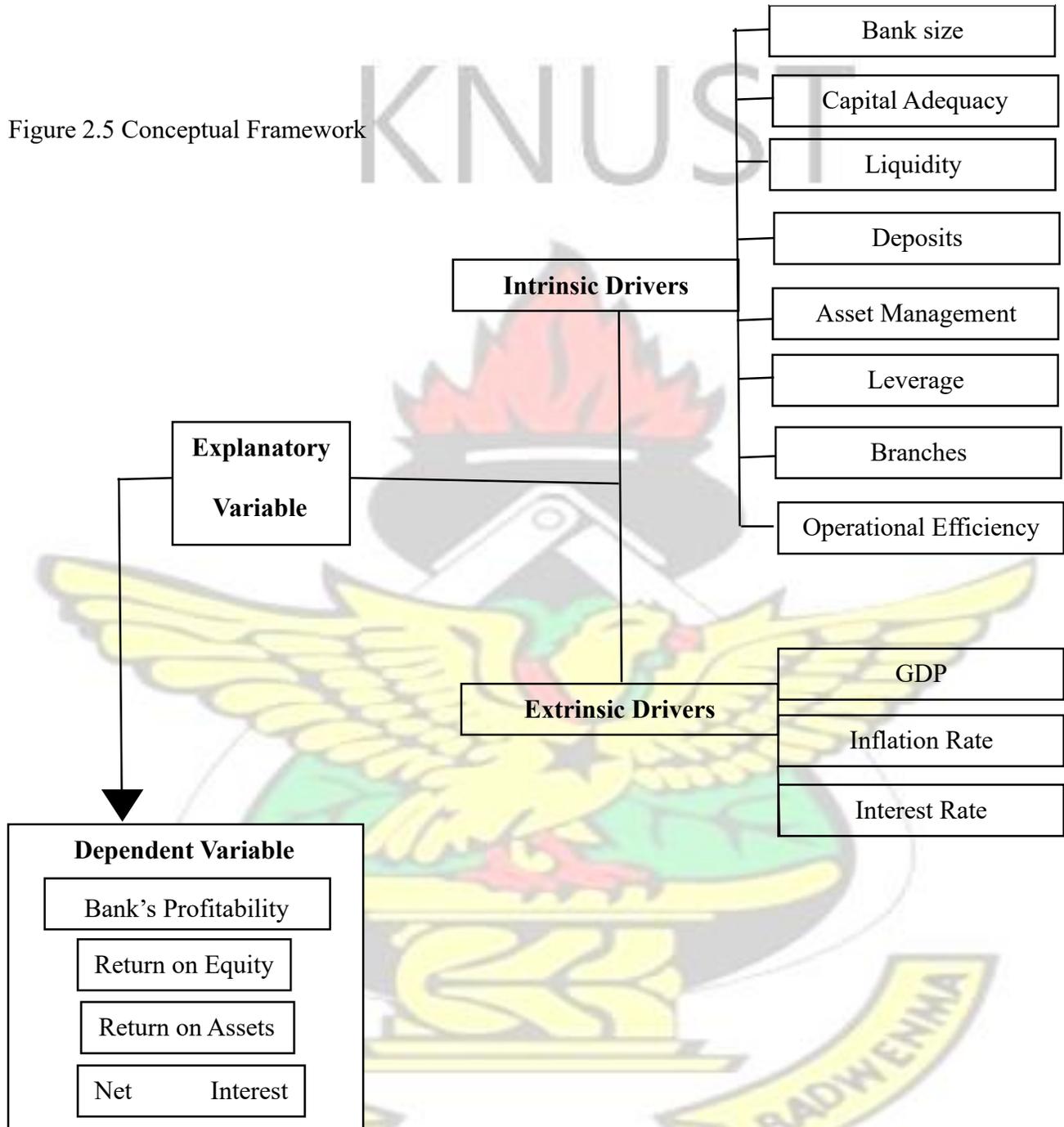
Aspal et al (2019) investigated the determinants of performance of 20 Indian private banking firms over a five-year period. The findings indicate that all but capital adequacy exhibit a significant effect on performance. Also, gross domestic product exhibited a significant effect on performance.

Amoah (2019) examined income diversification and profitability of 10 Ghanaian banks over an eleven-year period from 2006. The findings suggest that income diversification is positively related with profitability but this effect is not robust or monotonic.



2.5 Conceptual Framework

Figure 2.5 Conceptual Framework



Source – Adopted from Al-Homaidi et al (2018)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methods employed and adopted for the study. To elaborate, it delves into the research design used, research area, sample size and population, sampling technique, data collection, analysis of the data and the reliability and validity test conducted. This chapter also provides insight on the research design coupled with activities involved in sourcing data for this research

3.2 Research Design

It is worthy of note that no research design is superior, and the choice of a particular method is informed by the nature of the research. For this reason, a mix of descriptive and exploratory research design were adopted to examine the determinants of listed banks profitability in Ghana. The choice of selection of this combination is informed by substantial mental grasp it accords on the current happenings, the clarity on how variables impact, flexibility and the platform it provides to further explore other areas as well as new dimensions of a study (Patel and Davidson, 2003). Subsequently, the case study approach has been employed since the research is centered on listed commercial banks determinants in Ghana and this is justified by the fact that it is informing stakeholders on the forces which influences the profitability of these firms. Following the exploratory research design adopted, this research is purely quantitative since it provides insights on the determinants of listed banks profitability as well as the handiness it affords in extending a general conclusion with respect to content theme whilst not injuring accuracy (Yilmaz, 2013).

3.3 Population of the Study

Population denotes the complete unit where a sample is drawn (Saunders et al, 2007). For this research, the entire 11 listed banks on the Ghana Stock Exchange constitute the population. The

scope was on the Ghana Stock Exchange mainly because it is relatively easy to retrieve data from those firms since it is a requirement for such firms to make available their annual reports on their respective website as well as to the regulator of the stock exchange.

3.4 Sample Size and Sampling Technique

8 listed banks were taken out of the population of 12 listed banks. This niche was sampled out of 12 financial firms of which there are 10 listed banks and 2 insurance firms. To achieve this selection, a non-probability sampling technique, specifically convenience sampling was adopted. The justification of this was that the researcher wanted freedom in selecting this firms based on a characterizing trait notably among them that the selected firms should report in the country's currency (GHS).

3.5 Data Collection Procedures

This research make use of intrinsic level data sourced from the Ghana Stock Exchange which houses the annual reports of 37 firms in Ghana since its listing on the platform- the firms are represented according to sectors; finance, distribution, food and beverage, ICT, insurance, manufacturing, mining, agriculture, exchange trades funds and education (GSE December report, 2015). Put simply, the source of data for analysis is derived from secondary sources, specifically audited annual reports that have been made available by the sampled firms and retrieved from the Ghana Stock Exchange and/or firms' respective website covering 2009 to 2018 resulting in a firmyear observation of 80, making it a balanced panel. The extrinsic level data was obtained from the World Bank Development Indicator Database (World Bank, 2019). With the help of Microsoft Office Excel 2013 the variables were extracted from the annual reports and using STATA 12.0 an analysis run to determine the effects of the independent variables on the dependent variable.

3.6 Data Analysis

On data analysis, the tools employed to conduct the analysis was linear regression in line with Louzis et al (2012), Masood and Ashraf (2012) and Al-Homaidi et al (2018) to examine the forces that influences the profitability of listed Ghanaian banks. This research has conducted a balanced panel of 8 quoted Ghanaian firms and stands on the shoulders of the fact that it has the ability to exert influence on respective heterogeneity and multicollinearity (Kyereboah-Coleman, 2007; Baltagi, 2005; Hsiao, 2005; Martinez-Ferrero and Garcia-Sanchez, 2017). Narrowing on the linear regression model conducted, pooled, fixed and random effects model was employed.

3.7 Model Estimation

Following Chowdhury et al (2017) and Al-Homaidi et al (2018), the researcher develops a model to examine the determinants (both intrinsic and extrinsic forces) that influences the profitability of Ghanaian commercial banks.

$$P_{i,t} = k_i + \beta_1 CAD_{it} + \beta_2 Q_{it} + \beta_3 LQD_{it} + \beta_4 D_{it} + \beta_5 M_{it} + \beta_6 OE_{it} + \beta_7 L_{it} + \beta_8 B_{it} + \beta_9 S_{it} + \beta_{10} GDP_{it} + \beta_{11} Inf_{it} + \beta_{12} IR_{it} + \beta_{13} ER_{it} + \varepsilon_{i,t} \dots \dots \dots (1)$$

Where, P is Profitability measures, thus ROA, ROE, & NIM, k is constant term, *i. t* is firm I and t represents time, CAD represents capital adequacy, LQD denotes liquidity, S denotes bank size, OE denotes operational efficiency, M denotes asset management, L denotes leverage, B represents branches, D denotes deposits, GDP stands for Gross Domestic Product, IR denotes interest rate, Inf stands for inflation and $\varepsilon_{i,t}$ is the error term

3.8 Variable Description and Measurements

Table 3.8 Description of Variables

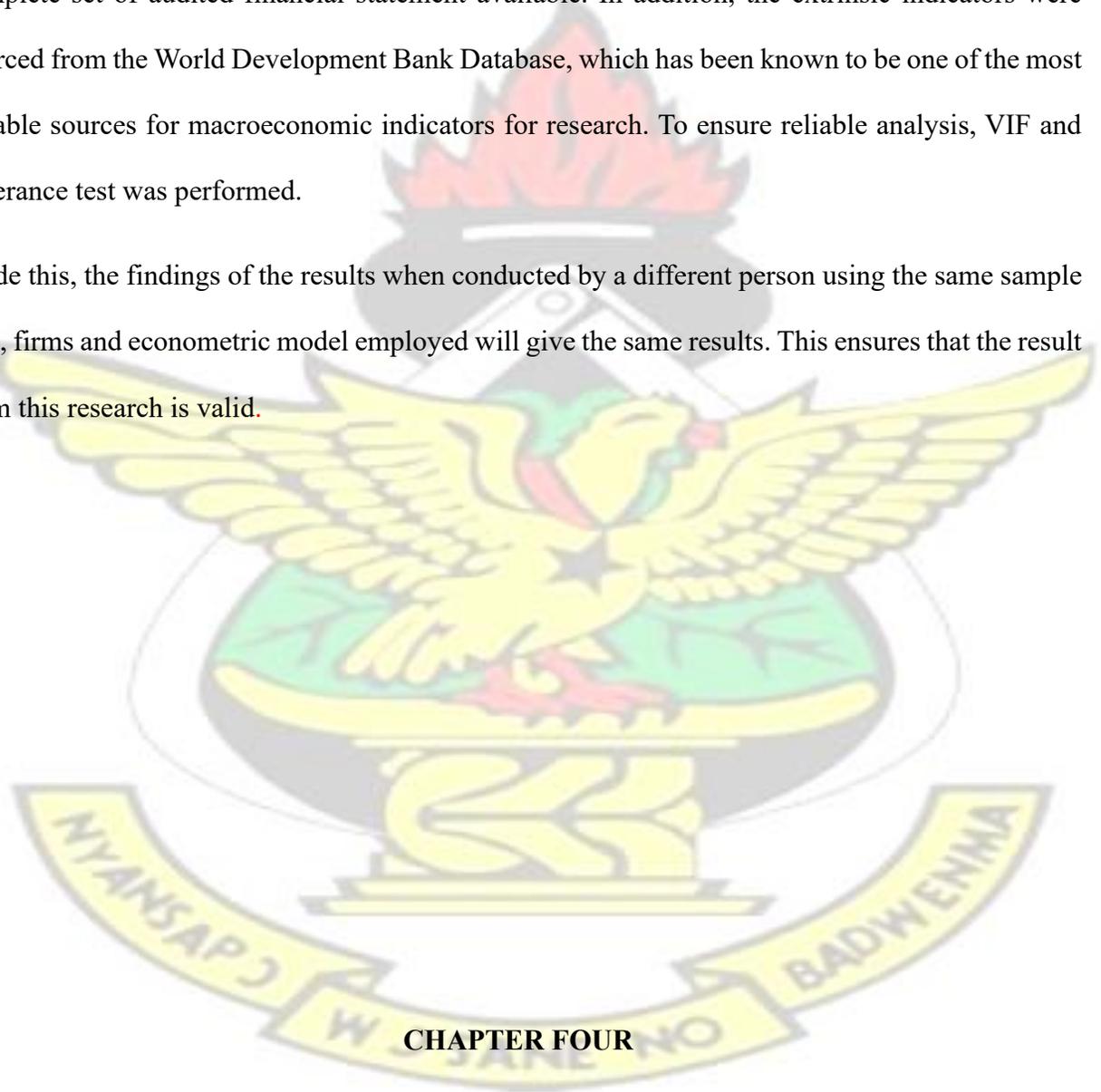
<i>Variable</i>	<i>Abbreviation</i>	<i>Proxy</i>
<i>Return on Assets</i>	ROA	Net profit for the year over total asset
<i>Return on Equity</i>	ROE	Net profit for the year over total equity
<i>Net Interest Margin</i>	NIM	Ratio of net interest income to total asset
<i>Bank Size</i>	S	natural logarithm of total assets
<i>Asset Quality</i>	Q	Ratio of loans to total assets
<i>Deposits</i>	D	Total deposit over total asset
<i>Asset Management</i>	M	Proportion of operating income to total assets
<i>Operational Efficiency</i>	OE	Operating expenses over interest income
<i>Leverage</i>	L	Total debt over total assets
<i>Branches</i>	B	Number of branches
<i>Liquidity</i>	LQD	Liquid assets over total asset
<i>Inflation</i>	Inf	annual inflation rate
<i>Interest Rate</i>	IR	Lending interest rate the bank gains
<i>Real Gross Domestic Product</i>	GDP	Aggregate economic activity

3.9 Reliability and Validity of Data

Reliability of data has been observed following an assertion that unreliability in financial data can be removed by extending the sample period over 5 years (Alipour et al, 2019) as well as panel data

being advocated as providing more benefits in terms of increasing consistency. Again, audited financial statements has been sourced and used which is in line with the same sources used by scholars who have published in top-tier journals within the Ghanaian environs such as (Yakubu, 2019; Mireku et al, 2018; Kyereboah-Coleman, 2007). Further checks were also conducted, given relevance to the fact that the selected firms should be solvent within the sample period and having complete set of audited financial statement available. In addition, the extrinsic indicators were sourced from the World Development Bank Database, which has been known to be one of the most reliable sources for macroeconomic indicators for research. To ensure reliable analysis, VIF and Tolerance test was performed.

Aside this, the findings of the results when conducted by a different person using the same sample size, firms and econometric model employed will give the same results. This ensures that the result from this research is valid.



CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

This division highlights the findings as well as gives an interpretation of the regression analyses on the determinants of banks profitability in Ghana using 8 selected quoted firms on the GSE. This division has been streamlined under five main themes namely descriptive analysis of the variables, correlation analysis, multicollinearity and regression results, i.e fixed effect and random effect.

4.2 Descriptive Statistics

Table 4.1 presents the summary of the descriptive statistics which provides minimum value, the maximum value, the mean, and the standard deviation of each variable as well as the number of observations. The normality test using skewness-kurtosis in table 4.1 generally exhibits that the distribution is not a normal distribution since the skewness test do not reject the null hypothesis of normality of the variable return on equity, deposits, operational efficiency, number of branches and gross domestic product. However, the Kurtosis test shows that the distribution is less than 3.0 hence the null hypothesis that all the variables are normally distributed at the 0.01 significance level.

4.1 Descriptive Statistics

Notes: **Table 4.1**, ROA means Return on Assets, NIM means net interest margin, ROE means return

Variable	Mean	Std. Deviation	Minimum	Maximum	Pr(Skewness)	Pr (Kurtosis)
ROA	.0294481	.0212174	-.0438445	-.0696399	0.0031	0.0403
ROE	.2182154.	.2376298	-.2735124	1.363171	0.0000	0.00000
NIM	.0814013	.0287683	.009253	.1575975	0.0137	0.2040
S	6.286517	.4076172	4.976281	7.02674	0.6607	0.0411
Q	.4205534	.1261035	.092126	.6601261	0.0137	0.2040
D	.745693	.5538863	.0281604	5.396186	0.0000	0.2300
M	.1229855	.0251785	.0674024	.1868679	0.4735	0.0000
OE	.6624116	.2205765	.3080309	1.379642	0.0002	0.7379
L	.8376949	.0920478	.172192	.9701319	0.0000	0.0074
LQD	.4785941	.4904104	.1499683	4.562722	0.0000	0.0000
B	58.0125	44.17041	14	187	0.0000	0.0000
INF	.1202	.0350039	.074	.193	0.0100	0.4339
GDP	.0693	.0323871	.035	.15	0.0000	0.0401
IR	.1865	.0438091	.125	.26	0.1482	0.0068

on equity, S means bank size, OE means operational efficiency, M means assets management, D means deposits ratio, L means leverage, LQD means liquidity, B means number of branches, GDP means gross domestic products, IR means interest rates and INF means inflation.

Source: Author's construction extracted from 'financial statements from 2009-2018.

The table presented above provides a trend operationalization of profitability spanning from 2009 to 2018. Also, it also gives a highlight of internal and external parameters for the aforementioned years. Inferring from the above, ROA, ROE and NIM revealed a minimum value of -4.4%, 27.35% and 0.925% respectively whilst revealing a maximum value of -6.97%, 136.31% and 15.76% respectively and having a mean of 2%, 22% and 8% which connotes that banks in Ghana have a negative skew. Also, internal and external factors of profitability have varying means and standard deviation. Deposits, asset management, operational efficiency, leverage, liquidity, and branches have a mean of 74.56%, 12.29%, 66.24%, 83.76%, 47.85%, and 58% separately whereas having 55.58%, 2.5%, 22.05%, 9.20%, 49.04% and 44% as standard deviation respectively. The 83% mean for leverage connotes that banks in Ghana are highly geared and as such more is paid into settlements of these debts and less to shareholders. Averagely, GDP growth is 6.93% and has a minimum and maximum value of 7% and 19.3%.

Also, inflation has a mean of 12.02% whereas interest rate is 18.65%. These two external variables have minimum values of 7.4% and 12.5% for the former and latter, with a maximum value of 19.3% and 26% for the same order.

4.3 Correlation Analysis

Table 4.2 presents the Pearson correlation coefficient for all dependent variables and explanatory variables. Correlation is not equal to causality but gives an indication of the strength of the variables. With reference to table 4.2, of the internal factors, firm size, asset management, leverage and liquidity exhibits a positive association with all profitability proxies whereas deposits and operational efficiency exhibits a negative relation with all profitability proxies. Liquidity exhibits a positive relation with ROA and NIM but a negative association with ROE. Also, the number of

branches exhibits a negative relation with ROA and a positive relation with ROE and NIM. On the other hand, from the viewpoint of external factors, inflation exhibits a positive relation with ROA and ROE and an inverse relation with NIM. Also, GDP exhibits a positive correlation with ROA and a negative correlation with ROE and NIM. Lastly, interest rate exhibits a negative correlation with all profitability measurements. None of the coefficients of correlation is greater than 0.7 hence there is no issue of multicollinearity (Pallant, 2000).



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Table 4.2 Correlation matrix

	ROA	ROE	NIM	S	Q	D	M	OE	L	LQD	B	INF	GDP	IR
ROA	1.0000													
ROE	0.6909	1.0000												
NIM	0.3244	0.2607	1.0000											
S	0.1106	0.2504	0.2385	1.0000										
Q	-0.1080	-0.0170	-0.2508	-0.1905	1.0000									
D	-0.0901	-0.0464	-0.0007	-0.0037	0.1307	1.0000								
M	0.4853	0.3534	0.6373	0.3525	-0.0287	-0.0579	1.0000							
OE	-0.8870	-0.6051	-0.2284	-0.1269	0.2316	0.0851	-0.2756	1.0000						
L	0.0455	0.2764	0.1202	0.5489	0.3192	0.0766	0.2079	-0.0082	1.0000					
LQD	0.1128	-0.0033	0.3812	0.1628	-0.2971	-0.0367	0.3166	-0.0565	-0.1059	1.0000				
B	-0.0764	0.0650	0.4938	0.4392	-0.2177	0.0261	0.3564	0.1587	0.2560	0.3096	1.0000			
INF	0.0006	0.0357	-0.0983	-0.1354	0.0015	-0.1265	-0.1183	0.0765	-0.1097	-0.1903	-0.0373	1.0000		
GDP	0.0542	-0.0005	-0.0091	-0.2486	-0.1262	0.0649	-0.2255	-0.1250	-0.0094	-0.0783	-0.0317	-0.4713	1.0000	
IR	-0.1526	-0.0830	-0.0016	0.4409	0.0875	-0.0363	0.2798	0.2083	0.1153	0.2181	0.0648	0.2204	-0.7601	1.0000



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4.4 Multicollinearity Test

Multicollinearity examines the linearity of two or more explanatory variables. The VIF or tolerance VIF gives an indication of the explanatory variables are correlated. The rule of thumb says that when the mean Variance inflation factor is higher or equal to five, multicollinearity is present. From the performance of the VIF the mean is 2.34 indicating that none of the explanatory variables are collinear.



Table 4.1 Multicollinearity Results

VARIABLE	MEAN	1/VIF
IR	3.85	0.2569679
S	3.43	0.291502
GDP	3.28	0.30448
M	2.43	0.411295
L	2.34	0.426532
NIM	2.34	0.431349
OE	2.29	0.435974
B	2.15	0.465491
Q	1.97	0.508182
ROE	1.96	0.510540
INF	1.75	0.572697
LQD	1.53	0.651543
D	1.05	0.949327
MEAN VIF	2.34	

Notes: **Table 4.3**, S means bank size, OE means operational efficiency, M means assets management, D means deposits ratio, L means leverage, LQD means liquidity, B means number of branches, GDP means gross domestic products, IR means interest rates and INF means inflation.

4.5 Optimum Panel Model Determination

Fixed effect, random effect and pooled ordinary least square are the basic methods by which a Green (2008) purports that fixed effect, random effect and pooled ordinary least square are the fundamental model used in examining panel data. To be able to select the best model to use, the Hausman Specification test must be performed to select the right model to explain the regression. The null hypothesis of the Hausman test favours the random effect. That is, if the p-value of the Hausman test result is greater than five percent (5%), then the null hypothesis should be the preferred method of estimating results. However, if the p-value of the Hausman test result is less than five percent, (5%), then failing to accept the alternate hypothesis or choosing the random effect as the preferred estimation method will be misleading

From the hausman specification test conducted using all three profitability indicators separately, the p-value is less than five percent, and hence the fixed effect model has been used in the regression to estimate the relationship between the variables. The presence of variance across entities understudy is a representation of the alternate hypothesis for the Breusch-Pagan lagrange multiplier test which is a test for heteroscedasticity. Therefore, by refusing to accept the alternate hypothesis we can infer that, there is zero variance across entities of the study. From the regression results, the null hypothesis is rejected and conclude on the fixed effect model as well as robustness for all the three dependent profitability measures run separately and tested individually.

4.6 Multiple Regression Results

Table 4.2 ROA as a Dependent Variable (USING POLS)

Variables	Coef.	Std.Err	P> t	t-statistics
S	.0015485	.0040063	0.700	0.39
Q	.0214774	.0096724	0.030	2.22
D	-.0000429	.0016418	0.979	-0.03
M	.2698961	.046057	0.000	5.86
OE	-.0767028	.0052078	0.000	-14.73
L	-.008243	.0145478	0.000	1.30
LQD	.0028794	.0022091	0.573	-0.57
B	-.0000223	.0000283	0.197	-0.79
INF	.0940103	.0331222	0.432	2.84
GDP	.0294033	.0496553	0.006	0.59
IR	-.0522295	.0392217	0.556	-1.33
_cons	.0315549	.0236934	0.320	1.33
R-sq = 0.8808				
Prob > F= 0.0000				

Notes: **Table 4.4**, ROA means Return on Assets, S means bank size, OE means operational efficiency, M means assets management, D means deposits ratio, L means leverage, LQD means liquidity, B means number of branches, GDP means gross domestic products, IR means interest rates and INF means inflation

Table 4.4.1 ROE as a Dependent Variable (Using POLS)

Variables	Coef.	Std.Err	P> t	t-statistics
S	.0610524	.0928612	0.513	0.66
Q	.1828065	.2241917	0.418	0.82
D	-.0002259	.0380538	0.995	-0.01
M	1.603883	1.067534	0.138	1.50
OE	-.6023337	.1207091	0.000	-4.99
L	.4320951	.3371963	0.204	-0.15
LQD	-.0078593	.0512043	0.878	1.28
B	.0002378	.0006555	0.718	0.36
INF	.9876954	.7677238	0.203	1.29
GDP	-.2481733	1.150938	0.830	-0.22
IR	-.787627	.9091016	0.389	-0.87
_cons	-.3671908	.5491778	0.506	-0.67
R-sq = 0.4894				
Prob > F= 0.0000				

Notes: **Table 4.4.1**, ROE means return on equity, S means bank size, OE means operational efficiency, M means assets management, D means deposits ratio, L means leverage, LQD means liquidity, B means number of branches, GDP means gross domestic products, IR means interest rates and INF means inflation

Table 4.4.2 NIM as a Dependent Variable (Using POLS)

Variables	Coef.	Std.Err	P> t	t-statistics
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S	-.0079456	.0103335	0.445	-0.77
Q	-.0378587	.0249478	0.134	-1.52
D	.0025325	.0042346	0.552	0.60
M	.6153345	.1187939	0.000	5.18
OE	-.0085604	.0134324	0.526	-0.64
L	.0272416	.0375228	0.470	1.47
LQD	.0083482	.005698	0.147	0.73
B	.0001749	.0000729	0.019	2.40
INF	.0197865	.0854314	0.818	0.23
GDP	-.0417794	.128075	0.745	-0.33
IR	-.1131037	.1011637	0.267	-1.12
_cons	.0600265	.0611118	0.329	0.98

R-sq = 0.4894
 Prob > F= 0.0000

Notes: **Table 4.4.3**, NIM means net interest margin, S means bank size, OE means operational efficiency, M means assets management, D means deposits ratio, L means leverage, LQD means liquidity, B means number of branches, GDP means gross domestic products, IR means interest rates and INF means inflation.

Table 4.4, Table 4.4.1 and Table 4.4.2 depicts the results from the pooled OLS estimation for the three profitability indicator (ROA, ROE and NIM). Using ROA as a profitability indicator, the results indicated that among the internal factors, asset quality and asset management exhibited a

positively significant effect on profitability while operational efficiency and leverage have a negatively significant impact on profitability. Additionally, only GDP had a positively significant impact on profitability while all other macroeconomic factors had an insignificant effect on profitability (see, Table 4.4).

Also, using ROE as the profitability indicator, operational efficiency has a negatively significant impact on profitability while all other internal factors exhibited an insignificant effect on profitability. However, all external factors exhibited an insignificant relationship with profitability (see, Table 4.4.1).

Lastly, using NIM as profitability indicator, the results suggested that asset management and number of branches have a positively significant relationship with profitability while all other internal factors exhibited an insignificant relationship. There was no evidence of a significant impact on profitability when linked with external factors (see, Table 4.4.2).

Table 4.5 ROA as a Dependent Variable (USING RANDOM EFFECT MODEL)

Variables	Coef.	Std.Err	P> z 	z-statistics
------------------	--------------	----------------	-----------------	---------------------

S	.0015485	.0040063	0.699	0.39
Q	.0214774	.0096724	0.026	2.22
D	-.0000429	.0016418	0.979	-0.03
M	.2698961	.046057	0.000	5.86
OE	-.0767028	.0052078	0.000	-14.73
L	-.008243	.0145478	0.571	1.30
LQD	.0028794	.0022091	0.192	-0.57
B	-.0000223	.0000283	0.429	-0.79
INF	.0940103	.0331222	0.005	2.84
GDP	.0294033	.0496553	0.554	0.59
IR	-.0522295	.0392217	0.183	-1.33
_cons	.0315549	.0236934	0.183	1.33

R-sq = 0.8546
 Prob > F= 0.0000

Notes: **Table 4.6**, ROA means Return on Assets, S means bank size, OE means operational efficiency, M means assets management, D means deposits ratio, L means leverage, LQD means liquidity, B means number of branches, GDP means gross domestic products, IR means interest rates and INF means inflation.

Table 4.5.1 ROE as a Dependent Variable (USING RANDOM EFFECT MODEL)

Variables	Coef.	Std.Err	P> z 	z-statistics
------------------	--------------	----------------	-----------------	---------------------

S	.0610524	.0928612	0.511	0.66
Q	.1828065	.2241917	0.415	0.82
D	-.0002259	.0380538	0.995	-0.01
M	1.603883	1.067534	0.133	1.50
OE	-.6023337	.1207091	0.000	-4.99
L	.4320951	.3371963	0.200	1.28
LQD	-.0078593	.0512043	0.878	0.36
B	.0002378	.0006555	0.717	-0.15
INF	.9876954	.76777238	0.198	1.29
GDP	-.2481733	1.150938	0.829	-0.22
IR	-.7876267	.9091016	0.386	-0.87
_cons	-.3671908	.5491778	0.504	-0.67

R-sq = 0.3765
 Prob > F= 0.0000

Notes: **Table 4.5.1**, ROE means return on equity, S means bank size, OE means operational efficiency, M means assets management, D means deposits ratio, L means leverage, LQD means liquidity, B means number of branches, GDP means gross domestic products, IR means interest rates and INF means inflation.

Table 4.5.2 NIM as a Dependent Variable (USING RANDOM EFFECT MODEL)

Variables	Coef.	Std.Err	P> z	z-statistics
S	-.0079456	.0103335	0.442	-0.77
Q	-.0378587	.0249478	0.129	-1.52
D	.0025325	.0042346	0.550	0.60
M	.6153345	.1187939	0.000	5.18
OE	-.0085604	.0134324	0.524	-0.64
L	.0272416	.0375228	0.468	1.47
LQD	.0083482	.005698	0.143	0.73
B	.0001749	.0000729	0.016	2.40
INF	.0197865	.0854314	0.817	0.23
GDP	-.0417794	.128075	0.744	-0.33
IR	-.1131037	.1011637	0.264	-1.12
_cons	.0600265	.061118	0.326	0.98
R-sq = 0.3765				
Prob > F= 0.0000				

Notes: **Table 4.5.2**, NIM means net interest margin, S means bank size, OE means operational efficiency, M means assets management, D means deposits ratio, L means leverage, LQD means liquidity, B means number of branches, GDP means gross domestic products, IR means interest rates and INF means inflation.

The results from the Random effect model estimation using ROA as a profitability indicator suggested that asset quality and asset management exhibit a significantly positive relationship with

profitability. On external factors, only inflation exhibited positive significance with profitability (see, Table 4.5).

Inferring from Table 4.5.1, using the random effect estimation model, only operational efficiency exhibited a negative significance with profitability while all other internal factors exhibited an insignificance relation. All macroeconomic variables also exhibited an insignificant impact on profitability using ROE as a profitability indicator.

Additionally, using NIM as a profitability indicator only asset management and number of branches exhibited a significant positive effect whereas all other variables exhibited an insignificant relationship (see, Table, 2.5.2)

Table 4.6 ROA as a Dependent Variable (USING FIXED EFFECT MODEL)

Variables	Coef.	Std.Err	P> t 	t-statistics
------------------	--------------	----------------	-----------------	---------------------

S	.005091	.0054706	0.356	0.93
Q	.0091113	.0114937	0.431	0.79
D	.0000844	.0016637	0.960	0.05
M	.3313702	.059798	0.000	5.54
OE	-.0795354	.0073608	0.000	-10.81
L	-.0023106	.0149816	0.878	1.39
LQD	.003056	.0022064	0.171	-0.15
B	-.0001415	.0001893	0.458	-0.75
INF	.1071626	.0334653	0.002	3.20
GDP	.0295204	.0482216	0.543	0.61
IR	-.0668438	.0404487	0.104	-1.65
_cons	.0117026	0.0294529	0.693	0.40

R-sq = 0.8621
 Prob > F= 0.0000

Notes: **Table 4.6**, ROA means Return on Assets, S means bank size, OE means operational efficiency, M means assets management, D means deposits ratio, L means leverage, LQD means liquidity, B means number of branches, GDP means gross domestic products, IR means interest rates and INF means inflation.

Table 4.6.1 ROE as a Dependent Variable (USING FIXED EFFECT MODEL)

Variables	Coef.	Std.Err	P> t	t-statistics
S	-.190074	.1201699	0.119	-1.58

Q	.024673	.2524772	0.922	0.10
D	.0023172	.0365451	0.950	0.06
M	1.417709	1.313557	0.285	1.08
OE	-.6136742	.1616915	0.000	-3.80
L	.4776278	.3290933	0.152	0.67
LQD	.032605	.0484666	0.504	1.45
B	.0095987	.0041588	0.024	2.31
INF	1.013838	.7351181	0.173	1.38
GDP	-.3494052	1.059262	0.743	-0.33
IR	-.457082	.8885184	0.609	-0.51
_cons	.648205	.6469786	0.320	1.00

R-sq = 0.4353

Prob > F= 0.0001

Notes: **Table 4.6.1**, ROE means return on equity, S means bank size, OE means operational efficiency, M means assets management, D means deposits ratio, L means leverage, LQD means liquidity, B means number of branches, GDP means gross domestic products, IR means interest rates and INF means inflation.

Table 4.6.2 NIM as a Dependent Variable (USING FIXED EFFECT MODEL)

Variables	Coef.	Std.Err	P> t 	t-statistics
------------------	--------------	----------------	-----------------	---------------------

S	-.0073879	.0145553	0.614	-0.51
Q	-.0341852	.0305807	0.268	-.1.12
D	.0006723	.0044264	0.880	0.15
M	.4557982	.1591017	0.006	2.86
OE	-0.0308319	.0195845	0.121	-1.57
L	.0108596	.0398607	0.786	1.56
LQD	.0091538	.0058704	0.124	1.13
B	.0005682	.0005037	0.264	0.27
INF	.0240077	.0890396	0.788	-0.34
GDP	-.0430395	.1283007	0.738	0.87
IR	.0932861	.1076198	0.389	0.98
_cons	.0771388	.0786369	0.329	.233837

R-sq = 0.3525
 Prob > F= 0.0028

Notes: **Table 4.6.2**, NIM means net interest margin, S means bank size, OE means operational efficiency, M means assets management, D means deposits ratio, L means leverage, LQD means liquidity, B means number of branches, GDP means gross domestic products, IR means interest rates and INF means inflation.

Table 4.6.1 exhibits the econometric model one. From the viewpoint of internal factors, only asset management and operational efficiency exhibited a significant relationship, with the latter

exhibiting a negative association and the former a positive association. The inverse significant relation exhibited by operational efficiency is in tandem with Al-Hoamide et al (2018), Sufian (2012) and Bourke (1989) however contradicts the works of Zarrouk, Jedidia and Moualhi (2016) and Singh (2010). Also, the significant positive relationship of asset management is in accordance with Bucevska and Misheva (2017) and Adusei (2015) but at variance with Sufian and Habibullah (2009). Firm size exhibited an insignificant but positive impact on ROA and is consistent with Sarpong-Kumankoma et al (2018). Additionally, the insignificance effect of bank size on ROA contradicts Appiah et al (2015) who documented a negatively significant effect within the rural Ghanaian banks. This means that the rural banks in rural Ghanaian bank enjoy diseconomies of scale while the commercial banks are enjoying to some extent economies of scale. Deposits exhibited a non-linear relationship with ROA which is consistent with the work of Garcia and Trindade (2018). Leverage also exhibited an insignificant yet a negative impact on ROA. However, liquidity exhibited an insignificant relationship but has a positive impact on ROA and is in line with Ali and Puah (2018). The insignificance also contradicts Appiah et al (2015). As the number of branches increase ROA decreases and the relationship is not significant.

On the other hand, focusing on external factors inflation has a positively significant relation with ROA which supports Adelopo et al (2018) whereas interest rate has an inversely significant relationship which agrees with the work of Garcia and Trindade (2018). However, GDP exhibits a positive impact but there is no significance. The significant effect of inflation on ROA suggest that the performance of commercial banks are an inflation phenomenon as opposed to the findings of Appiah et al (2015) whose result indicated that the rural banks in Ghana is not an inflation phenomenon.

From table 4.6.1 when ROE is used as a dependent variable, of the internal factors used as explanatory variables only branches and operational efficiency exhibits a significant relation. Of the significance relation, operational efficiency exhibited an inverse association, which is in accordance with Al-Homaidi et al (2018) whilst branches exhibited a positive association. Bank size exhibited a negative impact but is not significant. This contradicts the works of Al-Mutari (2008). Leverage and liquidity exhibited a positively insignificant relation with ROE. This is in variance with the works of Bougatef (2017).

On the other hand, GDP and interest rate exhibited an inversely insignificant relation whereas inflation rate is positively insignificant with ROE. This is in accordance with Louzis et al (2012).

From table 4.6.2 using NIM as the dependent variable in the econometric model 1, asset management is positively significant at 5%. Whereas all other internal factors exhibited an insignificant relationship. Focusing on bank specific factors, firm size, operational efficiency and asset quality exhibited a negatively significant relationship whilst deposit, leverage, liquidity and number of branches exhibited a positive impact.

From the viewpoint of external factors, GDP and interest rate exhibited an inversely insignificant relation with NIM whilst inflation exhibited an insignificantly positive impact on NIM. This is consistent with the findings of Al-Homaidi et al (2018).

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of findings, conclusion and recommendations made for the study.

5.2 Summary of Findings

The general objective of this study was to examine the determinants of profitability of listed banks in Ghana using a comprehensive factor of internal and external factors complimented with three accounting based proxies of profitability, namely; ROA, ROE and NIM. This research used ordinary least square regression.

5.2.1 Internal Factors Impact on Profitability

With focus on the internal factors of profitability when OLS techniques was applied, with ROA as a dependent variable and regressed on the explanatory variables, only asset management and operational efficiency where positively and negatively significant respectively at 5% level. All other internal factors exhibited an insignificant relation. Again, when ROE was used as a dependent variable and regressed on the explanatory variables, operational efficiency and number of branches exhibited an inverse and positive significance respectively at 5% level. All others exhibited insignificant relation. Also, using NIM as a measure of profitability, all but asset management exhibited a positive significance at 5% level.

5.2.2 External Factors Impact on Profitability

Concerning external factors impact on profitability using ordinary least square regression, appropriate model- fixed effect model, with ROA as the dependent variable, inflation alone was positively significant at 5% level. When ROE was used as the dependent variable, all external factors exhibited an insignificant relation. Similar results were experienced using NIM as the dependent variable.

5.3 Conclusion

This research sought to investigate the determinants of profitability of Ghanaian 8 listed banks for the period 2009 to 2018 using ordinary least square regression. Of the internal factors employed in the study, operational efficiency and asset management greatly impacts two out of the three accounting based profitability measures used. Followed strongly by number of branches which is a strong determinant of the return on equity profitability measure. Bank size, liquidity, leverage and capital adequacy) exhibited an insignificant impact. On external factors, the findings reveal that only inflation is a strong determinant of ROA and ROE.

5.4 Recommendations

This research brings to light the pivotal role of asset management and operational efficiency on the profitability of banks and as such management of banks ought to manage their assets and the individual components of the operational efficiency should be managed and a lot of results channeled to boost profits. Also, management should increase the number of branches of their banks as the result has shown that this enhances profitability. Again, inflation is the only key determinants of Ghanaian banks' profitability, though management cannot control macroeconomic factors, policymakers should consider its effect so that it will translate into enhanced profitability for the banks

Also, from the descriptive statistics, it was observed that listed banks are highly geared and that has the tendency of reducing profits.

5.5 Recommendation for Further Studies

Further research can be undertaken to include other firm level factors aside the one used as well as the incorporation of corporate governance variables in the examination. Also, future researchers can explore unlisted banks profitability determinants to compliment this research and generalization be made on banks in Ghana. Again, future scholars can employ other research techniques apart from the use of ordinary least square regression such as GMM and FMOLS.



REFERENCES

- Abate, T.W. and Mesfin, E.A., 2019. Factors affecting profitability of commercial banks in Ethiopia. *International Journal of Research and Analytical Reviews*, 6(1), pp.881891.
- Aburime, T., (2010). What drives IFDIs in the Nigerian Banking industry? *Aburime, TU, what drives IFDIS in the Nigerian Banking Industry*, pp. 112-123.
- Adelopo, I., Lloydking, R. and Tauringana, V., (2018). “Determinants of bank profitability before, during, and after the financial crisis. *International Journal of Managerial Finance*.
- Adusei, M., 2015. Bank profitability: Insights from the rural banking industry in Ghana. *Cogent Economics & Finance*, 3(1), p.1078270.
- Akhavein, J.D., Berger, A.N. and Humphrey, D.B., (1997). The effects of megamergers on efficiency and prices: evidence from a bank profit function. *Review of industrial organization*, 12 (1), pp. 95-139.
- Al-Homaidi, E.A., Tabash, M.I., Farhan, N.H. and Almaqtari, F.A., 2018. Bank-specific and macro-economic determinants of profitability of Indian commercial banks: A panel data approach. *Cogent Economics & Finance*, 6(1), p.1548072.
- Ali, M. and Puah, C.H., (2018). Does bank size and funding risk affect banks’ stability? A lesson from Pakistan. *Global Business Review*, 19(5), pp. 1166-1186.
- Almaqtari, F. A., Al-Homaidi, E. A., Tabash, M. I., & Farhan, N. H. (2018). The determinants of profitability of Indian commercial banks: A panel data approach. *International Journal of Finance & Economics*, 1 –18.

Amene, T.B. and Alemu, G.A., 2019. Determinants of financial performance in private banks: A case in Ethiopia. *African Journal of Business Management*, 13(9), pp.291-308.

Amoah, J.O., Ibrahim, M. and Madugu, A.H., 2019. Income diversification and profitability of banks: evidence from Ghana's banking sector. *African Review of Economics and Finance*, 11(2), pp.293-315.

Appiah, K.O., Asamoah, L. A. and Narkotey, Z., 2015. Determinants of performance of rural banks in Ghana. *African Journal of Accounting, Auditing and Finance* 4(4), pp.345-359.

Arshad, S. and Rizvi, S. A. R., (2013). Impact of corruption on bank profitability: an analysis of Islamic banks. *International Journal of Business Governance and Ethics*, 8(3), pp. 195-209.

Aspal, P.K., Dhawan, S. and Nazneen, A., 2019. Significance of Bank Specific and Macroeconomic Determinants on Performance of Indian Private Sector Banks. *International Journal of Economics and Financial Issues*, 9(2), p.168.

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

Baltagi, B. H. (2005). *Econometric analysis of panel data*. New York, NY: Wiley.

Bank, G., 2018. Annual report for the Year 2018.

Bank, G., 2019. Annual report for the Year 2019.

Bikker, J. A. and Hu, H., (2002). Cyclical patterns in profits, provisioning and lending of banks

and procyclicality of the new Basel capital requirements. *PSL Quarterly Review*, 55(221)

Boateng, K., 2019. The Relationship between Efficiency, Productivity, and Profitability of Ghanaian Banks. *IOSR Journal of Business and Management*, 21(6), pp.52-60.

Bucevska, V. and Hadzi Misheva, B., (2017). The determinants of profitability in the banking industry: Empirical research on selected Balkan countries. *Eastern European Economics*, 55(2). Pp. 146-167.

Bougatef, K., 2017. Determinants of bank profitability in Tunisia: does corruption matter? *Journal of Money Laundering Control*.

Bourke, P., (1989). Concentration and other determinants of bank profitability in Europe, North America and Australia. *Journal of Banking and Finance*, 13(1), pp. 65-79.

Caliskana, M.T. and Lecunab, H.K.S., 2020. The Determinants of Banking Sector Profitability in Turkey1, 2. *Business and Economics Research Journal*, 11(1), pp.161-167.

Chowdhury, M. A. F., & Rasid, M. E. S. M. 2017. Determinants of performance of Islamic banks in GCC countries: Dynamic GMM approach. *Advances in Islamic Finance, Marketing, and Management*, 49 –80.

Clark, J. A. and Speaker, P. J., (1992). The impact of entry conditions on the concentration-profitability relationship in banking. *Quarterly Review of Economics and Finance*, 32(4), pp. 45-64.

Clark, J. A., (1988). Economies of scale and scope at a depository financial institutions: A review of the literature. *Economic Review*, 73(8), pp. 17-33.

Demirguc-Kunt, A. and Huzinga, H., (2000). Financial structure and bank profitability.

Demsetz, H. (1973). Industry structure, market rivalry and public policy. *The Journal of Law and Economics*, 16(1), pp. 1-9.

Fatao, A., Asamoah, V., De-graft, E.A. and Amoh, A., Macroeconomic and Bank specific determinants of non-performing loans in the commercial Banking industry of Ghana.

Flamini, V., Schumacher, L. and McDonald, C.A. 2009, “The determinants of commercial bank profitability in Sub-Saharan Africa”, International Monetary Fund wp/09/15.

Garcia, M.T.M. and Guerreiro, J.P.S.M., 2016. Internal and external determinants of banks’ profitability. *Journal of Economic Studies*.

Garcia, M.T.M. and Trindade, M.J., 2019. Determinants of banks’ profitability in Angola. *African Journal of Economic and Management Studies*.

Ghana Banking Survey (2019). Banking reforms so far: topmost issues on the minds of bank CEOs, available at [www.pwc.com/gh/en/assets/pdf/2019-banking survey report.pdf](http://www.pwc.com/gh/en/assets/pdf/2019-banking_survey_report.pdf)

Gilbert, R. A., (1984). Bank market structure and competition: A survey. *Journal of money credit and banking*, 4(2), pp. 617-645.

Gul, S., Irshad, F. and Zaman, K. (2011). Factors affecting bank profitability in Pakistan. *Romanian Economic Journal*, 14(39).

- Grygorenko, O., 2009. Effects of price setting on bank performance: The case of Ukraine. *Kyiv School of Economics, Ukraine*.
- Gyamerah, I.A. and Amoah, B., 2015. Determinants of bank profitability in Ghana. *International Journal of Accounting and Financial Reporting*, 5(1), pp.173-187.
- Hannan, T. H., (1991). Bank commercial loan markets and the role of market structure: Evidence from surveys of commercial lending. *Journal of Banking and Finance*, 15(1), pp. 133-149.
- Hsiao, C. (2003). *Analysis of panel data*. Cambridge: Cambridge University Press
- Islam, S. and Rana, M.S., 2019. Determinants of Bank Profitability: Evidence from Commercial Banks of Bangladesh. *Journal of Asian Business Strategy*, 9(2), p.174.
- Kyereboah-Coleman, A., (2007). The impact of capital structure on the performance of microfinance institutions. *The Journal of Risk Finance*.
- Levine, R., Loayza, N. and Beck, T., 2000. Financial intermediation and growth: Causality and causes. *Journal of monetary Economics*, 46(1), pp.31-77.
- Louzis, D. P., Vouldis, A. T., & Metaxas, V. L. 2012. Macroeconomic and bank-specific determinants of non-performing loans in Greece: A comparative study of mortgage, business, and consumer loan portfolios. *Journal of Banking and Finance*, 36(4), 1012–1027
- Mamatzakis, E.C and Remoundos, P. C., (2003) determinants of Greek commercial banks profitability, 1989-2000. *Spoudal*, 53(1), pp. 84-94.

Masood, O. and Ashraf, M., 2012. Bank-specific and macroeconomic profitability determinants of Islamic banks. *Qualitative Research in Financial Markets*.

Martinez-Ferrero, J. and Garcia and Sanchez, I. M., (2017). Coercive, normative and mimetic isomorphism as determinants of the voluntary assurance of sustainability reports. *International Business Review*, 26(1), pp. 102-118.

Mireku, K., Sakyi, E.A. and Agana, J.A., 2018. Does Commercial Banks Presence Enhance Profitability in Ghana? *Global Business Review*, 19(6), pp.1449-1461.

Molyneux, P. and Thornton, J., (1992). Determinants of European bank profitability: A note. *Journal of banking and finance*, 16(6), pp. 1173-1178.

Naceur, S. B., (2003). The determinants of the Tunisian banking industry profitability: Panel evidence. *Universite Libre de Tunis working papers*, 10, p. 2003.

Patel, R. and Davidson, B., (2003). The research methodology's bases- to plan, implement and report a survey. *Student literature, Lund*.

Piper, T.R. and Weiss, S.J. (1974). The profitability of multibanks holding company acquisitions. *The Journal of Finance*, 29(1), pp. 163-174.

Rahman, H.U., Yousaf, M.W. and Tabassum, N., 2020. Bank-Specific and Macroeconomic Determinants of Profitability: A Revisit of Pakistani Banking Sector under Dynamic Panel Data Approach. *International Journal of Financial Studies*, 8(3), p.42.

- Rani, D. M. and Zergaw, L. N., (2017). Bank specific, industry specific and macroeconomic determinants of bank profitability in Ethiopia. *International Journal of Advanced Research in Management and Social Sciences*, 6(3), pp. 74-96.
- Raza, S. A. and Farooq, M. S., (2011). Firm and industry effects on firm profitability: An empirical analysis of KSE.
- Samad, A., (2008). Market structure, conduct and performance: Evidence from the Bangladesh banking industry. *Journal of Asian Economics*, 19(2), pp. 181-193.
- Saona, P. and Azad, M.A.K., 2018. Bank-and country-based determinants of banks' performance in Asia. *Journal of the Asia Pacific Economy*, 23(3), pp.428-446.
- Sarpong-Kumankoma, E., Abor, J., Aboagye, A.Q.Q. and Amidu, M., 2018. Freedom, competition and bank profitability in Sub-Saharan Africa. *Journal of Financial Regulation and Compliance*.
- Sathye, M., (2005). Privatization, performance and efficiency: A study of Indian banks. *Vikalpa*, 30(1), pp. 7-16.
- Singh, D.D., 2010. Bank specific and macroeconomic determinants of bank profitability: the Indian evidence. *Paradigm*, 14(1), pp.53-64.
- Singh, A. and Sharma, A. K., (2016). An empirical analysis of macroeconomic and bank-specific factors affecting liquidity of Indian banks. *Future Business Journal*, 2(1), pp. 40-53.
- Smirlock, M., (1985). Evidence on (non) relationship between concentration and profitability in banking. *Journal of money credit and banking*, 17(1), pp. 69-83.
- Stigler, A. (1964). "A Theory of Oligopoly", *Journal of Political Economy*, Vol.72, pp. 44-61.

- Sufian, F. and Habibullah, M.S., 2009. Determinants of bank profitability in a developing economy: Empirical evidence from Bangladesh. *Journal of business economics and management*, 10(3), pp.207-217.
- Sufian, F. and Habibullah, M.S., 2010. Bank-specific, industry-specific and macroeconomic determinants of bank efficiency: Empirical evidence from the Thai banking sector. *Margin: The Journal of Applied Economic Research*, 4(4), pp.427-461.
- Sufian, F., 2009. Determinants of bank profitability in a developing economy: empirical evidence from the China banking sector. *Journal of Asia-Pacific Business*, 10(4), pp.281-307.
- Sufian, F., 2009. Factors influencing bank profitability in a developing economy: Empirical evidence from Malaysia. *Global Business Review*, 10(2), pp.225-241.
- Sufian, F., 2012. Determinants of bank profitability in developing economies: empirical evidence from the South Asian banking sectors. *Contemporary South Asia*, 20(3), pp.375-399.
- Tabash M.I. (2016). An empirical investigation between liquidity and key financial ratios of Islamic banks of United Arab Emirates (UAE) *Business and Economic Horizons* 14(3) 713-724.
- Tabash, M. I., & Dhankar, R. (2014). The flow of Islamic finance and economic growth: An empirical evidence of Middle East. *Journal of Finance and Accounting*, 2 (1), 11–19. doi: 10.11648/j.jfa.20140201.12
- Whalen, G., (1988). Actual competition, potential competition and bank profitability in rural markets. *Federal Reserve Bank of Cleveland Economic Review*, 3, pp. 14-21.

Yakubu, I.N., 2019. Does corruption grease or sand the wheels of bank profitability in Ghana?
Cogent Economics & Finance, 7(1), p.1701909.

Yahya, A. T., Akhtar, A. and Tabash, M. I., (2017). The impact of political instability, macroeconomic and bank-specific factors on the profitability of Islamic banks: an empirical evidence. *Investment Management and Financial innovations* 14 no. 4 (2017): 30-39.

Yeh, Q. J. (1996). The application of data envelopment analysis in conjunction with financial ratios for bank performance evaluation. *Journal of the operational research society*, 47(8), pp. 980-988.

Yilmaz, K. (2013). Comparison of quantitative and qualitative research traditions: Epistemological, theoretical and methodological differences. *European Journal of Education*, 48 (2), pp.311-325.

Zarrouk, H., Jedidia, K.B. and Moualhi, M., 2016. Is Islamic bank profitability driven by same forces as conventional banks? *International Journal of Islamic and Middle Eastern Finance and Management*.

Appendix

```
. xtset F_ID YEAR
      panel variable:   F_ID (strongly balanced)
time variable:  YEARS, 2009 to 2018
              delta: 1 unit
```

DESCRIPTIVE STATISTICS

```
. sum ROA ROE NIM S Q D M OE L LQD B INF GDP IR
```

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	80	.0294481	.0212174	-.0438445	.0696399
ROE	80	.2182154	.2376298	-.2735124	1.363171
NIM	80	.0814013	.0287683	.009253	.1575975
S	80	6.286517	.4076172	4.976281	7.02674
Q	80	.4205534	.1261035	.092126	.6601261
D	80	.745693	.5538863	.0281604	5.396186
M	80	.1229855	.0251785	.0674024	.1868679
OE	80	.6624116	.2205765	.3080309	1.379642
L	80	.8376949	.0920478	.172192	.9701319
LQD	80	.4785941	.4904104	.1499683	4.562722
B	80	58.0125	44.17041	14	187
INF	80	.1202	.0350039	.074	.193
GDP	80	.0693	.0323871	.035	.15
IR	80	.1865	.0438091	.125	.26

POOLED OLS REGRESSION

KNUST



KNUST

Number of obs = 80
 F(11, 68) =
 Prob > F =
 R-squared =
 Adj R-squared =
 Root MSE =

Source	SS	df	MS	
Model	.037178724	11	.003379884	8.15
Residual	.028202779	68	.000414747	0.0000
Total	.065381504	79	.000827614	0.5686
				0.4989
				.02037

NIM	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
S	-.0079456	.0103335	-0.77	0.445	-.0285657 .0126746
Q	-.0378587	.0249478	-1.52	0.134	-.0876412 .0119238
D	.0025325	.0042346	0.60	0.552	-.0059175 .0109825
M	.6153345	.1187939	5.18	0.000	.3782849 .8523841
OE	-.0085604	.0134324	-0.64	0.526	-.0353643 .0182434
L	.0272416	.0375228	0.73	0.470	-.0476339 .1021172
LQD	.0083482	.005698	1.47	0.147	-.0030219 .0197183
B	.0001749	.0000729	2.40	0.019	.0000293 .0003205
INF	.0197865	.0854314	0.23	0.818	-.1506891 .1902621

KNUST

Number of obs = 80
 F(11, 68) =
 Prob > F =
 R-squared =
 Adj R-squared =
 Root MSE =

GDP	-.0417794	.128075	-0.33	0.745	-.2973491	.2137902
IR	-.1131037	.1011637	-1.12	0.267	-.3149728	.0887654
_cons	.0600265	.0611118	0.98	0.329	-.0619203	.1819732

Source	SS	df	MS	
Model	2.18341782	11	.198492529	5.93
Residual	2.27754618	68	.033493326	0.0000
Total	4.460964	79	.056467899	0.4894
				0.4069
				.18301

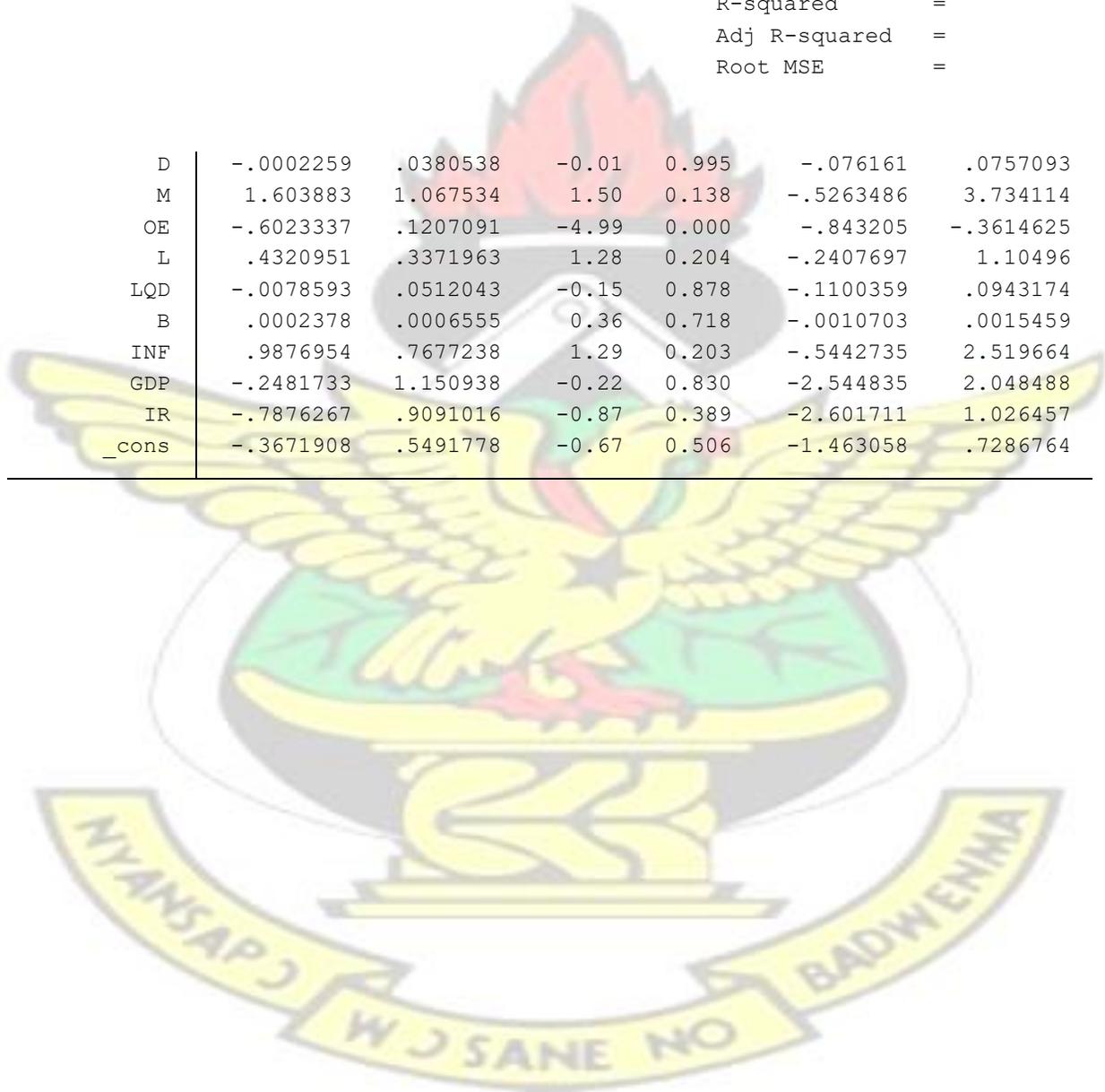
ROE	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
S	.0610524	.0928612	0.66	0.513	-.1242494 .2463541
Q	.1828065	.2241917	0.82	0.418	-.264561 .6301741



KNUST

Number of obs = 80
F(11, 68) =
Prob > F =
R-squared =
Adj R-squared =
Root MSE =

D	-.0002259	.0380538	-0.01	0.995	-.076161	.0757093
M	1.603883	1.067534	1.50	0.138	-.5263486	3.734114
OE	-.6023337	.1207091	-4.99	0.000	-.843205	-.3614625
L	.4320951	.3371963	1.28	0.204	-.2407697	1.10496
LQD	-.0078593	.0512043	-0.15	0.878	-.1100359	.0943174
B	.0002378	.0006555	0.36	0.718	-.0010703	.0015459
INF	.9876954	.7677238	1.29	0.203	-.5442735	2.519664
GDP	-.2481733	1.150938	-0.22	0.830	-2.544835	2.048488
IR	-.7876267	.9091016	-0.87	0.389	-2.601711	1.026457
_cons	-.3671908	.5491778	-0.67	0.506	-1.463058	.7286764



KNUST

Number of obs = 80
 F(11, 68) =
 Prob > F =
 R-squared =
 Adj R-squared =
 Root MSE =

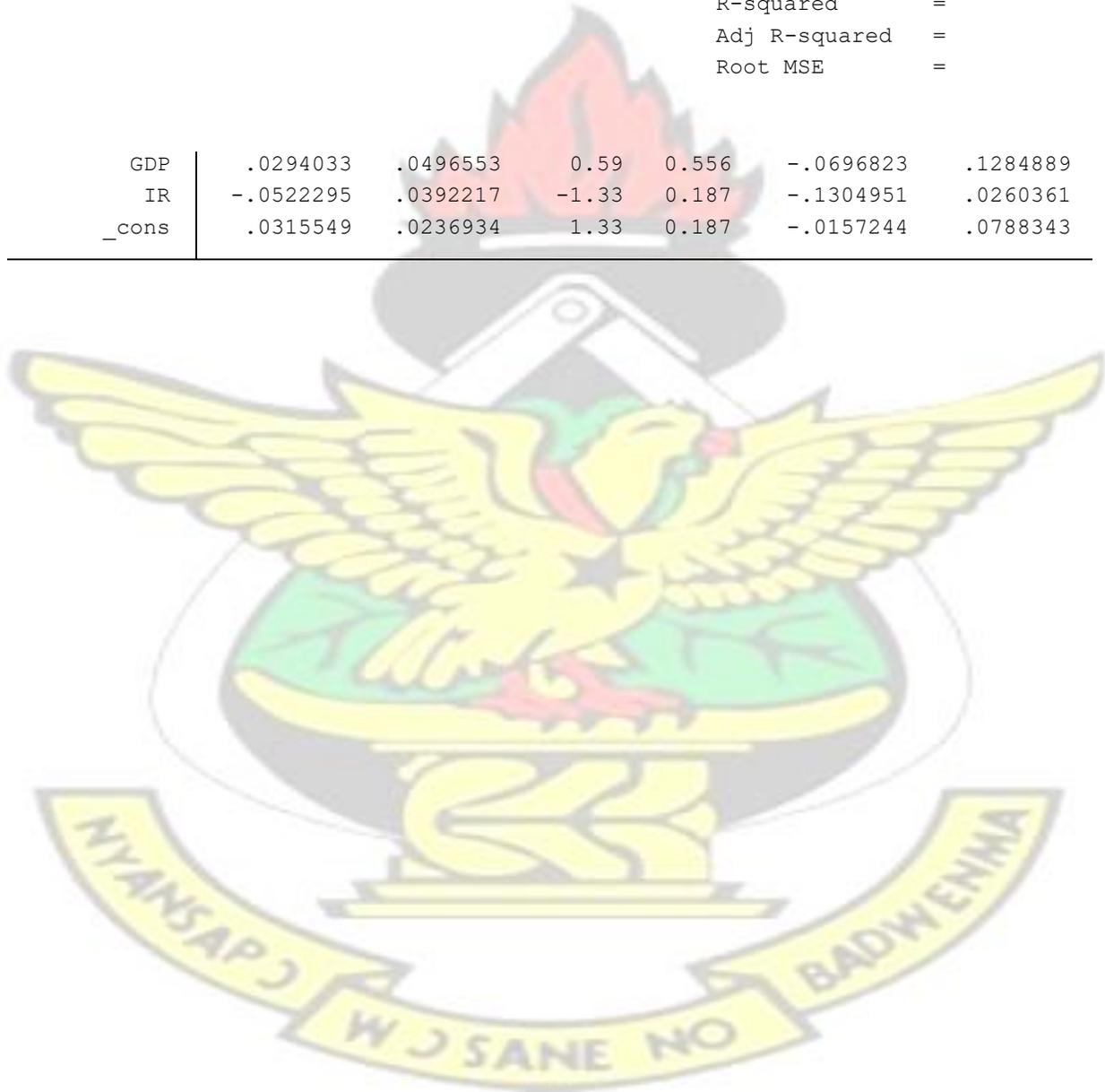
Source	SS	df	MS
Model	.031324682	11	.002847698
Residual	.004239302	68	.000062343
Total	.035563985	79	.000450177

ROA	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
S	.0015485	.0040063	0.39	0.700	-.006446 .0095431
Q	.0214774	.0096724	2.22	0.030	.0021765 .0407783
D	-.0000429	.0016418	-0.03	0.979	-.0033189 .0032332
M	.2698961	.046057	5.86	0.000	.1779908 .3618013
OE	-.0767028	.0052078	-14.73	0.000	-.0870948 -.0663108
L	-.008243	.0145478	-0.57	0.573	-.0372727 .0207866
LQD	.0028794	.0022091	1.30	0.197	-.0015288 .0072877
B	-.0000223	.0000283	-0.79	0.432	-.0000788 .0000341
INF	.0940103	.0331222	2.84	0.006	.0279161 .1601046

KNUST

Number of obs = 80
F(11, 68) =
Prob > F =
R-squared =
Adj R-squared =
Root MSE =

GDP	.0294033	.0496553	0.59	0.556	-.0696823	.1284889
IR	-.0522295	.0392217	-1.33	0.187	-.1304951	.0260361
_cons	.0315549	.0236934	1.33	0.187	-.0157244	.0788343



L	-.008243	.0145478	-0.57	0.571	-.0367561	.0202701
LQD	.0028794	.0022091	1.30	0.192	-.0014504	.0072092
B	-.0000223	.0000283	-0.79	0.429	-.0000778	.0000331
INF	.0940103	.0331222	2.84	0.005	.0290921	.1589286
GDP	.0294033	.0496553	0.59	0.554	-.0679193	.1267259
IR	-.0522295	.0392217	-1.33	0.183	-.1291025	.0246436
_cons	.0315549	.0236934	1.33	0.183	-.0148832	.0779931

sigma_u	0
sigma_e	.00764359
rho	0 (fraction of variance due to u_i)

corr(u_i, X) = 0 (assumed) Wald chi2(11) = 502.46
 Prob > chi2 = 0.0000

. hausman fe re

Note: the rank of the differenced variance matrix (0) does not equal the number of coefficients being tested (11); be sure this is what you expect, or there may be problems computing the test. Examine the output of your estimators for anything unexpected and possibly consider scaling your variables so that the coefficients are on a similar scale.

	Coefficients		(b-B) Difference	sqrt(diag(V_b- V_B)) S.E.
	(b) fe	(B) re		
S	.0015485	.0015485	0	0
Q	.0214774	.0214774	0	0
D	-.0000429	-.0000429	0	0
M	.2698961	.2698961	0	0
OE	-.0767028	-.0767028	0	0
L	-.008243	-.008243	0	0
LQD	.0028794	.0028794	0	0
B	-.0000223	-.0000223	0	0
INF	.0940103	.0940103	0	0
GDP	.0294033	.0294033	0	0
IR	-.0522295	-.0522295	0	0

b = consistent under Ho and Ha; obtained from xtreg B =
inconsistent under Ha, efficient under Ho; obtained from xtreg Test: Ho:
difference in coefficients not systematic

```
chi2(0) = (b-B)'[(V_b-V_B)^(-1)](b-B)
          = 0.00
Prob>chi2 = .
(V_b-V_B is not positive definite)
```

KNUST



```
. xtreg ROE S Q D M OE L LQD B INF GDP IR, fe
```

```
Fixed-effects (within) regression      Number of obs   =      80
Group variable: F_ID                  Number of groups =       8
```

```
R-sq:                                Obs per group:
    within = 0.4353                    min =          10
    between = 0.0428                   avg =         10.0
    overall = 0.0771                   max =          10
```

```
corr(u_i, Xb) = -0.8990                F(11,61)       =       4.27
                                          Prob > F        =       0.0001
```

ROE	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
S	-.190074	.1201699	-1.58	0.119	-.4303686	.0502205
Q	.024673	.2524772	0.10	0.922	-.4801864	.5295324
D	.0023172	.0365451	0.06	0.950	-.0707592	.0753937
M	1.417709	1.313557	1.08	0.285	-1.20891	4.044328
OE	-.6136742	.1616915	-3.80	0.000	-.9369964	-.290352
L	.4776278	.3290933	1.45	0.152	-.1804349	1.135691
LQD	.032605	.0484666	0.67	0.504	-.0643099	.1295199
B	.0095987	.0041588	2.31	0.024	.0012826	.0179147
INF	1.013838	.7351181	1.38	0.173	-.4561217	2.483797
GDP	-.3494052	1.059262	-0.33	0.743	-2.467529	1.768719
IR	-.457082	.8885184	-0.51	0.609	-2.233784	1.31962
_cons	.648205	.6469786	1.00	0.320	-.6455087	1.941919
sigma_u	.42254958					
sigma_e	.16790325					
rho	.86363767	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(7, 61) = 2.83                Prob > F = 0.0128
```

```
. xtreg ROE S Q D M OE L LQD B INF GDP IR, re
```

```
Random-effects GLS regression      Number of obs   =      80
Group variable: F_ID              Number of groups =       8
```

```
R-sq:                                Obs per group:
    within = 0.3765                    min =          10
    between = 0.7373                   avg =         10.0
    overall = 0.4894                   max =          10
```

corr(u_i, X) = 0 (assumed) Wald chi2(11) = 65.19
 Prob > chi2 = 0.0000

ROE	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
S	.0610524	.0928612	0.66	0.511	-.1209523	.2430571
Q	.1828065	.2241917	0.82	0.415	-.2566011	.6222142
D	-.0002259	.0380538	-0.01	0.995	-.0748099	.0743582
M	1.603883	1.067534	1.50	0.133	-.4884459	3.696211
OE	-.6023337	.1207091	-4.99	0.000	-.8389192	-.3657483
L	.4320951	.3371963	1.28	0.200	-.2287975	1.092988
LQD	-.0078593	.0512043	-0.15	0.878	-.1082179	.0924994
B	.0002378	.0006555	0.36	0.717	-.001047	.0015226
INF	.9876954	.7677238	1.29	0.198	-.5170155	2.492406
GDP	-.2481733	1.150938	-0.22	0.829	-2.503971	2.007624
IR	-.7876267	.9091016	-0.87	0.386	-2.569433	.9941797
_cons	-.3671908	.5491778	-0.67	0.504	-1.44356	.7091779

sigma_u	0
sigma_e	.16790325
rho	0 (fraction of variance due to u_i)

. hausman fe re

Note: the rank of the differenced variance matrix (0) does not equal the number of coefficients being tested (11); be sure this is what you expect, or there may be problems computing the test. Examine the output of your estimators for anything unexpected and possibly consider scaling your variables so that the coefficients are on a similar scale.

	Coefficients				
	(b)	(B)	(b-B)	sqrt(diag(V_b-	
V_B)	fe	re	Difference	S.E.	
S	.0610524	.0610524	0	0	
Q	.1828065	.1828065	0	0	
D	-.0002259	-.0002259	0	0	
M	1.603883	1.603883	0	0	
OE	-.6023337	-.6023337	0	0	
L	.4320951	.4320951	0	0	
LQD	-.0078593	-.0078593	0	0	
B	.0002378	.0002378	0	0	
INF	.9876954	.9876954	0	0	
GDP	-.2481733	-.2481733	0	0	
IR	-.7876267	-.7876267	0	0	

b = consistent under Ho and Ha; obtained from xtreg B =
 inconsistent under Ha, efficient under Ho; obtained from xtreg Test: Ho:
 difference in coefficients not systematic

$$\chi^2(0) = (b-B)' [(V_b - V_B)^{-1}] (b-B) = 0.00$$

Prob>chi2 = .

(V_b-V_B is not positive definite)

Skewness/Kurtosis tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	joint Prob>chi2
ROA	80	0.0031	0.0403	10.87	0.0044
ROE	80	0.0000	0.0000	47.84	0.0000
S	80	0.0137	0.2040	7.01	0.0300
NIM	80	0.6607	0.0411	4.45	0.1081
S	80	0.0137	0.2040	7.01	0.0300
Q	80	0.2434	0.2300	2.90	0.2347
D	80	0.0000	0.0000	.	0.0000
M	80	0.4735	0.7379	0.64	0.7267
OE	80	0.0002	0.0074	16.60	0.0002
L	80	0.0000	0.0000	.	0.0000
CAD	80	0.0000	0.0000	.	0.0000
LQD	80	0.0000	0.0000	.	0.0000
B	80	0.0000	0.0553	18.67	0.0001
INF	80	0.0100	0.4339	6.68	0.0355
GDP	80	0.0000	0.0401	16.80	0.0002
IR	80	0.1482	0.0068	8.30	0.0158

. xtreg NIM S Q D M OE L LQD B INF GDP IR, fe

Fixed-effects (within) regression Number of obs = 80
 Group variable: F_ID Number of groups = 8

 R-sq: Obs per group:
 within = 0.3525 min = 10
 between = 0.7853 avg = 10.0
 overall = 0.4875 max = 10

NIM	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
S	-.0073879	.0145553	-0.51	0.614	-.036493	.0217173
Q	-.0341852	.0305807	-1.12	0.268	-.0953351	.0269648
D	.0006723	.0044264	0.15	0.880	-.0081789	.0095235
M	.4557982	.1591017	2.86	0.006	.1376548	.7739416
OE	-.0308319	.0195845	-1.57	0.121	-.0699936	.0083298
L	.0108596	.0398607	0.27	0.786	-.0688468	.090566
LQD	.0091538	.0058704	1.56	0.124	-.0025848	.0208924
B	.0005682	.0005037	1.13	0.264	-.000439	.0015755
INF	.0240077	.0890396	0.27	0.788	-.1540379	.2020533
GDP	-.0430395	.1283007	-0.34	0.738	-.2995926	.2135137
IR	-.0932861	.1076198	-0.87	0.389	-.3084853	.1219131

_cons	.0771388	.0783639	0.98	0.329	-.0795595	.233837
sigma_u	.0179284					
sigma_e	.02033691					
rho	.43730594	(fraction of variance due to u_i)				
corr(u_i, Xb)	= -0.7950		F(11,61)	=	3.02	
			Prob > F	=	0.0028	

F test that all u_i=0: F(7, 61) = 1.03 Prob > F = 0.4217

Random-effects GLS regression Number of obs = 80
 Group variable: F_ID Number of groups = 8

R-sq: Obs per group:
 within = 0.3248 min = 10
 between = 0.9317 avg = 10.0
 overall = 0.5686 max = 10

NIM	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
S	-.0079456	.0103335	-0.77	0.442	-.0281988	.0123077
Q	-.0378587	.0249478	-1.52	0.129	-.0867554	.0110381
D	.0025325	.0042346	0.60	0.550	-.0057671	.0108321
M	.6153345	.1187939	5.18	0.000	.3825027	.8481663
OE	-.0085604	.0134324	-0.64	0.524	-.0348874	.0177665

L	.0272416	.0375228	0.73	0.468	-.0463017	.100785
LQD	.0083482	.005698	1.47	0.143	-.0028196	.019516
B	.0001749	.0000729	2.40	0.016	.0000319	.0003179
INF	.0197865	.0854314	0.23	0.817	-.1476559	.1872289
GDP	-.0417794	.128075	-0.33	0.744	-.2928018	.2092429
IR	-.1131037	.1011637	-1.12	0.264	-.311381	.0851735
_cons	.0600265	.0611118	0.98	0.326	-.0597505	.1798035

sigma_u	0	
sigma_e	.02033691	
rho	0	(fraction of variance due to u_i)

corr(u_i, X) = 0 (assumed) Wald chi2(11) = 89.64
 Prob > chi2 = 0.0000

. hausman fe re

Note: the rank of the differenced variance matrix (0) does not equal the number of coefficients being tested (11); be sure this is what you expect, or there may be problems computing the test. Examine the output of your estimators for anything unexpected and possibly consider scaling your variables so that the coefficients are on a similar scale.

	Coefficients		(b-B)	sqrt(diag(V_b-
	(b)	(B)		
V_B))	fe	re	Difference	
S	-.0079456	-.0079456	0	0
Q	-.0378587	-.0378587	0	0
D	.0025325	.0025325	0	0
M	.6153345	.6153345	0	0
OE	-.0085604	-.0085604	0	0
L	.0272416	.0272416	0	0
LQD	.0083482	.0083482	0	0
B	.0001749	.0001749	0	0
INF	.0197865	.0197865	0	0
GDP	-.0417794	-.0417794	0	0
IR	-.1131037	-.1131037	0	0

Fixed-effects (within) regression
 Group variable: F_ID

Number of obs = 80
 Number of groups = 8

R-sq:

within = 0.8621
 between = 0.9131
 overall = 0.8509

Obs per group:

min = 10
 avg = 10.0
 max = 10

corr(u_i, X_b) = -0.5428

F(11, 61) = 34.65
 Prob > F = 0.0000

ROA	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
S	.005091	.0054706	0.93	0.356	-.0058481	.0160301
Q	.0091113	.0114937	0.79	0.431	-.0138718	.0320944
D	.0000844	.0016637	0.05	0.960	-.0032424	.0034111
M	.3313702	.059798	5.54	0.000	.2117967	.4509438
OE	-.0795354	.0073608	-10.81	0.000	-.0942542	-.0648165
L	-.0023106	.0149816	-0.15	0.878	-.0322681	.0276469
LQD	.003056	.0022064	1.39	0.171	-.001356	.0074679
B	-.0001415	.0001893	-0.75	0.458	-.0005201	.0002371
INF	.1071626	.0334653	3.20	0.002	.0402445	.1740807
GDP	.0295204	.0482216	0.61	0.543	-.0669046	.1259454
IR	-.0668438	.0404487	-1.65	0.104	-.147726	.0140384
_cons	.0117026	.0294529	0.40	0.693	-.0471921	.0705973
sigma_u	.00593484					
sigma_e	.00764359					
rho	.37611913	(fraction of variance due to u _i)				

F test that all u_i=0: F(7, 61) = 1.65 Prob > F = 0.1382