DETERMINANTS OF PERFORMANCE OF COMERCIAL BANKS IN GHANA

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DECLARATION

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

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DEDICATION

This work is dedicated to my loving wife Theodosia E. Buckman, my parents Mr. and Mrs. Owusu and siblings who with their love and care encouraged me in my educational endeavors

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ABSTRACT

Given the rapid development of financial markets, banks in Ghana are facing intense competition. Managers in the industry ought to know and understand variables that significantly influence the profitability of the bank. This is crucial considering the fact that banks' profit may play a crucial role in the banks' sustainability and the development of the economy in general. With this backdrop, this study sought to examine the determinants of commercial banks profitability and the extent to which they impact on performance. The empirical estimation is based on a panel regression analysis of the relationship between profit variables and expenses to income ratio, capital adequacy, liquidity measure, asset quality, income diversification ability, gross domestic product, money supply, size of the bank and inflation. The results suggest that expenses to income ratio, capital adequacy, asset quality, income diversification ability, money supply, and size of the bank influences the banks profit in the statistically significant manner. The outcome shows that income diversification and size of the bank have improved banks profit level whiles efficiency of expenditure, capital adequacy, asset quality and money supply had reduce the banks profit level. However, of the extent of influence, income diversification in a form of fees and commissions' income has had a greatest impact i.e. contributing significantly to the profit of banks. One that has been reducing the banks profit level significantly is expenses to income ratio (expenses). The banks therefore should concentrate most on these variables as they want to maximize profit.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

1.1 Background of the study

A sound financial system is indispensable for a healthy and developing economy. The banking sector constitutes a predominant component of the financial system of any economy (Singh, 2010). The banking sector plays an important role in channelizing the funds from savers to borrowers. The growth and development of an economy largely depends on the success and efficient functioning of the banking sector. Banks are the most significant players in the Ghanaian financial market. As at 2008, the Banking system in Ghana accounted for 70 percent of the financial sector (Bawumia et. al., 2008). This makes the commercial banking sector critical to the development of the economy as failure of this sector could have adverse systemic effect on the entire economy.

The Ghana banking sector has witnessed many reforms and restructuring over the years as a result of internal and external economic developments and shocks. Recent developments in the banking sector are the adoption of International Financial Reporting Standards (IFRS) in line with international standards by Bank of Ghana as a way of reducing systemic risk. Other developments include the establishment of Collateral Registry and Credit Reference Bureaus that seeks to promote transparency and ease credit accessibility, the setting up of the Financial Intelligence Centre (FIC) to address money laundering and counter financing for terrorism, and the recapitalization of the banks required by Bank of Ghana. All these measures by Bank of Ghana are believed to have been fashioned to mitigate risk and stabilize the banking system. These reforms are backed by tighter and effective supervisory

oversight to ensure financial stability and soundness of the financial system. Banking sector reforms have changed the Ghana banking industry outlook. These well sequence financial sector reforms have been driven by banking sector liberalization, enhanced competition, and gradual capital account liberalization (Bawumia *et al*., 2008). It is therefore reasonable to assume that these reforms have changed the way commercial banks in Ghana operate and subsequently, their performance.

Due to the changing banking environment, profitability which is one of the most important criteria to measure performance of banks has come under intense pressure. Profitability is critical to the survival of commercial banks. Firstly, dividends are paid from profits (cash profits) and secondly, profit is an important source of retained earnings. Retained earnings are residual profits after dividends are paid. These earnings are important component of bank capital.

The relevance of the study is based on the fact that banks is the largest sector in the financial industry. Thus, failure in the banking system may have deep economic repercussion for the economy at large. Secondly, banking sector reforms are likely to affect the way banks operate and thus their performance. Finally, bank profitability is an important source of retained earnings; a very important component of bank capitalization, providing a margin of protection during recessionary periods, and enabling the banks to be more resilient against external shocks.

According to the Ghana Banking Survey 2010 (by Pricewaterhouse Coopers in collaboration with Ghana Association of Bankers), the banking industry profits show a declining trend in recent years despite increase in deposits and branch network (see Figure 1.1). The increase in deposits is expected to enable the banks to lend more and make more profit through interest income. However, asset quality has been on the decline increasing industry impairment charge for loan. The increased branch network is expected to lead to some efficiencies and especially economies of scale.

Source: Ecobank Research Department, 2009

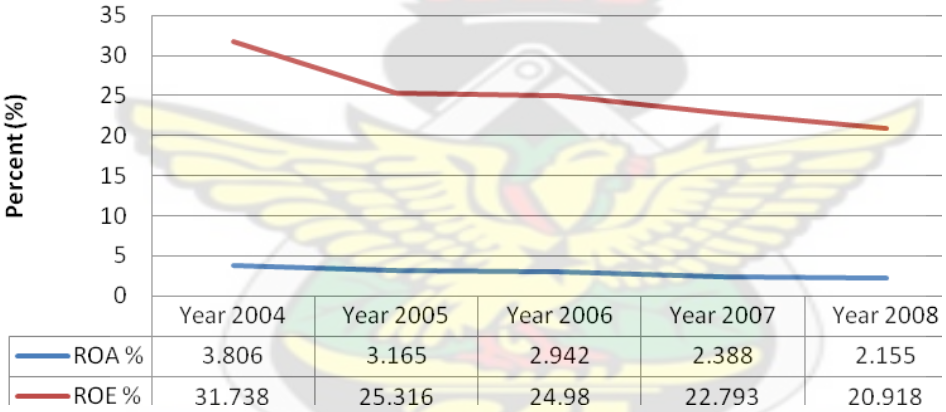

Fig 1.1 Banking Industry's Average ROA and ROE

Indeed if the size is inducing some efficiency, it should impact on profit by reducing the operating cost. The industry is quite concentrated despite the entry of eight foreign banks over the last six years. Five out of twenty-six banks account for more than 51% of the industry total deposits. While market power could lead to near monopoly profit it could also imply some inefficiency in the provision of financial services.

The high risk nature of the industry may be posing a natural barrier to entry so that industry profit is preserved. However, on the contrary we see new entrants and profits declining. It is clear that the banking sector environment has become very complex, more competitive and more challenging to the managers. In the context of rapid domestic economic and financial sector transformations, an efficient management of banking operations aimed at ensuring growth in profits and efficiency requires up-to-date knowledge of all those factors that influence the profitability of banks.

In this study, an attempt was be made to investigate some key determinants of profitability and the extent to which they impact on profitability of commercial banks. The analysis will adopted a multivariate regression model based on data pooled from annual financial statements of 21 banks over the period 2004-2010 and macroeconomic and industry data on GDP, inflation, and money supply for the same period.

1.2 Problem Statement

Given the rapid development of financial markets, banks are facing intense competition. Performance management standard appears to be insufficient to meet the needs of strategic development financial institutions (Derbali, 2011). Coupled with the declining of the industry profit in an increasingly complex banking sector, managers in the industry must know and understand variables that significantly influence the profitability of the bank. This is crucial considering the fact that banks play a crucial role in the development of the economy.

Singh (2010) observed that several factors affect profitability of bank. The profitability and changes in profitability of a bank, regardless of its ownership are determined by internal variables and external variables. The internal variables are related to the bank itself and they are influenced by the working and performance of the management. The external variables are the result of the macro environment in which the bank is operating. What are the exact factors that influence the profitability of commercial banks in Ghana? The problem of the study therefore is to investigate some key determinants of profitability and the extent to which they impact on profitability in the banking sector of Ghana

1.3 Objectives of the study

The main aim of this study is to examine the determinants of commercial bank performance and the extent to which they impact on performance. The specific objectives for the study are as follows:

- To identify factors (bank-specific, macroeconomic and financial structure factors) that significantly determines the profitability of Ghanaian banks.
- To ascertain the extent to which these factors impact on banks profitability and the relationship of the factors and profitability.
- To establish the major determinants of bank profitability and its implication for policy formulation and implementation.

1.4 Research Questions

Based on the research objectives the following questions are posed:

- What are the determinants (bank-specific, macroeconomic and financial structure factors) of profitability of commercial banks in Ghana?
- What level of impact do the determinants have on banks profitability?
- What are the main determinants of bank profitability and its implication for policy formulation and implementation

1.5 Significance of the study

Given the relation between the well-being of the banking sector and the growth of the economy, knowledge of the underlying factors that influence the financial sector's profitability is therefore essential not only for the managers of the banks, but also for numerous stakeholders such as the central banks, bankers associations, governments, and other financial authorities. Knowledge of these factors would be useful in helping the regulatory authorities and bank managers formulate future policies aimed at improving the profitability of the Ghanaian banking sector.

Apart from contributing to the existing literature on bank operation and to the body of academic knowledge for financial and accounting students, the study will also identify other areas that need further research for researchers to pursue further studies in the area.

1.6 Scope of the study

The scope of the study will be limited to studying the impact of internal and external factors that impact on the profitability of commercial banks, comprising of expenses management, capital adequacy, liquidity, asset quality, size, GDP, inflation, money supply and banking industry concentration. It is acknowledged that there are other factors that may impact on profitability of banks but not included in this study. The study is limited to data from the individual banks. Sampled banks were therefore being based on data availability. The analysis would be based on the published financial statements from 2004–2010. No special attention was given to the nature of the bank either local or foreign banks. Moreover, it must be indicated that some banks were not operational in around 2004. The study did not give the due regard to the year of operation.

1.7 Limitation of the study

The study is based on published annual information, which is a secondary data. The demerit in this instance is that this data had been published for some purposes other than to solve the problem at hand; the implications are that this data does not meet certain specific needs.

1.9 Organization of the study

The thesis is organized as follows. Chapter 1 which is introduction of the work presents the background of the study, the research question, and objectives of the study, justification, scope and limitation of the study. Chapter 2 review the various literature on determinants of bank profitability that are relevant for the study. Chapter 3 looks at the research

methodology and the banks profile. Key variables of the study are also defined. Chapter 4 presents analyzes and discusses the results. The final chapter presents the summary of findings, recommendation and conclusion are presented. In this chapter, the researcher presents the findings of the study and its attendant implications and suggests the direction for future research.

CHAPTER 2

LITERATURE REVIEW

2.1 Overview of banking in Ghana

Banking activities started in Ghana in 1896 when the British Bank of West Africa, now Standard Chartered Bank (Ghana) Limited, opened an office in Accra and delivered primary banking services of lending and borrowing of money.

The Ghanaian banking industry is relatively small consisting of 24 banks as of 2011. Of this number, fourteen are foreign banks (banks with foreign majority ownership) and thirteen local banks (banks with local majority owner). The banking system is based on the concept of universal banking where banks can offer all banking services. Some specialized banks have sprung up in the past only to be metamorphosed into universal banks.

The banking sector has witnessed many reforms. Prior to the reforms, there has been an extensive post-independence government intervention. Public ownership characterized the banking systems. All the banks that were set up between the early 1950 to the late 1980 were either wholly or majority-owned by the public sector. Interest rates were centrally controlled by the Monetary Authority (Bank of Ghana) and there were restrictions on sectorial credit allocation. According to Brownbridge & Gockel, (1996), financial sector policies were characterized by severe financial repressions, real interest rates were steeply negative and most of the credit was channeled to the public sector. This triggered a series of reforms which included the liberalization of allocative controls on banks, restructuring of

insolvent banks and reforms to prudential regulation and supervision. Thus, as part of a comprehensive macroeconomic adjustment programme, financial sector liberalization in Ghana was initiated in the early 1990s, under the Financial Sector Adjustment Programme (FINSAP). The effect of financial sector reform was to free the financial system from excessive government regulation in order to foster a free market-base system. The programme set prices right, initiated structural reforms, including fiscal and monetary operations. The regulatory framework was improved and bank supervision strengthened. The programme also led to the restructuring of distressed banks and cleaning up the non-performing loans in banks' balance sheet. The post-reform period has witnessed major transformation in the financial system. The institutional structure of the financial system has become more deepened and diversified. The banking sector in particular, has witnessed immense developments which include an increase in the entry of private banks (including foreign banks) into the market, and the expanded use of branches by the existing and new banks. Notwithstanding the natural barriers to entry which may exists due to tight regulation, risk, and capitalization requirements, the banking industry has witnessed the entry of eight banks from the sub-region and Asia in the last five years. That accounts for 42% growth in the number of banks in the industry over the period. In operation within the financial system are a significant number of insurance companies, a vibrant stock market and an ever-increasing number of non-bank financial intermediaries.

The financial system also operates in a legal and regulatory framework. These frameworks define the legal and regulatory environment in which banks operate. We shall not delve into the legal and regulatory environment but it is worth mentioning that the Constitution of the

Republic of Ghana and the following Acts define the regulatory system of the financial system.

• The Companies Act, 1963 (Act 179)

The Constitution of Ghana 1992;

The Securities Industry Act 1993 (Act 333);

The Bank of Ghana Act, 2002 (Act 612);

The Insurance Act 2006 (Act 724);

The Central Securities Depository Act 2007 (Act 733);

The Banking (Amendment) Act 2007 (Act 378); and

The Non-Bank Financial Institution Act 2008 (Act 774).

The phenomenal growth in the industry, coupled with expansion in branch network, and re-injection of capital across the spectrum of the industry have not succeeded in reducing the high interest rates. The industry still operates in a high interest rate regime despite attempts by Bank of Ghana in reducing the policy rate to which the interest rates have been pegged. Commercial banks are expected to change their lending rates in response to change in the policy rate by the Monetary Policy Committee of Bank of Ghana. The high interest rate may account for the business and financial risk, market power or inefficient management in the sector. An empirical study may help answer these questions. The capital re-injection may improve the margin of protection for risk absorption. However, new regulation would continue to add to the complexity of the business environment. The new Basel Capital Accord (Basel II) which is expected to be operational in 2011 will constitute the most significant change to banking supervision. Under the Basel II Accord, a bank's capital requirement will be based on their risk profile.

According to the Ghana Banking Survey 2010 by Pricewaterhouse Coopers in collaboration with Ghana Association of Bankers, Ghana Commercial Bank Ltd. has remained the industry leader in terms of total assets over the last ten years but only toppled by Barclays Bank Ghana Ltd. in 2007 after its nationwide expansion in branch network. Ghana Commercial Bank Ltd., Barclays Bank Ghana Ltd., Standard Chartered Bank Ghana Ltd., Ecobank Ghana Ltd., and Agricultural Development Bank Ltd., control more than 50% of the total market share in terms of total assets. It is therefore obvious that the industry is a highly concentrated one. The largest banks are not necessarily the most profitable. Although the industry profits, when measured in terms of return on shareholders' fund have remained high, it exhibits a declining trend. According to the 2010 Banking Survey, Standard Chartered Bank Ltd. appears to be consistent in bringing high returns to shareholders. The industry return on equity dropped from 22% in 2008 to 12.1% in 2009 (Ghana Banking Survey 2010). This is possibly as a result of the recapitalization requirements and a general decline in profits.

The banking industry has also witnessed the proliferation of electronic banking products such as internet banking, Short Message Service (SMS) banking, and other innovative electronic based services to facilitate online transactions and enquiries. There have been collaborations between some banks and telecommunication firms to fashion products to meet the needs of customers. While these platforms come with delightful products, adding value to banking services, it may also pose some risk of fraud if these platforms are not secured. The volume of online transactions would determine whether failure in these systems would have systemic impact on the industry as a whole. Bank of Ghana would have

to foster information security policy and best practices to ensure that the banking public is protected. Amidst all these complexities, the industry is expected to remain buoyant with increase in foreign direct investment, the new oil find and improved budget deficit.

2.2 The Role of Banks

The main role of a financial system is to lubricate the gears facilitating the economic operations. The banking system plays a major role in transferring funds from the saving units to the investing units (Hoffmann, 2011). It achieves this by matching supply and demand in the capital market. Therefore, a financial intermediary is an intermediary institution between lenders and borrowers. A financial intermediary provides market transparency in its role. Such intermediaries are facilitators of risk transfer, which are well positioned to deal with complex financial instruments and markets. Risk management is therefore a key activity of intermediaries. In contrast, the traditional theory about intermediaries provides little explanation about why institutions should perform a risk management function. At the same time, financial intermediaries reduce participation costs, that is; the costs involved in learning about using markets as well as participating in them regularly. Of course, this is an important explanation of the changes that have taken place.

Heffernan (1996) defines banks (as a special financial intermediary) as intermediaries between depositors and borrowers participating in the economy. Banks are distinguished from other types of financial firms because they provide deposit and loan products. To compliment this definition, Bossone (2001a) suggests that banks are special intermediaries since they thy have a unique capacity to finance production by lending their own debt to

agents that are willing to accept it. In turn, the banks use this as money. As such, banks manage liabilities but also lend money and thereby create bank assets. In general, the intermediation of banks result in them offering payment services to customers.

Essentially, banks produce a net social benefit by exploiting scale economies in processing the information involved in monitoring and enforcing contracts with borrowers. Banks reduce the delegation costs through a sufficient diversification of their loan portfolio. Fama (1985) points to the uniqueness of banks as deriving from integrating credit and liquidity provision functions. By having borrowers hold deposits with them, banks can observe cash-flow movements and gain private information on borrowers, which they then feed into the processing of new loans. Furthermore, Bossone (2001b) concluded two key features of banks, one is to issue debt claims on themselves that are accepted as money by the public, and the other is to inject money into the economy by lending out claims on their own debt. Thus, banks create money in the form of claims on their own debt and inject in the system by lending, which is to economize the use of outside money with their own deposit liabilities. As concluded by Heffernan (1996), with a lot of cost-intensive local branches, bank provides a bundle of different services while most other intermediaries only concentrate on one or few specific business. For example, a bank provides credit to firms and private customers, sells stocks and mutual funds and pays interest for saving deposits and distributes the money it receives from the central bank by providing its customers with cash. Integrating information-intensive lending and payment services distinguishes banks from other intermediaries, according to Goodfriend (1991). In short, banks are in the risk management business - they assess, assume and manage risk. The risks faced by banks

include liquidity risk, interest risk, credit risk, etc. The traditional focus of risk management in banking was the management of interest rate risk and liquidity risk, with a bank's credit risk usually managed by a separate department or division (Heffernan, 1996).

Besides the function roles banks played, as financial intermediaries, banks play a crucial role in the operation of most economies. Levine (1997) conducted survey and the result revealed that the efficacy of financial intermediation can affect economic growth. Crucially, financial intermediation affects the net return to savings and the gross return to investment (Demirguc-Kunt and Huizinga 1999). A number of authors mention that the efficiency of financial intermediation affects country's economic growth (e.g Rajan and Zingales, 1998; Levine, 1997) while at the same time bank insolvencies can result in systemic crises which have adverse consequences for the economy as a whole with losses that arise in many cases 10-20% of GDP and occasionally as much as 40-55% of GDP (Caprio and Klingebiel, 2003).

Specifically, the domestic credit provided by banking sector (% of GDP) in Ghana was reported at 27.74 in 2011, according to a World Bank report published in 2012.

2.3 Bank Regulation

A bank and its permissible activities are defined by regulations rather than markets. Arguments for bank regulations hinge on the special nature of banks. Banks' illiquidity can have negative effects on the stability of the financial sector and reverberate to the real sector. They are also inherently fragile and susceptible to contagious runs owing to the

combination of information asymmetries, intertemporal contracting, demandable par-value debt and high leverage (Diamond and Dybvig, 1983).

It has also been argued that banks are special because only banks can provide some essential forms of credit to corporations, especially short-term liquidity, which many argue that banks can provide it more cheaply because they combine committed lending (such as lines of credit) with deposit-taking services and economize on their cash and safe-securities holdings (Al-Jarhi, 2005). Some argue further that the somewhat fragile capital structure of banks, disciplines them to monitor corporations properly.

However, many countries did not treat banks as special from a regulatory point of view until the 20th century. Following the Great Depression, governments have taken a greater role in overseeing banks. Prudential regulation and supervision to prevent moral hazard and to limit bank opportunities to take more risk have therefore accompanied safety net provision. An important element of the regulatory framework has been restrictions on the type of activities banks may undertake. Despite regulations, many financial crises have taken place arguably because of the poor oversight and intervention of regulators in environments with too generous safety nets.

2.4 Competition in the Banking System

Several strands of literature have researched into the causes and implications of competition in the banking system. Competition in the banking system has been attributed to reforms and financial sector liberalization in developed and emerging markets alike. A study

conducted by the World Bank (2001) summarized that 'Facilitating the entry of reputable foreign financial firms to the local market should be welcomed too: they bring competition, improve efficiency, and lift the quality of the financial infrastructure.'

Some of the literature reviewed included the work of Claessens and Laeven (2004) in which bank-level data from fifty (50) countries were used to estimate the extent to which changes in input prices are reflected in revenues earned. They posit that banking systems which have greater foreign bank entry; and fewer entry and activity restrictions are more competitive. In a related study, Claessens el al. (2001) used bank-level data and macroeconomic data for 1988-1995 in eighty (80) countries to suggest that foreign bank entry improves the national banking markets and forces the domestic banks to be efficient with positive welfare implications for customers.

Levine (1996), as reported in Claessens el al. (2001), outlined three important roles played by foreign banks' entry into the national banking markets:

- Entry of foreign banks increases competition and improves the quality and availability of financial services in the domestic financial markets
- Stimulates the application of modern banking technology and skills
- Enhances countries access to international funds.

Furthermore, Claessens and Glaessner (1998) in cross-country evidence from Asia indicated a positive relationship between profitability and openness to foreign entry, thus suggesting that openness encourages banks to reduce costs and diversify their income (by greater

reliance on fee income). Competition also enhances the operations of domestic banks by removing inefficiencies and controlling overheads.

However, competition does not necessarily lead to good performance in the banking system than in other industries (Claessens and Laeven, 2004). In a similar vein, Stiglitz (1993) put forward the argument against the competition from foreign banks. He contended that government interventions in the financial markets of developing countries is important for the infant industry as domestic banks cannot compete with larger international banks for depositors who may be price-sensitive. Again, he noted that there is likely to be a stronger sense of social cohesion between domestic banks and the government than in the case of foreign banks. Leven (1999) in the study of the behavior of foreign and local banks in Asia also found that foreign-owned banks took relatively limited risks compared to other banks. Claessens el al. (2001), profitability, non-interest income and overall expenses of domestic banks were reported to be negatively affected with the increase presence of foreign banks.

2.5 The Concept of performance

Organizational performance comprises the actual output or results of an organization as measured against its intended outputs (or goals and objectives). According to Cascio (2006), performance is the degree of achievement of the mission at work place. Different researchers have different thoughts about performance. Mostly researcher's used the term performance to express the range of measurements of transactional efficiency and input & output efficiency (Stannack, 1996). In his contribution, Chenhall (2005) opined that performance of an organization can be measured either by financial or non-financial or both.

As Richardo and Wade (2001) suggested, organizations success shows high return on equity and this become possible due to establishment of good employees performance management system.

Nevertheless, Garg (2007) indicated that firm performance based on finance and accounting literature is measured by return on asset and ratio of sales to assets. Hossan and Habib (2010) indicated that profitability ratios designate a company's overall efficiency and performance. It measures the company how to use of its assets and control of its expenses to generate an acceptable rate of return. In his contribution to profitability ratios, Thachappilly (2009**)** stated in his article the Financial Ratio Analysis for Performance evaluation that profitability ratio help to evaluate the performance of a company, so that investors can decide whether to invest in that company. This study adopted finance and accounting measure of firm performance that is profitability.

2.6 Hypotheses regarding the determinants of bank profitability

Banking literature acknowledges several determinants of bank profitability, such as the bank's size. According to Goddard et al. (2004), scale economies are evident at low asset size levels but become exhausted as size increases. In this case, the bank's size can account for existing economies, or diseconomies, of scale. Berger and Humphrey (1997) argue that, on average, large banks are more efficient than small banks, but it is less clear whether large banks benefit significantly from scale economies. Profitability is more likely to improve by emulating industry best practice in terms of technology and management structure than by increasing the size per se. In this aspect, the empirical literature has not produced conclusive

findings for the bank's size variable. For instance, Akhavein el al. (1997) found a positive relationship between size and bank profitability. Demirgüç-Kunt and Maksimovic (1998) suggest that the extent to which various financial and legal factors, among others, affect bank profitability is closely linked to the bank's size. In addition, Short (1979) argues that size affects the capital adequacy of banks, since relatively large banks tend to raise less expensive capital and hence appear more profitable. However, other empirical works suggest that little cost saving can result from increasing the size of banks (Berger and Humphrey, 1997), which suggests that eventually very large banks could face scale inefficiencies. For instance, Goddard *et al*. (2004) suggest that the relationship between the relative size of a bank's off-balance sheet portfolio and its profitability is positive for the UK, but negative for other European countries like Germany and Spain. Naceur and Goaied (2008) examine the impact of bank characteristics, financial structure, and macroeconomic conditions on Tunisian banks' net-interest margin and profitability during the period of 1980 to 2000. They suggest that banks that hold a relatively high amount of capital and higher overhead expenses tend to exhibit higher net-interest margin and profitability levels, while size has a negative relation to bank profitability. Thus, the relationship between size and profitability for US banks can be positive or negative, depending on their scale efficiencies or inefficiencies due to bureaucracy and related factors. Another branch of research about the determinants of profitability refers to the market-power (MP) and efficient-structure (ES) hypotheses. The market-power hypothesis, also known as the structure-conduct-performance (SCP) hypothesis, states that there is a positive relationship between banking concentration and performance, because increased market-power yields monopolistic profits (Molyneux and Thornton, 1992). The collusion hypothesis also supports a positive

relationship between banking concentration and profitability. According to this hypothesis, a small number of banks may be able to collude, either implicitly or explicitly. This cartel would lead to more expensive loans and lower interest rates on deposits for individual investors.

However, if the number of banks is large, the collusion is more difficult to carry out (Goddard et al., 2004). The efficient-structure (ES) hypothesis says that firms (banks) with superior management or production technologies have lower costs and therefore higher profits. These firms are also assumed to gain large market shares, which may result in high levels of concentration, basically because highly concentrated markets will lower the cost of collusion and foster tacit and/or explicit collusion (Smirlock, 1985). Consequently, collusion has a positive effect on profitability. Finally, credit risk is another variable which can explain banking profitability. In this respect, the financial institutions as a whole are more vulnerable to high credit-risk than non-financial institutions. Issues related to high-risk loans, such as the accumulation of unpaid loans, imply that these loan losses have produced lower returns (Bourke, 1989). Additionally, Miller and Noulas (1997) also state a negative relationship between credit risk and profitability. This negative relationship indicates that higher risk associated with loans makes the level of loan loss provisions higher, which thereby makes it more difficult for a bank to follow the profit-maximization rule. In consequence, it is valid to expect that the higher the credit risk, the lower the profitability.

2.7 Ownership Structure and Profitability

Some studies have investigated the influence of ownership structure on banks' profitability, both for the non-banking sector as for the banking sector. Theoretical literature suggests that, co-operative entities, state-owned entities have fewer incentives for profit maximizing than private entities by differences in market discipline and objectives (Ommeren, 2011). However, there is no strong empirical evidence for the underlying theoretical explanations that ownership structure affects performance. Results for both the non-banking sector and banking sector are mixed, depending on period of study and region in which the study is performed.

An oft-cited study of Gompers el al. (2003) state that firms in the non-banking sector with stronger shareholders rights had higher profits. They used a large dataset of 1500 firms with observations in the 1990's. In addition, they found that investment portfolios of firms with strongest shareholder rights earned abnormal returns of 8.5% compared to firms with weakest rights. This findings stand in sharp contrast to Demsetz and Villalonga (2001) who do not find a significant relationship between ownership structure and firm performance. They assess 223 firms in the U.S.A. between 1976 and 1980. Saunders et al. (1990) extend the studies on ownership structure to the banking sector, in which third party agents set rules and regulation regarding risk taking. Following their article the presence of regulators could, unlike non-banking firms, increase or decrease bank risk-taking incentives. They find some evidence that banks in which managers have a stock option take more risk than banks which managers have no extra incentives in maximizing shareholder value. Results are in line with the agency theory of Jensen and Meckling (1976). Subsequently Saunders et al. (1990) also

found that the variation in risk taking between the banks with or without stock option compensation increased in periods of deregulation.

Recent studies try to vouch results of Saunders et al. (1990). However, evidence on whether stockholder-owned banks outperform governmental, mutual and co-operative banks is mixed (Goddard et al. 2007). Results from Molyneux and Thornton (1992) suggest that government-owned banks are more profitable than privately owned banks, in a sample of European banks between 1986 and 1989. They propose that the higher profitability, as measured by the return on equity, of government-owned banks arise by a lower equity-to-asset ratio of government-owned banks, which will lead to a higher return on equity, ceteris paribus. These banks are able to hold a lower equity-to-asset ratio since the government implicitly guarantees the underlying business. Furthermore, Altunbas et al. (2001) test whether there are differences in bank performance and bank efficiency for private, public and mutual ownership forms, using data between 1989 and 1996 in a sample of German banks. In contrary to Saunders et al. (1990), they find little evidence that private banks performed more efficient than their mutual and public counterparts did. Nevertheless, Inefficiency measures indicate that there are slight cost and profit advantages for mutual and public banks. Altunbas et al. (2001) propose an explanation for the cost and profit advantage of state-owned banks; they stated that state-owned, mutual and public banks have lower funding costs arising from the reliance on retail and small business customers. Those customers are perhaps less interest-rate sensitive.

In contrary to Molyneux and Thornton (1992), research of Iannotta et al. (2007) indicates that mutual and governmental-owned banks are less profitable than privately owned banks, controlling for bank characteristics, country and time effects. Research in similar period using a comprehensive model with more explanatory determinants of bank profitability (Dietrich and Wanzenried, 2011) does not find a significant relationship between the ownership structure and profitability.

Above-mentioned results with respect to the relationship between the ownership structure and banks' profitability are mixed and depending on dataset and region examined. Remarkably, this relationship is more visible in developing countries. Research of Micco et al. (2007) find that state-owned banks are less profitable than private banks in developing countries, whilst they do not find the same relationship in industrial countries. Their research uses data from banks in 179 countries between 1992 and 2002. Furthermore, Berger el al. (2005) find a modest relationship between corporate governance, ownership structure and performance for Argentinean banks in the 1990's and early 2000's. Accounting for static, selection and dynamic effects of governance, they indicate that state-owned banks have poorer long-term performance.

2.8 Balance Sheet Structure and Profitability

Corporate finance literature suggests that lower risk taking will negatively influence the expected return. In contrary to this explanation, Berger (1995) finds a positive Granger-causality relationship for U.S.A. banks between 1983 and 1992. He investigated the signaling and the expected bankruptcy costs hypothesis as possible explanations for the

remarkable result. For the signaling hypothesis, that states that an increase in the equity-to-asset ratio signal a better profitability to the market, no support is found. In contrary, some support is found for the expected bankruptcy costs hypothesis. Banks with many low-interest uninsured debts, adjust their equity to higher levels due to an exogenous change in bank failure probabilities. Although, one should be careful with generalizing the results from Berger (1995) since the findings could be caused by an exogenous shift in failure probabilities due to deteriorating financial condition in the eighties. Namely, the relationship between equity-to-asset ratio and performance changed in the period of 1990-1992 compare to the period of 1983-1989. Other studies also investigated balance sheet ratios like the equity-to-asset ratio, as the next paragraph will points out for which also a negative relationship is found.

2.9 Macroeconomic, Industry-Specific and Bank-Specific Factors and Profitability

In literature some researchers have investigated a broad range of factors that influence performance. Such comprehensive studies on bank performance are initially based on concentration, government ownership and growth in money supply (Bourke, 1989 and Molyneux and Thornton, 1992) but recently, studies also incorporate macroeconomic, industry specific and bank-specific determinants. Molyneux and Thornton (1992) repeat earlier study of Bourke (1989) and try to confirm results from one of those studies employing data on eighteen European countries for the period between 1986 and 1989. Molyneux and Thornton (1992) were one of the first that examine the European banking sector; they find that there is significant positive relationship between concentration, nominal interest rates, equity-to-asset ratio and governmental ownership. Their findings are

contradictory to Short (1979) but confirm results from the study of Bourke (1989) aside from the relationship between government ownership and return on equity, which turns out to be significant positive in the study of Molyneux and Thornton (1992).

Recent studies extend the research of Molyneux and Thornton (1992) by using more determinants (Demirgüç-Kunt and Huizinga, 1999; Pasiouras and Kosmidou, 2007 and Dietrich and Wanzenried (2011). Furthermore, recent studies often opt for a dynamic model that account for profit persistence. The studies of Pasiouras and Kosmidou (2007) and Dietrich and Wanzenried (2011) are discussed in more detail in subsequent paragraphs, as this thesis will build on their concepts. The other studies of Demirgüç-Kunt and Huizinga (1999), Goddard et al. (2004) and Athanasoglou et al. (2008) are less recent or use data from different regions than is the object of study. All three studies found significant relationships for different determinants. A summary of the findings of these studies is presented in table 2.1.

Table 2.1: Summary of literature review of regulation and banks' profitability

Author(s)	Purpose of the study	Sample	Methodology	Results	Conclusion
Barth et al. (1997)	They compare regulation, the structure in the banking sector and profitability of banks. Exploratory empirical analysis of different regulatory regimes on banks' profitability	Region: EU and G-10 countries (85% of total bank assets) Sample: all banks in the relevant countries are selected Period: 1993	Regression model and descriptive research DEPV: ROE EXPL: bank-specific variables, country-specific, macro-economic variables and regulation-specific variables	Results are exploratory and one should be cautious with generalizing results. There is significant variation in individual bank performance across the EU and G-10 country that is partly explainable by differences in regulation.	Their theoretical research indicates that there is still significant variation in the structure, regulation and profitability in EU and G-10 countries. There are differences between the countries which activities are allowed (securities, insurance and real estate activities)
Rime (2001)	Study the behavior of Swiss banks when capital requirements are placed by regulation. Extent literature from USA, to market with stricter regulatory pressure.	Region: Switzerland Sample: 154 banks, total 924 observations Period: 1989-1995	Regression model DEPV: capital and risk EXPL: Regulatory pressure, size, return on assets	Banks that are close to capital requirements tend to increase their Tier 1 and 2 capital in relation to the RWA. Hence, regulation has the desired impact on banks' behavior.	Rime (2001) find that regulation will force banks to increase their capital when they are close to minimum requirements. Regulation does not affect the risk-taking of a bank.

Barth et al. (2004)	Analyze the relationship between regulatory practices and development in the banking sector, efficiency of banks and stability.	Region: world (107 countries) Sample: unknown Period: 1999	Regression model DEPV: Bank development, NIM, overhead costs and non-performing loans. EXPL: capital regulatory index, supervisory power, banking entry, government	Restriction of bank activities negatively relate to development but not to NIM. No evidence of positive relation between bank entry and NIM and no relationship between capital restrictions and NIM or development	Regulations and supervisory practices that force accurate information disclosure and empower corporate control of banks work best to promote bank development, performance and stability.
Heid et al (2004)	Asses how banks adjust their capital and risk-taking behavior under regulation. They test the capital buffer theory and moral hazard by extending literature for non-US banks.	Region: Germany Sample: 570 banks (using a new dataset provided by Deutsche Bank). Period: 1993 - 2000	Regression model (dynamic panel data) DEPV: capital to total assets and risk weighted assets to total assets) EXPL: Size, loan loss provision, capital buffer and insolvency.	Banks with less capital buffers above minimum requirements try to increase the buffers when capital decreases (by extra risk-taking) whilst banks with higher capital buffers try rebuild their buffer when capital decreases by increasing risk taking.	They find that regulation w.r.t. capital has an impact on the risk and target capital adjustments. Moreover, capital is faster adjusted than risks. There is no evidence found that banks with low capital buffers adjust capital or risk faster than banks with high capital buffers

1.10 Determinants of Profitability for Banks

The study of Pasiouras and Kosmidou (2007) investigates European banks in a period between 1995 and 2001, generating a total sample of 584 banks with 4,088 observations. They apply a linear model for the total sample; nonetheless, they also separately run regressions for foreign and domestic banks within a country. The linear model of Pasiouras and Kosmidou (2007) uses return on average assets as dependent variable. Explanatory variables are categorized in internal (bank-specific) factors and external (macroeconomic and financial structure) factors. Bank-specific factors included proxies for the capital (e.g. equity-to-asset ratio) and liquidity structure (e.g. loan to customers and short term funding ratios). In addition, the cost-to-income ratio and size of a bank are included in bank-specific factors. Pasiouras and Kosmidou (2007) use macroeconomic variables such as inflation and growth of gross domestic product (GDP), and financial structure variables such as concentration.

In the total bank sample, all bank-specific determinants are statistically significant. They find a positive relationship between the equity-to-asset ratio and profitability. Furthermore, the coefficient of equity-to-asset ratio has the most explanatory power for profitability within the model of domestic banks. Proposing an explanation, the authors state that well-capitalized banks faced lower funding costs because these banks reduced bankruptcy costs and had less need for external funding. Findings of this relationship of capital ratio are consistent to Berger (1995), Demirgüç-Kunt and Huizinga (1999), Athanasoglou et al. (2008). Furthermore, the ratio between loans to customers and short term funding, as proxy for the liquidity structure, is negatively related to profitability for domestic banks but

positively related to profitability of foreign banks. No explanation is given for this contradicting result. Other variables that exhibited significance negative relationships are the cost to income and size. The negative coefficient for size means that large banks do not face economies of scale but rather diseconomies of scale. Pasiouras and Kosmidou (2007) propose that smaller banks achieve economies of scale up to a certain level, and the largest banks even face diseconomies of scale beyond a certain level.

Relationships between the external variables (relating to the macro economy and financial structure) and profitability are also statistically significant in the whole sample. Comparing the domestic and foreign sample, several coefficients change in sign. The authors find that there is a small positive relationship between inflation and profitability for domestic banks but a negative relation for foreign banks. The authors propose that domestic banks adjust the interest rates to the anticipated levels of inflation while foreign banks may not. Furthermore, concentration is significant in explaining profitability in the foreign banks sample but insignificant for the domestic subsample. To conclude the coefficient of GDP growth is also ambiguous; in the domestic sample, GDP growth is positively related to profitability but in the foreign sample negatively related. However, both inflation and GDP growth are in the total sample significant and positive but have very small coefficients. In the total sample, most explanatory power is found by cost-to-income and equity-to-asset ratio.

Kosmidou (2008) used an unbalanced pooled time series dataset of 23 Greek banks to examine the determinants of performance during the period of EU financial integration (1990-2002). The results indicated that high Return on Average Assets (ROAA) was found

to be associated with well-capitalized banks and lower cost to income ratios. Size was positive in all cases but statistically significant only when the macroeconomic and financial structure variables entered the models. Turning to macroeconomics and financial structure, the growth of gross domestic product (GDP) has a significant and positive impact on ROAA, while inflation has a significant negative impact.

In a related study, Grygorenko (2009) investigated the influence of price setting strategy on bank performance in Ukraine. He employed the Instrumental Variables Technique to explore this effect. It was found that the relationship between performance of the bank and its price setting policy is positive and statistically significant. According to these findings, banks with higher margins were more profitable. Also it was estimated that more profitable banks were characterized by strong capitalization level and high deposit-to-asset ratio. Such external factors as market concentration and inflation rate appeared to be insignificant in determination of bank performance in Ukraine, contradicting the inflation findings of Kosmidou (2008). Sufian and Parman (2009) employed the least squares methods of random effects, fixed effects, and ordinary least square models to provide empirical evidence on the factors that influence Non-Commercial Bank Financial Institutions (NCBFIs) profitability in Malaysia. The findings indicate that NCBFIs with a high loans intensity and credit risk tend to exhibit lower profitability level. On the other hand, large and more diversified NCBFI with high operational expenses and level of capitalization tend to exhibit higher profitability level. Li (2000) investigated the impact of bank-specific factors and macroeconomic factors on bank profitability in the UK banking industry over the period 1999-2006. The aim of his study is to demonstrate the strength of risk management in

banks. The results showed a negative correlation between loan loss reserves and profitability which was statistically significant. This implied that higher credit risk results in lower profits; a result which is consistent with that Sufian and Parman (2009). Capital strength was one of the main determinants of UK banks performance providing support to the argument that well capitalized banks face lower costs of going bankrupt, which reduces their cost of funding (Kosmidou, 2008). Finally, he observed that macroeconomic variables such as inflation, interest rate and GDP growth had insignificant impact on performance.

In the study of commercial banks in Jordan for the period 2005-2007 on Amman Stock Exchange, Al-Shubiri (2010) investigated the impact of bank characteristics, and financial structure variables on bank profitability. The researcher employed the Structure Conduct Performance (SCP) model in this study. To test the hypotheses, the researcher used simple and multiple regressions to develop two models. The results indicate that positive and significant relationship exists between the pre-tax profit and the independent variables such as equity, debt, and expenses. Vong and Chan (2009) examined the impact of bank characteristics as well as macroeconomic and financial structure variables on the performance of the Macao banking industry. It was demonstrated that the capital strength of a bank is of paramount importance in affecting its profitability. This result is in line with that of Al-Shubiri (2010), Li (2000) and Sufian and Parman (2009). On the other hand, the asset quality, as measured by the loan-loss provisions, affects the performance of banks adversely. In addition, banks with a large retail deposit-taking network do not achieve a level of profitability higher than those with a smaller network. Finally, with regard to macroeconomic variables, only the rate of inflation exhibits a significant relationship with

banks' performance contrary to the finding of Li (2000) who demonstrated that inflation had insignificant impact on bank profitability. El Biesi (2010) examined the profitability of foreign banks in nine economies of MENA (Middle East and Northern Africa) economies from 2002 to 2007. Using a panel dataset of 71 foreign banks, the paper investigates the impact of selected macroeconomic, financial market and bank specific determinants on foreign banks profitability. The results show that the most significant factors affecting foreign banks' profitability in MENA are capital, total assets and liquidity ratios at bank level, and stock market capitalization, trade volume, bilateral trade and level of income per capita growth on macro and banking industry level. Furthermore, factors such as concentration ratio, stock market trading volumes and turn over ratios have been investigated but appear to be insignificant factors.

CHAPTER 3

METHODOLOGY

3.0 INTRODUCTION

This chapter covers the methods used in the study. It takes into account the entire research design including the methods adopted in the sampling technique; sample size of the study; the nature and source of data, and the way these data were collected and analyzed. The purpose of the research, research approaches and strategies of the study are also discussed in this chapter. The last section of the chapter was devoted to the background of the Ghana banking industry.

3.1Nature and Source of Data

The objectives of the study were achieved through the use of secondary data in the form of the annual financial reports of individual banks and macroeconomic data drawn for the period 2004-2010. Malhotra (2007) defines secondary data as data that have been collected for some purpose other than the problem at hand. The advantages of secondary data lie in the fact that they are easily accessible, relatively inexpensive and quickly obtained. They can however be misleading and irrelevant since the objective, nature and methods used to collect the secondary data may not be appropriate to the present situation (ibid). In using the secondary data, the advice by Malhotra (2007) was therefore observed. According to Malhotra (2007), because secondary data have been collected for purposes other than the problem at hand, their usefulness to the current problem may be limited in several important

ways, including relevance and accuracy. Thus, the objective, nature, and methods used to collect the secondary data may not be appropriate to the present situation. Also, secondary data may be lacking in accuracy, or they may not be completely current or dependable. The collected secondary data were therefore evaluated on the basis of specification or method used to collect the date; accuracy or error in approach, research design, sampling, data collection, data analysis and reporting; currency in terms of time lag between collection and publication; objectives (i.e. why the data were originally collected); nature (in terms of the definition of key variables, units of measurement; categories used and relationship examined); and dependability (as in expertise, credibility, reputation and trustworthiness of the source).

Secondary data on bank financial was acquired from the Ecobank Research Department. Data on the macroeconomic indicators were obtained from the Bank of Ghana Research Department. From the financial data, which is basically bank's balance sheet and income statement, data on total assets, advances, provision for bad debt, and total annual overhead expense was used to estimate ratios and coefficients for the internal determinants. For the external determinants, macroeconomic data on Gross Domestic Product (GDP), inflation, and money supply was incorporated into the analysis. The time period selected was based on the fact that it offers recent time series observations and it constitutes a period of major changes for the Ghana banking system.

3.2 Sampling Criteria

All commercial banks existing in the banking industry as at 2010 were sampled. However, due regard was given to availability of data. The sampling criteria yielded an unbalanced

dataset of twenty-one (21) banks. The banks include Agricultural Development Bank of Ghana, Amal Bank (now Bank of Africa), Barclays Bank, CAL Bank, Ecobank Ghana, Fidelity Bank Ghana Limited, First Atlantic Merchant Bank Ghana (FAMBG), Ghana Commercial Bank, HFC Bank, International Commercial Bank, Merchant Bank Ghana Limited, National Investment Bank, The Trust Bank, Prudential Bank Limited, Société Générale - Social Security Bank (SG-SSB), Stanbic Bank, Standard Chartered Bank, UniBank, United Bank for Africa and Zenith Bank , Guarantee Trust Bank.

3.3 The Econometric Analysis

In order to establish the factors that determine the profitability of banks in Ghana, an econometric approach was adopted. The data analysis therefore passed through all the four main stages of econometric research outlined by Koutsoyiannis (1977) except the evaluation of the forecasting power of the estimated model. The three steps of the econometric approach were specification of the model; estimation of the model; and evaluation of the estimates.

3.5.1 Model Specification

Panel data are repeated surveys of a single (cross-section) sample in different periods of time (Koutsoyiannis, 1977). It involves the pooling of observations on a cross-section of units over several time periods and provides results that are simply not detectable in pure cross-sections or pure time-series studies (Abor, 2007). According to Vong and Chan (2009), panel data are commonly used because it has the advantage of giving more

information as it consists of both the cross sectional information, which captures individual variability, and the time series information, which captures dynamic adjustment. In short, panel modelling helps to identify a common group of characteristics while, at the same time, taking into account the heterogeneity that is present among individual units. Moreover, in panel data modeling, several data points are used which improves the degrees of freedom. Abor (2007) accordingly described the general form of the panel data model.

$$Y = \beta X + \varepsilon \quad (1)$$

The left hand variable Y represents the dependent variable in the model, which in this particular study was the firm's gross profit to total asset. X Contains the set of explanatory or independent variables in the estimation model. The ordinary least squares (OLS) econometric method was adopted because of the following reasons:

1. The parameter estimates obtained by OLS have some optimal properties described as BLUE (Best, linear, unbiased estimator).
2. The computational procedure of OLS is fairly simple as compared to other econometric techniques and the data requirements are not excessive. Also, the mechanics are simple to understand.
3. The least square method has been used in a wide range of econometric relationship with fairly satisfactory result.
4. OLS is an essential component of most econometric techniques (Koutsoyiannis, 1977).

The research design of this thesis builds on the econometric model suggested by Athanasoglou et al. (2008) with modification.

The model adopted for the analysis is as follows using the names of the variables:

Model I

$$ROA_{it} = \beta_0 + \beta_1 EOI_{it} + \beta_2 CAR_{it} + \beta_3 AOD_{it} + \beta_4 AQ_{it} + \beta_5 SIZE_{it} + \beta_6 GDP_{it} + \beta_7 INF_{it} + \beta_8 MS_{it} + \beta_9 NIITA_{it} + \varepsilon_{it} \quad (2)$$

Model II

$$ROE_{it} = \beta_0 + \beta_1 EOI_{it} + \beta_2 CAR_{it} + \beta_3 AOD_{it} + \beta_4 AQ_{it} + \beta_5 SIZE_{it} + \beta_6 GDP_{it} + \beta_7 INF_{it} + \beta_8 MS_{it} + \beta_9 NIITA_{it}(3) + \varepsilon_{it} \quad (3)$$

Where:

$ROA(Y)$ = Profit before Interest and Tax/total assets for bank *i* in time *t* and

$ROE(Y)$ = Profit after Interest and Tax/total assets for bank *i* in time *t* and

$EOI(x_1)$ = ratio of expense to income for banks *i* in time *t*

$SIZE(x_2)$ = log of total asset for bank *i* in time *t*

$CAR(x_3)$ = Equity to Total Assets for bank *i* in time *t*

$AOD(x_4)$ = Advances over Deposits for bank *i* in time *t*

$AQ(x_5)$ = Provision for bad debt to Advances for bank *i* in time *t*

$GDP(x_6)$ = annual change in the gross domestic product

$INF(x_7)$ = annual inflation rate

$MS(x_8)$ = Natural Log of money supply

$NIITA(x_9)$ = ratio of non-interest income to total assets for banks *i* in time *t*

ε = the error term

The Multiple Linear Regression Model

According to S. Chattefuee and A. S. Hadi (2006) the multiple linear regression can be represented in a matrix form as,

$$Y = X\beta + \varepsilon \tag{4}$$

Where

$$Y = \begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_p \end{bmatrix}, \qquad X = \begin{bmatrix} 1 & x_{11} & \dots & x_{1p} \\ 1 & x_{21} & \dots & x_{2p} \\ \vdots & \vdots & \dots & x_{2p} \\ 1 & x_{n1} & x_{n1} & x_{np} \end{bmatrix}, \qquad \beta = \begin{bmatrix} \beta_0 \\ \beta_1 \\ \vdots \\ \beta_p \end{bmatrix}, \qquad \varepsilon = \begin{bmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \vdots \\ \varepsilon_n \end{bmatrix}.$$

The assumptions made about ε for least square estimation are:

In multiple linear regression applications, these assumptions help the method applicable:

1. **linearity** of the relationship between dependent and independent variables
2. **independence** of the errors (no serial correlation)
3. **homoscedasticity** (constant variance) of the errors versus the predictions (or versus any independent variable)

4. **Normality** of the error distribution

$$E(\varepsilon) = 0, \quad and \quad \text{var}(\varepsilon) = E(\varepsilon\varepsilon^T) = \sigma^2 I_n$$

The vector Y is called the response vector and the matrix X is called the model matrix.

Where μ is some function (the signal) and ε is the noise (everything else). We usually impose some Structure on μ and ε. From the regression model above, we have,

$$b = (X'X)^{-1}X'y \tag{5}$$

Therefore, the fitted model is given by,

$$\hat{y} = Xb \tag{6}$$

Which can be represented by using the names of the predictors,

Fitted Model I:

$$ROA = b_0 + b_1 EOI + b_2 CAR + b_3 AOD + b_4 AQ + b_5 SIZE + b_6 GDP + b_7 INF + b_8 MS + b_9 NIITA \tag{7}$$

Fitted Model II:

$$ROE = b_0 + b_1 EOI + b_2 CAR + b_3 AOD + b_4 AQ + b_5 SIZE + b_6 GDP + b_7 INF + b_8 MS + b_9 NIITA \tag{8}$$

Gauss Markov Theorem

If $E(y) = x\beta$ and $\text{cov}(y) = \sigma^2 \text{I}_n$, the least-square estimators β_j , j=0,1….k. where k is the number of independent variables are the best linear unbiased estimators.

Properties of Ordinary least square Estimators

1. Linearity, $Y = X\beta + \varepsilon$
2. Unbiasedness

   An estimator is unbiased if $E(b) = \beta$
3. $\text{var}(b) = E\left[\left(b-(E)\right)\left(b-E(b)\right)^{T}\right]$

   $= \sigma^2 I_n (\mathrm{x}^{\mathrm{T}}\mathrm{x})^{-1}$

   $var(y) = var(x\beta + \varepsilon)$

   $var(y) = \sigma^2 I_n$

Testing the Normality Assumption

In determining if the normality assumption holds, we can use tests to determine if the evidence present is statistically significant, or if it could have happened merely by chance. There are many statistical tests of normality. We will use the Shapiro-Wilk test, since it is known to be a good test and to be quite powerful. According to G. J. Kerns (2010), the Shapiro-Wilk test is based on the statistic

$$W = \frac{\left(\sum_{i=1}^{n} a_i E_i\right)^2}{\sum_{j=1}^{n} E_j^2}$$

Where the E_i are the ordered residuals and the $\mathrm{a_i}$ are constants derived from the order statistics of a sample of size n from a normal distribution.

The hypotheses are

H_0 : the residuals are normally distributed

Versus

H_1 : the residuals are not normally distributed.

Testing the Constant Variance Assumption

We will use the Breusch-Pagan test to decide whether the variance of the residuals is non-constant. The null hypothesis is that the variance is the same for all observations, and the alternative hypothesis is that the variance is not the same for all observations. Studies by G. J. Kerns (2010) suggested that the test statistic is found by fitting a linear model to the centered squared residuals,

$$W_i = E_i^2 - \frac{SSE}{n}, i = 1, 2, \ldots., n$$

Independence Assumption

One of the strongest of the regression assumptions is the one regarding independence. Departures from the independence assumption are often exhibited by correlation (or autocorrelation, literally, self-correlation) present in the residuals. There can be positive or negative correlation.

Positive correlation is displayed by positive residuals followed by positive residuals, and negative residuals followed by negative residuals. Looking from left to right, this is exhibited by a cyclical feature in the residual plots, with long sequences of positive residuals being followed by long sequences of negative ones.

On the other hand, negative correlation implies positive residuals followed by negative residuals, which are then followed by positive residuals, etc. Consequently, negatively correlated residuals are often associated with an alternating pattern in the residual plots.

Testing the Independence Assumption

We may statistically test whether there is evidence of autocorrelation in the residuals with the Durbin-Watson test (G. J. Kerns, 2010). The test is based on the statistic

$$D = \frac{\sum_{i=1}^{n} (E_i - E_{i-1})^2}{\sum_{j=1}^{n} E_j^2}$$

3.4 Research Variable Selection

In general the determinants of profitability are divided into two main categories, namely, the internal determinants and external determinants. The internal determinants are those factors that are influenced by the Bank's management decision and policy objectives and the external determinants reflect the economic and industry conditions. The subsequent discussions give justification for variables selected

3.5.1 Performance measures: Dependent Variables

Based on the arguments of Golin (2001), and Rose et al., (2005), this study used the ratio of Return on Assets (ROA) and Return on Equity (ROE), as measures of bank's performance. Return on assets is the net profit after tax divided by average total assets and it indicates the returns generated from the assets financed by the bank. Average assets are being used in this study, in order to capture any differences that occurred in assets during the fiscal year. Return on average equity is the ratio of the net profit after tax to the average total equity for the fiscal year.

Internal Determinants of Profitability

According to the literature review in the preceding chapter, five bank characteristics are used as internal determinants of performance. They are the Expense-to-Income ratio, the ratio of Equity to Total Assets, the ratio of bank's advances to customer deposits, the ratio of provision for bad debt to advances, and the bank's total assets which are proxies for expenses management, capital adequacy, liquidity, asset quality and size, respectively.

3.6.2 Research variable justification

The ratio of Expense-to-Income (EOI) measures the overheads or costs of running the bank, the major element of which is normally salaries, as percentage of income and it is used to provide information on variation of bank costs over the banking system. According to the argument advanced by Kosmidou (2008), although the relationship between expenditure and profits appears straightforward implying that higher expenses mean lower profits and vice versa, this may not always be the case. The reason is that higher amounts of expenses may be associated with higher volume of banking activities and therefore higher revenues. It is expected that this variable will have a negative impact on performance because efficient banks are expected to operate at lower costs. The ratio of Equity to Total Assets (CAR) is incorporated in the regression model as a proxy for capital adequacy. Capital adequacy refers to the sufficiency of the amount of equity to absorb any shocks that the bank may experience. According to Kosmidou (2008), it is expected that the higher the equity to assets ratio, the lower the need for external funding and therefore the higher the profitability of the bank. In addition, well-capitalized banks face lower risk of going bankrupt which reduces their costs of funding. The relationship therefore between capital adequacy and profitability

is indeterminate requiring further empirical investigation. Another important decision that the managers of commercial banks must take refers to the liquidity management and specifically to the measurement of their needs related to the process of deposits and loans. For that reason the ratio of bank's advances to deposits (AOD) is used as a measure of liquidity. From the literature review, Guru *et al.* (1999) discovered that negative correlation exists between the level of liquidity and profitability. However, Bourke (1989), and Kosmidou et al., (2005) found a significant positive relationship between liquidity and bank profitability. Thus the relationship between liquidity and profitability is indeterminate.

The ratio of provision for bad debt to advances (AQ) indicates how much of the total portfolio has been provided for but not charged off and is used as a measure of bank's asset quality. The variable (AQ) is incorporated into the regression model as a proxy for asset quality and credit risk. Poor asset quality and subsequently credit risk can have rippling effect and thus lead to insolvency (Bessis; 2002). From the literature review, the higher the ratio, the poorer the quality and therefore the higher the risk of the loan portfolio will be. On one hand, the risk-return hypothesis implies a positive relationship between risk and profits. On the other hand, bad asset quality may have a negative impact on bank profitability by reducing interest income revenue and by increasing the provisions costs. Bank's size (SIZE) included in the regression model is considered an important determinant of performance. The variable SIZE is the natural logarithm of the total asset as used in most studies of banking. In the literature review, the relationship between size and profitability is indeterminate, since some studies found economies of scale for large banks and others diseconomies for larger banks.

To recognize that financial institutions in recent years have increasingly been generating income from off-balance sheet business and fee income general, the ratio of non-interest income over total assets (NII/TA) is entered in the regression analysis as a proxy for non-traditional activities. Non-interest income consists of commission, service charges, and fees, guarantee fees, net profit from sale of investment securities, and foreign exchange profit. The ratio is also included in the regression model as a proxy measure of bank diversification into non-traditional activities. The variable is expected to exhibit positive relationship with bank profitability (Sufian and Chong, 2008).

External determinants

The external environment in which banks operate have effect on them. Therefore, the financial market structure, the economic condition of the country, the legal and political environment all may influence the performance of the banks. In this study, two sets of external determinants are examined: the macroeconomic and the financial structure indicators.

The variable (MS) is incorporated into the regression equation to measure the stock of money supply at the end of each period. MS is the natural log of M2 money supply. The M2 money supply is composed of currency in circulation, private demand deposits in local currency with banks and quasi-monetary deposits. From literature review, Mamatzakis et al., (2003) used the supply of money as a measure of market size and found that it significantly influences bank profitability. Badaruddin et al., (2009) indicated the impact of money supply on bank performance depends on the industry concentration. They concluded that in a highly concentrated banking industry, money supply and bank performance are

negatively related. Therefore, relationship between money supply and bank profitability is indeterminate. Gross domestic product (GDP) is among the most commonly used macroeconomic indicators, as it is a measure of total economic activity within an economy. The gross domestic product growth (GDP)**,** calculated as the annual change of the GDP is used as a measure of the macroeconomic conditions. A positive relation is expected between the performance of the banks and this variable based on the findings of Bikker (2002).

The variable (INF) is used as a proxy for percentage change in aggregate price levels. Staikouras *et al.*, (2003) point out that inflation may have direct effects and indirect effects on the profitability of the banks. From the literature review, the impact of inflation on profitability depends on whether the inflation is anticipated or unanticipated. If anticipated, the interest rates are adjusted accordingly resulting in revenues, which increase faster than costs, with a positive impact on profitability. If inflation is unanticipated, the banks may be slow in adjusting their interest rates, which results in a faster increase of bank costs than bank revenues that consequently have a negative impact on bank profitability.

CHAPTER 4

DATA PRESENTATION, ANALYSIS AND DISCUSSIONS

4.1 Introduction

This chapter captures the findings of the study and presents them in a format that answers the research objectives and hypotheses. In order to keep the findings in the right perspective thus establishing the determinants of banks' profitability, Regression method was used to model the data. Appropriate tables were presented to facilitate the discussion. In specific, the chapter presents findings on banks' profitability during understudy; bank-specific and macroeconomic factors that are likely to influence the profitability of banks; and major determinants of bank profitability and its implication for policy formulation and implementation capital structure and banks' capitalization. In order to rationalize the findings of the study, the chapter also discusses the findings in the light of relevant literature.

4.2 Descriptive Analysis

Descriptive analysis shows the mean and standard deviation of the different variables of interest computed from the financial statement of the various banks considered in the study. It also presents the minimum and maximum values of the variables which help in getting a picture about the maximum and minimum values a variable achieved.

Table 4.1: Summary of descriptive statistics

Variable |	Obs	Mean	Std.Dev.	Min	Max
ROA |	136	.0284377	.0352978	-.1340304	.1998146
ROE |	136	.185181	.2493792	-.8516586	1.327215
EOI |	136	.4160818	.149526	.140698	.7359619
CAR |	136	.1181928	.0517394	.0266552	.3593059
AOD |	136	.671963	.3172127	.0419054	1.98228
AQ |	136	.0349122	.0320541	.0010715	.1650446
NIITA |	136	.0454545	.0174818	.0054588	.1016814
SIZE |	136	12.29921	.4753037	10.98337	13.28264
GDP |	136	6.048707	1.293862	3.9915	8.4305
MS |	136	9.669601	.2397716	9.3126	10.0144
INFL |	136	15.74942	5.077027	10.7327	26.6749

Table 4.1 provides a summary of the descriptive statistics of the dependent and explanatory variables. This shows the average indicators of variables computed from the financial statements of the 21 banks considered under the study. The mean return on asset (ROA) of banks was 0.0284. ROA sho

ws how the firms have converted its asset into earnings. The higher ratio indicates higher ability and therefore is an indicator of better performance. The 0.0284 implied that with GH¢1 of asset that the banks employed was able to generate average earnings of almost 3 Ghana pesewa. The return on equity (ROE) which is also a measure of profitability recorded a mean of 0.1852. The return on equity shows how the banks have performed in using their

equity to generate returns. Thus the banks were able to generate an average of 18.52 Ghana pesewa for every GH¢1 of equity they employed in their operations.

The EOI variable which measure how efficient the management has been regarding expenses it's incurred in generating its income, recorded a mean of 0.416 with the standard deviation of 14.95%. The mean value indicates that the banks spent on average 41.6% of its income as expenses. The variable CAR measure of capital adequacy, is calculated as the ratio of equity to total assets. The mean capital adequacy of the banks was 0.1182. This indicates the extent to which the banks' equity to absorb any shocks that may happen is 11.82%. The ratio of advance to deposit was 67.19% and this implied that on average 67.20% in proportional terms of money mobilized from customers (deposit) was loan to customer. However, maximum value recoded for AOD was 1.982. The ratio of provision for bad debt to advances (AQ) which represent asset quality recoded a mean of 3.49%. This implied that during the period understudy, about 3.5% of loan granted to customers were supposed to go bad. The variable NIITA is the ratio of non-interest income to total asset and its shows the extent of banks' diversifications reported a mean value of 0.0454. This implied that the banks earn additional income of 4.54% in relation to its asset. The GDP variable reports the gross domestic product growth during the period understudy. The mean value for GDP was 6.05%. The INFL reports on inflationary rate during the period understudy. The mean value was 15.75%. Size, determined as the natural logarithm of total assets had a mean of 12.299. MS which is money supply to the economy was also log transformed and recorded a mean value of 9.669.

4.3 Correlation analysis

Table 4.2 reports the correlations between the explanatory variables and the dependent variables. A correlation of -1 represents a perfect negative correlation in which variables move in exactly the opposite direction. Consequently, variables move in the same direction when a correlation of 1 is found. Correlations indicate the relationship between the variables but they do not imply causation. As reported in table 4.2, the expense-to-income ratio (EOI) is most correlated with ROA. It reported correlation value of -0.64. This implied that expense-to-income ratio and return on asset move in opposite direction. A measure of bank's asset quality, which is ratio of provision for bad debt to advances (AQ) and return on asset, reported a negative correlation with value of -0.23. Also, correlation between return on asset and money supply (MS), all reported a negative correlation. However, return on asset reported a positive correlation with capital adequacy (CAR); liquidity measure (AOD), gross domestic products growth (GDP), and banks' income diversifications (NIITA), inflationary rate (INFL) and banks' size. this impled that these variable increases they tend to move in the same direction as banks' profitability.

With regards to correlation between the return on equity and the explanatory variables, mix results were obtained as in the case of return on asset. The result of the study shows that return on equity correlated positively with liquidity measure, banks' income diversifications ability, gross domestic products growth, inflationary rate and size of banks. The explanatory variables that correlated negatively with return on equity include expense-to-income ratio, capital adequacy, asset quality and money supply.

Among the explanatory variables, the highest correlation was between money supply and bank size and the correlation is positive. The value is 57%. The second highest correlation was between expense-to-income ratio and size of the bank but the correlation is negative. The value is -40%. The lowest correlation among the explanatory variables was between the capital adequacy and liquidity measure and was negative.

Table 4.2: Correlation matrix of dependent (ROA and ROE) and independent variables

	Roa	*Roe*	*eoi*	*car*	*aod*	*aq*	*Niita*	*size*	*Gdp*	*ms*	*infl*
Roa	1.00										
Roe	0.80	1.00									
Eoi	-0.64	-0.43	1.00								
Car	0.08	-0.36	-0.26	1.00							
Aod	0.04	0.06	-0.11	-0.02	1.00						
Aq	-0.23	-0.33	0.09	0.16	-0.15	1.00					
Niita	0.30	0.19	-0.27	0.09	-0.05	0.26	1.00				
Size	0.29	0.26	-0.40	0.00	0.20	-0.20	0.17	1.00			
Gdp	0.03	0.21	-0.12	-0.25	0.19	-0.34	-0.03	0.09	1.00		
Ms	-0.26	-0.18	0.18	0.06	0.19	-0.27	-0.02	0.57	0.16	1.00	
Infl	0.05	-0.02	0.22	0.05	-0.11	0.25	0.18	-0.15	-0.36	-0.22	1.00

The correlation matrix above shows that the independent variables are not correlated, based on the methodology of multicollinearity. This can be seen as the correlation coefficient between each pair is less than 0.8. Therefore all the independent variables can be included in the model.

4.4 Empirical Results of the Determinants of Banks' Profitability

This section empirically investigates which determinants of banks' profitability are present using annual observations for an unbalanced panel of 21 banks between 2004 and 2010. Table 4.3a and table 4.4a report the regression outcomes using ROA and ROE as measure for banks' profitability. The determinants of banks' profitability are investigated using Prais-Winsten regression, correlated panels corrected standard errors (PCSEs). This regression checks the constant variances of residuals (homoscadecity).

4.4.1 Results for Estimation of the Return on Assets

The results estimated from regression model (I) are reported in Table 4.3. The Adjusted R-squared is 0.5462 and is the proportion of variance in the dependent variable (return on asset) which can be predicted from the independent variables (expense to income ratio, capital adequacy, liquidity measure, asset quality, income diversification ability, gross domestic product and inflation). This value indicates that 55% of the variance in return on asset values can be explained by the explanatory variables; expense to income ratio, capital adequacy, liquidity measure, asset quality, income diversification ability, gross domestic product and inflation. Again it is worth noting that this is an overall measure of the strength of association, and does not reflect the extent to which any particular independent variable is associated with the dependent variable. This means that there are more variable(s) or factors that may account for profitability (in term of return on asset) that was not included in the model. The p-value of the F-statistic prove the efficiency of the estimated models at 0.05 level of significance.

Table 4.3a: Regression full-model result (Dependent variable: ROA)

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	0.2116613	0.0542822	3.899	0.000166
eoi	-0.0523143	0.0136526	-3.832	0.000211
car	0.0103940	0.0294065	0.353	0.724415
aod	-0.0006103	0.0040161	-0.152	0.879492
aq	-0.2370720	0.0491578	-4.823	4.54×10^{-6}
niita	0.2369345	0.0825937	2.869	0.004935
size	0.0124127	0.0045608	2.722	0.007545
gdp	-0.0005204	0.0011212	-0.464	0.643417
ms	-0.0328704	0.0086255	-3.811	0.000228
infl	0.0004889	0.0002766	1.768	0.079824

Residual standard error	0.01336
Multiple R-squared	0.5833
Adjusted R-squared	0.5495
F-statistic:	17.26
p-value:	$< 2.2\times10^{-16}$
Denomenator degrees of freedom	111
Numerator degrees of freedom	9

The full model is significant since the p-value of the F-test statistic is less than 0.05, the level of significance.

Table 4.3b: Regression reduced-model result (Dependent variable: ROA)

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	0.236532	0.051168	4.623	9.98×10^{-6}
eoi	-0.045566	0.011158	-4.084	8.23×10^{-5}
aq	-0.216692	0.046553	-4.655	8.75×10^{-6}
niita	0.269692	0.079778	3.381	0.000989
size	0.013487	0.004171	3.234	0.001594
ms	-0.036764	0.007479	-4.916	2.97×10^{-6}

Residual standard error	0.0134
Multiple R-squared	0.5651
Adjusted R-squared	0.5462
F-statistic:	29.89
p-value:	$< 2.2\times10^{-16}$
Denomenator degrees of freedom	115
Numerator degrees of freedom	5

Model I:

$$Roa = 0.24 - 0.05eoi - 0.22aq + 0.27niita + 0.01size - 0.04ms \quad (9)$$

From the table above it is evident that the reduced model is more accurate than the full model. This is because the difference in the adjusted R-square for the full model and the

reduced model is not very much. This tells us that independent variables such as car, infl, gdp, aod, have not contributed much in describing the variation in a profit (roa) when they are included in the model.

Table 4.3b shows the results estimated from model 1. The expense-to-income ratio in the model is statistically significant and negative related to return on asset. The expense-to-income ratio measures the overheads or costs of running the bank, as percentage of income and it is used to provide information on variation of bank costs over the banking system. The negative relation implies that the overheads cost of banks in Ghana appears to be expensive or have inefficiencies inherent in it and therefore affect the banks profit margin. The negative relationship is in line with expectation and is consistence with Kosmidou (2008). According to Kosmidou (2008), higher expenses result in lower profits banks. The magnitude of the coefficient of the expense-to-income ratio in model is -0.05 and this suggest that a unit change expense to income ratio will reduce profit of the banks by 0.05.

The result of table 4.3b shows that the variable AQ which is loan loss provision and gives an indication of asset quality shows a statistically significant and a negative relationship with profitability. This implied that assets of the banks were not quality that is to say a lot of write-offs during the period of study and therefore it affected the profit of the banks. Bessis (2002) observed that poor asset quality and subsequently credit risk can have rippling effect and thus lead to insolvency. AQ variable reported a coefficient of -0.22 which implies that a unit change in AQ will reduce banks profitability by 0.22. Asset quality therefore has serious implications on banks profitability.

As expected, ratio of non-interest income to total asset which is a proxy for income diversification has a statistically significant and positive relationship with profitability. The coefficient of NIITA variable is 0.27. Accordingly, there is evidence found that margins are larger for non-interest income (such as fees and commissions income) or that diversification is positively associated with profitability. The findings are in line with earlier studies of Valverde and Fernández (2007) and Dietrich and Wanzenried, 2011). The finding suggested that non-interest income lower the volatility and cyclical variation of banks' earnings and profitability through diversification. This indicator which is a proxy for the banks' non-traditional activities is a relevant driver for performance of banks in Ghana. The magnitude of the coefficient implies that a unit change in NIITA variable may improve the banks' profitability by 0.27.

From the table above, we can also see that the size of the bank is statistically significant with positive coefficient of 0.013. This helps Banks to earn higher returns as they look for more customers. As the size of the Bank increases their capital will also increase, which helps them to do more business and enjoy economies of scale and its merits.

Finally, the natural log of money supply is statistically significant and has a coefficient of -0.037. This shows that a very small change in money supply has negative effect on profit. This also shows that an increase in money supply is very small, that less than one (<1).

Table 4.4a: Regression full-model result (Dependent variable: ROE)

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	1.024114	0.373848	2.739	0.007174
eoi	-0.333878	0.094027	-3.551	0.000565
car	-1.063318	0.202526	-5.250	7.38×10^{-7}
aod	-0.006731	0.027660	-0.243	0.808184
aq	-1.408810	0.338555	-4.161	6.27×10^{-5}
niita	1.109056	0.568832	1.950	0.053733
size	0.051465	0.031411	1.638	0.104161
gdp	0.003680	0.007722	0.477	0.634561
ms	-0.128266	0.059405	-2.159	0.032990
infl	0.003205	0.001905	1.683	0.095210

Residual standard error	0.09198
Multiple R-squared	0.5386
Adjusted R-squared	0.5012
F-statistic:	14.4
p-value:	3.45×10^{-15}
Denomenator degrees of freedom	111
Numerator degrees of freedom	9

The full model is significant since the p-value of the F-test statistic is less than 0.05, the level of significance.

Table 4.4b: Regression reduced-model result (Dependent variable: ROE)

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	1.24877	0.35686	3.499	0.000665
eoi	-0.38947	0.06555	-5.941	3.08×10^{-8}
car	-1.14257	0.18300	-6.244	7.40×10^{-9}
aq	-1.34559	0.33319	-4.038	9.74×10^{-5}
niita	1.39761	0.55468	2.520	0.013118
ms	-0.07709	0.03777	-2.041	0.043517

Residual standard error	0.09311
Multiple R-squared	0.5102
Adjusted R-squared	0.4889
F-statistic:	23.95
p-value:	$< 2.2\times10^{-16}$
Denomenator degrees of freedom	115
Numerator degrees of freedom	5

Model II

$$Roe = 1.25 - 0.39eoi - 1.14car - 1.35aq + 1.4niita - 0.08ms \quad (10)$$

From the table 4.4b it is evident that the reduced model is more accurate than the full model. This is because the difference in the adjusted R-square for the full model and the reduced model is not very much. This tells us that independent variables such as size, infl, gdp, aod, have not contributed much in describing the variation in a profit (roe) when they are included in the model.

Table 4.4b shows the results estimated from model II. The expense-to-income ratio in the model is statistically significant and negative related to return on asset. The expense-to-income ratio measures the overheads or costs of running the bank, as percentage of income and it is used to provide information on variation of bank costs over the banking system. A negative relation show that the overheads cost of banks in Ghana appears to be expensive or have inefficiencies inherent in it and therefore affect the banks profit margin. The negative relationship is in line with expectation and is consistent with Kosmidou (2008). According to Kosmidou (2008), higher expenses result in lower profits banks. The magnitude of the coefficient of the expense-to-income ratio in model is -0.39 and this suggest that a unit change in expense to income ratio will reduce profit of the banks by 0.39.

The variable, ratio of equity to total asset (CAR) has a negative and statistically significant relationship with return on asset. CAR shows the sufficiency of the amount of equity to absorb any shocks that the bank may experience. According to Kosmidou (2008), it is expected that the higher the equity to assets ratio, the lower the need for external funding and therefore the higher the profitability of the bank. The result of the negative relations implies that the banks' capital was not adequate and therefore they might have obtained external funding which was expensive to finance their operations. The expensive finance may have affect or reduce their profits margin. The increase in bank capitalization by the Ghana Monetary Authority will not only provide a margin of protection in the advent of economic shocks but it will also ensure that banks remain profitable. It also implies that banks should ensure that they are well capitalized if they must remain profitable. It is therefore expected that the banks will retained more of their profits in order to improve the

equity to asset ratio to enable the banks to absorb external shock that may arise and benefit from signal hypothesis.

The result of Table 4.4b shows that the variable AQ which is loan loss provision and gives an indication of asset quality shows a statistically significant and a negative relationship with profitability. This implied that assets of the banks were not quality that is to say a lot of write-offs during the period of study and therefore it affected the profit of the banks. Bessis (2002) observed that poor asset quality and subsequently credit risk can have rippling effect and thus lead to insolvency. AQ variable reported a coefficient of -1.35 which implies that a unit change in AQ will reduce banks profitability by 1.35. Asset quality therefore has serious implications on banks profitability.

As expected, ratio of non-interest income to total asset which is a proxy for income diversification has a statistically significant and positive relationship with profitability. The coefficient of NIITA variable is 1.4. Accordingly, there is evidence found that margins are larger for non-interest income (such as fees and commissions income) or that diversification is positively associated with profitability. The findings are in line with earlier studies of Valverde and Fernández (2007) and Dietrich and Wanzenried, 2011). The finding suggested that non-interest income lower the volatility and cyclical variation of banks' earnings and profitability through diversification. This indicator which is a proxy for the banks' non-traditional activities is a relevant driver for performance of banks in Ghana. The magnitude of the coefficient implies that a unit change in NIITA variable may improve the banks' profitability by 1.4.

Finally, the natural log of money supply is statistically significant and has a coefficient of -0.08. This shows that a very small change in money supply has negative effect on profit. This also shows that an increase in money supply is very small, that less than one (<1).

From the regression analysis, the major determinant of bank profitability in Ghana is non-interest income. The magnitude of coefficient of non-interest income in the regression model was 0.27.

Residual analysis of models I and II

Shapiro-Wilk normality test

W = 0.99, p-value = 0.5312

Shapiro-Wilk normality test

W = 0.9863, p-value = 0.2626

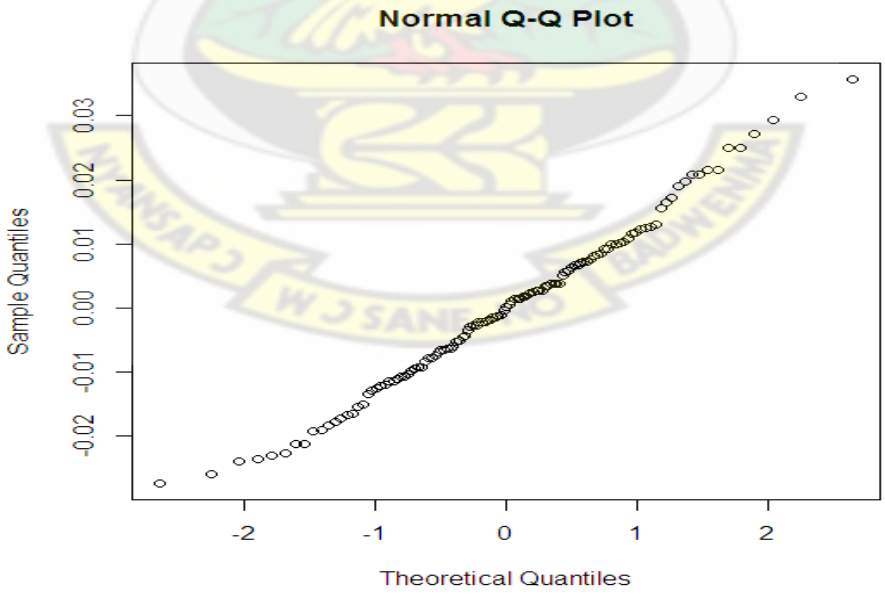

Fig : 4.1 Q-Q plot for model I

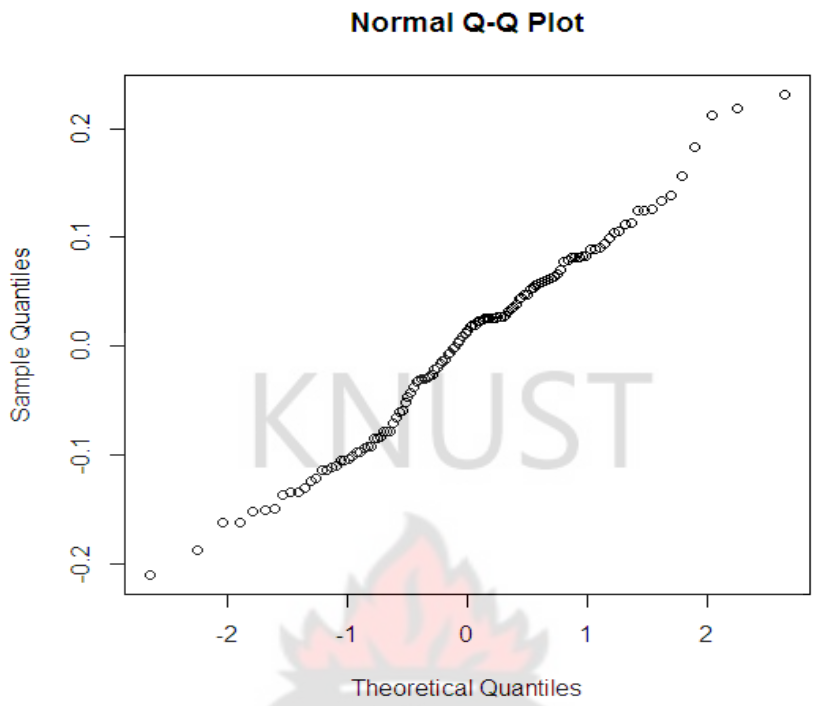

Fig 4.2 Q-Q plot for model II

From the above normality tests, it is clear that the normality assumption of the error terms for the two models is satisfied.

Constant variance test for models I and II

studentized Breusch-Pagan test of model I

BP = 12.4483, df = 5, p-value = 0.02914

studentized Breusch-Pagan test of model II

BP = 5.5729, df = 5, p-value = 0.35

From the test above, model II has a constant variance but model I does not have a constant variance. A further look at a plot of model I shows that the variances are not too different

this is because the plot does not show any fanning out (or in) of the dots; hopefully they fall in a constant band.

Therefore, the two reduced models above can be used for predicting profits of commercial banks in Ghana, that is, profit before tax and profit after tax.

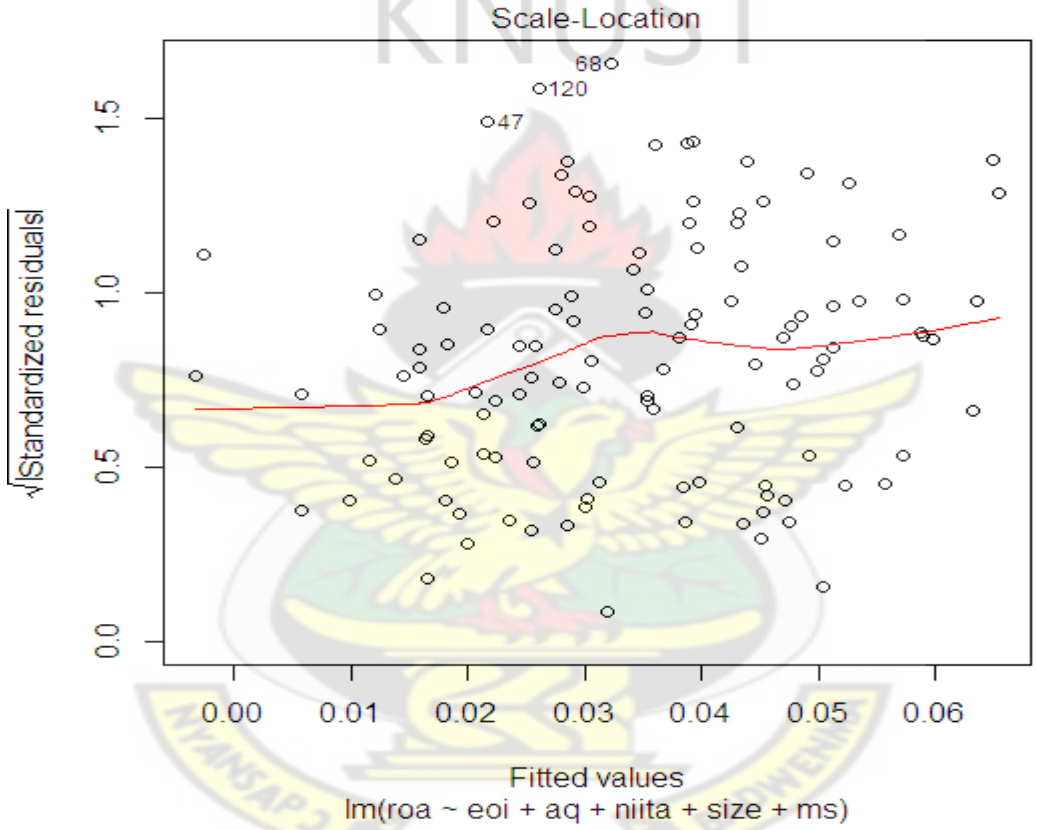

Fig 4.3 A plot of standard residual against the fitted values

CHAPTER 5

5.0 SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction

This chapter deals with the summary of the entire study especially of the findings; the conclusions drawn from the findings; and the recommended measures stipulated by the findings of the study. The chapter also outlines recommendations for further studies.

5.2 Summary of Findings

Summary of descriptive statistics

The mean return on asset (ROA) of banks was 0.0284. ROA shows how the firms have converted its asset into earnings. The 0.0284 implied that with GH¢1 of asset that the banks employed was able to generate average earnings of almost 3 Ghana pesewas. The return on equity (ROE) which is also a measure of profitability recorded a mean of 0.1852. Thus the banks were able to generate an average of 18.52% Ghana pesewas for every GH¢1 of equity they employed in their operations.

The EOI variable which measure how efficient the management has been regarding expenses it's incurred in generating its income, recorded a mean of 0.416 with the standard deviation of 14.95%. The mean value indicates that the banks spent on average 41.6% of its income as expenses. The variable CAR measure of capital adequacy, is calculated as the ratio of equity to total assets. The mean capital adequacy of the banks was 0.1182. This

indicates the extent to which the banks' equity to absorb any shocks that may happen is 11.82%. The ratio of advance to deposit was 67.19% and this implied that on average 67.20% in proportional terms of money mobilized from customers (deposit) was loan to customer. The ratio of provision for bad debt to advances (AQ) which represent asset quality recoded a mean of 3.49%. This implied that during the period understudy, about 3.5% of loan granted to customers were supposed to go bad. The variable NIITA is the ratio of non-interest income to total asset and its shows the extent of banks' diversifications reported a mean value of 0.0454. This implied that the banks earn additional income of 4.54% in relation to its asset. The GDP variable reports the gross domestic product growth during the period understudy. The mean value for GDP was 6.05%. The INFL reports on inflationary rate during the period understudy. The mean value was 15.75%. Size, determined as the natural logarithm of total assets had a mean of 12.299. MS which is money supply to the economy was also log transformed and recorded a mean value of 9.669.

Determinant of banks' profitability (Banks specific variables)

Expense to income ratio (Efficiency of expenditure)

The result of the study shows that expense-to-income ratio in the model was statistically significant and negatively related to return on asset. The expense-to-income ratio measures the overheads or costs of running the bank, as percentage of income and it is used to provide information on variation of bank costs over the banking system. The magnitude of the coefficient of the expense-to-income ratio in model I is 0.05 and this suggest that a unit change expense to income ratio will reduce profit of the banks by 0.05.

Equity to total asset ratio (Capital adequacy)

Findings of the study show that equity to total asset has a negative and statistically significant relationship with profit. The result of the negative relations implies that the banks' capital was not adequate and therefore they might have obtained external funding which was expensive to finance their operations.

Loan loss provision to advance (asset quality)

The result of loan loss provision shows a statistically significant and a negative relationship with profitability before taxation. This implied that assets of the banks were not quality that is to say a lot of write-offs during the period of study and therefore it affected the profit of the banks. Asset quality variable reported a coefficient of -0.22 which implies that a unit change in asset quality will reduce banks profitability by 22%. Asset quality therefore has serious implications on banks profitability. Also this implies that increase in provision for bad and doubtful debts has negative effects on the profits of the banks. This means more customers are failing to honor their obligations.

Provision for doubtful debts also has an effect on profits of banks after taxation and this is even more as compared to profits before tax.

Non-interest income to total asset ratio (Diversification)

The ratio of non-interest income to total asset which is a proxy for income diversification has a statistically significant and positive relationship with profitability before taxation. The coefficient of NIITA variable is 0.27. Accordingly, there is evidence found that margins are larger for non-interest income (such as fees and commissions income) or that diversification

is positively associated with profitability. The magnitude of the coefficient implies that a unit change in NIITA variable may improve the banks' profitability by 0.27. Also NIITA has higher positive relationship profit after tax.

Determinant of banks' profitability (Macroeconomic variables)

Inflation

The result indicates that inflation was statistically insignificant in determining the profitability of banks before and after taxation. This signals that bank managers are able to forecast accurately inflation and are proactive in managing anticipated inflation.

5.3 Conclusions

This study builds on Pasiouras & Kosmidou (2007) and Kosmidou (2008) in establishing factors that determine profitability of banks from the developing economy perspective. This study examines the determinant of commercial bank profitability and the extent to which they impact on performance. The empirical estimation is based on a panel regression analysis of the relationship between profit variables and expense to income ratio, capital adequacy, liquidity measure, asset quality, income diversification ability, gross domestic product and inflation.

The results suggest that expenses to income ratio, capital adequacy, asset quality, income diversification ability, size and money supply influence the banks profit in the statistically significant manner. The outcome shows that income diversification and size have improved banks profit level whiles efficiency of expenditure, capital adequacy asset quality and

money supply growth rate had reduce the banks profit level. However, of the extent of influence, income diversification in the form of fees and commissions' income have had a greatest impact i.e. contributing significantly to the profit of banks. One that has been reducing the banks profit level significantly is expenses to income ratio (expenses). The banks therefore should concentrate more on these variables as they want to maximize profit.

5.4 Recommendations

The study has produced some interesting results and one avenue for future research is to extend the investigation to other emerging markets, especially those in the sub region. The incentives for further research on other emerging markets come from the limitation of the studies which currently exist. Further research that will replicate these studies using more comprehensive variables such as interest charge by banks would shed more light on issues raised in this study. Also, an attempt should be made to add money supply and banks size variables to the model to ascertain the effect of these variables.

As a follow up to the study the following recommendation is made to be considered by the banks in Ghana:

- Banks capitalization should be encouraged so that bank performance can be enhanced. Banks should endeavor to retain earnings to boost up capital rather than paying exorbitant bonuses. A well-capitalized banking system will ensure financial stability and make the industry more resilient against external shocks and risk.

- Bank managers and credit officers must adhere to prudential guidelines in the administration of credit. Banks must be encouraged to establish an appropriate credit risk environment, operate under a sound credit-granting process, strictly adhering to know your customer (KYC) norms, maintain an appropriate credit administration, measurement and monitoring process (both on-site and off-site supervision) and ensure adequate controls over credit risk. These practices should also be applied in conjunction with sound banking supervision practices related to the assessment of asset quality, the adequacy of provisions and reserves, and the disclosure of credit risk. The establishment of the Collateral Security by the Central Bank is appropriate as it ensures the integrity of the collateral instruments and transparency in credit administration process. The study found that the current asset quality is reducing their profit level.

- Efficient management of bank operations can alleviate the high operational cost that erodes bank profits. Bank occupancy cost and salaries are major components of operational cost. Bank must be encouraged to employ more technologies to automate their service delivery. Moreover, these technologies would enable banks to explore new markets without maintaining a physical presence. It would reduce the number of staff costs, occupancy cost, paper cost and queuing times in the banking halls.
- The banks should put more effort in generating non-interest income in a form of fees, commissions and other income (be it a consultancy, guarantee fees, net profit from sale of investment securities, and foreign exchange etc). The study found this variable contributing greatest to the banks profits.

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APPENDICES

APPENDIX I – Financial data derived from the financial statements

bank	index	roa	roe	eoi	car	aod	aq	niita	size	gdp	ms	infl
cal	1	0.024	0.156	0.65	0.127	0.803	0.016	0.037	12.654	3.9915	10.0144	19.2507
cal	1	0.031	0.225	0.57	0.105	1.183	0.011	0.05	12.526	8.4305	9.9184	16.5221
cal	1	0.028	0.156	0.508	0.129	0.958	0.014	0.045	12.37	6.4597	9.7749	10.7327
cal	1	0.042	0.214	0.421	0.136	1.004	0.032	0.055	12.196	6.4000	9.6387	10.9152
cal	1	0.047	0.156	0.391	0.185	0.651	0.042	0.048	11.987	5.9000	9.4946	15.1182
cal	1	0.05	0.194	0.488	0.193	0.628	0.026	0.059	11.917	5.6000	9.4173	12.6246
cal	1	0.056	0.291	0.562	0.121	0.649	0.034	0.073	11.768	5.2000	9.3126	26.6749
ecobank	2	0.051	0.262	0.372	0.148	0.495	0.021	0.057	13.142	3.9915	10.0144	19.2507
ecobank	2	0.048	0.396	0.366	0.092	0.588	0.014	0.068	12.964	8.4305	9.9184	16.5221
ecobank	2	0.045	0.346	0.31	0.097	0.659	0.002	0.043	12.825	6.4597	9.7749	10.7327
ecobank	2	0.053	0.388	0.306	0.099	0.483	0.002	0.041	12.635	6.4000	9.6387	10.9152
ecobank	2	0.055	0.432	0.289	0.087	0.468	0.014	0.046	12.505	5.9000	9.4946	15.1182
ecobank	2	0.053	0.398	0.274	0.087	0.46	0.01	0.049	12.367	5.6000	9.4173	12.6246
ecobank	2	0.061	0.396	0.289	0.09	0.491	0.021	0.059	12.226	5.2000	9.3126	26.6749
gcb	3	0.01	0.091	0.505	0.104	1.005	0.029	0.066	13.283	3.9915	10.0144	19.2507
gcb	3	0.03	0.182	0.273	0.124	1.055	0.008	0.062	13.216	8.4305	9.9184	16.5221

gcb	3	0.034	0.151	0.199	0.144	0.885	0.011	0.035	13.058	6.4597	9.7749	10.7327
gcb	3	0.05	0.287	0.146	0.115	0.574	0.005	0.043	12.89	6.4000	9.6387	10.9152
gcb	3	0.039	0.181	0.167	0.12	0.542	0.029	0.041	12.768	5.9000	9.4946	15.1182
gcb	3	0.042	0.284	0.22	0.103	0.491	0.047	0.034	12.746	5.6000	9.4173	12.6246
gcb	3	0.042	0.198	0.24	0.093	0.551	0.064	0.036	12.705	5.2000	9.3126	26.6749
stanchart	4	0.06	0.36	0.232	0.114	0.49	0.037	0.045	13.147	3.9915	10.0144	19.2507
stanchart	4	0.045	0.371	0.309	0.091	0.62	0.004	0.042	12.993	8.4305	9.9184	16.5221
stanchart	4	0.053	0.374	0.324	0.109	0.537	0.006	0.035	12.908	6.4597	9.7749	10.7327
stanchart	4	0.066	0.381	0.241	0.113	0.538	0.006	0.038	12.852	6.4000	9.6387	10.9152
stanchart	4	0.069	0.358	0.242	0.126	0.664	0.014	0.052	12.711	5.9000	9.4946	15.1182
stanchart	4	0.069	0.435	0.265	0.101	0.532	0.004	0.057	12.643	5.6000	9.4173	12.6246
stanchart	4	0.076	0.433	0.292	0.104	0.501	0.01	0.056	12.592	5.2000	9.3126	26.6749
nib	5	-0.04	-0.37	0.61	0.111	0.845	0.11	0.033	12.734	3.9915	10.0144	19.2507
nib	5	-0.07	-0.852	0.492	0.082	0.945	0.165	0.06	12.614	8.4305	9.9184	16.5221
nib	5	0.018	0.082	0.376	0.169	0.793	0.037	0.049	12.561	6.4597	9.7749	10.7327
nib	5	0.012	0.113	0.416	0.14	0.811	0.008	0.037	12.447	6.4000	9.6387	10.9152
nib	5	0.039	0.258	0.348	0.12	0.719	0.082	0.041	12.279	5.9000	9.4946	15.1182
nib	5	0.048	0.303	0.305	0.115	1.745	0.046	0.056	12.168	5.6000	9.4173	12.6246
nib	5	0.041	0.25	0.341	0.126	1.082	0.089	0.063	12.018	5.2000	9.3126	26.6749
icb	6	0.004	0.007	0.523	0.359	0.397	0.079	0.014	12.275	3.9915	10.0144	19.2507
icb	6	0.046	0.245	0.476	0.144	0.416	0.001	0.049	12.016	8.4305	9.9184	16.5221

icb	6	0.021	0.13	0.503	0.139	0.39	0.016	0.029	11.911	6.4597	9.7749	10.7327
icb	6	0.022	0.116	0.441	0.131	0.325	0.04	0.02	11.842	6.4000	9.6387	10.9152
icb	6	0.029	0.124	0.522	0.165	0.276	0.016	0.03	11.656	5.9000	9.4946	15.1182
icb	6	0.034	0.117	0.491	0.195	0.256	0.016	0.042	11.525	5.6000	9.4173	12.6246
icb	6	0.03	0.145	0.609	0.143	0.208	0.016	0.047	11.339	5.2000	9.3126	26.6749
fambl	7	0.01	0.266	0.595	0.027	0.723	0.012	0.018	12.566	8.4305	9.9184	16.5221
fambl	7	0.017	0.205	0.504	0.059	0.742	0.054	0.034	12.226	6.4597	9.7749	10.7327
fambl	7	0.011	0.143	0.517	0.059	0.955	0.084	0.036	12.139	6.4000	9.6387	10.9152
fambl	7	0.016	0.127	0.502	0.081	1.108	0.082	0.039	11.923	5.9000	9.4946	15.1182
fambl	7	0.022	0.203	0.512	0.068	0.849	0.088	0.066	11.703	5.6000	9.4173	12.6246
fambl	7	0.007	0.075	0.721	0.067	0.636	0.086	0.056	11.616	5.2000	9.3126	26.6749
ttb	8	0.051	0.275	0.476	0.131	1.062	0.025	0.044	12.494	3.9915	10.0144	19.2507
ttb	8	0.052	0.325	0.372	0.116	1.313	0.028	0.053	12.403	8.4305	9.9184	16.5221
ttb	8	0.048	0.408	0.296	0.09	0.978	0.016	0.042	12.342	6.4597	9.7749	10.7327
ttb	8	0.063	0.408	0.243	0.112	0.982	0.018	0.048	12.09	6.4000	9.6387	10.9152
ttb	8	0.069	0.449	0.334	0.103	0.786	0.025	0.057	11.992	5.9000	9.4946	15.1182
ttb	8	0.066	0.52	0.342	0.08	0.437	0.049	0.05	11.953	5.6000	9.4173	12.6246
ttb	8	0.058	0.409	0.419	0.076	0.455	0.04	0.05	11.795	5.2000	9.3126	26.6749
sgssb	9	0.047	0.178	0.174	0.188	0.762	0.015	0.059	12.761	3.9915	10.0144	19.2507
sgssb	9	0.05	0.223	0.147	0.16	0.961	0.022	0.072	12.64	8.4305	9.9184	16.5221
sgssb	9	0.037	0.198	0.183	0.14	0.759	0.026	0.056	12.621	6.4597	9.7749	10.7327

sgssb	9	0.039	0.173	0.21	0.157	0.599	0.026	0.055	12.564	6.4000	9.6387	10.9152
sgssb	9	0.2	1.327	0.217	0.136	0.694	0.007	0.055	12.465	5.9000	9.4946	15.1182
sgssb	9	0.069	0.288	0.225	0.151	0.471	0.03	0.067	12.387	5.6000	9.4173	12.6246
sgssb	9	0.055	0.269	0.271	0.156	0.591	0.075	0.06	12.32	5.2000	9.3126	26.6749
stanbic	10	0.005	0.027	0.461	0.122	0.692	0.091	0.102	12.854	3.9915	10.0144	19.2507
stanbic	10	0.046	0.437	0.392	0.099	0.972	0.016	0.097	12.662	8.4305	9.9184	16.5221
stanbic	10	0.042	0.563	0.316	0.074	0.999	0.002	0.068	12.547	6.4597	9.7749	10.7327
stanbic	10	0.037	0.32	0.273	0.113	0.698	0.009	0.031	12.131	6.4000	9.6387	10.9152
stanbic	10	0.032	0.239	0.349	0.128	0.407	0.067	0.051	11.945	5.9000	9.4946	15.1182
stanbic	10	0.022	0.159	0.305	0.128	0.366	0.065	0.048	11.869	5.6000	9.4173	12.6246
stanbic	10	0.03	0.102	0.324	0.196	0.339	0.029	0.047	11.621	5.2000	9.3126	26.6749
merchant	11	0.012	0.1	0.503	0.081	0.659	0.121	0.049	12.847	3.9915	10.0144	19.2507
merchant	11	0.068	0.425	0.419	0.123	0.97	0.063	0.084	12.644	8.4305	9.9184	16.5221
merchant	11	0.006	0.001	0.456	0.076	0.882	0.089	0.037	12.667	6.4597	9.7749	10.7327
merchant	11	0.038	0.289	0.365	0.096	0.98	0.029	0.055	12.526	6.4000	9.6387	10.9152
merchant	11	0.044	0.253	0.342	0.12	0.805	0.032	0.054	12.282	5.9000	9.4946	15.1182
merchant	11	0.057	0.315	0.338	0.116	0.603	0.055	0.075	12.144	5.6000	9.4173	12.6246
merchant	11	0.028	0.162	0.546	0.102	0.46	0.099	0.076	11.997	5.2000	9.3126	26.6749
barclays	12	-0.02	-0.112	0.28	0.125	0.55	0.119	0.021	13.16	3.9915	10.0144	19.2507
barclays	12	-0.01	-0.06	0.332	0.089	0.778	0.065	0.023	13.141	8.4305	9.9184	16.5221
barclays	12	0.037	0.322	0.24	0.079	0.89	0.009	0.026	13.076	6.4597	9.7749	10.7327

barclays	12	0.07	0.503	0.185	0.096	0.741	0.009	0.047	12.815	6.4000	9.6387	10.9152
barclays	12	0.098	0.622	0.155	0.113	0.786	0.001	0.055	12.694	5.9000	9.4946	15.1182
barclays	12	0.09	0.518	0.141	0.107	0.653	0.022	0.055	12.68	5.6000	9.4173	12.6246
barclays	12	0.087	0.548	0.15	0.103	0.575	0.033	0.058	12.578	5.2000	9.3126	26.6749
unibank	13	0.014	0.127	0.605	0.091	0.599	0.003	0.052	12.342	3.9915	10.0144	19.2507
unibank	13	0.016	0.084	0.428	0.149	0.725	0.004	0.054	12.067	8.4305	9.9184	16.5221
unibank	13	0.012	0.098	0.37	0.124	0.694	0.018	0.053	11.84	6.4597	9.7749	10.7327
unibank	13	0.016	0.064	0.267	0.192	0.628	0.053	0.048	11.57	6.4000	9.6387	10.9152
unibank	13	0.005	0.034	0.376	0.122	0.594	0.053	0.06	11.341	5.9000	9.4946	15.1182
unibank	13	0.009	0.053	0.428	0.148	0.404	0.087	0.055	11.234	5.6000	9.4173	12.6246
unibank	13	0.008	0.092	0.527	0.085	0.409	0.027	0.062	10.983	5.2000	9.3126	26.6749
amalbank	14	0.025	0.241	0.708	0.077	0.54	0.027	0.047	12.54	3.9915	10.0144	19.2507
amalbank	14	0.031	0.292	0.522	0.078	0.458	0.012	0.039	12.479	8.4305	9.9184	16.5221
amalbank	14	0.011	0.078	0.553	0.091	0.547	0.022	0.038	12.174	6.4597	9.7749	10.7327
amalbank	14	-0	-0.055	0.495	0.114	0.33	0.057	0.035	11.822	6.4000	9.6387	10.9152
amalbank	14	0.016	0.131	0.564	0.084	0.293	0.031	0.04	11.602	5.9000	9.4946	15.1182
amalbank	14	0.025	0.215	0.702	0.079	0.254	0.03	0.05	11.564	5.6000	9.4173	12.6246
amalbank	14	0.012	0.18	0.709	0.037	0.159	0.076	0.036	11.476	5.2000	9.3126	26.6749
prudential	15	0.012	0.138	0.611	0.073	0.738	0.008	0.032	12.531	3.9915	10.0144	19.2507
prudential	15	0.024	0.276	0.499	0.057	0.803	0.004	0.034	12.449	8.4305	9.9184	16.5221
prudential	15	0.021	0.285	0.46	0.047	0.643	0.02	0.027	12.385	6.4597	9.7749	10.7327

prudential	15	0.019	0.214	0.398	0.052	0.855	0.01	0.029	12.189	6.4000	9.6387	10.9152
prudential	15	0.03	0.361	0.452	0.063	0.67	0.017	0.04	12.008	5.9000	9.4946	15.1182
prudential	15	0.029	0.376	0.488	0.055	0.585	0.02	0.039	11.941	5.6000	9.4173	12.6246
prudential	15	0.023	0.395	0.589	0.049	0.453	0.032	0.039	11.789	5.2000	9.3126	26.6749
adb	16	0.018	0.104	0.486	0.166	0.877	0.043	0.069	12.866	3.9915	10.0144	19.2507
adb	16	0.024	0.137	0.343	0.174	1.16	0.019	0.068	12.795	8.4305	9.9184	16.5221
adb	16	0.025	0.122	0.267	0.201	0.845	0.017	0.062	12.673	6.4597	9.7749	10.7327
adb	16	0.028	0.155	0.263	0.169	0.644	0.053	0.054	12.613	6.4000	9.6387	10.9152
adb	16	0.024	0.121	0.319	0.181	0.696	0.05	0.052	12.536	5.9000	9.4946	15.1182
adb	16	0.04	0.197	0.332	0.181	0.527	0.122	0.079	12.491	5.6000	9.4173	12.6246
adb	16	0.029	0.17	0.319	0.155	0.57	0.11	0.047	12.476	5.2000	9.3126	26.6749
hfc	17	0.025	0.172	0.577	0.124	1.326	0.012	0.033	12.412	3.9915	10.0144	19.2507
hfc	17	0.021	0.208	0.521	0.073	1.661	0.016	0.021	12.576	8.4305	9.9184	16.5221
hfc	17	0.027	0.247	0.477	0.081	1.226	0.015	0.017	12.206	6.4597	9.7749	10.7327
hfc	17	0.015	0.113	0.486	0.101	1.189	0.01	0.016	12.03	6.4000	9.6387	10.9152
hfc	17	0.011	0.068	0.475	0.15	1.062	0.005	0.011	11.848	5.9000	9.4946	15.1182
hfc	17	0.035	0.168	0.49	0.163	1.333	0.01	0.012	11.773	5.6000	9.4173	12.6246
hfc	17	0.035	0.2	0.519	0.174	1.982	0.021	0.007	11.709	5.2000	9.3126	26.6749
fidelity	18	0.008	0.064	0.705	0.088	0.598	0.009	0.029	12.559	3.9915	10.0144	19.2507
fidelity	18	0.012	0.245	0.681	0.043	0.548	0.001	0.035	12.341	8.4305	9.9184	16.5221
fidelity	18	0.002	0.046	0.718	0.046	0.283	0.013	0.025	12.163	6.4597	9.7749	10.7327

fidelity	18	-0.01	-0.151	0.729	0.08	0.055	0.065	0.005	11.9	6.4000	9.6387	10.9152
fidelity	18	0.013	0.066	0.736	0.132	0.042	0.075	0.007	11.705	5.9000	9.4946	15.1182
uba	19	0.004	0.011	0.488	0.232	0.19	0.099	0.05	12.431	3.9915	10.0144	19.2507
uba	19	-0.03	-0.82	0.572	0.04	0.245	0.032	0.011	12.29	8.4305	9.9184	16.5221
uba	19	-0.02	-0.254	0.479	0.065	0.425	0.06	0.054	11.976	6.4597	9.7749	10.7327
uba	19	-0.03	-0.22	0.342	0.137	0.563	0.024	0.064	11.734	6.4000	9.6387	10.9152
uba	19	-0.13	-0.673	0.297	0.199	0.378	0.015	0.037	11.432	5.9000	9.4946	15.1182
zenith	20	0.033	0.169	0.665	0.131	0.401	0.056	0.067	12.744	3.9915	10.0144	19.2507
zenith	20	0.033	0.245	0.538	0.101	0.405	0.009	0.038	12.589	8.4305	9.9184	16.5221
zenith	20	0.003	0.113	0.599	0.034	0.44	0.013	0.04	12.19	6.4597	9.7749	10.7327
zenith	20	-0.05	-0.415	0.433	0.111	0.25	0.01	0.02	11.811	6.4000	9.6387	10.9152
gtbank	21	0.059	0.138	0.34	0.309	0.596	0.021	0.036	12.456	3.9915	10.0144	19.2507
gtbank	21	0.026	0.377	0.489	0.057	0.451	0.021	0.045	12.241	8.4305	9.9184	16.5221
gtbank	21	-0.04	-0.256	0.585	0.15	0.376	0.014	0.031	11.617	6.4597	9.7749	10.7327
gtbank	21	-0.1	-0.327	0.529	0.323	0.28	0.01	0.012	11.327	6.4000	9.6387	10.9152