UNIVERSITY OF GHANA

INCOME STRUCTURE, RISK-TAKING BEHAVIOUR, COMPETITION AND PROFITABILITY OF BANKS: EVIDENCE FROM GHANA

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THIS THESIS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON, IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF A MASTER OF PHILOSOPHY DEGREE IN BUSINESS ADMINISTRATION (FINANCE)

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DECLARATION

I hereby declare that with the exception of references to the work of other researchers in the same area of study, which have been duly recognized and acknowledged, this research is the result of my own investigations and that this work contains no material previously published by another person or material which has been accepted for the award of Master of Philosophy in Finance in any University.

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CERTIFICATION

I hereby certify that this thesis was supervised in accordance with procedures laid down by the University.

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(SUPERVISOR)

DEDICATION

I dedicate this piece of work to the Almighty God. I also dedicate this work to my precious wife, Mrs Gertrude Obeng; my sweet mothers, Lydia Gyamfi and Olivia Gyamfi; my aunties, Patience Amoah, Adwoa Fordjour; and my humble father, George Obeng for their immense support throughout my education. I also dedicate it to my spiritual father, Rev. Tony Goldwyn Amoakohene, for his prayers and spiritual guidance as well as to Mr & Mrs Prince Akyeampong, Mrs Norah Adei Sowa, Mrs Eunice Mensshan, Prof B. K. Ahunu, Staff of College of Basic and Applied Sciences- Finance Office, and Mr & Mrs. Kingsford Nimako. My final dedication goes to my dear siblings, Benedicta Fosu, Selina Opuni, Osei Bonsu Ezekiel, Opuni Antwi and Bernard Osei Bonsu; my uncle, Moses Amoah; Mr Opuni Ibrahim, Mr & Mrs Ernest Adjin Mensah, Mr & Mrs Frank Appiah and Mr & Mrs Kissiedu, Mr & Mrs Martin Owusu Afriyie, and Mr & Mrs I. K. Acheampong, through whose sacrifice, support and encouragement I have come this far.

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LIST OF ABBREVIATIONS

PERF	Profitability
ROA	Return On Assets
ROE	Return On Equity
RAROA	Risk Adjusted Return On Assets
RAROE	Risk Adjusted Return On Equity
NIM	Net Interest Margin
NNII	Net Non –Interest Income
FEE & COM	Fees and Commissions Income
TRD INCOME	Trading Income
LLP	Loan Loss Provision
Lerner	Market Power
CTRL	Control Variables
RISK	Risk Taking Variables
SIZE	Size of a Firm
DpTA	Deposit to Total Assets
LTA	Loans to Total Assets
MC	Marginal Cost
TC	Total Cost
Q	Bank Output

SCP	Structure Conduct Profitability
SIC	Standard Industrial Classification
RM	Risk Management
POS	Profits Over Sales
GMM	Generalized Method of Moments
FINSAP	Financial Sector Adjustment Programme
PWC	PriceWaterhouseCoopers
E/A	Equity to Assets
σROA	Standard Deviation of Return on Asset

ABSTRACT

This study examined the relationship between bank income structure, risk-taking and competition on bank profitability. The study employed fixed effect panel regression of twenty five banks in Ghana covering periods between 2008 and 2013. The study revealed that net non-interest income positively affects risk adjusted return on equity; net fees and commissions income negatively affects risk adjusted return on asset while net trading income positively affects risk adjusted return on asset. Moreover, the results revealed mixed results between bank income structure and banks' risk-taking behaviour due to the different measure of variables used in the study. Furthermore, the findings established that bank competition improves bank profitability measures. However, the study does not find any significant relationship between bank risk-taking and profitability measures. These findings have implication for policy-makers and bank managers. First, bank managers should strengthen income diversifications, specifically on their fees and commissions as well as trading activities in order to improve their profitability. The varying effect of income structure variables on profitability suggests that managers must be careful and selective in their income structure options so as to focus on the income structure activities that yield higher returns for the banks. Measures must also be put in place to control risks associated with loan losses in order to enhance returns to the banks. Policy-makers like government and its allied regulatory agencies must endeavour to enact policies that promote bank profitability through risk-taking behaviours, income diversification and competitive environment.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

In recent times, the combination of traditional and non-traditional activities of banks has given rise to a number of studies. Quite a number of these studies have been done due to the 1970s and 1980s reforms in the United States and some European providence which sort to implement deregulation policies for the banking industries amongst a number of regulatory reforms. Prior studies (Davis & Touri, 2000; Fiordelisi & Molyneux, 2011; Meslier & Tacneng, 2014) advance that attributes like technological changes, competition and bank risk-taking behaviour are some factors of the reforms that brought significant changes to the banking sector. These changes and reforms have had a lot of studies documenting the reactions that may have occurred in the banking sector (Lepetit, Nys, Rous & Tarazi, 2008). There have also been conclusive results indicating the reactions of banks to the fluctuation in the banking sector by offering a wider a range of products and also by diversifying their business lines. Some researchers identified three forms of diversification in the banking sector, namely: "financial products and services diversification, geographic diversification and combination of geographic and business line diversification" (Mercieca, Schaeck & Wolfe, 2007).

In the banking sector, income diversification is described as the increasing proportion of fees, income from trading operations as well as other non-interest income within net operating income of a bank. It is believed that when banks diversify their income sources, they are able to reduce risk levels and improve their overall profitability. DeYoung and Roland (2001) conclude on how the diversification of the sources of their income into other non-traditional sources by banks shows how they take more risks and stand a better chance of earning higher returns than banks with low risk-taking initiatives. Stiroh and Rumble (2006) also expressed

the opinion that the diversified income of a bank exposes the bank to higher risk. This has also been affirmed in the literature (Baele, Jonghe & Vennet, 2007; Demirguc-Kunt & Huizinga, 2010). Some researches postulate that the earnings of banks are at risk of reduction when banks have diversified incomes (Gallo, Apilado & Kolari, 1996; Rogers & Sinkey, 1999; Geyfman, 2010). Lee (2008) also offers signals which shows that banks provides reasons for unsuccessful risky dealings as a result of the "free cash flow hypothesis" which posits that "cash flow" increases agency costs of firms with poor investment opportunities.

There are however diverse views on the reasons for banks to diversify into "non-traditional incomes"., provided its impacts on the general risk of the sources of non-interest income sources with regards to the profit potentials of banks. Again, does the banks' profit influence their risk-taking behaviour or not? This research work was aimed at determining the relationship between the structures of income, their risk-taking behaviour and the profitability of Ghanaian banks.

1.2 Problem Statement

There has been a massive recognition of the "non-interest income component of a bank's income structure" (Stiroh, 2006). DeYoung and Torna (2013) in their recent studies examined the profit potential of banks that are affected by non-traditional income. Ali and Daly (2010), Berge and Boye (2007) and Rinaldi and Arellano (2006) evaluated the determinants of bank risk-taking but did not consider banks in Ghana and how risk-taking affects profitability. More so, studies conducted in Ghana on the relationship between competition and performance in the banking sector only focussed on how competition affects performance amongst foreign banks (Debrah, 2007; Ntow-Gyamfi & Afoley Larrea, 2011; Amidu & Wolf, 2013).

Previous studies also revealed how risky a bank is with regards to its stability when it diversifies its income into "other non-traditional sources" (Barthlomew, Zaman & Zephirin, 2004), which affects profitability. However, their findings (i.e. Barthlomew, Zaman & Zephirin, 2004) are

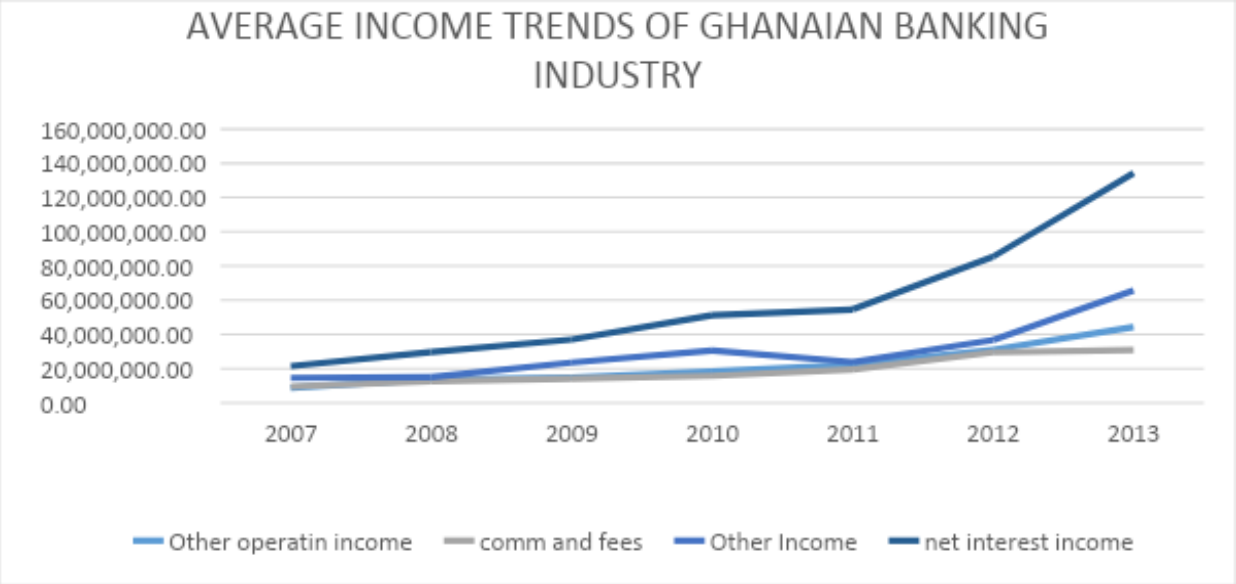
inconsistent with the different use of income structure variables. On the other hand, numerous literatures seemed to agree on the risk associated with diversification of income and profitability. The findings of Tarraf and Majeske (2010) on risk-taking and profitability are consistent with some previous studies by Sanya and Wolfe (2011) as they reveal that the lower the bank's risk, the higher the financial performance. However, their study was conducted during a period when there was financial crisis, which could be an influencing factor.

More so, most of the research conducted on bank income structure, competition, risk-taking and profitability results were done in developed countries (DeYoung & Rice, 2004; Stiroh, 2004: 2006; Stiroh & Rumble, 2006; Lepetit *et al*., 2008). There has therefore been very little literature on Africa (Sanya & Wolfe, 2011; Pennathur, Subrahmanyam, & Vishwasrao, 2012). Goetz (2012) studied how profitability of banks is influenced by banks risk-taking activities but there are very few works on the effect of income structure, risk-taking and competition on profitability of banks, particularly in Ghana.

This present study therefore seeks to fill both the knowledge and time gaps identified in empirical literature on the nexus between income structure, risk-taking and competition, and profitability amongst banks in Ghana. As proven in the above review, studies on the effect of income structure on banks profitability are less discussed in the context of Africa and this study contributes to the few discussions by further breaking down the various components of income structure and its effects on banks profitability. Earlier studies do not reflect the effects of various components of income structure on banks profitability and that is what this study seeks to do. The study also presents extensive analysis of different profitability measures and how these profit measures have been affected by various aspects of non-interest income of banks which has not been done by earlier research.

Recent evidence in the Ghanaian banking survey shows that non-interest income is increasingly becoming important in the banking industry (Geyfman, 2010). However, the extent to which

increases in non-interest income affect profitability has not extensively been researched, particularly in emerging markets like that of Ghana. Moreover, what is not known is whether net non-interest income is affecting profitability positively or negatively. The risk associated with the growth is a concern because this may change the banks' risk profile; so the overall effect on banks profitability is not clear and that is what this paper seeks to do. On the other hand, the loan-loss provisions have grown up to about 5% of gross loans over the study period and it is not clear if its effects on profitability will be negative profitability or the banks are making enough to cover all those losses adequately. Data on Income structure and its relationship with profitability of the Ghanaian banking industry from 2006 to 2013 have been provided in Appendix I and Appendix II. The trend of the average income and profits are shown in the diagram below.



Source: Computed by author based on data from BankScope

Commissions and fees recorded a steady increase between 2007 and 2008 with 11% drop in 2009. Other operating income followed the same trend with a fall of 13.7%. Other income and net-interest income picked a different trend with a rise and fall in 2007 to 2009. Commission and fees as well as other operating income move in the same direction with increase and

decrease trend from 2010 to 2013. Other income dropped by 24.9% in 2011 but picked up with an increasing rate of 1.3% in 2012 and 18.7% in 2013. Net interest income has a steady growth from 2010 to 2013. The data set for this study thus shows that there is high degree of positive correlation between the traditional and non-traditional income sources of the banks. This implies that any adverse or economic shock in the industry will greatly affect profitability of banks in a similar direction.

1.3 Objectives of the Study

The main objective of the research work is to explore the impact of income structure and risk-taking behaviour of banks on profitability among Ghanaian banks. The precise objectives, however, are as follows:

i. To examine the relationship existing between income structure and profitability
ii. To examine the influence, the behaviour of risk-taking has on the profitability of Ghanaian banks.
iii. To establish how related bank competition is to profitability in the Ghanaian banking system.

1.4 Research Questions

The study seeks to provide answers to:

i. What is the relationship between income structure and profitability?
ii. How does the behaviour of risk-taking affect the profitability of Ghanaian banks?
iii. How is bank competition related with the profitability of the Ghanaian banking system?

1.5 Significance of the Study

This study is of high importance to banks in the development and designing of their products and for making diversification decisions. It is also of important for academia purposes. In terms of its contribution to banks' product development and designing it helps to create more income

avenues. It also helps to determine the sources of incomes banks can choose when they want to diversify their assets or incomes to the non-traditional sources. This research work will contribute to filling the gaps in literature concerning the subject under study for Sub Saharan Africa, particularly Ghana. This study also contributes to the analysis of the income portfolio of banks within a uniform environment. The study further examines whether or not profitability from banks' income portfolio influences risk-taking behaviour of banks or whether profitability is higher when risk is taken. The finding of the study is relevant to managers as it broadens understanding on risk-taking behaviour of banks in Ghana.

1.6 Scope of the study

The scope of the study was all Ghanaian banks, with data from 2008 to 2013. Twenty-five banks were however eligible and considered for the study.

1.7 Limitations of the Study

The study was however limited to only banks that existed within 2008-2013 period and had a minimum of three (3) years' information. However, newly incorporated banks and merged banks that did not meet the minimum data points were not included in the study. Given the criteria for the study, only twenty-five (25) out of twenty-seven (27) universal banks in Ghana were considered for the study. The selection criteria were also dependent on the reliability of the data sources in the sense that if the data had been altered before being put in the public domain it was not considered.

1.8 Organisation of the study

The first chapter of this study comprises of the research background, the problem statement and purpose of the study, research questions and objectives, significance, and limitations. Chapter 2 takes account of the literature review of concepts such as bank income structure, risk-taking, competition and profitability of banks in both emerging and developed economies.

The chapter 3 covers the methodology applied in this research study including the population of the study, instruments used, data collection procedures and tools for data analysis. The outcomes of this research work are presented in Chapter 4. The discussion of the study's findings, its conclusions, the implications as well as the possible recommendations are covered in chapter 5.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

A lot of research work has been done on the diversification of banks' income, risk-taking and profitability in developed countries, with few studies in Sub-Saharan Africa. In Ghana, several studies exist on ownership structure, risk-taking, efficiency and profitability, but only a few on diversification and profitability. This study seeks to contribute to the few research works on diversification and profitability and also adds new variables: risk-taking behaviour and competition. This chapter therefore discusses both theoretical and empirical evidence of previous studies and presents a brief background of the Ghanaian banking industry.

2.2 Theoretical Review

2.2.1 Concepts and Definitions

Sinkey (1986) explains that the conduct and behaviour of individual firms is influenced by market structure. Aside external variables like changes in technology, economic changes, and demographic changes, market structures are also influenced by internal variables like competition and regulation. The behaviour of banks in the market refers to the term *conduct*. These include pricing, marketing and innovative behaviours of the banking business. The term *profitability* describes the products and services the various banks within the industry offer to their clients. In terms of profitability, the quantity and the quality of the products are considered (Sinkey, 1986).

The Structure Conduct Profitability model (SCP) is regarded as one of the most frequently tested hypothesis for all organisations within the industry (Sinkey, 1986). The SCP is explained as the relationship existing between market structure, firm conduct and firm profitability. It

also assumes that one of the main factors for organisational profits includes the existence of higher the cost of entry, the likelihood of maintaining monopolistic profits.

2.2.2 The Concept of profitability

The profitability of organisations mostly consists of the actual outcome as compared to the potential or expected outcome (Skrinjal, Bosilj-Vuksic & Indihar-Stemberger, 2008). Cascio (2006) describes profitability as "the degree of achievement of the mission at the workplace". There are numerous perspectives on profitability. Most times, the term profitability is regarded as "express the range of measurements of transactional efficiency and of input and output efficiency" (Stannack, 1996). As Richardo and Wade (2001) suggest, organizations' success is possible when there is a high return on equity. This is possible through the establishment of good employees' profitability management systems. Garg (2007) indicates that firm profitability based on finance and accounting literature is measured by return on assets and ratio of sales to assets. Hossan and Habib (2010) also indicate that profitability ratios show a company's overall efficiency and profitability. It measures how an entity has been able to make good use of its assets and have control of its expenses to generate an acceptable rate of return. Thachappilly (2009) states (in his article- *The Financial Ratio Analysis for Profitability evaluation)* that the profitability ratio helps to evaluate the profitability of a company, so that investors can decide whether to invest in that company or not.

2.2.3 Income Diversification

Traditionally, the income of banks was considered to be the income generated from the intermediary role they play between depositors and borrowers. The difference between these two activities generates a spread which is their main source of income. Umakrishman and Bandyopadhyay (2005), however, state that for the purpose of profit maximization and risk mitigation, banks are increasingly diversifying their business. Ansoff (1957) defines diversification as "the entry into new markets with new products". This definition has been

declared as one of the most utilized meanings of diversification. Dundas and Richardson (1980) additionally shows diversification as separating markets and seeking after more than a targeted market. Numerous researches and academic studies on strategic management have recognized and accepted some motives for the diversification of corporate activities. One study on diversification recommends that organizations look for diversification fundamentally as a result of opportunities for synergy and money-related intentions (Amit & Livnat, 1988).

As indicated by Amit and Livnat (1988), diversifying of business goes beyond just increasing the size of the business to enjoying economy of scale in manufacturing, marketing and research and development (R&D), and subsequently produces synergy for the business. In diversification, the financial motive of the organization depends on the essentials of the portfolio hypothesis: "whenever cash flows of individual business units are not perfectly correlated, the total risk of an overall operation can be reduced by diversification". Rumelt (1974) claims that the fundamental thought processes in diversification may be due to a large group of variables identified with the current state of the firm, for example, rivalry in the market, drop in sales, market development, and other underlying factors. Then again, Chatterjee and Wernerfelt (1991) argued that organizations through diversification, look to use excess assets of current activities for extra income.

2.2.4 Risk Defined

In the area of safety and health, risk is connected with potential dangers and threats, while in accounts it is a specialized matter of the variability of anticipated results and could be either negative or positive (Sidiqi, Hassan & Tahiri, 2010; Opoku-Adarkwa, 2011). In different organizations and political settings, risk is firmly connected and related with big businesses and the creation of value (Power, 2007). Ewald (1991, p.197) states that "nothing is a risk in itself; there is no risk in reality".

The analysis and management of risk over the last decades has proven to be a vital and essential factor for organisations that are interested in making profit as well as non-financial organizations. The various sources of risk firms are exposed to can be classified as operational risks and financial risks. With operational risks – or alternatively business risks, the uncertainty is dependent on the product market within which the firm operates. In addition to operational risks, unexpected changes in interest rates, exchange rates, and oil prices, among others, create financial risks for individual companies. The financial risk on the other hands are the market-based risk that impacts on the financial profitability whole economy. They tend to be specific risk. The two classified risks can cause a substantial influence on the firm's value.

2.2.5 Competition

Claessens and Laeven (2004) states that competition in the banking industry is vital for efficiency in the provision of financial services. In theory, six main reasons can be identified as the contributing factors that make the existence of competition in the financial sector very important. Beck and Levine (2004) state the first one as making financial services accessible to firms and households. The second reason, according to Claessens and Laeven (2005) is to facilitate proper functioning of the financial sector. Boyd and De Nicolo, (2005) also state that another reason for competition in the banking industry is to ensure stability of the financial system. According to Berger and Hannan (1989), it is also important to state that competition is key in terms of ensuring efficient management of financial intermediaries. The fifth and sixth reason, is to see improvement in monetary policy transmission through inter-bank transactions and for the overall industrial growth (Allen & Gale, 2004).

Banking sector competition has similar characteristics to any other sector (Claessens, 2009). Claessens (2009) further clarifies that the extent of competition that exists in the financial services industry matters for the purposes of efficient provision of financial services, the quality

of financial services and products and the extent of innovations in the sector. This is key because banks are important intermediaries between borrowers and lenders of funds (Bailey-Tapper, 2009). More so, banks are unique institutions that create liquidity, making them more vulnerable to systematic risk (Vives, 2010). Their main role is to mobilize deposits and provide loans which often creates a coordination problem. That is, usually, banks have both short-term deposit and long-term loan portfolio; making them exposed to the risk that might cause many depositors and investors call back their deposits.

2.3 Income Diversification of Corporate Organisations

There is currently no concrete measure that is commonly satisfactory in estimating the degree of a firm's diversification (Shergill, 1991). Wrigley (1970) utilizes four classes to check the level of firm diversification: "single, dominant, related, and unrelated products". Refining Wrigley's characterization structure, Rumelt (1974) presents new expansion classes ("related, related-linked, related-constrained, and unrelated") with specialization and related proportions. His significant contribution is the refinement of relatedness, and the utilization of that idea to defeat a concept of the constraints of Wrigley's characterization structure. (Shergill, 1991). In spite of the fact that Rumelt's clear cut proportions of firm expansion have been regularly condemned as a result of the subjectivity associated with its estimation, his downright measures are commonly acknowledged by numerous researchers since they recognize various sorts of related and unrelated organizations (Shergill, 1991; Singh & Gu, 1994).

2.4 Income Diversification of Banks

In the banking sector, income diversification is described to mean the increasing proportion of fees, net trading profits as well as other non-interest within the net operating income of a bank. Gurbuz, Yanik and Ayturk (2013) state that in modern theory of finance, diversification of income sources of a bank should result in a lower risk level and an improved risk-adjusted profitability. Diversification, with respect to income sources of banks should enable them to be

more stable since their service fees, net trading profits as well as other non-interest incomes have an imperfect correlation with net interest income (Gurbuz, Yanik, & Ayturk, 2013). On the contrary, in exploring the impacts of income diversification on banks' risk adjusted profitability, DeYoung and Roland (2001) have established that the volatility of banking operating income may increase as a result of diversification. They cite three basic reasons which lead to increased volatility of bank operating income. These are: loan-based activities requiring high switching cost comparative to fee-based activities, lending activities with lower operating leverage than fee-based activities and lending activities which need lower financial leverage than fee-based activities.

2.5 Risk Management in Banking

Schmidt and Roth (1990) define Risk Management (RM) as the management of activities to limit the negative effect of vulnerability with respect to potential uncertainties. Risk management is a methodical procedure for the assessment of unknown risk facing the business entity or the individual and for the determination and usage of the most fitting systems for treating such exposures. The procedure includes recognizing the risk, estimating the risk, and management of the risk (Redja, 1998). Bessis (2010) likewise defines the management of risk as a combination of tools and models for estimating and controlling danger or risk.

According to Fatemi and Glaum (2000), the aims of managing risk includes the minimization of losses from external exchange, decrease of the instability of incomes, insurance of gaining variances, increase in productivity and affirmation of firm's survival. Perhac (1998) and Boubala (2010) express that RM is tied in with guaranteeing that risks are taken purposely with full information, with clear reason and the comprehension that risk can be estimated and alleviated to keep a firm from enduring inadmissible loss making it fizzle or substantially harm its competitive position. To guarantee that banks work in a sound RM condition with

diminished effect of vulnerability and potential misfortunes, management need measures that are reliable in order to channel funds to best risky and rewarding activities.

The management of an organization needs the estimation of the magnitude of potential losses to know the steps to take. They likewise need systems to screen positions and make forecast for careful risk-taking. RM is the procedure by which managers fulfil these requirements by recognizing key dangers, getting reliable and justifiable information, identifying operational risk measures, picking which risks to decrease, which to increase and by what strategies would be used in monitoring the results of the risk positions (Pyle, 1997). Bessis (2010) additionally demonstrates that the objective of RM is to measure risks so as to monitor and control them. It also deals with developing suitable business products and helping with creating competitive advantage through the estimation of proper pricing and to formulate other different strategies dependent on the risk profile of the customers. Also, the management of the financial firm depends on a combination of steps to execute a framework for RM. These ordinarily contain four sections which are “standards and reports, position limits or rules, investment guidelines or strategies, and incentive contracts and compensation”. These strategies are commonly used to quantify presentation, describe strategies to deal with these risks, limit the positions of individuals on accepted levels, and urge managers to oversee risk in a way that is in sync with the organization's objectives (Santomero, 1995).

2.6 Risk in the Banking Sector

As indicated by Sinkey and Greenwalt (1991), banking risks might be deliberate or unusual depending upon whether their occurrence is industry-wide or specific to one bank. Systematic risks are brought about by factors connected to changes in the remote environment, for example economic condition, interest rate trend, and market competition, among others. Baele, De Jonghe and Vennet (2007) define idiosyncratic risks as risks which are brought about by

specific factors relating to the bank, for example, “capital, balance sheet structure and quality of asset portfolio.” Reasons for credit risk on the other hand, can be both external just as internal to a bank. Risk types, in this manner, might be dependent and can happen mutually and separately. For example, operational risk may prompt market liquidity or credit risk or financing cost, and risk may encourage credit risk and liquidity issues in a bank.

Risk rises with increasing mistakes in the making of decisions because of the asymmetry of information and as a result of issues relating to “moral hazard, conflict of interest and adverse selection”. Moral hazard issues develop when an individual or an organization does not need to bear the full outcome of his/her activity. Conflict of Interest emerges when there is a competition of personal and organizational interest, causing an inappropriate behavior such as “opportunism”. Adverse selection or a wrong selection between decisions may occur as an immediate consequence of absence of information. With majority of bank reserves being provided by depositors, who are usually small yet numerous, the capital structure of banks permits a sharp asymmetry in the dissemination of “profits and losses”. While profits can without much of a stress be appropriated to the investors, losses must be borne by the depositors. In this manner, as per Demsetz and Strahan (1997), the financial activities are perceived as being exposed to moral risk and over the top risk-taking and, along these lines, it has pulled in store several insurances for depositors that makes the government liable for the losses.

In concentrated markets, banks may force robbery expenses and imperatives on accessibility of credit. Bolton, Katok and Ockenfels (2004) have indicated that banks that have an imposing business model may have an irreconcilable circumstance driving them to forestall data revelation so as to have higher dealing power and expanded credit rates. High paces of advances raise the borrower's obligation load compelling them to take part in unsafe undertakings offering higher benefits yet having higher likelihood of default (Bolton, Katok & Ockenfels, 2004). It has been seen that banks regularly do not have the necessary sturdiness in

implementing credit agreements and will in general keep stretching out credit to a troubled borrower with the expectation of recuperating a past advance (a circumstance which, according to Boot and Thakor (2000), is incited by 'delicate spending requirements').

Risk associated with adverse selection, emerges because of inclinations in the evaluation of a project causing an over or under-estimation of the outcome expected. Such predispositions may emerge because of absence of complete information about the borrower. Banks require delicate information so as to make an increasingly complete appraisal of a borrower. Borrowers, in any case, might be dealing with a lot of banks and as such may not completely give full details about their activities (von Rheinbaben & Ruckes, 2004) so as to get better loan deals or dodge necessary aspects of the loan contract. In another examination on the loaning procedure in banks, McNamara and Bromiley (1997) recognize some factors including level of institutionalization of the credit audit process, length of client relationships, pressure for efficiency and so on as impacting the decision on loaning. As per Sheaffer, Richardson and Rosenblatt (1998), the high performing divisions of the bank might be excluded from basic consideration, as on account of Barings Bank, and early admonition signs may not be noticed, causing behaviors of high risk-taking.

2.6.1 Risk-Taking behaviour and Agency Theory

According to Jensen and Meckling (1976), a review of the agency theory implies that risk-taking is influenced by conflicts between managers and shareholders. The agency theory predicts that managers are risk averse so that they can strengthen their position as well as obtain personal benefits. However, shareholders with diversified portfolios have incentives to take more risk after mobilizing funds from depositors and bondholders (Esty, 1998). On the contrary, agency problems could be mitigated in firms with a concentrated ownership structure,

as shareholders of such firms have high incentives that enable them monitor managers well and replace them when they do not make enough profit (Franks & Mayer 2001).

Expectations are that risk-taking tends to be more pronounced in firms with a concentrated ownership structure than with dispersed ones. It is empirically established that the relationship between risk and concentrated ownership is unclear. According to Haw, Ho and Wu (2010) and Laeven and Levine (2009), the control of concentrated ownership is associated with higher risk. However, Shezad, de Haan and Scholtens (2010) have found evidence that an increase in concentrated ownership results in a decrease in credit risk. A source of risk could be as a result of the type of shareholders of the firm. Anderson (2003) state that, for instance, companies that are owned by families may want to avoid risk because the transfer of the firm to the next generation is their utmost objective. However, Anderson (2003) also found evidence that diversification in firms is significantly low and this makes non-family firms very risky.

2.7 Profitability Analysis of Banks

A lot of literature on diversification in strategic management utilizes bookkeeping or accounting ratios in measuring corporate monetary return and risk. Bowman (1980) recommends the paradox of risk and return. The problem is on the connection between the bookkeeping factors of return and risk. To quantify monetary returns, experts have essentially utilized the methods for Returns On Assets (ROA), Returns On Equity (ROE), Profit Over Sales (POS), or net profit margins (Nickel & Rodriguez, 2002); while a key risk measure has been the fluctuations of the returning factors (Nickel & Rodriguez, 2002). As a method for defeating this impediment, market-based proportion of return and risk in light of the cost of an organization's stock, is regularly used to quantify budgetary productivity and risk since it mirrors the market's desire for an organization's future benefit. Moreover, the essential advantage of stock returns as a market measure is that stock costs productively and rapidly

reflect publicize information about the money-related benefit of firms, consequently making it a proficient market speculation. Despite the fact that the speculation has been tested by experimental examinations (Basu, 1977; Brigham & Gapenski, 1988; Strong, 2000), it is commonly acknowledged that the securities exchange is near productivity (Bodie, Kane & Marcus, 2001). Along these lines, stock returns can be considered as a compelling substitute for bookkeeping-based benefit measures. Current research on diversification show that experts will in general support different proportions of benefit to the diversification and productivity relationship (Kim & Gu, 2003).

2.8 Empirical Evidence

Gurbuz *et al.* (2013) studied income diversification and bank profitability using evidence from the Turkish banking industry. Their study focussed on establishing the relationship between non-interest income generating activities and risk-adjusted bank profitability, using yearly unbalanced panel datasets of bank deposits of 26 banks from 2005 to 2011. They applied system generalized methods of moment's estimators. Their results show that risk adjusted financial profitability of Turkish banks increases as a result of income diversification. In a related study, Goetz (2012) investigated bank diversification, market structure and bank risk-taking: theory and evidence using commercial banks in the US. The focus of the investigation was to study how a bank's diversification affects its own risk-taking behaviour and the risk-taking of competitors and non-diversified banks. By combining theories of bank organization, structure of market and risk-taking, Goetz (2012) shows that the majority of geographic diversification of banks varies its behaviour of lending as well as the market interest rate which has implications on non-diversified competing banks as a result of the interaction in the market. This relationship is supported by empirical evidence in the commercial banking sector of the U.S as there is an indication that bank's risk-taking is minimum when competitors have diversified branch networks. It was further found that a bank's diversification has impacts on

the risk-taking behaviour of competitors irrespective of these banks not diversifying their activities.

Using a sample of unbalanced panel of annual report data from 1996 to 2002 for a set of European commercial and cooperative banks established in 14 European countries, Lapetit *et al.* (2008) examined bank income structure and risk: an empirical analysis of European banks. The purpose of the study was to investigate the relationship between bank risk and product diversification in the changing structure of European banking industry. The findings showed that banks extending their activities into non-interest income activities have a higher risk and higher insolvency risk than banks which mainly provide loans. It was established that a higher proportion of trading operations is never connected with higher risk and for small banks, the implications are that, in some cases it lowers assets and default risks.

Umakrishman and Bandyopadhyay (2005) also examined the changing income structure, ownership and profitability in an empirical analysis of the Indian banking industry. The investigations centred on finding the relationship between the changing patterns of the sources of bank income and risk adjusted profitability. Using a dataset of 77 banks for the period 1999 to 2004 consisting of 3 cooperative banks, 27 public banks, 22 private banks and 25 foreign banks, Umakrishman and Bandyopadhyay were able to compare the composition of their incomes. Profitability of banks was measured by risk-adjusted return in accordance with BIS risk allocated capital provisions. By adopting a multivariate panel regression, the relationship between ownership pattern and profitability was examined and as a result compared the new generation private sector banks and foreign banks with their public sector and cooperative counterpart banks.

2.8.1 Diversification and Bank Risk-Taking

Acharya, Joseph, Kannathal, Lim, and Suri, (2006) stated that a bank's risk-return trade-off might increase as a result of diversification as it exposes banks to idiosyncratic market shocks.

When the agency problem intensifies as a result of a large conglomerate, it might limit the positive consequences due to diversification (Gurbuz *et al*. 2013). Expansion of a bank also changes its market behaviour which has implications for banks that are non-diversified. Carlson and Mitchener (2009) find evidence that local banks respond to the entry from multi-market banks by becoming more efficient and profitable. More competition, on the other hand, may result in the reduction of bank rates. Allen and Gale (2000) posit that lower bank rates have the implication of reducing a bank's charter value which eventually leads to an increase in risk-taking. A bank's nature of competition may also change due to diversification. This implies that a bank's cost may not necessarily be minimized as a result of larger branch network (Berger, & Mester, 1997). However, it allows banks to provide other services which may lead to the generation of additional income (Dick, 2008). In a nutshell, bank expansion leads to market changes and as a result offers both diversifying and non-diversifying banks with the chance to differentiate themselves from their competitors (Goetz, 2012). This is a confirmation of studies by Cohen and Mazzeo (2007) who found evidence that multi market banks' competition is tougher than multi market and single market banks competition. Hence, differentiation across intermediation services banks adjusts the competition.

2.8.2 Income Diversification and Profitability

Theoretically, banks prefer diversification among income sources because service fees, net trading profits and other non-interest income have imperfect correlation with net interest income. This should eventually lead to stability in net operating income and lead to superior financial profitability. On the contrary, evidence gathered from empirical investigations on the effects of income diversification in banking is not consistent and does not support the expected benefits of diversification (Gurbuz *et al*., 2013). Moreover, findings on the relationship between income diversification and profitability are mixed in nature. That is, whereas some studies provide evidence that income diversification leads to an improvement in risk-adjusted

profitability or risk reduction in banks, some studies find no significant or negative impact of income diversification on the profitability or risk of the bank (Gurbuz *et al*., 2013).

Mercieca *et al* (2007) studied income diversification using small European banks with the focus on establishing whether increase in non-interest income activities will lead to enhanced profitability. In all, a dataset consisting of 755 small banks for the period 1997 to 2003 was used and the findings were that there is an inverse relationship between non-interest income as well as risk-adjusted profitability of banks. In a related study, Lepetit *et al*. (2008) examined the same relationship regarding the European banking industry from 1996 to 2002. Their findings showed that there is a positive relationship between non-interest income and bank default risk.

Furthermore, studies such as that by Elsas, Hackethal, and Holzhauser (2010) also studied the effects of income diversification on both market value and the profitability of bank using a panel data of 9 countries from 1996 to 2008. Their findings indicate that income diversification can increase profitability of banks. Sanya and Wolfe (2011) also investigated income diversification using data of emerging countries. Their findings showed that income diversification is positively related to risk-adjusted profitability of emerging markets.

2.8.3 Competition and Bank profitability

According to Bushman, Hendricks and Williams (2014), there has been a paradigm shift in the financial system and the banking system. This has taken place initially in advanced economies and recently in emerging economies. The change has caused financial deregulation due to the financial repression during the 1980s and 1990s. This was purposely to accelerate the level of competition (Uddin & Suzuki, 2014). Competition has been described as a rivalry that exists between two individual firms that have the aim of winning the business of a customer over a period of time (Whish, 2005; Kocabay, 2009).

In business, managerial decisions and profitability are generally influenced by the powerful forces of competition. These forces are common to all sectors of an economy; however, the crucial aspect of these forces, which is also relevant to regulators of banks as well as policy makers is the likelihood of the relationships that exist between bank competition and excessive risk-taking by banks. The theory of economics states the competing hypothesis on whether bank competition improves or weakens the stability of the financial system (Bushman, Hendricks & Williams, 2014). This hypothesis regards banks as choosing risk of loan portfolios, stating that an environment that is highly competitive exerts pressure on profits of banks which eventually serves as motivation to take excessive risk (Keely, 1990)

Over the years, there seem to be divisions in literature on banking in relation to conflicts between the Structure Profitability Conduct (SCP) and ES paradigms. According to Seelanatha (2010) and Park (2009), the SCP model of profitability is the oldest and most traditional model. The SCP hypothesis states that a bank's profitability is highly dependent on the market structure, which includes the number of banks and banks' market share. Moreover, it also assumes that bank profitability decreases with increase in competition. In essence, as the ratio of concentration of banks increases, banks' profitability also increases indicating that market share and bank profitability have a positive association. This is because the SCP model is guided by the neoclassical theory on the basis that as a result of the monopolistic nature of banks, regardless of their inefficiencies, they are readily in a position to charge fees that exceed their marginal cost in order to maximize their profit irrespective of the market concentration. Lloyd-William, Molyneux and Thornton (1994) posit that in a low concentrated market, restrictions on regulations such as the interest rate ceilings and barriers to market entry are the collusive behaviour of banks. Hence, the SCP hypothesis emphasizes the relevance of increasing concentration with the intention of minimizing the competition of banks (Bikker & Haff, 2002).

Furthermore, many researchers have shared opinions in support of a market structure that is concentrated. Competition minimizes banks' efforts towards the achievement of optimal profit (Hellmann, 1997). Other authors such as Boyd and De Nicolo (2005) and Beck and Levine (2004) found evidence that a financial crisis is less probable to occur in a market that is highly concentrated.

2.8.4 Risk-Taking and Bank profitability

Banks have solid motivation to take excessive risks despite the increase in agency problems from conflict of interests existing between managers and owners of the bank. This comes as a result of several factors. Firstly, shareholders have the desire to increase their asset investment risk to the detriment of debt holders (Jensen & Meckling, 1976). Secondly, the risk of shareholders' risks increases the risk of investment as the ratio of leverage increases (Green & Talmor, 1986). In order to establish stability and soundness in the banking system, various regulations as well as policies have been instituted to regulate the risk-taking behaviour of banks. These include minimum capital requirements, corporate governance and deposit insurance schemes (Chen, 2012). Risk-taking behaviour of banks has gained recognition in both theoretical and empirical research and most especially amongst regulators in the banking industry. Few studies have attempted to examine bank risk-taking behaviour and its determinants, that is, banks' risk-taking behaviour studies that consider the regulatory environment, bank charter value and ownership structure (Chen, 2012).

In the literature of financial theory, owners of business (entrepreneurs) and risk are two elements that cannot be separated. Owners of business are often described as risk takers implying their exposure to risk. This draws the line between them and employees and managers (Begley & Boyd, 1987). Consequently, they deal with risk and their behaviour towards risk influences the profitability of their business. The assumptions under economic theory are that risk-taking in the behaviour of owners has a positive impact on profitability, despite the fact

that risk mitigation through the minimization of the exposure to income shocks seems to be important (Boermans & Willebrands, 2012). In a financial market where risk is rewarded with various premiums and investors are risk averse, a higher risk portfolio will lead to higher expected returns of risk premium (Pratt, 1964). In this regard, expectations of shareholders are that the level of risk will have a positive relationship with profitability (Cressy, 2006).

Empirical evidence, however, is divided over the impact of risk-taking on firm profitability. The general financial literature emphasises that risk-taking is one of the most important determinants of firm profitability (Lumpkin & Dess, 1996). In a meta-analysis of 60 articles, Zhao and Watanabe (2010) found evidence that there is no significant impact of risk-taking on firm profitability. The related studies that were used during this meta-analysis indicate that there is no effect of risk-taking on the profitability of firms. This may be because of differential external circumstances that determines whether the impact of risk-taking is negative or positive. In a business environment which is not hostile, risk-taking may be linked with improved profitability because the need for uncertainty will be reduced (Lumpkin & Dess, 2001). In a related study, Tang and Tang (2007) posit that under uncertain circumstances, high levels of risk-taking lead to low profitability.

In the banking industry, Lee (2009) compared risk-taking and profitability between regional banks and national banks in the Korean banking sector. The investigation was aimed at determining whether Korean regional banks took advantage of the flexible regulations as compared to national banks or engaged in risky strategies to maximize their profit as compared to national banks. It was found that regional banks in Korea pursue riskier strategies as compared to national banks and that, greater risk-taking behaviour of regional banks resulted in higher profits than national banks.

2.9 Measures of Variables

This section reviews measures of profitability, risk-taking behaviour, income structure and competition as used by other researchers.

2.9.1 Profitability measures

Financial ratios used to measure profitability may include ROA, ROE and NIM

- **Return on Asset (ROA)**

ROA is important in determining the ability of a bank to make profit and also assess the role of loan quality in the determination of profits among banks in Ghana (Naimy, 2011; Sakyi, Ofoeda, Kyereboah-Coleman & Abor, 2014). According to Naimy (2011), ROA can also be divided into Profit margin (PM) and Asset utilization (AU). Thus;

ROA = Profit Margin X Assets Utilization

Where:

$$Profit\ Margin(PM) = \frac{Net\ Interest\ Income}{Total\ Revenue}$$

$$Asset\ Utilization\ (AU) = \frac{Total\ Revenue}{Average\ Total\ Assets}$$

- **Return on Equity (ROE)**

This is the measure of profitability from the viewpoint of shareholders. Here, there is a measure of the profits per dollars of book equity capital. It is calculated as the net income per total equity. It can be classified into a leverage factor or Equity Multiplier (EM) and ROA (Naimy, 2011; Sakyi *et al*. 2014). This is expressed as:

ROE=ROA X EM,

where:

$$Return\ on\ Asset\ (ROA) = \frac{Net\ Interest\ Income}{Average\ Total\ assets}$$

$$Equity\ Multiplier\ (EM) = \frac{Average\ Assets}{Average\ Equity}$$

Net Interest Margin (NIM)

Net interest margin is among the standard indicators of measuring bank profitability apart from using ROE and ROA. It is usually regarded as a better measure of the long-term revenue structure of a bank (Holten, 2013). Banks' interest margins are basically driven by two determinants: the extent of competition in the industry and interest rate risk which banks are exposed to (Ho & Saunders, 1981). It is the difference existing between interest generated by loans and other assets and interest earned through the payment of interest on funding and liabilities. This does not include income from fees, commissions, trading activities and one-off gains classified as non-interest income in financial statements.

It is computed as:

$$Net\ Interest\ Margin(NIM) = \frac{Net\ Interest\ Income}{Total\ assets}$$

2.9.2 Income structure measures

- **Net Non-Interest Income**

Net non-interest income is one of the vital elements of bank income. It has been increasing since banks started diversifying their activities and entering businesses that enabled them to generate fee income (Sharma, 2008). Net non-interest income is the ratio of net non-interest income (the difference between non-interest income and non-interest expenses) to net operating income (Lapetit *et al*, 2008). Net non-interest income is computed as:

$$Net\ Non-Interest\ Income(NNII) = (\frac{Net\ Non\ Interest\ Income}{Net\ Operating\ Income})$$

In order to determine the proportion of non-interest income in the total income of banks, net non-interest income is further divided by total income (Stiroh & Rumble, 2006). Common sense shows that a shift from interest to non-interest should minimize risk. However, Stiroh (2004) posits that a shift towards non-interest income is believed to result in reducing cyclical variations of banks' profitability depending less on entire business conditions of the bank.

2.9.3 Risk-Taking Behaviour

The study used the Z-score by Hannan and Hanweck (1988) for risk measure which has been used by most researchers including Naimy (2011), Isshaq, Bokpin and Amoah (2012), Amidu and Wolfe (2013), Meslier *et al*. (2014) and Sakyi *et al*. (2014). Naimy (2011) states that the changeability of ROA gives an all-inclusive degree of the total bank. This is because it does not only reflect credit risk but also interest rate risk, liquidity risk, operating risk and any other risk that is realised in an entity's earnings". The standard deviation of return on assets (ROA) provides a good measure of the variability of return on assets (ROA).

Sakyi *et al*. (2014) state that "capital adequacy (CAR) is often used as an indicator for risk in financial institutions because high levels of capital provide protection against large decline in income". Hence, better capitalised financial institutions will, all other things being equal, incur less risk of insolvency. Combining return on assets (ROA), capital adequacy (CAR) and the standard deviation of return on assets (σ_{ROA}) provides the total risk. It is empirically stated as:

$$\text{Z} - \text{Score} = \frac{ROA + Capital\ ratio\ (CAR)}{\sigma_{ROA}}$$

where,

Z-score = Insolvency of total bank risk for the various banks under study

ROA = Return on Assets for each bank for each year

CAR = The inverse of the Equity Multiplier or Equity Capital to Total Assets Ratio.

σ_{ROA} = the standard deviation of Return on Assets (ROA).

Where

The standard deviation of ROA is a standard measure of how an entity's accounting earnings can fall until it has a negative book value. Naimy (2011) states that it is an appealing risk measure because it includes ROA, the most widely accepted accounting measure of overall entity profitability. The variability of ROA is a standard measure of risk in financial economies and book capital adequacy represents an industry standard for bank safety and soundness. Sakyi *et al*. (2014) also state that riskier firms would have lower risk of insolvency and safer firms would have higher insolvency risk. This is a measure for risk-taking taking into account all risks that a firm is exposed to Loan loss provisions

Loan loss provisions represent an increase in the current year provision of future loan losses which are disclosed as outstanding expenses in the banks' income statement. Empirical studies have shown that there is a positive relationship between stock returns and loan loss provision (Jennings & Beaver, 1997; Duncan & Elliott, 2004; Griffin & Wallach, 1991; Johnson, 1989). This contradicts the notion that loan loss provisions are interpreted as expenses that reflect future loan losses. Because of information asymmetry of loan portfolio concerning default risks, the manager's judgement in the provision of losses on loans for each loan is necessary (Wahlen, 1994). The loan loss provision is a measure of credit risk and it has been used in this study because increased credit risk and low levels of capital are major causes of bank failure. Agoraki, Delis and Pasiouras (2011) and Sakyi *et al*. (2014) postulate a negative relationship between loan loss provision and bank profitability. This is because an increase in loan loss as an expense will lead to a fall in bank profitability. It is expressed as:

$$\text{LLP} = \frac{Loan\ Loss\ Provision}{Net\ Loan}$$

2.9.4 Competition

The Lerner Index was adopted as proxy for competition for the selected sample. It gives a direct measure of the extent to which market power represents the mark-up of price over marginal cost. According to Berger *et al*. (2009), as adopted by Amidu and Wolfe (2013), the Lerner index is the measure of competition computed as:

$$Lerner_{it} = \frac{Pr_{it} - MC_{it}}{Pr_{it}}$$

where.

Pr is the price of total assets.

MC_{it} is the marginal cost of producing an additional unit of output. The MC_{it} is derived from the translog cost function as:

$$In\ Cost_{it} = \beta_1 InQ_{it} + \frac{\beta_2}{2} InQ_{it}^2 + \sum_{k=1}^{3} \gamma_{k,t} InW_{k,it} + \sum_{k=1}^{3} \emptyset_k InQ_{it} InW_{k,it}$$
$$+ \sum_{k=1}^{3} \delta_i InW_{k,it} InW_{it} + \sum_{i=1}^{3} \frac{\delta_i}{2} InW_{it}^2 + \sum_{k=1}^{2} \eta_k trend^k$$
$$+ \sum_{i=3}^{3} \varsigma_i InW_{it} trend + \upsilon InQ_{it} trend + \lambda_i + \vartheta_t + \rho_{it}$$

where:

$In\ Cost_{it}$= the natural logarithm of the total cost for bank i at time t

InQ_{it}= the natural logarithm of bank output or total assets for bank i at time t

$InW_{k,it}$= the natural logarithm of the kth input price (k =1, 2, 3)

W_1= Input Price of deposit funds

W_2=Input Price of labour

W_3= Input Price of capital

$trend^k$= technological progress of the various years, computed as year dummies for technology transfer or technological changes in the banking sector across the years of a specific country

λ_i=individual bank variance term

ϑ_t=time variance error term

ρ_{it}=Idiosyncratic error term

The translog c*ost* function is defined as the bank's total cost including financial and operational cost; Q_{it} is also used as proxy for bank output while W_1, W_2 *and* W_3 are defined as the input price of deposit funds, labour as well as capital. These are computed as: ratio of interest expenses to total deposits and money market funds, labour cost to total assets, and operating expenses to total assets. The Lerner index is interpreted to mean that an index that has a higher value indicates higher power and less competitive and vice versa. The marginal cost is calculated for each bank as:

$$MC_{it} = \frac{Cost_{it}}{Q_{it}}\left[\beta_1 + \beta_2 InQ_{it} + \sum_{k=1}^{3} \emptyset_k InW_{k,it} + vtrend_{it}\right]$$

In developing countries, Amidu and Wolfe (2013) estimated the cost function using panel data for each African country in their sample. They employed data from 2000 to2007, with 978 banks in 55 emerging countries. Moreover, evidence from the Ghanaian Banking Industry shows the use of Lener Index, employing the translog cost function of banks using quarterly

data from 2001 to 2006 (Aboagye, Akoena, Antwi-Asare & Gockel, 2008). This study intends to follow the work of Aboagye et al., (2008) and Amidu and Wolfe (2013).

The literature review highlighted the concepts, definitions, theories, measurements and results of related literature on income diversification in the banking sector, competition, risk-taking behaviour and profitability of banks. It reviews how these variables are interrelated with one another. The next section shows the method used to address the various objectives of the study.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter presents the methodology used for the study and begins with the research design for the study. It also highlights the data and variables used for the study as well as the method of data analysis.

3.2 Research Design

This study used a descriptive research design which was justified by the research objectives which sought to establish the effect of income structure, risk taking behaviour and competition on the profitability of banks. Data for the study were mainly secondary data which were obtained from the published audited annual report of twenty-five (25) banks in Ghana from 2008 to2013. The data gathered were quantitative in nature and were analysed with the aid of Microsoft Excel and STATA software. The study used the Pearson Correlation Coefficients and regression to analyse the data.

3.3 Definition of Variables

The study used bank variable data to measure the income structure, risk-taking behaviour, competition and profitability of the banks. The variables used in the study are as follows:

3.3.1 Bank Income Structure Variables

The measure of income structure used are net fees and commission, net trading income (income from trading operations less trading expense) and net non-interest income. These variables are expressed as follows:

- Net Fees and Commissions (FEE & COM.) = $\frac{\text{Net Fees and commission income}}{\text{Net operating income}}$

- Net Trading Income (TRAD INCOME) = $\frac{\text{Net trading income}}{\text{Net operating income}}$
- Net Non-Interest Income (NNII) = $\frac{\text{Net Non}-\text{Interest Income}}{\text{Net operating income}}$

3.3.2 Bank Profitability Variables

The study use profitability ratios and these include Return on Assets (ROA), Return on Equity (ROE), Risk adjusted ROA, Risk adjusted ROE and Net Interest Margin (NIM). These are expressed as follows:

- Return on Assets (ROA) = $\frac{\text{Net Profit}}{\text{Total Assets}}$
- Return of Equity before tax (ROE) = $\frac{\text{Net Profit}}{\text{Shareholder's Equity}}$
- Risk adjusted ROA, (RAROA) = $\frac{\text{average ROA}}{\text{standard deviation of ROA}}$
- Risk adjusted ROE (RAROE)= $\frac{\text{average ROE}}{\text{standard deviation of ROE}}$
- Net Interest Margin (NIM) = $\frac{\text{Net Interest Income}}{\text{Net operating income}}$

3.3.3 Bank Risk-Taking Behaviour Variables

The risk-taking behaviour of the banks are captured in the following variables: Z-score and LLP. This is expressed as;

$$Z - Score = \frac{\text{average ROA+ average Capital ratio (CAR)}}{\sigma_{ROA}}$$

Where, Capital ratio is the ratio of Equity to Total Assets

$$LLP = \frac{\text{Loan Loss Provision}}{\text{Net Loan}}$$

The higher the ratio, the higher the asset risk.

3.3.4 Bank Competition

The Lerner Index was adopted as proxy for competition for the selected sample. It gives a direct measure of the extent to which market power represents the mark-up of price over marginal

cost. According to Berger *et al*. (2009), as adopted by Amidu and Wolfe (2013), the Lerner index is the only measure of competition computed as:

$$Lerner_{it} = \frac{Pr_{it} - MC_{it}}{Pr_{it}}$$

Pr is the price of total assets.

MC_{it} is the marginal cost of producing an additional unit of output. The MC_{it} is derived from the translog cost function. The translog cost function is a second – order logarithmic approximation to a cost function. It is estimated as a system of equations that depicts the aspect of the firm's behaviour of total cost across the various inputs expenditure portion, the firm's output level and the input prices that the firm faces (Maloney, 2005). According to Berger, Klapper and Turk Ariss (2009) the translog cost function depicts the total operating cost of running the bank as a function of a single, aggregate output proxy $Q_{i,t}$, and three input prices $W_{k,it}$ with k=(1,2,3). It allows a derivation of input demand equation with scale economies to vary level of output without placing strict restrictions on the elasticities of substitution to enable the unit cost curve to attain the classical U-shape (Christensen & Greene, 1976). The total cost function can be written as

TC=H (Q, P)

where,

TC, Q, and P, are total cost, level of output, and a vector of factor prices, respectively. The translog cost function for the bank's output and the three inputs factors can be written as:

$$In\ Cost_{it} = \beta_1 InQ_{it} + \frac{\beta_2}{2} InQ_{it}^2 + \sum_{k=1}^{3} \gamma_{k,t} InW_{k,it}$$

$$+ \sum_{k=1}^{3} \emptyset_k InQ_{it} InW_{k,it} + \sum_{k=1}^{3} \delta_i InW_{k,it} InW_{it} + \sum_{i=1}^{3} \frac{\delta_i}{2} InW_{it}^2 + \sum_{k=1}^{2} \eta_k trend^k$$

$$+ \sum_{i=3}^{3} \varsigma_i InW_{it} trend + \ vInQ_{it} trend + \mu_i + \lambda_t + \varepsilon_{it}$$

Aboagye, Akoena, Antwi-Asare and Gockel (2008), stated that the translog cost function is estimated under the usual assumption of symmetry of mixed partial derivatives and homogeneity of degree 1 in prices. An error term is introduced on the right-hand side of the translog cost function to complete the econometric specification for the estimation.

where:

$In\ Cost_{it}$= the natural logarithm of the total cost for bank i at time t

InQ_{it}= the natural logarithm of bank output or total assets for bank i at time t

$InW_{k,it}$= the natural logarithm of the kth input price (k =1, 2, 3)

$trend^k$= technological progress of the various years, computed using year dummies, 1 for years in which there was a technological progress or technological changes, and 0, otherwise

Homogeneity in input prices is obtained by imposing restrictions:$\sum_{k=1}^{3} \gamma_{kt} = 1$; $\sum_{k=1}^{3} \emptyset_k =$ 0 for all k; $\sum_{j=1}^{3} \delta_{ij}$ =0 for all I; and $\sum_{i=3}^{3} \varsigma_i = 0$.

The cost function was estimated separately by employing a panel data for each bank in the sample across specific years. An error term (ε_{it}) was introduced in the translog cost function to capture the bank-specific and time-specific effects.

Marginal cost is obtained by taking the first derivative of bank cost with respect to output and substituting in the values obtained from the translog cost as follows:

$$MC_{it} = \frac{Cost_{it}}{Q_{it}}\left[\beta_1 + \beta_2 InQ_{it} + \sum_{k=1}^{3} \emptyset_k InW_{k,it} + vtrend_{it}\right]$$

In which *Cost* is defined as the bank's total cost including financial and operational cost; Q_{it} is also used as proxy for bank output while W_1, W_2 *and* W_3 are defined as the input price of deposit funds, labour as well as capital. These are computed as: ratio of interest expenses to total deposits and money market funds, labour cost to total assets, and operating expenses to total assets. Following Berger, Klapper, and Turk Ariss (2009), the Marginal cost is estimated separately for each bank in the sample to reflect potentially different technologies.

3.4 Model Estimation

The study examines the relationships between variables using the pooled panel regression. The fixed-effects panel regression was used because banks included in the sample were not randomly selected. Following Lepetit, Nys, Rous & Tarazi (2008), the models for the study are expressed as:

Relationship between Income Structure and Profitability

$$Y_{it} = \beta_1 NNII_{it} + \beta_2 \text{FEE \& COM}_{it} + \beta_3 TRD\ INCOME_{it} + \beta_4 BankSize_{it} + \beta_5 DpTA_{it} + \beta_6 LTA_{it} + \phi_i + \vartheta_t + \rho_{it} \quad (1)$$

Effect of Bank Risk Taking Behaviour and Competition on Profitability

$$Y_{it} = \alpha_1 Z\ Score_{it} + \alpha_2 LLP_{it} + \alpha_3 Lerner_{it} + \alpha_4 BankSize_{it} + \alpha_5 DpTA_{it} + \alpha_6 LTA_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (2)$$

Y_{it} is a vector of profitability variables which include Return on Asset (ROA), Return on Equity (ROE), RAROA -- risk adjusted ROA, RAROE -- risk adjusted ROE, and Net Interest Margin to Total Asset for each bank (i) at time (t). The error term captures the bank (entity) effect (ϕ_i and μ_i**)** and time-variance effects (ϑ_t *and* λ_t) and the idiosyncratic error term (ρ_{it} *and* ε_{it})

of the model estimation. Estimation was fixed-effects regression using yearly panel data for 25 banks from 2008-2013.

Table 1: Summary and Description Variables Employed

Variables	Definition	Measurement
Dependent variables		
Profitability	Return on Asset (ROA)	$\text{ROA} = \frac{\text{Net Profit}}{\text{Total Assets}}$
	Return on Equity (ROE)	$\text{ROE} = \frac{\text{Net Profit}}{\text{Shareholder's Equity}}$
	Risk Adjusted ROA (RAROA)	$\text{RAROA} = \frac{\text{average ROA}}{\text{standard deviation of ROA}}$
	Risk Adjusted ROE (RAROE)	$\text{RAROE} = \frac{\text{average ROE}}{\text{standard deviation of ROE}}$
	Net Interest Margin (NIM)	$\text{NIM} = \frac{\text{Net Interest Income}}{\text{Net operating income}}$
Independent Variables		
Income structure Variables	Fees and Commissions (FEE & COM.)	$\text{FEE \& COM.} = \frac{\text{Net Fees and commissions income}}{\text{Net operating income}}$
	Trading Income (TRAD INCOME)	$\text{TRAD INCOME} = \frac{\text{Net Trading income}}{\text{Net operating income}}$
	Net Non-Interest Income (NNII)	$\text{NNII} = \frac{\text{Net Non}-\text{Interest Income}}{\text{Net operating income}}$
Risk taking behaviour	Z – Score	$\text{Z} - \text{Score} = \frac{\text{average ROA+ average Capital ratio (CAR)}}{\sigma_{ROA}}$ Where, Capital ratio is the ratio of Equity to Total Assets
	Loan Loss Provision (LLP)	$\text{LLP} = \frac{\text{Loan Loss Provision}}{\text{Net Loan}}$
Competition	Lerner Index	$Lerner_{it} = \frac{Pr_{it} - MC_{it}}{Pr_{it}}$ Where $\mathbf{Pr_{it}}$ is the price of total assets. MC_{it} is the marginal cost of producing an additional unit of output.

Control Variables	Bank Size	Bank size = natural logarithm of total assets
	Loan to total asset (LTA)	$\text{LTA} = \frac{\text{Loan}}{\text{Total Assets}}$
	Deposit to total asset (DpTA)	$\text{DpTA} = \frac{\text{Deposit}}{\text{Total Assets}}$

Source: Computed by author based on data from Bank Scope

The income structure was divided into net interest income (fees and commissions and trade income) variables and non-interest income. From the model, equation (1) employed only the non-interest income variables while the net interest income variables were used in equation (2) to avoid heteroscedasticity.

3.4.1 Hypothesis test

The hypotheses for this research are stated below:

$\boldsymbol{H_1}$: There is no significant relationship between the income structure and profitability

$\boldsymbol{H_2}$**:** There is no significant relationship between risk taking behaviour and profitability

$\boldsymbol{H_3}$**:** There is no relationship between competition and banks' profitability

- **Robustness Test**

The study analysed panel data by examining the relationships at a 1%, 5% and 10% level of significance, hence the null hypotheses are rejected when their probabilities (p-values) are less than 0.05. The error term of the model was tested for their assumptions of normality, no autocorrelation and homoscedasticity. The coefficient variables were tested to ensure the presence of no multicollinearity among the independent variables. The results of the data analyses were presented in tables and figures.

CHAPTER FOUR

DISCUSSION OF RESULTS

4.1 Introduction

This chapter presents the results of the data analysis. It provides information on the descriptive statistics, the correlation and the regression analyses of the data.

4.2 Descriptive statistics for Bank specific variables

The descriptive statistics provides a statistical description of the bank variables from 2008 to 2013. This is shown in Table 4.1 below:

Table 4.1: Descriptive statistics of variables

Variables	Measures	Mean	Std. Dev.	Minimum	Maximum
Profitability	ROA	0.0217	0.0314	-0.1712	0.1417
	ROE	0.1882	0.4161	-0.5761	4.5249
	RAROA	4.41256	6.7204	-4.4426	49.6800
	RAROE	2.7811	4.1102	-2.5376	28.2471
	NIM	0.0673	0.0272	0.2085	0.2250
Income Structure	FEE & COM INCOME	0.2864	0.3539	0.0023	2.9286
	TRAD INCOME	0.1611	0.1926	-0.0257	1.2889
	NNII	0.4996	0.6653	0.0123	4.5114
Risk Taking Behaviour	Z-SCORE	15.1355	17.6364	-0.5623	125.1060
	LLP	0.0437	0.0340	-0.0189	0.1408
Competition	LERNER	0.2178	0.2180	-1.0092	0.5818
Control variables	SIZE	8.7493	0.4470	7.1452	9.6650
	DTA	0.6662	0.1451	0	0.8940
	LTA	0.4254	0.1563	0	0.7700

Notes: ROA- stands for the ratio of net income to total assets. ROE – measured as net income to equity; RAROA - risk adjusted ROA is the ratio of average ROA to standard deviation of ROA; RAROE - risk adjusted ROE, ratio of average ROE to standard deviation of ROE; NIM= ratio of Net Interest Income to Total Asset; NNII - the ratio of net non-interest income to net operating income where net operating income is the sum of net interest income and net non-interest income; Z-score = ratio of the sum of ROA and CAR to standard deviation of ROA, CAR is the capital adequacy ratio measured as equity to total assets; LLP – ratio of loan loss provision to net loans; LERNER= price index, proxy for competition; SIZE stands for the natural logarithm of total assets; DpTA= ratio of deposit to total asset; LTA = ratio of net loans to total assets.

Source: Data Analysis (Stata computation, 2015)

4.2.1 Profitability of the Banks

There were five variables that were used as proxies for profitability; these are: Return on Asset (ROA), Return on Equity (ROE), Risk Adjusted Return on Asset (RAROA), Risk Adjusted Return on Equity (RAROE) and Net Interest Income Margin (NIM). The mean ROA is 2.17% which is lower than the mean ROE of 18.82%, whereas the mean risk-adjusted ROA (4.41) is higher than the risk-adjusted ROE (2.78) with standard deviation of 6.72 and 4.11 for risk adjusted ROA and risk adjusted ROE respectively. The risk adjusted ROA and the risk adjusted ROE measure the overall profitability of the banks and that of equity respectively, taking into consideration risk. ROA accounts for a standard deviation of 0.03143 with minimum and maximum values of -0.17125 and 0.1417, respectively. ROE also recorded a standard deviation of 0.4161 with minimum and maximum values of -0.57611 and 4.5249, respectively. From the table, the mean (standard deviation) value of Net Interest Margin was 0.0673 (0.02717) with minimum and maximum values of 0.2085 and 0.22504. This means that on average the net interest margin is 6.7% of the net operating income. The average profitability values suggest that the overall profitability of the banks is relatively low, given their respective minimum and maximum values.

4.2.2 Income Structure

From Table 4.1, the mean (standard deviation) of fees and commissions accounted for 0.2864 (0.3539) with minimum and maximum values of 0.00231 and 2.9286 respectively, whereas the mean (standard deviation) of net trading income was 0.16115 (0.1926) with minimum and maximum values of -0.02565 and 1.289 respectively. The mean (standard deviation) value of Net Non-Interest Income was 0.4996 (0.6653) with minimum and maximum values of 0.01232 and 4.511364, respectively. This suggests that on average, the ratio of net non-interest income to the operating income is 49.96%.

4.2.3 Risk-Taking Behaviour

Table 4.1 details the measures of risk factors used, which are the Z-Score and loan loss provisions (LLP). It can be observed that the mean (standard deviation) of the Z-score is 15.1355 (17.64), which indicates that the insolvency risk of Ghanaian banks is quite low, given a minimum value of -0.562 and maximum value of 125.106. Finally, the mean asset risk (loan-loss provisions) also has a mean (standard deviation) of 4.376(0.03397) % of net loans.

4.2.4 Bank Competition

The Lerner Index was a proxy for bank competition, and this recorded a mean of 0.2178, standard deviation of 0.2180 with a minimum and maximum of -1.0092 and 0.5818 respectively. This means that on the average, there is high competition among the banks in Ghana.

4.2.5 Bank specific Variables

The descriptive statistics of control variables are also presented in Table 4.1 above. From Table 4.1, Bank Size (log of total asset) recorded an average (standard deviation) value of 8.7493 (0.4470) with minimum and maximum values of 7.1452 and 9.6650, respectively. Deposit to Total Asset and Loan to Total Asset recorded a mean (standard deviation) value of 0.6662 (0.1451) and 0.4254 (0.1563) respectively.

4.3 Correlation Matrix

Pearson's correlation matrix was used to analyse the association among the variables (both dependent variables and independent variables). Table 4.2 shows that the correlations among all variables are quite low except that the correlation between the income structure variables is strongly and positively correlated. From the table, a high correlation coefficient of more than 0.6 indicates multi-collinearity between the variables and in order to proceed to analyse the regression analysis, some of the explanatory variables were dropped to prevent multi-

collinearity (see table 4.2). For instance, the pair variables; FEECOM and NNII, as well as TRAD INCOM and NNII were highly correlated (see Table 4.2), which may cause multicollinearity problem. To handle the problem of multicollinearity, the variable that was highly correlated (like NNII) was not put in the same model while running the regression.

Table 4.2 Correlation Matrix

	ROA	*ROE*	*NIM*	*RAROA*	*RAROE*	*FEECOM*	*TRADINCOM*	*NNII*	*ZSCORE*	*LLP*	*LERNER*	*SIZE*	*DPTA*	*LTA*
ROA	1.000													
ROE	0.349	1.000												
NIM	0.242	0.056	1.000											
RAROA	0.105	-0.022	0.045	1.000										
RAROE	0.186	-0.022	0.154	0.278	1.000									
FEECOM	0.005	0.084	-0.021	0.023	0.308	1.000								
TRADINCOM	-0.099	-0.090	-0.147	-0.030	-0.058	0.551	1.000							
NNII	-0.020	0.007	-0.053	0.003	0.249	0.962	0.670	1.000						
ZSCORE	0.010	-0.074	-0.076	0.861	0.148	-0.057	-0.008	-0.037	1.000					
LLP	-0.212	-0.192	-0.066	-0.235	-0.227	-0.045	0.142	-0.032	-0.094	1.000				
LERNER	0.484	0.029	0.469	0.209	0.267	0.012	-0.080	0.015	0.076	-0.181	1.000			
SIZE	0.399	0.134	0.145	0.232	0.117	0.100	0.059	0.102	0.028	-0.269	0.617	1.000		
DPTA	-0.054	0.153	-0.044	0.021	-0.019	0.186	0.109	0.119	-0.069	-0.207	0.066	0.373	1.000	
LTA	0.119	0.124	0.189	0.135	0.097	0.069	-0.036	0.118	0.130	-0.451	0.061	0.235	0.304	1.00

Notes: Variable definitions (all variables are expressed in percentage except bank SIZE)
ROA, ROE, RAROA, and RAROE represent Return on Asset, Return on Equity, Risk-Adjusted Return on Asset and Risk-Adjusted Return on Equity respectively. RAROA - risk adjusted ROA, ratio of average ROA to standard deviation of ROA; RAROE - risk adjusted ROE, ratio of average ROE to standard deviation of ROE; NIM stands for the ratio of Net Interest Income to Total Asset; NNII - the ratio of net non-interest income to net operating income where net operating income is the sum of net interest income and net non-interest income; FEE&COM = net fees and commissions income/net operating income; TRD INCOME = net trading income/net operating income; Size stands for the natural logarithm of total assets; Z-score stands for the ratio of the sum of ROA and CAR to standard deviation of ROA; LLP – ratio of loan loss provision to net loans; LTA stands for the ratio of net loans to total assets; DpTA is the ratio of deposit to total asset. (represent strong correlation)*

Source: Data Analysis (Stata computation, 2015)

4.4 Regression Results

Tables 4.3 and 4.4 show the regression results obtained for the data in line with the objectives of the study. The data variables are normally distributed, and the study used the fixed-effect panel regression after Hausman test among the banks. Panel regression with robust standard error was used to correct for heteroskedasticity and autocorrelation. Table 4.3 and 4.4 show the regression analysis for the data. In each of the two tables, five (5) regression models were reported. Table 4.3 look at net non-interest income (NNII) as an income structure together with risk taking behaviour (Z score and LLP), and Competition (Lerner) on five (5) different profitability variables (Models 1-5). Similarly, Table 4.4 looks at the other income structure variables (Fees and Commissions and Trading Income) together with risk taking behaviour (Z score and LLP), and Competition (Lerner) variables on five (5) different profitability variables (Models 6-10). This was as a result of multicollinearity reported in the correlation matrix between NNII and other income structure variables (Fees and Commissions and Trading Income). Hence, the results are reported in the relationship between income structure and profitability, risk taking behaviour and profitability and competition and profitability.

Table 4.3: Model 1 Regression Results

	Dependent Robust SE				
	Model 1 ROA	Model 2 ROE	Model 3 RAROA	Model 4 RAROE	Model 5 NIM
NNII	-0.001	0.007	-0.2556	1.807**	-0.001
	(0.33)	(0.08)	(0.31)	(2.61)	(0.46)
Z-SCORE	0.000	0.001			0.000
	(0.6)	(0.29)			(0.37)
LLP	-0.161***	-4.580**			0.079
	(0.279)	(1.90)			(1.14)
LERNER	0.032***	-0.157	3.315	8.043***	0.039*
	(2.37)	(0.38)	(1.36)	(3.45)	(3.24)
SIZE	-0.009	-0.277	2.997	-5.083*	-0.007
	(0.59)	(0.61)	(0.67)	(2.39)	(0.55)
DpTA	-0.01	0.74	2.361	-11.1449	0.013
	(0.38)	(0.89)	(0.40)	(2.05)	(0.452)
LTA	0.087*	0.587	-5.7613	-4.977	0.017
	(3.54)	(0.78)	(0.83)	(1.30)	(0.80)
constant	0.068	2.100	-21.903	54.993	0.101
	(0.54)	(0.234)	(0.60)	(2.60)	(0.91)
Observations	87	87	87	87	87
R Square	0.43	0.11	0.062	0.2173	0.23
Adjusted R-sq	0.38	0.09	0.041	0.206	0.19
F-stat	4.76	7.74	12.55	14.24	66.05
Sign	0.0002	0.0000	0.000	0.000	0.0000

*Numbers in parentheses are t-statistics; ***, ** and * indicate significance at the level of 1%, 5% and 10% respectively. ROA- stands for the ratio of net income to total assets. ROE – measured as net income to equity; RAROA - risk adjusted ROA is the ratio of average ROA to standard deviation of ROA; RAROE - risk adjusted ROE, ratio of average ROE to standard deviation of ROE; NIM= ratio of Net Interest Income to Total Asset; NNII - the ratio of net non-interest income to net operating income where net operating income is the sum of net interest income and net non-interest income; Z-score = ratio of the sum of ROA and CAR to standard deviation of ROA, CAR is the capital adequacy ratio measured as equity to total assets; LLP – ratio of loan loss provision to net loans; LERNER= price index, proxy for competition; SIZE stands for the natural logarithm of total assets; DpTA= ratio of deposit to total asset; LTA = ratio of net loans to total assets*

Source: Data Analysis (Stata computation, 2015)

Table 4.4 Model 2 Regression result

	Dependent Robust SE				
	Model 6	Model 7	Model 8	Model 9	Model 10
	(ROA)	(ROE)	(RAROA)	(RAROE)	(NIM)
FEE & COM	0.001	-0.022	-2.344***	4.105***	0.002
	(0.23)	(0.42)	(5.53)	(5.50)	(0.36)
TRAD	-0.011	-0.040	4.82**	-3.51*	-0.009
INCOME	(0.91)	(0.37)	(2.59)	(2.04)	(0.75)
Z-SCORE	0.000	0.002			0.000
	(0.6)	(1.18)			(0.46)
LLP	-0.161***	-1.531**		-14.111	0.079
	(0.279)	(2.12)		(0.64)	(1.00)
LERNER	0.032***	0.056	4.3152*	6.674***	0.037*
	(2.37)	(0.48)	(1.77)	(3.06)	(2.95)
SIZE	-0.009	-0.020	3.3477	-3.941	-0.008
	(0.59)	(0.16)	(0.63)	(1.70)	(0.58)
DpTA	-0.01	-0.379	0.88122	-13.47**	0.015
	(0.38)	(1.55)	(0.10)	(2.26)	(0.58)
LTA	0.087*	0.934	-6.611	-3.534	0.019
	(3.54)	(4.42)	(0.89)	(0.98)	(0.81)
constant	0.068	0.237	-23.935	46.538	0.108
	(0.54)	(0.22)	(0.56)	(2.04)	(0.91)
Observations	87	87	87	87	87
R Square	0.50	0.47	0.2147	0.2173	0.24
Adjusted R-sq	0.44	0.35	0.201	0.198	0.21
F-stat	4.76	7.74	3.67	14.24	66.05
Sign	0.0002	0.0000	0.000	0.00	0.0000

Source: Data Analysis (Stata computation, 2015) - Notes: This table presents regression results for estimating Eq. (2). Standard errors are clustered by banks. The variables: ROA, ROE, RAROA, and RAROE are dependent variables. FEE & COM - the ratio of net fees and commissions income to net operating income where net operating income is the sum of net interest income and net non-interest income; TRAD INCOME - the ratio of net trading income to net operating income where net operating income is the sum of net interest income and net non-interest income; Z-score stands for the ratio of the sum of ROA and CAR to standard deviation of ROA, LLP – ratio of loan loss provision to net loans; LERNER is the price index, a measure of market power, proxy for competition; SIZE stands for the natural logarithm of total assets; DpTA is the ratio of deposit to total asset; LTA stands for the ratio of net loans to total assets.

4.4.1 The Relationship between Income Structure and Profitability

Model 1 regression results for the first objective indicated that the effect of income structure (NNII) was significant at a level of 5% and positively related with profitability on Risk Adjusted Return on Equity (RAROE) in table 4.3 model 4. Thus, an increase in the NNII by 1% results in 1.807% increase in RAROE holding all other variables constant. These results

are consistent with those of Lanskroner, Ruthenberg and Zaken (2005) who found that diversification gains and risk-adjusted profitability are largely in line with optimal portfolio choice. Studies by Elas, Hackethal and Holzhauser (2010) also found similar results and indicated that diversification increases bank profitability and hence market value. Again, these results confirm those of Demirguc-kunt and Huizinga (2010) who found that a higher level of NNII increases bank risk and returns. Moreover, it confirms a study by Stiroh (2006) who found non-interest income to be statistically positively related to volatility of market returns in U.S bank holding companies. From the study of Mercieca, Schaeck and Wolfe (2007), direct diversification benefits within and across business lines and the study suggests that greater diversification benefits exist if banks move into non-traditional banking activities that generate non-interest income. The results contradict those of Chunhachinda and Li (2012) who found no effect of net non-interest income on risk adjusted return on assets and return on equity although there were negative coefficients. The results established that there was no significant relationship between net non-interest income (NNII) and ROA, ROE, RAROA and NIM in table 4.3 models 1, 2, 3 and 5, respectively. These results are inconsistent with the studies of Baele, Jonghe and Vennet (2007) and Lepetit *et al*. (2008). The researchers found a positive and significant relationship between NNII and profitability measured by ROA and ROE.

However, splitting income structure into fees and commissions, and trading income in Table 4.4 models 8 and 9 showed a varying effect on Profitability (RAROA and RAROE). Table 4.4 results established that there was no significant relationship between fees and commissions, and trading income and the other profitability variables (ROA, ROE and NIM) as shown in table 4.4 regression 6, 7 and 10 respectively. Fees and commissions have a positive statistically significant relationship with risk adjusted return on equity (RAROE) at 4.105 and 1% significance level. This implies that a 1% increase will increase RAROE by 4.11%. The results established a negative and statistically significant relationship between fees and commissions

and risk adjusted return on assets (RAROA). Trading income activities had a positive and statistically significant impact on RAROA. The negative coefficient associated with fees and commissions suggests that banks with higher fees and commissions exposure tend to have less risk adjusted return on asset, whereas the positive coefficient of fees and commissions suggests that banks with higher fees and commissions exposure tend to have more risk adjusted return on Asset.

This finding is consistent with that of Stiroh and Rumble (2006) and Stiroh (2004b). Furthermore, this suggests that greater diversification benefits (from moving) into trading income activities increased the weak correlation with net interest income activities and responded too much more of the various shocks (fluctuations) in the market. Trade income has a negative and statistically significant relationship with RAROE. This implies that banks with a high degree of income diversification (from moving) into trading income activities are faced with lower returns and higher profits' volatility and risk. It also shows that greater exposure to trade income reduces RAROE at 10% significant level, such that a 1% increase in trading income activities will reduce risk adjusted return on equity by 3.51%. Thus, banks with more gains on trading and derivatives and securities activities will have higher RAROA and a net interest margin, whereas banks with more gains on trading activities will have lower RAROE. This finding is in line with studies by DeYoung and Roland (2001), and Stiroh and Rumble (2006) who established that income structure diversification is more than offset by the cost of increased exposure to the volatility of non-interest activities.

4.4.2 The Effect of Risk Taking Behaviour on Banks' Profitability

In both table 4.3 model 1 and table 4.4 model 2, risk as measured by Z score has no significant relationship with Profitability as shown in regression 1, 2 and 5 results. The Z score was excluded in Models 3, 4, 8 and 10 due to multicollinearity. However, Loan Loss Provision (LLP) was significant and negatively related with profitability on ROA and ROE in both table

4.3 and 4.4 models 1, 2, 6 and 7 results. From Table 4.3, the relationship between ROA and Loan Loss Provision (LLP) was negative and significant at 1% level of significant. This suggests that an increase in LLP by 1% will decrease ROA by 0.161%. Table 4.4 shows that the Z-score has positive coefficients for all profitability variables but was not statistically significant. This finding, however, agrees with Isshaq, Bokpin and Amoah (2012) who found that risk taking behaviour in Ghanaian banks is not persistent and statistically insignificant. It was also consistent with Zhao *et al*. (2010) who found evidence that there is no significant impact of risk-taking on profitability. This may be due to the effect of differential external circumstances that determines whether the impact of risk taking is negative or positive. The results contrast with the findings of Lumpkin and Dess (2001) who established that hostile risk-taking may be linked with improved profitability because the need for uncertainty will be reduced.

On the other hand, Loan Loss Provisions (LLP) which measures credit risk (asset quality) was negative and statistically significant with ROA and ROE in Table 4.4. This suggests that the potential loss from risky loans may be covered by potential returns on asset and equity as well as gains from net-interest margins. These results affirm those of Agoraki *et al*. (2008) and Ofoeda *et al*. (2012) who indicate that increased credit risk and low levels of capital are major causes of bank failure. The results contradict the financial market theory which states that risks are rewarded with various premiums and investors are risk averse, a higher portfolio will lead to higher returns of risk premium (Pratt, 1964). It also contradicts the level of risk having a positive relationship with profitability (Cressy, 2006). The results are also in line with our expected negative relationship between loan loss provisions and bank profitability. This is because an increase in loan loss as an expense will lead to a fall in bank profitability. However, LLP was not significantly associated with NIM.

4.4.3 The Relationship between Bank Competition and Profitability of Banks

In Model 1, the results for objective 3 showed that competition measured by Lerner index was significant and positively related with ROA, RAROE and NIM as shown in Table 4.3 models 1, 4 and 5. The Lerner was significantly positive with ROA at 1% significant level. This suggests that an increase in competition (Lerner) by 1% will increase ROA by 0.032%, without a change in any variable. But there was no significant relationship between Lerner and ROE and RAROA as shown in table 4.3 models 2 and 3. However, Table 4.4 Lerner was positive and significantly related with profitability (ROA, RAROA, RAROE and NIM) as shown in model 6, 8, 9 and 10 respectively, but not significant on ROE as depicted in model 7.

From Table 4.4, the Lerner index was positive and statistically significant with all profitability variables except for ROE. This implies that increase in market power leads to a decrease in bank competition which results in greater profits. The results are in line with Beck *et al.* (2006) and Berger *et al.* (2009), who suggest that monopolistic banks operating in uncompetitive banking systems may enhance profits and reduce financial fragility by maintaining high(er) levels of capital that protect them from external economic and liquidity shocks. The results contradict the theory on 'competition stability view' (De Nicolo *et al*., 2004; Uhde & Heimeshoff, 2009) and the empirical work by Amidu and Wolfe (2013) that increasing banking competition increases financial soundness of individual banks.

4.4.3 The Control variables and Profitability

The results further established a negative and statistically significant relationship between bank size and RAROE at a 10% significance level. This suggests that size matters and those large banks tend to perform worse than smaller ones (Baele, Jongble & Vennet, 2007). The results further established a negative and statistically significant relationship between deposit to total asset and bank profitability (RAROE) at a 5% significance level. Loans to total assets was negative and statistically significant with ROA. This means that Ghanaian banks' lending is

associated with decrease in profitability. This contradicts the empirical finding by Amidu and Wolfe (2013) who found a positive relationship with profitability and risk.

4.5 Conclusion

This chapter discussed the descriptive statistics of the variables used, correlation matrix and the regression results of the model used. The study shows that banks which have expanded into net non-interest income have a higher risk adjusted return on equity and the relationship is statistically significant. Fees and commissions were statistically significant to risk adjusted return on asset and risk adjusted return on equity. Banks that have expanded their income structure through trade income activities present a higher level of RAROA but lower levels of RAROE and it was statistically significant. Risk (Z-score) was not statistically significant, but LLP (also a risk measure) was statistically significant. LLP was negatively and significantly associated with ROA and ROE but insignificantly associated with NIM. Competition (measured by Lerner) was statistically significant with profitability variables except for ROE, which had a negative insignificant relationship with Lerner.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the findings of the study. It also presents the conclusions and recommendations for policy consideration

5.2 Summary

The study examined the effect of income structure, risk taking and competition on profitability. The study used twenty-five (25) selected banks with data from 2008 to 2013. It highlighted the summary of descriptive statistics, correlation coefficient and regression results from the data collated. Income structure was captured by three variables: ratio of net non-interest income to net operation income (NNII), ratio of net fees and commissions to net operating income (FEE & COM.), and ratio of net gains on trading and derivatives and other securities to net operating income (TRAD INCOME). Two risk taking behaviour variables selected were: Z-score (ratio of the sum of average ROA and average capital ratio to standard deviation of ROA) and the ratio of the Loan Loss Provision (LLP) to net loans. The Lerner index is the proxy for bank competition. The dependent variables used were the profitability ratios measured by return on assets (ROA), return on equity (ROE), and risk adjusted return on asset (RAROA), risk adjusted return on equity (RAROE) and net interest margin (NIM).

The Pearson's Correlation Matrix was performed, and the regression results were presented. The regression results revealed that a share of net non-interest income to net operating income will not have a significant relationship with profitability. Higher fees and commissions will lead to higher risk adjusted return on asset as well as higher risk adjusted return on equity, implying a positive significant relationship between fees and commissions and risk adjusted ROA, and also between fees and commissions and risk adjusted ROE. However, a higher ratio

of net gains on trading, derivatives and other securities to net operating income will increase RAROA and reduce RAROE and will thus have a significant impact.

The results further showed that the Z-score (measure of risk taking behaviour of banks) will not have any significant relationship with profitability, whereas LLP was negatively significant to ROA and ROE but was insignificant with NIM. In this case, risk taking decreases profitability and suggests that the banks are exposed to high risk. Bank size was found to be significantly and positively related to all profitability variables indicating that larger banks tend to have higher returns. The results also imply that fees and commissions will increase a bank's profitability significantly. Bank competition was found to have a negative and significant relationship with the profitability ratios.

5.3 Conclusions

The study shows that banks which have expanded into net non-interest income have a higher risk adjusted return on equity and the relationship is statistically significant. Fees and commissions were statistically significant to risk adjusted return on asset and risk adjusted return on equity. Banks that have expanded their income structure through trade income activities present a higher level of RAROA but lower levels of RAROE and it was statistically significant. Risk (Z-score) was not statistically significant, but LLP (also a risk measure) was statistically significant. LLP was negatively and significantly associated with ROA and ROE but insignificantly associated with NIM. Competition (measured by Lerner) was statistically significant with profitability variables except for ROE, which had a negative insignificant relationship with Lerner.

5.4 Recommendations

Net non-interest income shows that diversification (income structure) improves profitability. This gives an indication that for managers to maximise shareholders' wealth, they need to focus more on net non-interest income. This is because a higher net non-interest income improves bank profitability and leads to stability in their earnings. Policy makers should encourage and institute policies that ensure diversification of banking activities. This also proves that universal banking is beneficial and should be promoted as such.

From the study, a measure of credit risk (loan loss provision) is negative and significant on bank profitability. This implies that increase in provisions (bad debt specifically) reduces bank profitability, therefore managers should ensure that policies and procedures that govern granting of credit to clients are tightened. The banks may protect their value from the higher loan risk through more equity capital, a smaller loan portfolio and other risk mitigation measures. Prudent measures should also be put in place in order to reduce losses on loans to the barest minimum. Managers should follow a strong due diligent process that ensures that credits granted to customers are fully paid back. Policy makers should ensure an environment that enhances the rule of law, the protection of property, a credit referencing bureau and the like.

The Lerner index, a measure of market power, proxy for competition, indicated a positive and significant relationship with bank profitability. This implies that the greater the market power, the less the competition leading to a higher profitability. Increased competition increases the stability of bank earnings. Policy makers should therefore ensure an environment that promotes competition so that efficiency and service quality can be achieved.

5.5 Future Research Directions

Future research should be undertaken to investigate the effect of income structure on banks' risk taking behaviour. In addition, researchers should look at this same study over a longer period of time. Moreover, the relationship between income structure and competition, as well as risk taking behaviour and competition, could also be investigated for policy and practitioners' recommendations.

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APPENDIX

Table 1: Average Income Structure of Ghanaian Banking Industry

Averages	**2006**	**2007**	**2008**	**2009**
Other Operating Income	7,078,626.78	8,642,541.10	13,654,660.65	14,876,874.96
No	19	19	20	23
Fees and Commissions	8,676,729.30	9,430,550.42	12,573,935.10	14,128,376.83
No	20	21	21	24
Other income	11,428,482.50	14,552,552.88	15,017,162.00	23,488,780.43
No	8	8	8	7
Net Interest Income	21,296,695.57	21,377,665.88	29,571,152.75	36,946,069.50
No	14	16	16	18
Profit After Tax	8,409,451.05	10,182,114.62	8,484,348.14	7,496,010.38
No	20	21	21	24

Source: Computed by author based on data from BankScope

APPENDIX

Table 1I: Average Income Structure of Ghanaian Banking Industry

Averages	2010	2011	2012	2013
Other Operating Income	18,395,663.39	22,202,969.04	30,984,054.96	44,318,381.24
No	23	24	24	25
Fees and Commissions	15,706,417.92	19,565,976.24	29,538,557.60	30,895,128.66
No	24	25	25	27
Other income	30,606,942.89	23,841,001.60	36,705,709.89	65,668,484.00
No	9	10	9	7
Net Interest Income	51,105,458.28	54,555,610.89	85,426,657.22	134,361,839.50
No	18	18	18	20
Profit After Tax	16,184,043.71	18,584,826.16	37,586,182.08	55,319,287.41
No	24	25	25	27

Source: Computed by author based on data from BankScopes