KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF BUSINESS

COLLEGE OF HUMANITIES AND SOCIAL SCIENCES

THE EFFECT OF CAPITAL STRUCTURE ON ASSET QUALITY OF BANKS

By

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A thesis submitted to the Department of Accounting and Finance, Kwame Nkrumah University of Science and Technology, School of Business in partial fulfillment of the requirements for the degree of Master of Business Administration (Finance).

NOVEMBER, 2020

DECLARATION

I, **Djan Akuramah Maytred**, hereby declare that this submission is my own work towards the award of a Master of Business Administration, Finance Option and that to the best of my knowledge, it contains no material previously published by another person or any material which has been accepted for the forward of any other degree of the University, except where due acknowledgement has been made in the text

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DEDICATION

I dedicate this work to God Almighty my creator, for seeing me through my studies, my lovely parents for their good efforts and encouragement and to the school management and working staff for their contributions and support towards my academic work, my friends and colleagues.

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ACKNOWLEDGMENT

I would like to express my deepest appreciation to the almighty God for his grace, and my sincere gratitude to all who in diverse ways contributed to my studies. I am also profoundly grateful to my eminent supervisor **Dr. Joseph Oscar Akotey** of Department of Accounting and Finance, Kwame Nkrumah University of Science and Technology for spending substantial part of his time reading my entire manuscript, and providing corrections that have helped me improve my knowledge in research. I extend my appreciation entire lecturers of the Department of Accounting and Finance for the knowledge they have impacted in me. I wish to also acknowledge my MBA colleagues; Oppong Gyan, Emmanuel Ntim, and friends like Mr Kwasi Agyeman, Emmanuel Osei-Bonsu and Caleb Amankwaa Kumi whose encouragement and support helped me to complete my thesis with ease.

ABSTRACT

Asset quality of banks has a key influence on the profitability and performance of banks. Poor asset quality does not only affect the performance of bank but may lead to the collapse of banks in the long run. Considering the critical role of banks in various societies, the collapse of banks does not only affect the banks but the economy of a country as a whole. As a result, various studies have been undertaken to identify the determinants banks asset quality. However, most of these studies have focused on the macroeconomic determinants of asset quality. Only a few studies have examined bank specific determinants of asset quality. This study is therefore undertaken to address this gap in literature. Specifically, this study examines the effect of capital structure on banks asset quality. Secondary data for a period of 9 years spanning from 2009-2018 were used for the study. Data for the study were quantitatively retrieved from the annual reports and accounts of the 11 universal banks operating in Ghana. Descriptive statistics, correlation and OLS Robust regression were used to describe and analyze the data. This study employed the Harris-Travalis unit root test to investigate the stationarity property of the data series. First the study found that the composition of the capital structure of the banks is made up of more debt as compared to equity. Further, the results from the trend analysis of asset quality of the banks shows an increasing trend for the periods 2009 to 2018. In addition, the study found the capital structure has a negative and significant impact on asset quality. Owing to the fact that the non-performing loans of the banks have been increasing over period understudied, this study recommends that the various policy makers and regulatory bodies such as bank of Ghana must put measures in place reverse the trend.

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CHAPTER ONE

INTRODUCTION

1.1 Background

The banking sector plays an essential role in the growth of an economy (Ishaq et al., 2016). According to Alkhazaleh and Almsafir (2014), banks promote economic growth by mobilizing national funds and applying them in other productive sectors of the economy. Nimesh (2017) explains that banks function as financial intermediaries by means of receiving funds from lenders and allocating them to borrowers. These activities ensure efficient allocation of capital by directing funds from those with surplus to those who are in shortage of funds. Therefore, in many countries, especially developing economies where capital markets are not strong and well developed, banks become a vital source of finance for business (Ntow and Laryea, 2012). As a result, the survival and performance of banks becomes an issue of concern for all.

In an attempt to explore the determinants of bank performance, some studies have highlighted the significance of the capital structure of banks (Doku et al.,2019; Tuncay, 2019; Charles-Anyaogu et al., 2018; Siddik et al., 2017; Huang and Pan, 2016; Anarfo, 2015). Brealey et al. (2017) simply defines capital structure as a mix of debt and equity financing. The capital structure literature began by Modigliani and Miller's pioneering work (1958) on capital structure irrelevance. Within the finance literature, capital structure is one area which has been highly researched by scholars. Goyal (2013) maintains that decisions pertaining to capital are critical to enable businesses operate effectively in a highly competitive market to maximize returns for the various stakeholders. This indicates that decisions on capital structure are very essential for organizations to maximize their value and to ensure their “going concern”. Zeitun, and Tian (2007) further explains that in practical terms, when firms are able to identify an

optimal capital structure, they are rewarded by means of reduction of cost of finance which further reflects in revenue maximization. According to Tuncay (2019), banks with sound capital structure are able to attract more funds and also have the advantage surviving financial turmoil.

In addition to capital structure, the business activities undertaken by banks are also key determinants of bank performance (Erasmus, 2018; Goyal, and Joshi, 2011; DeYoung and Rice, 2004). One notable business activity of banks involves giving out loans individuals and organizations at specific interest rates. Consequently, interests earned by banks from loans influences their performance. The quality of bank loans is largely dependent on the rate of repayment (Ifeacho and Ngalawa, 2014). The quality of bank loans is also referred to as asset quality (Kadioglu, Telceken, and Ocal, 2017). Existing studies on banks asset quality have used non-performing loans (NPL) to measure banks asset quality. Kadioglu et al. (2017) defines non-performing loans as "overdue loans and follow-up loans".

Abata (2014), explains that that management of asset quality involves evaluating the assets of a business so as to enhance the measurement of the size and the level of credit risk linked to its operation. The author further asserts that asset quality is associated to the left-hand side of the bank's balance sheet and fixated on the quality of loans. Bank asset quality is extremely important (Abata, 2014; Kadioglu et al., 2017) and as such it is of significant concern to policy makers, financial supervisory authorities, investors, scholars and many other concerned stakeholders (Gafoor, Mariappan and Thyagarajan, 2018). Asset quality is considered to be a critical determinant of the financial soundness and health of banks (Abata,2014). Deterioration of banks asset quality gives an indication of lapses in the banking system and if this is not properly addressed, it may result in financial crises (Swamy, 2019). This is because non-performing loans lowers banks interest earning ability and their profit margins which in turn makes it difficult for banks to generate enough funds to repay their depositors. In addition,

some studies have found that asset quality has a substantial impact on bank bankruptcy. Due to the negative economic implication of low asset quality (Gafoor et al., 2018; Ghosh, 2015; Zheng, 2012) some financial analysts refer to it as "financial pollution" (Swami, 2019).

As a result of the relevance of asset quality, the subject has attracted the interest of several scholars. Several of these studies have been dedicated to identifying the determinants of bank asset quality. However, the existing studies have mostly focused on the external factors (macroeconomic determinants) such GDP, inflation, bank lending rate, and exchange rates. Only a few studies have focused on the internal factors (bank specific factors) influencing asset quality. The study of Muneer et al. (2017) sought to find the effect of bank specific factors comprising capital adequacy ratio, return on assets, cost of funds, bank credit growth rate, bank asset, operating expenses to total asset, credit to deposit ratio, and macroeconomic factors comprising of inflation, GDP, bank lending rate, exchange rate, index of industrial production, saving growth rate and market capitalization growth rate on asset quality. The study found that the determinants of asset quality include bank lending rate, inflation, GDP, index of industrial production, exchange rate, saving growth rate, and market capitalization growth rate. In a related study Gafoor et al. (2018) investigated the influence of the board structure of banks on asset quality. The study showed that the number of independent board directors and number of financial experts have a substantial positive effect on the bank's asset quality. However, the study found that asset quality is not significantly influenced by number of meetings organized by the board, size of the board, and CEO duality.

Considering the paucity of studies on bank specific determinants of asset quality, this study contributes to literature by exploring effect of capital structure on asset quality. Existing studies give hint on the likelihood of capital structure to influence asset quality. However, no study has empirically studied the impact of capital structure on asset quality. Thus, this research seeks to empirically examine the effect of capital structure on asset quality.

1.2 Problem Statement

Banks function as financial intermediaries by means of receiving funds from lenders and allocating them to borrowers (Nimesh, 2017). The activities of banks help to ensure that ensure effective and efficient allocation of capital by directing funds from those with surplus to those who are in shortage of funds. The main operations of banks involve accepting deposits and issuing loans and advances. One source of income to banks is the interest rate spread. Anteneh (2016) defines interest rate spread as the difference between the interest rates banks pay on deposits and the interest rates banks charge on loan. When banks give out loans, they are exposed to credit risk which is directly related to non-performing loans (Abata, 2014). Existing studies on banks asset quality have used non-performing loans to measure banks asset quality (Abata, 2014; Kadioglu et al., 2017). Following the approach of past studies, non-performing loans is used as an indicator of bank asset quality in this study. Non-performing loans is simply defined as loans which borrowers to fail to pay back as they pledged. In a more detailed explanation, IMF (2005) describes non-performing loan an instance when the payment of interest and/or principal of a loan is due by 90 days or more. Several studies have used non-performing loans as a measure of bank asset quality (Ezeoha, 2011; Gafoor, 2018). Non-performing loans have adverse effect on the profitability of banks and their performance in general. Non-performing loans do not only affect the performance of bank but leads to the collapse of banks in the long run. Most studies on banks failures have found that failing financial institutions had large portions of non-performing loans prior to their collapse (Anteneh, 2016). In addition, it has been empirically verified in the existing finance literature that non-performing loans is a statistically significant predictor banks insolvency (Bhattarai, 2016). Considering the critical role of banks in various societies, the collapse of banks does not only affect the banks but the economy of a country as a whole. Thus, non-performing loans in banks have a long-term adverse effect on the economy of welfare of country. As a result,

various policy makers and government supervisory bodies have the interest of finding solutions to control the problem of non-performing loans in banks (bank asset quality). From a scholarly perspective, a number of empirical studies have been undertaken to identify the various predictors of asset quality. However, most of these studies have focused on the macroeconomic determinants of asset quality (Erasmus, 2018). Only a few studies have examined bank specific determinants of asset quality (Erasmus, 2018). This study is therefore undertaken to address this gap in literature by examining bank specific determinants of asset quality. Specifically, this study examines the effect of capital structure on banks asset quality.

1.3 Research Objectives

The aim of this study is to examine the effect of capital structure on asset quality of banks in Ghana. The specific objectives of the study include:

1. To evaluate the composition of the capital structure of banks in Ghana.
2. To evaluate the trend of the asset quality of banks in Ghana.
3. To examine the effect of capital structure on the asset quality of banks in Ghana.

1.4 Research Questions

The following research questions are addressed by this study:

1. What is the capital structure of banks in Ghana?
2. What is the level of asset quality among banks in Ghana?
3. Does capital structure affect the asset quality of banks in Ghana?

1.5 Significance of Study

Lending and borrowing are the main activities of banks. These activities help to ensure the efficient allocation of capital by channeling them from areas of surplus to areas in need of funds. In many countries, banks are the main sources of fund for businesses. Thus, banks promote economic growth by mobilizing funds and directing them towards productive sectors

of the economy. For many businesses including small, medium and large enterprises, banks loans are their major source of funds. Therefore, if the lending and borrowing activities of banks are deteriorated as a result of loan defaults, it will not only affect the banks but ultimately affect the economy at large. Thus, at study on asset quality and capital structure is timely to proffer solutions to control the problem of low asset quality. This study makes contribution to both theory and practice. From a theoretical perspective, this study contributes to the nascent body of studies on asset quality. Considering the fact that existing studies have mostly focused on macroeconomic determinants of asset quality, this study fills a gap in literature by examining capital structure as a bank specific determinant of asset quality. From a practical perspective, the findings of this study will inform various policy makers and management of banks to develop policies to improve asset quality in banks.

1.6 Research Methodology

This study adopts the quantitative approach to examine the effect of capital structure on asset quality. The study relies on secondary sources of data for the quantitative analysis. Data will be collected from the financial statements of banks. The study adopts the use of an exploratory research design with panel data approach to in order to establish the relationship between the variables of interest in this study. The analytical strategies for this study will include descriptive statistics and inferential statistics.

1.7 Scope of Research

This study examines the impact of capital structure on asset quality. The variables of interest in this study are asset quality and capital structure. The study relies on non-performing loans as a measure of bank banks asset quality. The study considers only banks in Ghana. This study relies on secondary sources of data for the quantitative analysis and therefore only banks whose financial statements are available are considered.

1.8 Organisation of the Study

This thesis is organised into five main chapters. The first chapter which is the introduction, give a background to the study, the research problem to be investigated, the research objectives and questions to help in achieving these objectives. The chapter also presents information on the scope and significance of the study and further presents an overview of the methodology used for this research. The next chapter of the study is the literature review. This chapter reviews theories backing the research and empirical studies conducted by other scholars. It also explains the variables used in this study. The chapter three, which is the methodology, follows the literature review. The methodology chapter talks about the research design, population and sample, the data and sources of the data and presents the model specification for the study. The fourth chapter is the data presentation and analysis, which presents the various test, conducted by the researcher to validate the data used for the study and further presents the analysis of the data. The final chapter is the summary, conclusion and recommendation. In that chapter, the researcher summarises the entire study and makes conclusions based on other studies conducted in the field. The study further makes recommendations based on the findings of the study. The recommendations were made for government, policy makers, investors and future studies.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews theories and concepts related to capital structure and asset quality. The chapter has three main sections. The first section discusses relevant concepts related to capital structure. The second section discuses relevant themes on asset quality. The final section presents a conceptual framework and a discussion of the relationship between capital structure and asset quality.

2.2 Conceptual Literature Review

This section reviews literature and explain the various concepts of the study. The section presents on salient points of the main concepts of the study. Included in the items discussed under this section are capital structure and asset quality among others as they are documented in prior studies. The next sub-sections discuss them into details.

2.2.1 Capital Structure

One of the most critical decisions made by any organization is the decision on capital structure (Chadha and Sharma, 2017). Capital structure decision-making is a continual process that is needed if a company needs financing for its activities. According to Hansen et al. (2014), the capital structure is a mixture of long-term debt, unique short-term debt, common equity, preferred equity and retained earnings used to fund the total activities and growth. The capital structure is a very critical financial decision because it contributes significantly to the risks and return of the company. Any decision on capital structure which is not well thought out could result in a high cost of capital, lowering the valuation of the company. On the opposite, a successful judgment on capital structure leads to a low cost of capital which has a positive impact on the firm's results. In the study of Puwanenthiren (2011), the author explains capital

structure mainly as the composition of various firm sources of funding being long-term financial obligations and equity shares or hybrid of them not forgetting retained earnings and other equity gains by the entity. The percentage or share of an entity's common stock and long-term financial obligations on the balance sheet definitely can be described as tactical choice decision made by finance managers depending on the various factors and policy objectives at hand. Saad (2010) also asserts to the fact that capital structure can also be seen to mean how company assets are funded through a mix of long-term obligations, equity and hybrid instruments. Also, Storey (1994) clearly capital structure as combination of financial obligations, equity stock and preference shares. Thus, it could be observed that the various authoritative definitions point to the same thing which is centered around the mix of sources of finance for a company and usually long-term. It is generally opined that ideal composition of owners' equity (common stock) and financial obligation (debt) is attained where the average cost of finance is lowest or minimal, thus, yielding maximum returns holding other factors constant. The capital structure concept has become more phenomenon as a result of the fact that it is almost impossible to find a company being financed by either only debt or only equity. So far as a mix of these two or more sources of finance exist, capital structure will remain an important concept worth studying.

2.2.2 Capital Structure in Banks

The capital structure of banks holds a lot more leverage compared to the amount of a non-financial firm (DeAngelo and Stulz, 2015). This assertion is confirmed by Liikanen et al. (2012). In the study of Gropp and Heider (2010), the authors demonstrate the difference between the amount of leverage in banks compared to non-financial companies by comparing their sample to the sample of a similar study undertaken by Frank and Goyal (2009). Their study concludes that the median book leverage for banks is ninety-two percent for banks and

the that of non-financial institutions are twenty four percent. Rudholm and Saari (2018) maintains that the banking sector certain unique features which causes the capital structure of banks to differ from the that of non-financial institutions. Unlike non-financial firms, banks are heavily regulated, they can raise funds by taking in deposits, and also the government to some extent guarantees their liabilities (Gropp and Heider, 2010; Sorokina et al.,2017). One form of the banking regulation is the regulatory capital requirements that are imposed on banks. The regulatory capital requirement requires the financial institutions to keep a certain amount of equity capital on their balance sheets (Hull, 2015). This equity is then used to absorb losses that the banks might face (Hull, 2015). Since banks are required to keep a certain amount of equity on their balance sheet, the banking regulation affects the funding mix (debt and equity) of the bank. When the non-financial firms can rely on any amount of debt financing as long as they can find lenders willing to provide them with funds, banks need to always keep some equity in them (Admati, 2016). There are also consequences for the bank if the capital requirements are not met. If the regulators believe that the bank is holding too little equity, the way the bank uses its equity might be limited. Banks leverage also differs from that of the non-financial firms. When the customers of a bank are depositing their money on their bank accounts, they are actually borrowing money for the bank. For these deposits, banks pay a lower return but provide services such as ATMs, credits and debit cards, and electronic banking services which comes at a cost (Admati, 2016). Even though banks can finance their operations by taking in more deposits, previous studies have found a trend of the banks leveraging themselves less with deposits and more with non-deposit debt (Gropp & Heider, 2010). As the nonfinancial firms do not generally have access to deposit debt, the measures used to study the level of debt within the financial firm and non-financial firm differ (Joida & Hallara, 2015). The debt of non-financial firms is usually studied by examining the ratio of longterm debt divided by assets, whereas the financial firms are studied by dividing the total liabilities by

assets. If only the long-term debt was included in the ratio when examining the leverage of financial firm, deposits would not be included in the measure. Another unique characteristic of banks is that substantial proportion of their liabilities are guaranteed by the government (Sorokina et al., 2016). In several countries, government regulators have initiated guarantee schemes to preserve trust in banks (Hull, 2015). These systems usually guarantee depositors of a certain predetermined level of safety against damages. Deposit insurance increases moral hazard in the banking sector (Hull, 2015). Deposit Insurance encourages banks to pursue more risky strategies that would not be possible without insurance. For instance, by offering high interest rates on certain deposits, banks can expand their deposit base and use those funds to make risky loans. Without the deposit insurance, the depositors would be likely to consider the bank to be too risky, which would lead them to withdraw their money from the bank Moral hazard is simply referred as the possibility that the behavior of an insured entity changes due to the existence of an insurance contract (Hull, 2015). This moral hazard dilemma is remedied by forcing banks to maintain some minimum capital (Gropp and Heider, 2010). There are some theoretical studies trying to explain the capital structure of banks. Diamond and Rajan (2000) find that the bank capital is affected by the safety of the bank, the bank's ability to refinance at a low cost, and the bank's ability to collect repayment from borrowers or the banks willingness to liquidate those payments. In the model of Diamond and Rajan (2000), the agency costs of debt are not ruled out, which in turn partly explains why leverage is seen as an attractive choice for the bank (DeAngelo & Stulz, 2015). DeAngelo and Stulz (2015) eliminate these agency costs from their theoretical model, yet they still find the high amount of leverage being optimal for banks. Allen et al. (2011) state that in a market with perfect competition, banks may find it more it more beneficial to use costly capital instead of leverage. The assumption is that the bank's loan rate and the liquidity of the bank provide reasons for monitoring, and that competitive pressures in the credit market will offer some market discipline on the asset side

of the balance sheet of banks (Allen et al.,2011). The use of capital in monitoring brings higher borrower surplus for the bank, which in turn may explain why banks hold more capital in them than what the regulators require. There is no agreed optimal level of leverage within the banks. There are arguments for both high leverage (DeAngelo and Stulz, 2015) and low leverage (Admati & Hellwig, 2013; Miles et al. 2013) to be the most optimal choice for the bank. The minimum capital requirement can be considered as the limit of optimal capital structure of banks for the stakeholders. If the amount of leverage was higher, the risk that the bank might end in trouble is higher which in turn means that the risk that the government need to bail out the bank is higher.

2.2.3 Factors that Affect the Capital Structure of Banks

Studies have shown that a several factors affects the capital structure of an organization. These factors include the taxation, firm size, profitability, structure of the company's assets, company growth potential, structure of ownership, and risk associated. A detailed discussion of each factor if presented below.

2.2.3.1 Taxation

A number of studies have concluded that the taxation is a key factor that affects capital structure (Danso, 2014; Ross et al., 2001). When deciding the combination of debt and equity to use, taxation is a critical factor that must be considered. MacKie-Mason (1990) concludes in his studies that corporate financing decisions are affected by tax rates, thus any change in marginal tax rate will impact decisions on financing. As a common practice, organizations that are eligible to carry forward losses will use more debt if there is a possibility of making profit within the illegible period. The reason is that tax shields lower the effective marginal tax rate on interest deduction. Graham (1999) maintains that while taxes influence firm financial decisions, the impact is mostly not too much. In addition, DeAngelo and Masulis (1980) clarify that the tax position of leverage can be replaced by other shields like capital allowance, research

and development spending or investment deductions. In reality, the result is not easy to value as it is monotonous to create an effective fiscal reduction indicator that decreases the influence of economic depreciation and expenses (Titman and Wessels, 1998). In their study, Dammon and Senbet (1988) suggest that revenue likewise has an effect on taking decisions regarding investments at the same time as funding. It demonstrates further that expanded tax shields related to permissible spending due to improvements to the corporate tax system do not inherently lead to decreased debt at individual corporate level if investment can be optimally balanced. It is clarified that the influence of this rise is critically dependent on the trade between the 'substitution results' and the 'revenue effects' (DeAngelo and Masulis, 1980).

2.2.3.2 Firm Size

The size of a firm has an influence on its capital structure. Typically, larger firms are comparatively more diversified with varying asset portfolios with relatively more stable earnings and this can have effect on its capital mix (Castanias, 1983; Wald, 1999). In a related study, Castanias (1983) explains that there is the presence of information asymmetry in smaller organizations, thus this hinders their ability to attract loans from lenders. As a result, smaller organizations mostly have lower equity to debt ratio. In contrast larger organizations with lower information asymmetry, relative stable earnings and large asset base serving as collaterals are more likely to attract loans from lenders. This is because lenders perceive that these firms have the capacity and are more likely to repay their debts. Thus, larger organizations have large debt to equity ratio. Castanias (1983) also maintains that with larger non-current asset base, the cost of default per asset is lower and marginal default per asset increases at a reducing rate for larger companies but the opposite is true for smaller entities. Several studies have found that firm size have an influence on the ability of an organization to attract loans from debtors, and this influence their capital structure (Bigsten et al., 2000; Cassar and Holmes, 2003; Hall et al.,

2004). The study of Bigsten et al. (2000) sampled entities from Africa focusing on six countries and revealed that 64 percent of micro entities, 42 percent of small entities as well as 21 percent of medium-sized entities sampled were debt restricted, however, only 10 percent of larger companies faced such restriction or constraint. Thus, since small firms are mostly debt restricted, they are inherently restricted to go for a high equity and low debt mix. The opposite can be said for larger firms.

2.2.3.3 Profitability

The pecking order theory argues that high-profit firms must retain a minimum leverage level as domestic profits can be generated to fund their company. A negative relation between firm leverage and profitability is anticipated from the perspective of the pecking order theory (Sheikh and Wang, 2011; Cassar and Holmes, 2003). Nevertheless, the trade of theory indicates that as result of the tax shield on interest paid by debt there is a beneficial link between profitability and leverage (Pike and Neale, 2006; Tong and Green, 2005). It may also be argued that profitable corporations are more likely than less efficient companies to take on the debt because lenders perceive them to be less risky. Fama and French (2002) concluded that, especially if investment overweight profits, lucrative businesses with huge investment commitments are to be expected to be higher in leverage. Overall, no theoretical study presents a decisive evidence on the profitability-leverage ratio. While theories based on taxes suggest a strong relationship, the theory of pecking order infers an opposite view.

2.2.3.4 Asset Structure

Extensive research works have been performed with regards relationship between leverage and asset tangibility. Bradley et al., (1984), for instance, find that businesses with a sizeable number of tangible assets became more leveraged financially. This is because such companies borrow

from the reserves at low interest rates if this loan is guaranteed. Likewise, trading theory entails the choice of firms with actual assets to use those assets to encourage lenders to focus on assets in the event of financial distress. In consideration of the tangible assets reduce the insecurity of borrowers as they are secured against structural risk arising out of default, Williamson (1988) puts the above point forward. Accordingly, Frank and Goyal (2009) noted that assets which are tangible in nature are priced easier than assets which are intangible, lowering the possible costs of trouble. Wiwattanakantang (1999) also reported that businesses that were not able to provide borrowing assets as insurance, are subject to tighter loan conditions than those that have bonds. Cheng and Shiu have noted (2007) that the portfolio of assets is necessary for the gaining of long-term debt, particularly in countries where there is a lack of strong busines reputation. The study from many emerging economies continues to show mixed findings between tangibility and leverage in Chakraborty (2010). Baner (2004) observed a negative tangibility-leverage relationship in his study which focused listed firms in some selected Eastern European countries.

2.2.3.5 Entity Growth

The theory of pecking order indicates that leverage and development opportunities for firms are related positively (Kayo and Kimura, 2011). Those organisations with opportunities for growth have typically used more liabilities for their operations (Cheng and Shiu, 2007). There will then be a requirement for more money for businesses with improved opportunities for growth but not enough existing cash flow. From the standpoint to the theory of pecking order, firms use more debt to finance growth chances, as managers stop selling new shares because of asymmetry of knowledge (Chakraborty, 2010; Salawu, 2007). In their study of listed Chinese firms, however, Huang and Song (2002) do not find any evidence that companies with favorable growth outlook have strong leverage ratios. This is in line with the agency hypothesis, which indicates a reverse correlation between growth opportunities and leverage

(Kayo and Kimura 2011). The leverage-crowd relationship's scientific findings are either positive or disadvantageous. The prevailing position is that firms with strong profit and capacity for growth should finance this from internal generated funds because this is much less costly than funding from outside. In the other hand, firms with less retained profits will need to rely on externally generated funds to support these benefits.

2.2.3.6 Operational Risk of Entity

Kale, Thomas and Ramirez (1991) argues that the presence of risk in an entity informs what form of capital to employ. This indicates that the operational risk of a firm influences its capital mix. Castanias (1983) asserts that tax shelter and bankruptcy cost of financial mix informs the ideal mix of equity and liability the firm should employ. Due to the presence of financial risk of inability to meet mandated financial commitments and agency cost, the entity is therefore demotivated to use debt to the fullest. This implies that when risk is high entities are likely to avoid using much debt which will result in a lower gearing. The risk can be identified from the volatility of the entity's returns or cashflows measured by the standard deviation to mean variance. When this operational risk is high, the entity is unable to honour mandatory commitments to debt holders when they fall due and this could crease serious repercussions for the entity including winding up. Interestingly, Kim and Sorensen (1986) also explain that the presence of operational and business risks poses risk of inability to sustain debt and the risk that comes with it.

2.2.4 Bank Asset Quality

Asset quality is a measure of the total risk tied to assets owned by a bank. Asset quality is used to determine the value at of assets at risk and points to how much provisions banks have to make for loan losses. The asset quality comprises credit risk related to the loan and investment portfolio and includes real estate, other assets and off-balance sheet items such as bank

guarantees and letters of credit. When evaluating asset quality various aspects are taken into consideration including but not limited to potential counterparty or issuer default in a contractual agreement and the adequacy of loan loss provisions. Asset quality should be regarded in an enterprise risk framework whereby all other risks that will likely affect the value of the asset are taken into consideration for example the compliance, regulatory, operational and strategic risks. When there is a high loan delinquency or past due loans that results in a ballooning level of non-performing assets this erodes the income for the bank and has a negative impact on returns. Therefore, it is very critical for the level of delinquency to be correctly measured or determined to be able to manage and mitigate this risk. Delinquency, also referred to as the portfolio at risk is the total number of the loans outstanding that have either the principal or instalment unpaid for a period of more than 30 days. The ratio indicates a measure of weak management control and gaps in institutional capacity (Mutie, 2005). Conventionally, some common measures of bank asset quality are loan loss provisions and non-performing loans. As mentioned earlier, this thesis adopts non-performing loans as a measure of asset quality. However, brief discussion of these two measures of bank asset quality are presented below to elicit a general understanding of asset quality measurement.

2.2.4.1 Loan Loss Provisions

Ahmed et al. (1999) defined loan loss provisions as an instrument used to adjust loan loss reserves depending on loan portfolio performance. Numerous studies agree that loan-loss provisions provide a relevant source of information about the performance of a bank's loan portfolio. Loan loss provisions are recorded in the income statement as an expense while loan loss reserves are treated as balance sheet items (Cohen et al., 2014). While loan-loss provisions signify the quality of bank loans, they are also used for other purposes (Erasmus, 2018). Laeven and Majnoni (2003) find that loan loss provisions are used effectively to level out bank earnings or mitigate capital management uncertainty. This result is close to that of Ahmed et al. (1999),

who claimed capital management was one of the most critical aspects of loan loss clauses. Furthermore, loan loss provisions are misleading as a calculation of asset quality since loan loss provisions offer a skewed image of bank asset quality. As loan-loss provisions offer an interpreted perception on asset quality, bank managers have used loan-loss provisions to distort details on asset quality. Cohen et al. (2014) has reported that the tactical presentation of loan loss provisions has been used to influence the appearance of financial position of a bank. While loan loss guarantees have been the foundation of some quality ratios of assets (Moody's, 2011; Laeven & Majnoni, 2003), this study does take non-performing loans as an asset quality metric because of the possibly discretionary nature of loan loss provisions.

2.2.4.2 Non-Performing Loans

Non-performing loans is an indicator which is mostly used to measure asset quality (Biswas,2014; Mishra and Aspal, 2012). Meeker and Gray (1987), conclude in their study that non-performing loans are the most suitable measure of bank asset quality. This assertion is several confirmed in more recent studies on asset quality (Gafoor et al., 2018; Kadioglu et al., 2017). A loan is a financial asset of every bank thus forms the major component of every bank's assets which generates revenue through interest income on loan advances given to borrowers. A loan that is in default or close to default is seen as not performing. A default loan on the other hand is a loan in which the borrower fails to pay back the loan upon its due time (Balogun and Alimi, 1988). Zafar, Maqbool and Khalid (2013) defined and non-performing loans as any loan that does not generate any income for a bank. IMF (2009) defines a NPLs as a loan for which payment of principal and interest is over 90 days or even though repayment may not be due, there is reasons to believe that borrower cannot or will not be able to make full payment. Once a loan has not received payment for more than 3 months and cease to generate income for the bank or lender, it may be considered to be a NPLs irrespective of the terms of agreement (Mikko, 2003). According to Woo (2000), when non-performing loans increase overtime, it

has the ability to destabilize the whole economy resulting from financial crisis rather than the lending function. As a result, many banks as part of the managerial functions use different loan or credit policies, appraisals and recovery procedures to mitigate the risk. A credit policy is basically the set of principles and or conditions for which a lending firm may decide to lend money to its borrower to be repaid at another date with an interest. Banks use appraisals to determine whether a loan will be default or not. They do that by assessing the accuracy, capacity, cash flow and honesty of the borrower. The loan recovery procedures also serve as a means for reducing the probability of a loan going bad. Poor loan recovery procedures contribute greatly to the non-performance of loans whereas strict loan recovery procedures mitigate the risk on NPLs. Espinoza and Prasad (2010) identified that the cause of NPLs can be generally grouped into two main categories namely; macro-economic and bank level variables. The issue of loans not performing in Ghana is not any different. The BoG Sector Report as at June 2017 reported that the total stock of loans that banks fear may go bad has risen to about 8 billion Ghana cedis as compared to June 2016 showing an increase in NPL ratio of about 2.4 percent point increase. The report attributes the increase in NPL's to the energy sector debt and other expenses. It was also revealed that the private owed about 90% of the debts increasing its debt component from 87.3 to 94.9 percent over a one year period from June 2016 to June 2017.

2.3 Overview of the Banking Sector of Ghana

Ghana's banking sector comprises of the national system of accredited and statutory financial institutions engaged in banking under Ghana's banking law (Adams and Agbemade, 2012). The Central Bank of Ghana is the main regulatory body for the banking sector of Ghana (Kosiba et al., 2018). The Bank of Ghana Act of 1992 (PNDCL 291) was succeeded by the Bank of Ghana Act of 2002 (Adams and Agbemade, 2012). The establishment of Banking Act 2004 (Act 673) helped create foreign financial services in Ghana; for example, a local subsidiary of Barclays

Bank was allowed to start up as an offshore bank (Adams and Agbemade, 2012; Asamoah and Owusu-Agyei, 2020). Banks in Ghana were categorized into the divisions namely development banking, retail banking and merchant banking. The retail and development banks were responsible for clients across the banking industry whiles merchant banks were limited to commercial business. In 2003, Bank of Ghana introduced the universal banking law acceptable to provide a level playing ground for all the banks. This reform allowed banks, without the need of separate licenses, to engage in commercial, development, investment and merchant banking services. The aim of this policy is to make sure banks provide their customers with flexible services (Quartey and Afful-Mensah, 2014). With this all-inclusive banking license, the banks are providing numerous services such as insurance plans, savings products, equity holdings, investment advice services and foreign exchange, not just taking deposits and offering loans. After a new minimal capital directive from the Bank of Ghana on 11 Sept 2017, the banking industry witnessed some reforms (PWC, 2019). In 2017 the Bank of Ghana laid out an ambitious policy plan to reinforce a more resilient banking regulatory and supervision System. Due to the changes, some banks left the market, while others had to combine to raise the proposed new minimum capital requirement of 400 million.

2.4 Theoretical Literature

A number of theoretical perspectives have been propounded by scholars to explain the capital structure decisions of firms of organizations. This aspect of the paper concentrates on certain relevant theories on capital structure. The theories discussed include the Modigliani and Miller theory, trade-off theory, pecking order theory, asymmetric information theory and agency cost theory.

2.4.1 The Modigliani and Miller Theory

After publication by Modigliani and Miller (1958) on their seminar paper on capital structure irrelevance, capital structure has and continue to generate much interest among finance and even non-finance researchers which has seen lots of studies in this regard producing varying results. In the seminal paper of Modigliani and Miller (1958), they contend that where the market is competitive, the ratio of an organization's debt to owner's choice of equity to fund the operation of the business is insignificant as far as shareholder value development is concerned. This means that the value of a firm is not influenced by its capital structure. They argued that, the advantages of employing liability are offset by reducing common equity benefits which meant that there is a trade-off between liability and equity usage. In contrast to capital structure theory propounded by Modigliani and Miller (1958), conventional viewpoints hold that debt usage or financial leverage increases company's value due to interest deductibility before tax. To this effect, expected ideal liability and common stock composition creates minimal finance cost resulting in superior value clearly indicating sharp contrast to the theory of Modigliani and Miller. In their later study, Modigliani and Miller (1963) relaxed the earlier conditions including the fact that there is market imperfection, different cost on funds, tax allowance on use of debt indicate that entity value increases as a result of using more liability or debt. The viewpoint is consented to by the study of Boateng (2004) which posits that market imperfection and tax deductibility of interest expense result in higher value of geared entities. In conclusion, profitable firms having positive net present value projects will improve in company value by acquiring more liability to fund the project. The caveat issued is that liability is good enough when firm is in a profit-making position, eligible to carry forwarded losses and has positive net present value projects to undertake.

2.4.2 The Trade-Off Theory

Trade-off theory is one of the widely accepted versions of structural capital theories, and is one of the most prominent theories of structural capital models in recent times (Danso, 2014). Unlike the theory of irrelevance, the trade-off theory presupposes that the usage of debt as to equity entails expenses and rewards. As a consequence, companies must select an appropriate capital structure that provides incremental gains and debt costs after recognizing market imperfections. According to trade-off principle, any enterprise should have an optimized capital structure (Hassan and Samour, 2015). The rationale behind the argument is the trade-off between future gains and debt servicing costs (Kraus and Litzenberger, 1973; Myers, 1984). As Modigliani and Miller (1963) acknowledge, due to interest deductibility pre-tax profits, companies may profit from leveraging. In other words, there is a tax shield to exploit because interest expenditures minimize taxable profits and enable businesses to collect tax savings (Graham, 2003). Masulis further proves its favorable effect on firm valuation (1980). However, Myers (1984) and Cornett and Travlos (1989) argue that although companies will profit from tax deduction by raising their debt levels, each company can step towards its own optimum capital structure, which can entail either raising or decreasing debt. The trade-off theory acknowledges the detrimental impact of debt on firm performance. Debt funding is related to a pledge to the potential liquidity outflow due to future debt interest payments. Interest payments thus adversely impact the liquidity and financial results of companies, which raises the financial likelihood of failure and insolvency (MacKay and Phillips, 2005; Brealey et al.,2008; Ross et al., 2013). The trade-off theory proposes that the optimum capital structure can be calculated by matching the debt advantages of tax savings with the debt costs of higher financial distress risk (Kraus and Litzenberger, 1973; Myers, 1984). Again, the principle suggests that businesses should increase their debts under normal business situations, as long as the debt gains outweigh the expense of the possibility of bankruptcy. However, bankruptcy

risk grows noticeably during emergencies, raising the possibility of debt burdens being greater than debt gains. In other words, businesses have incentives to reduce their amount of debt during periods of recession. However, the trade-off theory supports debt finance benefits since the business handles the trade-offs between debt and debt prices. That is, tax advantages can improve firm efficiency. While bankruptcy expenses remain, Gruber and Warner (1977) and Miller (1977) conclude that tax savings are far lower.

2.4.3 The Pecking Order Theory

Myers' theory of pecking order (1984) is one of the popular capital structure theories that attempts to explain the alternate funding behavior of firms . The theory of pecking order does not begin with an ideal capital structure. Rather the theory suggests that companies favor internal funds and use external funds only when internal sourcing is inadequate (Myers, 1984; Myers and Majluf, 1984). The theory assumes that when an entity identifies financially viable investment opportunity, firm finances the operation with free cash flow until exhausted, liability considered and in the absence of debt, equity finance will then be considered. New equity issuance is therefore the last resort after considering debt. The understanding from this theory is the cheapest source of finance is internal funds or free cash flow. This claim is underscored by four main reasons. First, internal funds or free cash flow does not come with compulsory obligation to make interest and principal regular payments. Second, no collateral security required. Third, there is no dilution of shareholding. Lastly, it presents flexibility. The reason above justifies why it is more appropriate to use free cash flow to finance projects. In an instance where internal surplus fund is exhausted, debt is considered as the next option. The advantages of debt over equity are based on the fact that debt issuance does not dilute shareholding, interest expense is tax deductible and cost of issuing debt is lower than equity issuance. Corporate executive management members have sufficient and better information

about the entity and its operations than equity holders who are separated from the management of the firm. This situation is described as information asymmetry. In view of this, Myers and Majluf (1984) argues that information asymmetry results in inaccurate share price since the real value and conditions of operations or projects are only known to executive management. Consequently, asymmetric information is the main reason behind the "picking order theory". Myers and Majluf (1984) in their conclusion emphasize the position that there is always a preferred hierarchy of usage of capital in funding business operations which are internal surplus fund, liability and shareholders' funds. Subsequently, Dimitrov and Jain (2003) having studied the operations of some entities, put forward extra theory arguing that when executive management has insider information about the entity's operations deteriorating, they will issue more liability or debt. Hence, issuing more debt instrument gives a negative signal or indication to the public and this is termed as "signaling effect". In addition, Rajan and Zingales (1995) reveal that smaller entities have more information asymmetry than larger institutions due to absence of corporate governance best practices.

2.4.4 Asymmetric Information Theory

The Asymmetric information theory posits that by default, shareholders do not have better and much information about the entity's operations as agents or executive management do however, equity holders or investors can possibly have that information by a careful evaluation of the mix of the capital structure over time (Cassar and Holmes, 2003; Ross, 1977). In simple terms, prospect about the entity is revealed in the capital structure and by careful analysis of capital structure and its trend, owners can have the very information that executive management is having though they have not publicly stated it. Ross (1977) goes ahead to explain that when more liability instrument is issued, it signals promising future prospects because firm is managed efficiently and hence value will go up and operational stability. This

seems to contrast the opinion of Dimitrov and Jain (2003) stating that more debt signals worsening future prospects. Again, in contrast to the conclusion of Ross (1977), Fama and French (2002) argues that debt issuance gives worsening operations signal. The reason they gave for their stance is that more debt issuance places limitations on cash flow for future investment opportunity which indicates poor future prospects for the company. Voulgaris et al. (2004) refers to the argument of Binks and Ennew (1996) and explain that asymmetry of information suggests that there is a direct link between structure of the entity's fixed asset and long-term liability. This meant that the presence of more fixed asset creates an incentive for more borrowing as the fixed assets serves as collateral security. In concluding, Voulgaris et al. (2004) suggest that there is likelihood of more debt issuance as direct response to higher size per fixed asset. Ross (1977) in his conclusion states that more liability issuance signals improved future prospects and helps counter asymmetry of information due to the positive relationship he claimed exists between debt and future prospect or value while Fama and French state the opposite showing a clear disagreement. Prasad et al. (2001) in his work observe the order that companies fund fixed assets expansion by employing free cash flow, debt and equity known as the pecking order theory.

Voulgaris et al. (2004) explain in supporting Prasad (2004) stance that free cash flow provides lowest cost seen as the opportunity cost of funds based on four reasons given to mean the following; it does not come with compulsory obligation to make interest and principal regular payments, no collateral security required, no dilution of shareholding and it presents flexibility. This stance is supported by Chen (2004). Clearly, it could be deduced that the authors have different opinions on why a firm will use a particular mix of sources of finance.

2.4.5 Agency Cost Theory

The agency theory suggests that there is a clash of interest between owners (principal) and administrators (agents) of firms. In response to this, Pinegar and Wilbricht (1989) noted that the principal-agent dilemma can be solved to some degree via the capital structure by increasing the amount of debt and without inducing any drastic rise in the costs of the agency. Correspondingly, Lubatkin and Chatterjee (1994) argued that expanding the debt levels will aid mangers return excess income to owners of the firm instead of capitalizing in unprofitable projects. Thus, there will be more effective and efficient administrators of the firm since they will have to ensure that the debt commitments of the firm are reimbursed.

There are categories of agency costs which can help expatiate the significance of capital structure. In the first place, asset substitution effect which elaborates that as the leverage increases, administrators have an increased motivation to embrace risky projects. This is on the account of the project being successful, investors get all the profit, whereas if it is unproductive, creditors are disadvantaged. If these projects are endeavored, there could a shot of firm value and a capital gains transfer from creditors to owners of the firm (shareholders). In the light of this, the management must have an ideal blend of debt and equity to capitalize on the value of the firm. Also, there is underinvestment issue if debt is hazardous. The gain from the investment will accumulate to creditors rather than stockholders. Subsequently, administrators have an incentive to dismiss profitable projects, despite the fact they can potentially increase firm value. Ultimately, unless free cash flow is given back to stockholders, management of a firm have an enticement to crush firm value through luxurious life styles and perks just to discuss few. Increased debt in the capital structure mix therefore enacts financial control on management.

2.5 Empirical Literature Review

The aim of this section is to present a review of empirical literature on bank capital structure and asset quality. The sub-section below presents a discussion on the empirical literature on bank capital structure and bank asset quality.

2.5.1 Empirical literature on Bank Capital Structure and Asset quality

In the past studies have found that capital structure decisions are very important to banks. The study of Lama et al. (2014) examined the the effect of capital structire on the performance of Isalmic banks. In their study they explained that decisions pertainng to capital structure important to banks for two main reasons. First they argue that banks are sensitive to changes in financial leverage and this is as a result of their low level of equity capital to total assets. Additionally, they assert that the capital structure of banks is highly regulated. Further they mentionn that decisions which has to do with capital structure are only imperative for managers and regulators, but they qually of key interest to shareholders. The study underyaken by Al-Taani (2013), the author concluded that capital structure decision imposes a risk-return trade-off for the bank. In furtherance, the study empasisieed that when making capital structure decisions, a key emphasis is given to the mix of debt and equity the firm can employ at a lower cost. The agency cost theoretical model as related by Jensen and Meckling (1976) posits that firm employ debt financing to mitigate opportunistic behaviour of managers and other agency related problems. This has tendency to reduce the free cash because the use of debt by firm may bring about debt commitment that must be repaid to meet up with debt obligations to prevent bankruptcy of the firm. Going bankrupt may be very costly for managers especially when they have managerial shareholding in the organisation. To forestall this kind of event, managers often strive to ensure they meet up with the debt commitment of the organisation to their creditors. Applying the arguments of the agency cost theory to this study, its is argued that debt financing will have an effect on non-performing loans. As debt financing leads to

reduction in free cash flow, managers of banks with high debt financing are meticlous when they issues loan. In order to avert bankruptcy, managers put measure in place to avoid giving out risky loans that may lead low loan repayments.

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CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the strategy used by the researcher for this study. It describes the methods and instruments used in achieving the objectives of the research. It gives details about the research design, population, sampling techniques, research instruments, data collection method used, and data analysis method. This chapter of the research is essential in order to ensure validity, reliability and generalization of the research results.

3.2 Research Design

For every research, the research design is very important. The choice of a research design is determined by the objectives of the study. When an appropirate research design is adopted, the researcher is able to efficiently and effectively deal the research question. Research design provides researchers with a comprehensive strategy for the accomplishment of the research goals by ensuring that all information collected is ideal for theoretical examinations (Rindfleisch et al, 2008). Using an inappropriate design can adversly affect the validity of the research findings. Therefore in any study, efforts must be made to find the correct approach to draw a reasonable conclusion. The study employed descriptive research design. The main of this study si to examine the relationship between capital structure and asset quality. Owing to this objective, the explanatory research design was adopted for this research. This research design is adopted chosen because it would help to explain the relationship between the variables of interest in the study. This study is also quantitative in nature. The use of the quantitative approach would help for a systematic and organised numerical data that can be used to make statistical inference (Creswell, 2009).

3.3 Population

Mugenda and Mugenda (2003) describe population as a category of persons, activities, or artifacts with similar measurable characteristics. In succinct terms, a population of a study refers to the whole community of individuals or objects which the researchers aims to apply the results of the study to. The study examines the relationship between capital structure and bank asset quality. Thus target propulation of this study is all commcercial banks in Ghana. Currently there are 23 universal banks in Ghana (PWC, 2019).

3.4 Data Collection

The secondary data was the main source of data for this study. Specifically, the main source of data for the study was the income and financial statements of the 11 universal banks in Ghana. The study used annual data spanning from the years of 2009 to 2019. In order to enhance the credibility of the findings, this study used data from the banks audited annual financial statements posted in their respective website. The use of data from audited financial records offers assurances that the data collection process is valid, accurate and reliable.

3.5 Description of Variables

This section describes the variables used in the study, which is the dependent and independent variables. The model used in this study has only two main variables (a single dependent and independent variable). Again, the study used inflation, gross domestic product, and firm size

3.5.1 Dependent Variable – Asset Quality

The study employs NPLs as a proxy for asset quality as the dependent variable which measures as a ratio of NPLs to total loans or advances (NPL ratio). Loans is a key bank asset. A loan is said to be nonperforming when it ceases to generate interest income to the lender and that there is a high probability of a default by the borrower. According to IMF (2009), a NPLs is a loan

for which repayment is for more than 90 days or even though repayment may not be due, there is reasons to believe that payment cannot or will not be fully paid.

3.5.2 Independent Variables (Capital Structure)

The study used total debt to total capital ratio as a measure of capital structure. This approach to measure capital structure was adopted from the study of Awunyo-Vitor and Badu (2012). Capital structure is also referred to as the leverage ratio. This ratio is a form of financial ratio that shows the amount of debt shouldered by firms against their capital or equity base. Capital structure basically provides a signal of how a firm's assets and operations are funded.

3.5.2 Control Variables

The study has three main control variables inflation, gross domestic product, and firm size. The firm size was measured as the logarithm of total assets at the end of the period (Petria, Capraru, & Ihnatov, 2015). Gross domestic product refers the overall monetary or market value of all the finished goods and services produced within a country's borders in a specific time period. Again, inflation refers to the annual average increase in the Ghanaian consumer price index.

3.6 Data Analysis

The study uses the panel data analysis method for the model estimation and analysis and relies on the Hausman Test to determine if the Fixed or Random Effect model is appropriate for the study. The analysis is conducted using Stata V.15, which is a more suitable software for panel data analysis. According to Stock and Watson (2001), the panel analytical method does not only exploit the advantages of both time and cross-sectional series method but also makes up for the weakness that are prevalent with the adoption of any of the two latter techniques. Additionally, it also helps to control variables that have not been included in the estimation but may have either a short- or long-term impact on the reliability of the finding from the study.

3.7 Model Specification

The general form of a panel data model is Yit = αi + yt + βXit + Ɛit …….. (Eqn)

The study uses a panel approach to establish the link existing between the variables so as to realize the objectives of the study.

The specific model is stated as:

$AQit = \beta o + \beta 1CSit + \beta 2FSit + \beta 3INFit + \beta 4GDPit$ ……Model 1

Where **AQ** = Asset Quality

CS = Capital Structure

Control Variables Included:

FS = Firm Size

INF = Inflation

GDP = Gross Domestic Product

3.8 Preliminary tests

In order to be able to use the data for this study, there are assumptions that has to be met by the data depending on the kind of analysis to be performed. The section is dedicated to explaining the various preliminary tests that were conducted on the data before use.

3.8.1 Panel co-integration

A unit root test tests is undertaken to determine whether a variable of a time series data is non-stationary and possesses a unit root. The null hypothesis is generally defined as the presence of a unit root and the alternative hypothesis is either stationarity, trend stationarity or explosive root depending on the test used. To investigate the stationarity of the series used, this study applies the unit root tests on panel data.

3.8.2 Autocorrelation

Autocorrelation denotes the connection between past and future values in a series of time, making time series probable and can obscure the identification of significant relationships and covariates (Yaffee, 2003). It was tested using the Wooldridge autocorrelation test.

3.8.3 Multicollinearity

Pearson correlation coefficient and variance inflation factor (VIF) were used. A VIF below 10 is acceptable.

3.8.4 Heteroskedasticity

Ordinary least squares have the assumption that the error term's observations are extracted from a distribution that has a constant variance. It was tested using the Modified Wald test for GroupWise heteroscedasticity.

3.9 Ethical Issues

Ethical considerations were observed during the conduct of this research. First, the study used only data which were made available online by the banks for public use. Specifically, the study used data from the banks audited annual financial statements made posted on their respective websites. Again, the researcher applied maintain the highest level of honesty and objectivity without prejudice in analyzing the data. The data used for the analysis were exactly the figures reported in audited financial statements of the banks. Unethical activities related to data misrepresentation were avoided.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS

4.1 Introduction

In the third chapter of the study, the research methodology of this study was discussed. This chapter presents the data analysis and the discussion of findings of the research. The section 4.2 presents the descriptive statistics which was done using mean, standard deviations, minimum, and maximum values for all variables. The section 4.3 presents the trend analysis for each variable. The section 4.4 presents and discusses the preliminary testing undertaken before proceeding to use data for analysis. The preliminary testing included the LM test, F-Test and Hausman tests used to select the appropriate model for the study in addition to tests for autocorrelation and heteroscedasticity. The section 4.6 presents the analysis of data based on the model specification and finally the section 4.7 discussed the findings of the study.

4.2 Descriptive Statistics

This section presents the descriptive statistics for all the variables used in the study. The descriptive statistics are analysed using the means, standard deviations, minimum and maximum values of the variables. The results from of the descriptive statistics in the Table 4.1 below.

Table 4.1: Descriptive Statistics of Variables

Variable	Mean	Std. Dev.	Min	Max
Asset Quality	0.0851443	0.0683579	0.0125935	0.4795181
Capital Structure	0.5755607	0.5755607	0	2.503438
Firm Size	21.3147	0.9138382	7.12635	23.08742
Inflation	12.97808	3.923305	12.5	19.25071
GDP	6.6327	3.386957	0.218087	14.04712

Source: Field Study, 2020

4.2.1 Descriptive Statistics of Asset Quality

Based on the results presented in table 4.1, it can be observed that asset quality recorded a minimum of 0.0125935 and a maximum of 4.795181. Again, the descriptive results show that a mean and standard deviation values of 0.0851443 and 0.0683579 were respectively attained for asset quality. The results show that the average asset quality of the banks was 0.851443 for the period that was understudied.

4.2.2 Descriptive Statistics of Capital Structure

Again, the results presented in table 4.1 shows that the minimum capital structure was 0 and the maximum capital structure 2.5033438. Likewise, results show that the mean value for capital structure was 0.5755607 with a corresponding standard deviation of 0.5572515. The results of the descriptive statistics imply that average capital structure of the banks for the years understudied was 0.5755607.

4.2.3 Descriptive Statistics of Firm Size

In terms of firm size, the analysis shows that the minimum firm size was 18.98108 with a maximum of 23.08752. In addition, the results show a mean value of 21.3147 was attained for firm size, with a standard deviation of 0.9138382. The results suggest that the on the average the size of the banks for the periods understudied was 21.3147.

4.2.4 Descriptive Statistics of Inflation

With regards to inflation, the results show that the minimum inflation rate was 7.12635 and with a maximum of 19.25071. Likewise, the results show that a mean value of 12.97808 was attained for inflation and a standard deviation 3.923305. These results imply that the average inflation rate of Ghana for the period understudied was 12.97808.

4.2.5 Descriptive Statistics GDP

In terms of GDP, the analysis shows that the minimum GDP was 2.178207 with a maximum of 14.04712. In addition, the results show a mean value of 6.6327 was attained for GDP, with a standard deviation of 3.386957. The results suggest that the on the average the GDP of Ghana for the periods understudied was 6.6327.

4.4 Trend Analysis

This section of this chapter presents the results of the trend analysis of the variables examined in this study. In the sub-sections below trend analysis for capital structure, asset quality, firm size, inflation and GDP.

4.4.1 Trend of Capital Structure

The figure 4.1 shows the trend analysis for capital structure. In this study capital structure was measure with debt to equity ratio. The figure 4.1 reveals that while the capital structure for the banks kept fluctuating over the period 2009 to 2018, trend shows a constant trend. The minimum capital structure was recorded in 2013 and the maximum capital was recorded 2009.

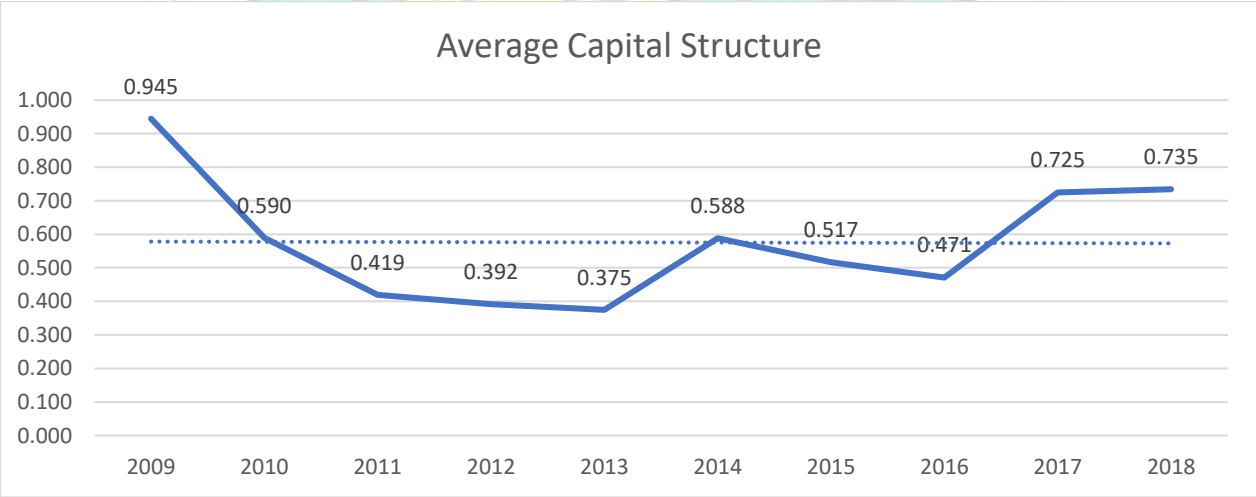

Figure 4.1: Trend Analysis for Capital Structure

Source: Field Study, 2020

4.4.2 Trend of Asset Quality

The figure 4.2 shows the trend analysis for asset quality. In this study asset quality was measured with non-performing loans. The figures reveal that asset quality shows an increasing trend from the year 2009 to 2018. This shows that asset quality of the banks of which was measured with non-performing loans had not improved over years but kept deteriorating. The minimum non-performing loans was recorded in 2014 and the maximum in 2018.

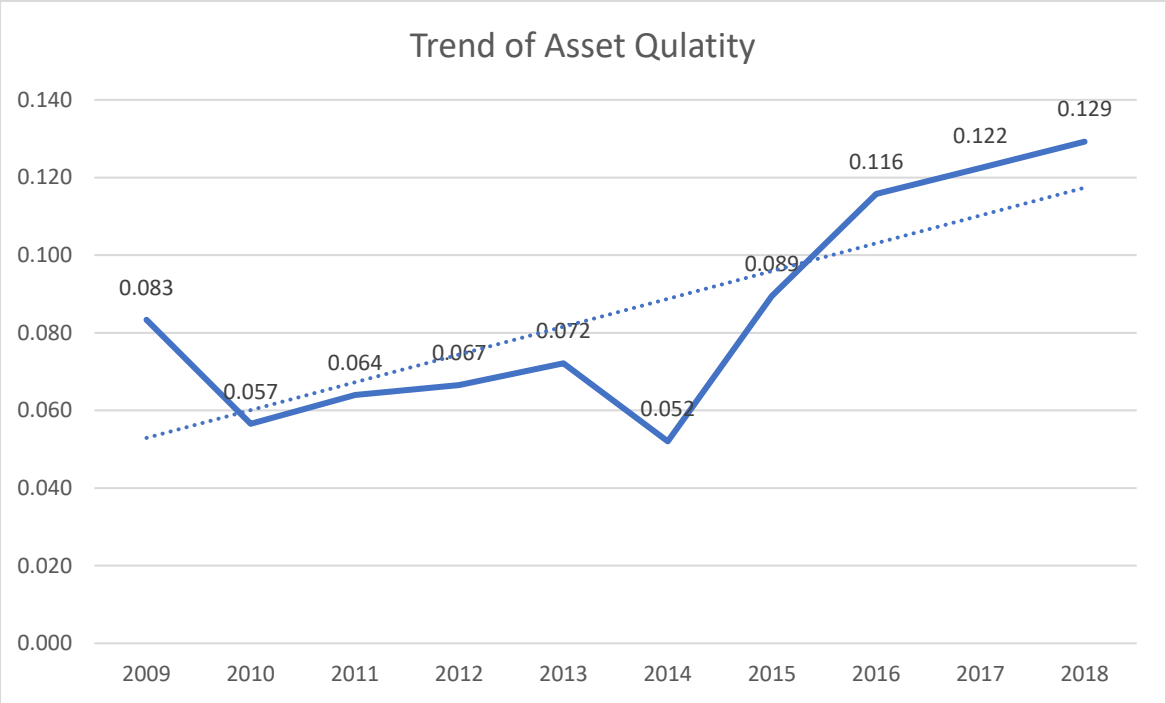

Figure 4.2 Trend Analysis for Asset Quality

Source: Field Study, 2020

4.4.2 Trend of Inflation

The figure 4.3 shows the trend analysis for inflation. The figures reveal that whiles inflation has been fluctuating for the period of 2009-2018, the trend has been constant. The highest inflation was recorded in the year 2009 and the lowest inflation was recorded in the year 2012.

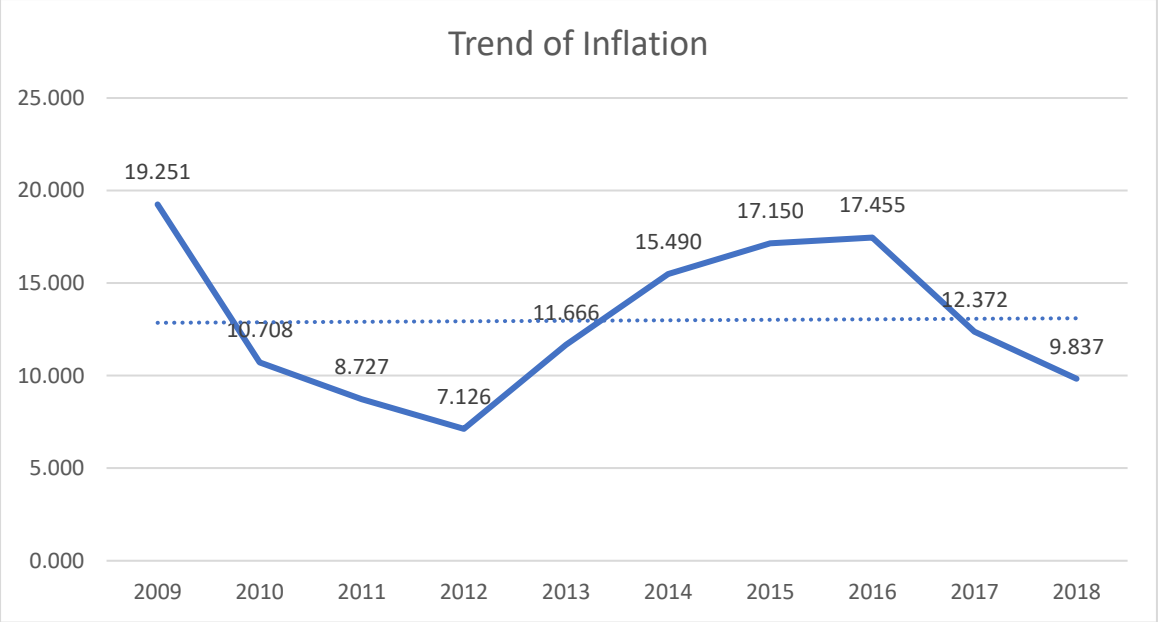

Figure 4.3 Trend Analysis for Inflation

Source: Field Study, 2020

4.4.3 Trend of Firm Size

The figure 4.4 shows the trend analysis for firm size. The results displayed in figure 4.4 shows that firm size recorded an increasing trend from the 2009 to 2018. The minimum average firm size for the banks was recorded in the year 2009 and the maximum average firm size was recorded in the year 2018.

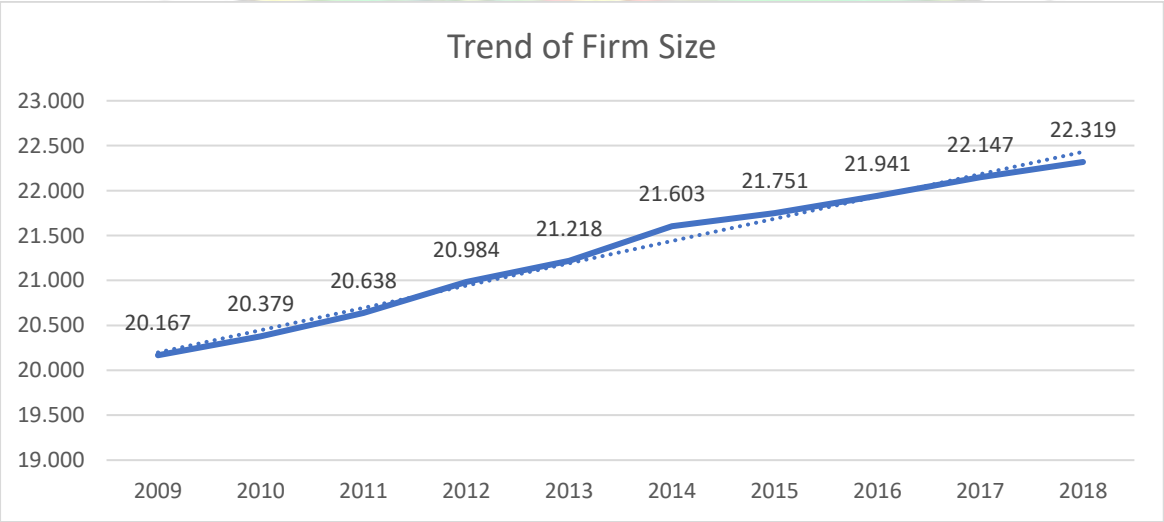

Figure 4.4 Trend Analysis for Firm Size

Source: Field Study, 2020

4.4.4 Trend of GDP

The figure 4.4 shows the trend analysis for GDP. The results displayed in figure 4.4 shows that GDP recorded an increasing trend from the 2009 to 2018. The minimum GDP for the banks was recorded in the year 2015 and the maximum average GDP was recorded in the year 2011.

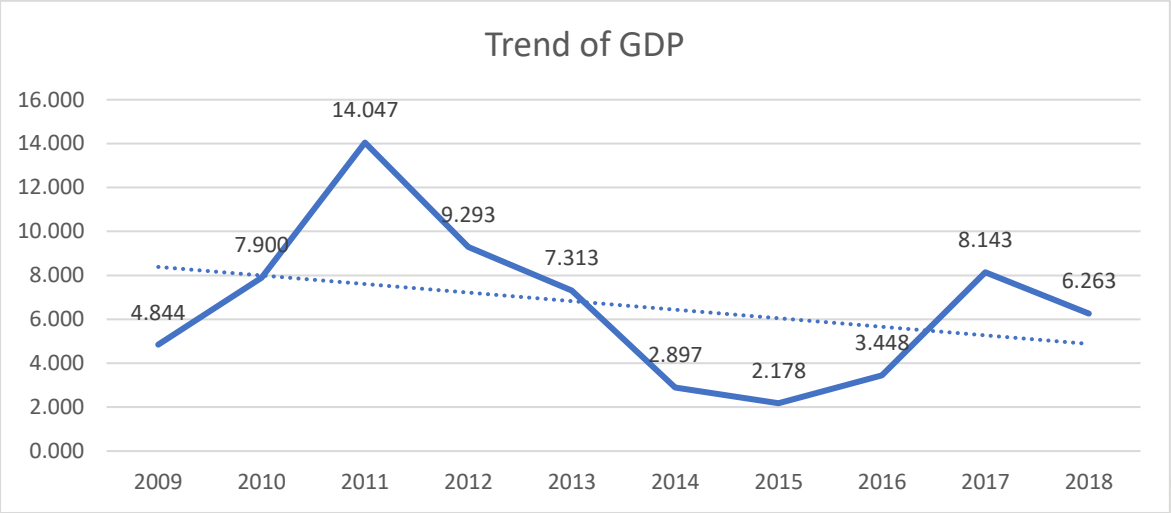

Figure 4.5 Trend Analysis for Asset Quality

Source: Field Study, 2020

4.5 Preliminary Testing

This section discusses the preliminary testing conducted on the data used for this study. The study used a panel data. The panel data is a combination of time series and cross-sectional data. Because time series data suffers from autocorrelation and cross-sectional heteroscedasticity a preliminary testing of the panel data is required in order to attain the best results from the regression analysis. The various preliminary tests performed in this section include the panel unit root test, multicollinearity, autocorrelation and heteroscedasticity. In addition, the test to determine which panel data analysis to be used for this study was also carried out in this section.

4.5.1 Panel Unit Root Test

The Harris-Travalis unit root test, which assumes that the number of panels (n) is greater than the time period (t) was used test the variables in the entire data set. The study adopted the Harris-Travalis unit root test because in the dataset used for the study, panels were more than the time period.

Table4.2: Panel Unit Root Test

Variable	Statistic	Z-Score	p-value	Conclusion
Asset Quality	0.2419	-5.8396	0.0000	Stationary
Capital Structure	0.2774	-5.4129	0.0000	Stationary
Firm Size	-0.1700	-9.5626	0.0000	Stationary
Inflation	0.3900	-4.0586	0.0000	Stationary
GDP	0.4537	-3.2917	0.0005	Stationary

Source: Field Study, 2020

From table 4.2 above, it was observed that asset quality recorded a z-score of -5.8396 and a p value of 0.0000. Since the p-value is less than 0.05 asset quality can be said to be stationary at level. With respect to capital structure the unit roots test shows a z-score of -5.4129 and a p value of 0.0000. These results suggest that capital structure is at a stationary level (p-value is less than 0.05). Again, the table shows that as firm size recorded a z-score of -9.5626 and a p-value of 0.0000. Since the p-value is less than 0.05 firm size can be said to be stationary at level. In addition, inflation recorded a z-score of -4.0586 and a p-value of 0.0000 which presents overwhelming evidence against the null hypothesis and hence it was concluded that inflation growth rate was stationary at level. The study also found that GDP growth rate reported a z-score of -3.2917 and a p-value of 0.0000 which also presents overwhelming evidence against the null hypothesis and hence it was concluded that GDP growth rate was stationary at level.

4.5.2 Multicollinearity

Multicollinearity occurs when independent variables in a regression model are correlated. If the degree of correlation between variables is high enough, it can cause problems when you fit the model and interpret the results. To check for multicollineearity, the study uses the Pearson correlation analysis and from the analysis presented in table 4.3 below. The study observed that the highest correlation among the independent variables was -0.7902 which shows that there exists strong correlation among the inflation and GDP. A further analysis was done to assess the presence of multicollinearity.

Table 4.3: Pearson Correlation Analysis

Variable	Asset Quality	Capital Structure	Firm Size	Inflation	GDP
Asset Quality	1.0000				
Capital Structure	-0.1019	1.0000			
Firm Size	0.2128	0.0787	1.0000		
Inflation	0.0680	0.1392	0.0438	1.0000	
GDP	-0.0879	-0.0915	-0.3007	-0.7902	1.0000

Source: Field Study, 2020

Multicollinearity among the variables was further confirmed using the Variance Inflation Factor (VIF), which assess whether the factors are correlated to each other, which could affect the p-values and reliability of the model. It is observed from the analysis that the highest VIF was1.05 and since the acceptable VIF is anything below 3.2, we can conclude that there exists no multicolinearity between the independent variables.

Table 4.4: VIF Analysis

Variable	VIF	I/VIF
Capital Structure	3.30	0.303149
Firm Size	3.05	0.328131
Inflation	1.25	0.802068
GDP	1.04	0.970645

Source: Field Study, 2020

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4.5.3 Model Specification

In order to determine which model to use for the analysis of the panel data, the LM test and F-tests were conducted to determine whether the appropriate model would be the pooled OLS, random-effect or the fixed-effect regression model. From table 4.5, we observe that, in the LM test for the model strongly rejected the Pooled OLS in favour of the Random-Effect.

Table 4.5: LM Test

Model	Chibar2	Prob>chibar2	Conclusion
Model 1	20.35	0.0000	Random Effect Supported

Source: Field Study, 2020

F-test was further conducted to ascertain whether the models would be appropriate under the fixed effect or pooled OLS regression. It is observed from table 4.6 that the analysis provides overwhelming evidence against the null hypothesis of pooled OLS and hence we conclude that the analysis is consistent under the Fixed-Effect model.

Table4.6: F-Test

Model	F-Statistics	Prob > F	Conclusion
Model 1	F (10,95) = 3.89	0.0002	Fixed-Effect Supported

Source: Field Study, 2020

4.3.4 Hausman Test

The results obtained from the LM test and the F-test, provides support for both Random and Fixed-effect regression model in all five models. The study therefore conducted the Hausman test to ascertain whether the random or the fixed-effect model is the appropriate model for the estimation. From table 4.7, the p-values provides overwhelming evidence against the Fixed-Effect model, we therefore accept the null hypothesis of the Hausman test; that the random effect model would provide the best estimate for the regression analysis. Therefore, the model would be analysed using the random effect model.

Table4.7: Hausman Test

Model	Chi2	Probability	Conclusion
Model 1	0.81	0.9371	Random Effect Supported

Source: Field Study, 2020

4.5.5 Autocorrelation

The Wooldridge Test for autocorrelation was used to test the models for autocorrelation. From table 4.8, it is evident that there is order autocorrelation in the tested model tested since the p-values in less than 0.05. Therefore, there exists auto correlation in the model of the study. This will be corrected using the Driscoll-Kray standard errors for the regression analysis.

Table4.8: Wooldridge Test of Autocorrelation

Model	Statistics	P-Value	Conclusion
Model 1	4.961	0.0401	There is first-order autocorrelation

Source: Field Study, 2020

4.5.6 Heteroscedasticity

The Breusch-Pagan/Cook-Weisberg test for heteroskedasticity was used to test the existence of heteroscedasticity. From the figure 4.9 below, we find overwhelming support for the null

hypothesis of homoscedasticity and therefore its concluded that the model does not suffer heteroscedasticity.

Table 4.9: Breusch-Pagan/Cook-Weisberg test for Heteroskedasticity

Model	Statistics	P-Value	Conclusion
Model 1	1.15	0.2842	Heteroscedastic

Source: Field Study, 2020

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4.6 Analysis of Data

In this section, the data is analysed in accordance to the model specification presented in the third chapter of this thesis. The study had only one model. The model of the study focused on the effect of capital structure on asset quality. In the proposed model, firm size, inflation and GDP are control variables. A summary of the regression analysis is presented in Table 4.10 below.

Table 4.10: Regression with Driscoll – Kraay Standard Errors

Asset Quality	Coef.	Drisc/Kraay Std. Err.	t	p>|t|	[95% Conf. Interval]	
Capital Structure	-0.0181127	0.0063623	-2.85	0.019	-0.325053	-0.0037201
Firm Size	0.0245806	0.0065611	3.75	0.005	0.0097385	0.0394228
Inflation	0.0033452	0.0020707	1.62	0.141	-0.0013389	0.0080294
GDP	0.0030101	0.0028789	1.05	0.323	-0.0035024	0.0095226
Constant	-0.4917393	0.1156985	-4.25	0.002	-0.7534674	-0.0300112
sigma_u	0.3537853					
sigma_u	0.05955134					
Rho	0.26086696	(fraction of Variance due to u_i)				
Overall R-squared = 0.0667		Wal chi2 (4) = 336.17			Prob > chi2 = 0.0000	
Number of obs = 110		Number of groups = 11				

Source: Field Study, 2020

4.6.1 The Effect of Capital Structure on Asset Quality

The main aim of the study was to examine the effect of asset quality on firm performance. The study proposed a regression model to capture this relationship. In the regression model the effect of capital structure is regressed against asset quality. Again, the model has three control variables which are firm size, GDP and inflation. As shown in Table 4.10, the model recorded an R-squared value of 0.0667. This implies that about 6.67% of the variation in the dependent variable can be explained by the variations in the predictive variable. Again, the results also show that the model is statistically significant (Prob > chi2 = 0.0000). Also, the results on the Table 4.10 that out of the three control variables, only firm size was statistically significant. From the table the table 4.10, it is observed that constant recorded a coefficient of -0.4917393 units and is significant at 0.5 significance level (p=0.002). This result suggests that with zero capital structure, and zero control of firm size, inflation and GDP, asset quality would be expected to decrease by -0.475878 units. Likewise, the independent variable recorded a coefficient of -0.0181127 and is significant at 0.05 significance level (p=0.019). This result implies that holding all other variables constant, a unit increase in capital structure will cause a significant decrease in non-performing loans (asset quality).

4.7 Discussion of Results

In this section, the findings of the study are discussed according to results obtained from the analysis of the data. The discussion is done according to the objectives of the study. The study had the specific objectives. The first object was to evaluate the composition of the capital structure of banks in Ghana. The second objective was to evaluate the trend of the asset quality of banks in Ghana. The final objective was to examine the effect of capital structure on the asset quality of banks in Ghana.

With respect to the first objective which was to evaluate the composition of capital structure of banks in Ghana, a descriptive analysis and a trend analysis was conducted. First the descriptive

statistics shows that between the period of 2009 to 2018 the minimum capital structure was 0 and the maximum capital structure was 2.5033438. Likewise, results show that the mean value for capital structure was 0.5755607 with a corresponding standard deviation of 0.5572515. The results of the descriptive statistics suggest that average capital structure of the banks for the years understudied was 0.5755607. This implies that 57.56% of the capital of the banks for the understudied period was debt since capital structure was measured with debt to equity. A further trend analysis shows that while the capital structure for the banks kept fluctuating over the period 2009 to 2018, trend shows a constant trend. These findings are in line with the results of the study of Musah (2017).

The second objective was to evaluate the trend of asset quality of banks in Ghana. The descriptive and trend analysis were employed. First the descriptive analysis revealed that asset quality for the banks which was measured with non-performing loans recorded a minimum value of 0.0125935 and a maximum of 4.795181 for the period understudied. Again, the descriptive results show that a mean and standard deviation values of 0.0851443 and 0.0683579 were respectively attained for asset quality. Again, a further trend analysis of asset quality shows an increasing trend from the year 2009 to 2018. The minimum non-performing loan for the period being studied was 0.052 and this was recorded in the year 2014. Likewise, the maximum non-performing loans was 0.129 and this was recorded in the year 2018. A closer look at the trend graph for asset quality (non-performing loans) shows that on average asset quality of the banks of which was measured with non-performing loans had not improved over years but kept deteriorating. Improvements in asset quality only occurred for the period of 2009 to 2010 were non-performing loans decreased from 0.083 in 2010 to 0.057 in 2010 and the period of 2013 to 2014 were non-performing loans reduced from 0.72 in 2013 to 0.052. This result is in support of the study of Asiama and Amoah (2019) which found that on an average non-performing of Ghanaian banks have been trending up.

The third objective was examining the effect of capital structure on asset quality of banks in Ghana. To achieve this, the study uses the random effect analysis as suggested by the Hausman-test undertaken during the preliminary analysis. The results show that capital structure has a negative and significant effect on asset quality. The results imply that an increase to debt-to-equity ratio (capital structure) will lead to a fall in non-performing loans (asset quality). This suggests that when it comes to non-performing loans (asset quality), debt to equity ratio (capital structure) plays a critical role. This finding is in sync with the postulations of Leary (2005) that when banks have more debt that equity, the burden of mangers to repay the debt forces them to put strict measures in place to reduce the rate of non-performing loans.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATONS

5.1 Introduction

The chapter presents summarized results, conclusion and recommendations that have been done based on objectives of this study. The chapter is divided into four main sections, Section 5.2 presents a summary of the findings of the findings of the study, Section 5.3 is dedicated to conclusion that can be made based on the findings of the study. Sections 5.4 provides recommendations and policy implications for appropriate stakeholders and also section 5.5 highlight on the suggestions for future studies.

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5.2 Summary of Findings

This section of the chapter discusses the summary of findings of the entire research. The main aim of this study was to examine the effect of capital structure on the asset quality of banks in Ghana. The study had three specific objectives: (1) to evaluate the composition of the capital structure of banks in Ghana; (2) to evaluate the trend of the asset quality of banks in Ghana; (3) to examine the effect of capital structure on the asset quality of banks in Ghana. The study used a panel data set. The main source of data for this study was financial statement of the 11 universal banks Ghana which remained after the financial sector clean up exercise by the Bank of Ghana. Data was collected for the period of 2009 to 2018. The study proxied capital structure with debt-to-equity ratio and asset quality with non-performing loans. Relevant preliminary test such as the panel unit root test, multicollinearity, autocorrelation and heteroscedasticity were conducted.

The first objective of the study was to examine evaluate the composition of the capital structure of banks in Ghana. In order to achieve this objective, a descriptive analysis and a trend analysis was conducted. First the descriptive analysis revealed that for the period of 2009 to 2018 the

minimum capital structure for the 11 banks was 0 with a maximum capital structure of 2.5033438. Likewise, results show that the mean value for capital structure was 0.5755607. The results suggest that average capital structure of the banks for the years understudied was 0.5755607. Since capital structure was measured with debt to equity the results imply that 57.56% of the capital of the banks for the understudied period was debt since capital structure was measured with debt to equity. Thus, the banks have more debt as compared to equity for the study period. These findings are in line with the results of the study of Musah (2017) which indicated that majority of Ghana banks have more debt to equity.

The second objective was to evaluate the trend of asset quality of banks in Ghana. In order to ascertain the trend of asset quality of the banks, the descriptive statistics and trend analysis were applied. First the descriptive analysis revealed that a mean value of 0.0851443 was recorded for asset quality. Since asset quality was measure with non-performing loans, the results imply the average non-performing loans of the banks for the period understudied was 8.51%. Again, a further trend analysis of asset quality showed an increasing trend from the year 2009 to 2018. The resulted of the trend analysis indicated that the asset quality of the banks of which was measured with non-performing loans had not improved over years but kept deteriorating. The minimum non-performing loan for the period being studied was 0.052 and this was recorded in the year 2014. Likewise, the maximum non-performing loans was 0.129 and this was recorded in the year 2018. Improvements in asset quality only occurred for the period of 2009 to 2010 were non-performing loans decreased from 0.083 in 2010 to 0.057 in 2010 and the period of 2013 to 2014 were non-performing loans reduced from 0.72 in 2013 to 0.052. This result is in support of the study of Asiama and Amoah (2019) which found that on an average non-performing of Ghanaian banks have been trending up. The implication of this

to banking institutions is that, there is the need to put measure in place to mitigate the instances of non-performing loans.

The third objective was examining the effect of capital structure on asset quality of banks in Ghana. From the study, it was revealed that on the average, the banks studied by this research have more debt than equity. Again, the results from the regression analysis showed that capital structure has a negative and significant effect on asset quality. The results infer that an increase in debt-to-equity ratio (capital structure) will lead to a fall in non-performing loans (asset quality). This suggests that when it comes to non-performing loans (asset quality), debt to equity ratio (capital structure) plays a critical role. It can be deduced from this results that banks whose capital structure is made up of more debt than equity is likely to recorded low non-performing loans. This finding is in sync with the postulations of Leary (2005) that when banks have more debt that equity, the burden of mangers to repay the debt forces them to put strict measures in place to reduce the rate of non-performing loans.

5.3 Conclusion

The main objective of the study is to examine the effect of capital structure on the asset quality of universal banks in Ghana. The study also sought examine the composition of the capital structure of the banks and also their trend of asset quality. In order to achieve this objective, the study used a panel data set obtained from 11 universal banks operating in Ghana with data covering a period of 2009 to 2018. To achieve the study objectives, descriptive statistics, trend analysis and regression analysis were conducted in respect to each objective. Based on the result obtained from the analysis the study draws a conclusion that the composition of the capital structure of the banks is made up of more debt as compared to equity. Further, the results from the trend analysis of asset quality of the banks shows an increasing trend for the periods

understudied. In addition, the study found the capital structure has a negative and significant impact on asset quality. The study concludes that capital structure has an influence on the asset quality of the banks in Ghana.

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5.4 Policy Implication and Recommendations

As a result of the conclusions drawn above, the following implications and recommendations have been suggested. The study found that capital structure has a negative and a significant effect on the asset quality of banks. Since asset quality was measured with non-performing loans and capital structure was measured with debt to equity ratio, the implication is that banks whose capital structure is composed of more debt that equity are likely to record lower non-performing loans. Thus, this study recommends that on banks should keep more debt that equity as it has the tendency to reduce non-performing loans. Again, owing to the fact that the non-performing loans of the banks have been increasing over period understudied, this study recommends that the various policy makers and regulatory bodies such as bank of Ghana must put measures in place reverse the trend. This important because high non-performing loans has ramifications for the economy of Ghana.

5.5 Suggestions for Further Research

First and foremost, the assessed the impact on asset quality of banks. While this study provides useful insights, future studies may expand the current study by examining other variables which are likely to influence the asset quality of banks. Since this study relied solely on non-performing loans as a measure of asset quality, future studies the subject may apply other approaches in addition to non-performing loans to measure asset quality. Again, the study focused on universal banks in Ghana and therefore findings may not apply to other banking institutions such as the rural bank. Therefore, future studies may focus on the rural banks.

Possibly a comparative analysis between rural banks and universal bank will provide very insightful findings.

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APPENDIX

Raw Stata Output

Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
AssetQuali~L	110	.0851443	.0683579	.0125935	.4795181
CapitalStr~y	110	.5755607	.5572515	0	2.503438
FirmSize	110	21.3147	.9138382	18.98108	23.08742
Inflation	110	12.97808	3.923305	7.12635	19.25071
GDP	110	6.6327	3.386957	2.178207	14.04712

Correlation

	AssetQ~L	Capita~y	FirmSize	Inflat~n	GDP
AssetQuali~L	1.0000				
CapitalStr~y	-0.1019	1.0000			
FirmSize	0.2128*	0.0787	1.0000		
Inflation	0.0680	0.1392	0.0438	1.0000	
GDP	-0.0879	-0.0915	-0.3007*	-0.7902*	1.0000

Auto or Serial Correlation

```
. xtserial AssetQualityNPL CapitalStructuredebttoequity FirmSize Inflation GDP

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,      10) =      4.961
           Prob > F =      0.0501
```

F-test

```
. xtreg AssetQualityNPL CapitalStructuredebttoequity FirmSize Inflation GDP, fe

Fixed-effects (within) regression               Number of obs      =       110
Group variable: ID                              Number of groups   =        11

R-sq:                                           Obs per group:
     within  = 0.1080                                         min =        10
     between = 0.0133                                         avg =      10.0
     overall = 0.0660                                         max =        10

                                                F(4,95)            =      2.87
corr(u_i, Xb)  = -0.1998                        Prob > F           =    0.0270

------------------------------------------------------------------------------
             AssetQualityNPL |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-----------------------------+------------------------------------------------
CapitalStructuredebttoequity |  -.0191333   .0133871    -1.43   0.156    -.0457101    .0074434
                    FirmSize |    .027622   .0090305     3.06   0.003     .0096942    .0455498
                   Inflation |   .0037367   .0026502     1.41   0.162    -.0015246    .0089979
                         GDP |   .0035998   .0032551     1.11   0.272    -.0028625     .010062
                       _cons |  -.5649688   .2226725    -2.54   0.013     -1.00703   -.1229079
-----------------------------+------------------------------------------------
                     sigma_u |  .03802127
                     sigma_e |  .05955134
                         rho |  .28958799   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0: F(10, 95) = 3.89                      Prob > F = 0.0002
```

Hausman Test

```
. hausman F1

                 ---- Coefficients ----
             |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
             |       F1           R1         Difference          S.E.
-------------+----------------------------------------------------------------
CapitalStr~y |  -.0191333    -.0181127       -.0010207        .0049548
    FirmSize |    .027622     .0245806        .0030414        .0033795
   Inflation |   .0037367     .0033452        .0003914        .0005139
         GDP |   .0035998     .0030101        .0005897        .0007155
------------------------------------------------------------------------------
                           b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =        0.81
                Prob>chi2 =      0.9371
```

Heteroscedasticity

```
. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of AssetQualityNPL

         chi2(1)      =     1.15
         Prob > chi2  =   0.2842
```

LM Test

```
Breusch and Pagan Lagrangian multiplier test for random effects

        AssetQualityNPL[ID,t] = Xb + u[ID] + e[ID,t]

        Estimated results:
                         |       Var     sd = sqrt(Var)
                ---------+-----------------------------
                AssetQu~L |   .0046728       .0683579
                        e |   .0035464       .0595513
                        u |   .0012516       .0353785

        Test:   Var(u) = 0
                             chibar2(01) =    20.35
                          Prob > chibar2 =   0.0000
```

Unit Root Test

```
. xtunitroot ht AssetQualityNPL

Harris-Tzavalis unit-root test for AssetQualityNPL
---------------------------------------------
Ho: Panels contain unit roots               Number of panels  =     11
Ha: Panels are stationary                   Number of periods =     10

AR parameter: Common                        Asymptotics: N -> Infinity
Panel means:  Included                                   T Fixed
Time trend:   Not included
-------------------------------------------------------------------------
                   Statistic         z         p-value
-------------------------------------------------------------------------
 rho                 0.2419       -5.8396       0.0000
-------------------------------------------------------------------------

. xtunitroot ht CapitalStructuredebttoequity

Harris-Tzavalis unit-root test for CapitalStructuredebttoequity
---------------------------------------------
Ho: Panels contain unit roots               Number of panels  =     11
Ha: Panels are stationary                   Number of periods =     10

AR parameter: Common                        Asymptotics: N -> Infinity
Panel means:  Included                                   T Fixed
Time trend:   Not included
-------------------------------------------------------------------------
                   Statistic         z         p-value
-------------------------------------------------------------------------
 rho                 0.2774       -5.4129       0.0000
-------------------------------------------------------------------------

. xtunitroot ht   FirmSize

Harris-Tzavalis unit-root test for   FirmSize
---------------------------------------------
Ho: Panels contain unit roots               Number of panels  =     11
Ha: Panels are stationary                   Number of periods =      9

AR parameter: Common                        Asymptotics: N -> Infinity
Panel means:  Included                                   T Fixed
Time trend:   Not included
-------------------------------------------------------------------------
                   Statistic         z         p-value
-------------------------------------------------------------------------
 rho                -0.1700       -9.5626       0.0000
-------------------------------------------------------------------------

. xtunitroot ht Inflation

Harris-Tzavalis unit-root test for Inflation
---------------------------------------------
Ho: Panels contain unit roots               Number of panels  =     11
Ha: Panels are stationary                   Number of periods =     10

AR parameter: Common                        Asymptotics: N -> Infinity
Panel means:  Included                                   T Fixed
Time trend:   Not included
-------------------------------------------------------------------------
                   Statistic         z         p-value
-------------------------------------------------------------------------
 rho                 0.3900       -4.0586       0.0000
-------------------------------------------------------------------------

. xtunitroot ht GDP

Harris-Tzavalis unit-root test for GDP
---------------------------------------------
Ho: Panels contain unit roots               Number of panels  =     11
Ha: Panels are stationary                   Number of periods =     10

AR parameter: Common                        Asymptotics: N -> Infinity
Panel means:  Included                                   T Fixed
Time trend:   Not included
-------------------------------------------------------------------------
                   Statistic         z         p-value
-------------------------------------------------------------------------
 rho                 0.4537       -3.2917       0.0005
-------------------------------------------------------------------------
```

VIF

```
. vif
```

Variable	VIF	1/VIF
GDP	3.30	0.303149
Inflation	3.05	0.328131
FirmSize	1.25	0.802068
CapitalStr~y	1.03	0.970645
Mean VIF	2.16	

Regression

```
. xtscc AssetQualityNPL CapitalStructuredebttoequity FirmSize Inflation GDP, re

Regression with Driscoll-Kraay standard errors   Number of obs     =       110
Method: Random-effects GLS regression            Number of groups  =        11
Group variable (i): ID                           Wald chi2(4)      =    336.17
maximum lag: 2                                   Prob > chi2       =    0.0000
corr(u_i, Xb) = 0 (assumed)                      overall R-squared =    0.0667
```

AssetQualityNPL	Coef.	Drisc/Kraay Std. Err.	t	P>|t|	[95% Conf.	Interval]
CapitalStructuredebttoequity	-.0181127	.0063623	-2.85	0.019	-.0325053	-.0037201
FirmSize	.0245806	.0065611	3.75	0.005	.0097385	.0394228
Inflation	.0033452	.0020707	1.62	0.141	-.0013389	.0080294
GDP	.0030101	.0028789	1.05	0.323	-.0035024	.0095226
_cons	-.4917393	.1156985	-4.25	0.002	-.7534674	-.2300112
sigma_u	.03537853					
sigma_e	.05955134					
rho	.26086696	(fraction of variance due to u_i)				