

**THE DETERMINANT OF BANK INTEREST RATES SPREADS IN
GHANA**

By

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DEDICATION

There are a number of people without which this thesis might not have been written and to whom I am greatly indebted. First and foremost, I dedicate this thesis to my loving wife and my two beautiful daughters, Aseda Madina Mettle and Ayeyi Dedaa Mettle.

I also dedicate this work to all my family members, friends and my church members, especially, Reverend Mark Obeng for their immense support and contribution.

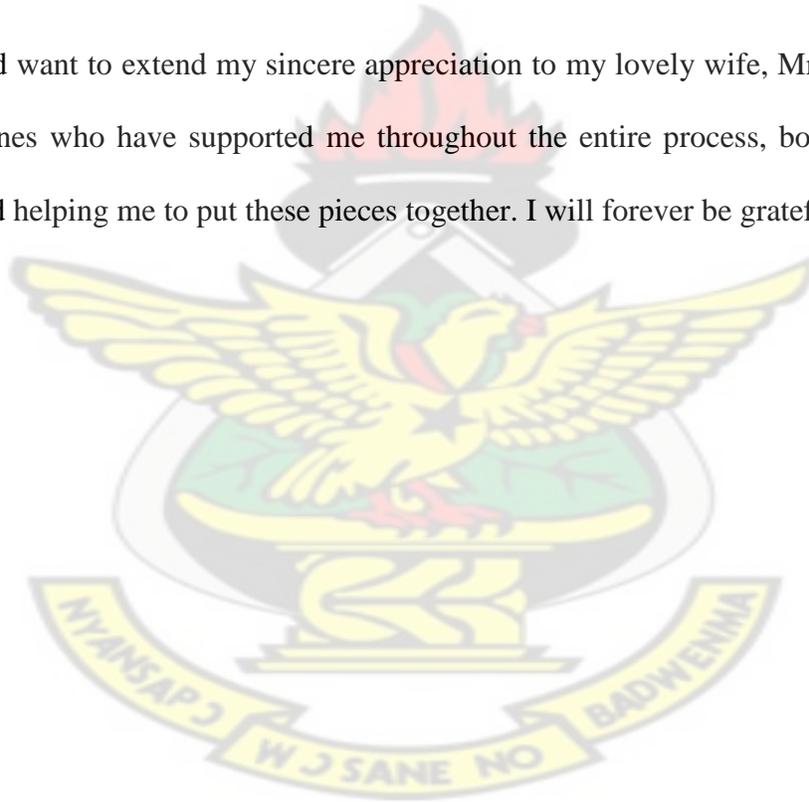


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ABSTRACT

In Ghana, there is a widespread perception that interest rate spread is too wide. Banks, on the other hand, had justified the wide interest rate spread on the basis of some economic variables that affect the banks. The purpose of this study is to examine the determinants of the bank interest margin in Ghana. This study therefore examines the determinants of banking sector interest rate spreads in Ghana. Based on the availability of data, the study focused on some banking industry-specific and macroeconomic determinants of (IR) spread. This study used exploratory and explanatory approaches. The exploratory methodology was used to identify the factors affecting determination of interest rate spreads and an explanatory approach was employed to establish how the factors affect the determination of interest spread in Ghana. The study found that factors affecting the determination of interest rate spread in Ghana are GDP, Exchange Rate, Prime Rate, Treasury Bill Rate, Liquidity, Overhead Costs, Loan Loss Provisioning and Profit Margin.

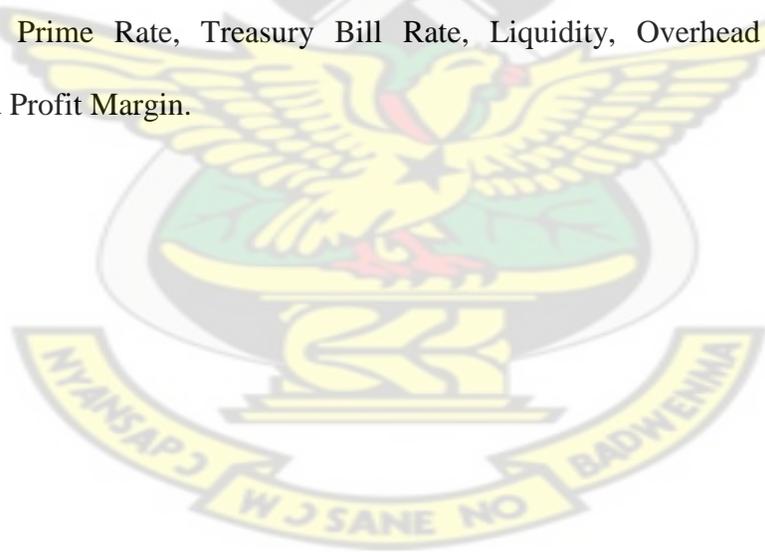


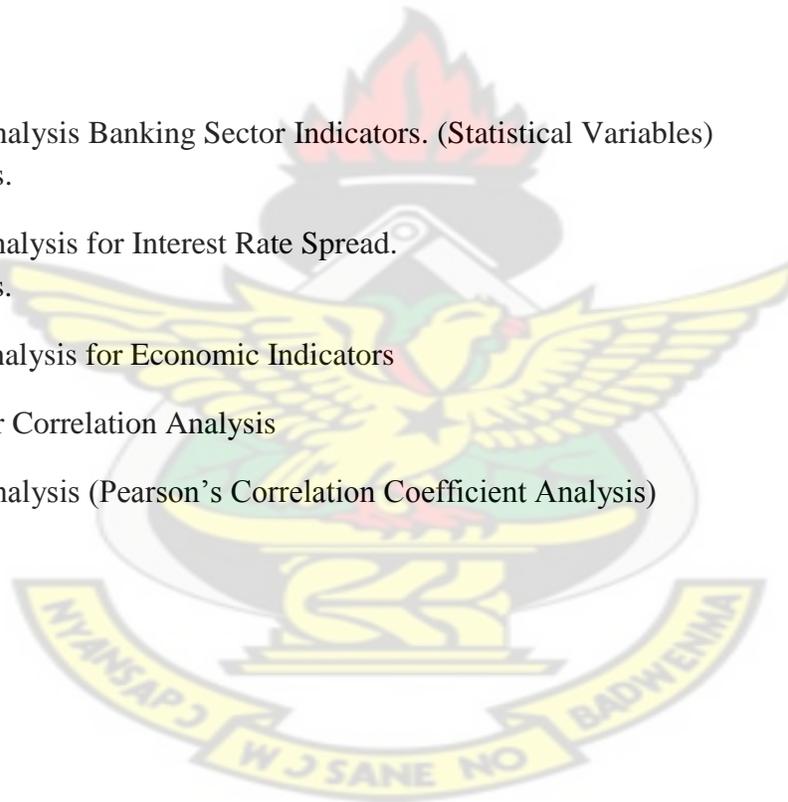
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LIST OF ABBREVIATIONS

EXR	Exchange Rate
GDP	Gross Domestic Product
HHI	Herfindahl-Hirschman Index
INFL	Inflation
IRS	Interest Rate Spread
LIR	Lending Interest Rate
MPC	Monetary Policy Committee
PRIMR	BoG Prime Rate
RMS	Real Money Supply
SSA	Sub-Saharan African
TBIL	Treasury Bill



CHAPTER 1

INTRODUCTION

Overview

This study contributes to the literature on the determinants of interest rate spreads by using actual loan and deposit interest rate data to examine the macroeconomic and market specific determinants of banking sector spreads in Ghana. Numerous variables exogenous to the operations of commercial banks have been widely touted in academic literature and popular discourse to be important factors causing the typically high spreads in Ghana and other developing countries.

Despite the widespread implementation of costly financial sector reform programs in Ghana, banking sectors in Ghana and many developing countries are still characterized by persistently high interest rate spreads. Studies by Randall (1998), Gelbard and Leite (1999), and Brock and Rojas-Suarez (2000) all show that interest rate spreads in Sub-Saharan Africa, Latin America and the Caribbean are wider than in Organization for Economic Co-operation and Development (OECD) countries. This is indicative of inefficiency in the banking sectors of developing countries, as it is now widely acknowledged that interest rate spreads are an adequate measure of bank intermediation efficiency (Sologoub 2006:2). Such spreads reflect the costs of intermediation that banks incur, inclusive of their normal profits (Robinson 2002:5).

1.1 Background of the study

One of the expected benefits of financial liberalization and deepening of the financial sector is the narrowing of the interest rate spread which is the difference between the interest rate charged to borrowers and the rate paid to depositors. This is predicated on the understanding that liberalization enhances competition and efficiency in the financial sector. Thus, a wide deposit-lending interest rate spread could be indicative of banking sector inefficiency or a reflection of the level of financial development (Folawewol and Tennant, 2008). Embedded in the spread, is the information on the efficiency of financial intermediation, profitability, monetary policy impact, among others. An analysis of bank interest rate spreads is therefore central to the understanding of the financial intermediation process and the macroeconomic environment in which banks operate.

The issue of Bank interest spreads in Ghana has generated considerable public debate recently as the gains of the macro stability have not been translated into significantly declining interest rate spreads. According to Bawumia et al (2005), interest rate spreads within the Ghanaian banking industry are among the highest in Africa. Ghana's experience with the aim of liberalizing the interest rates through financial sector reforms has rather shown a widening interest rate. The period of liberalization has been characterized by high implicit costs with tight monetary policy achieved through increased reserves and cash ratios (Bawumia et al, 2005).

The purpose of this study is to examine the determinants of the bank interest margin in Ghana. This study therefore examines the determinants of banking sector interest rate spreads in Ghana.

Based on the availability of data, the study focused on some banking industry-specific and macroeconomic determinants of interest rate spread.

1.2 Statement of the problem

While the McKinnon and Shaw theoretical framework posits low real interest rates is a disincentive to savings, thus the financial sector should be liberalized for real interest rates to increase, thereby reversing the disintermediation process and increasing the availability of credit, the models of Stiglitz and Weiss (1981) assert interest rates cannot be the main allocator of credit as it can be used as a screening device between high risk and low risk borrowers who rather have the potentials to invest. More currently, there is the growing belief that interest rates must be low for private investments to be boosted. It thus appears there is some level of inconsistency in the linkage between interest rates and the demand for credit.

The problems associated with high interest rate in Ghana have led to industry stakeholders suggesting for reduction in the interest rate in Ghana. The failure to reduce the interest rate spreads are known to emerge from the following problems:

- Lack of changes in the structure and institutional behaviour of the banking system shown by concentration, the conditions of free entry and competitive pricing.
- High reserve requirements, which act as implicit financial tax. While reserve requirements may be designed with the aim of protecting depositors, the availability of a pool of resources allows for financing high fiscal deficits through the implicit financial

tax, creating an environment that can promote high inflation and persistent high intermediation margins.

- Adverse selection and adverse incentive (moral hazard) effects, which could result in mounting non-performing loans and provision for doubtful debts.
- High operational costs have also been found to be a source of persistent and wide intermediation spreads in developing countries. Operational costs reflect variations in cost of capital, employment, and wage levels. Inefficiency in bank operations may also be shifted to bank customers through wide margins.
- The cost of capital that banks hold to cushion themselves against risks is relatively more expensive than debt because of taxation and may lead to high spreads.
- Macroeconomic instability and the policy environment may also affect the pricing behaviour of commercial banks.

This study is an attempt at addressing the issue of the determinants of interest rate spreads in Ghana empirically, through income statement and balance sheet analysis as well as econometric estimations.

1.3 Objectives of the study

The main aim of the study is to examine the determinants of interest rate spreads in Ghana. It also seeks to ascertain how macroeconomic and banking sector indicator affects interest rate spread in Ghana. The study also intends to find out the level of interest rate spreads in terms of deposit interest rate and lending interest rate.

1.4 Research questions

In pursuance to achieving the above objectives, the study is guided by the following research questions:

- What are the determinants of interest rates spread?
- How do some macroeconomic indicators affect interest rate spread?
- What is the level of interest rate spreads in terms of deposit interest rate and lending interest rate?

1.5 Significance of study

This study will serve as a source reference to the researchers of similar interest and by so doing contribute to existing literature on the topic under study. It will help to enrich the knowledge of future researchers and students who wish to broaden their understanding on this topic.

The study will provide a comprehensive resource material for policy makers in the banking, non-financial institution as well as other business communities on the effect of high interest rate and how to tackle the problem high interest rate.

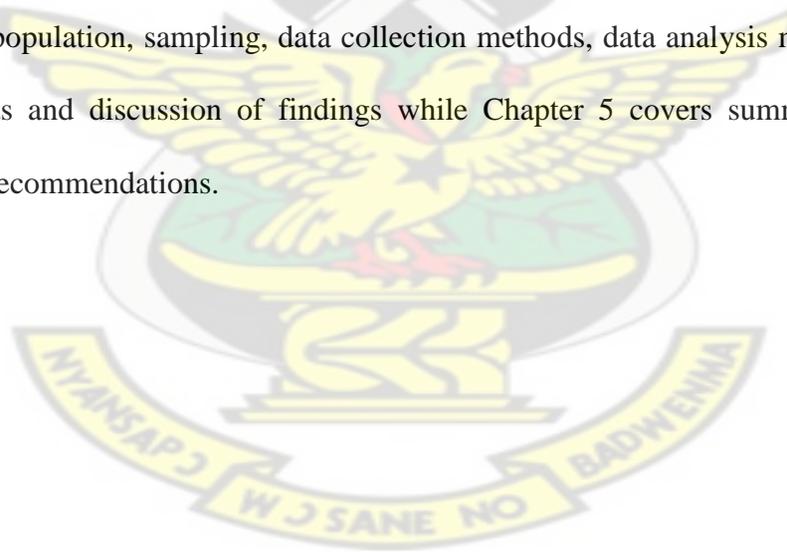
1.6 Scope and Limitation of the Study

A study of the determinants of interest rate spreads in Ghana needs wider coverage in terms of countrywide examination of all factors deemed necessary, to enhance the quality of this study. However, the study was limited by resource and time constraints. Lack of financial resources and adequate time coupled with inability to get adequate data could not permit the involvement of other equally important factors to fully address the research questions. In this vein, the study

focused on GDP, inflation, exchange rate, prime rate, Treasury bill rate, liquidity, cost of operation, loan loss provisioning and profit margin of banks. Despite the limitations, compressive study was conducted leading to the achievement of the research objectives.

1.7 Organization of the Study

The entire study is structured in 5 chapters. Chapter 1 is dedicated to the background to the study, statement of the problem, research objectives, research questions, significance of the study, scope and limitation of the study and organization of the study. Chapter 2 is devoted to literature review, thus various views from different authors on determinants of interest rate spreads reviewed. Chapter 3 concentrates on methodology of the research and this covered the research design, population, sampling, data collection methods, data analysis models. Chapter 4 focuses on results and discussion of findings while Chapter 5 covers summary of findings, conclusions and recommendations.



CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

This chapter is a review and appraisal of the literature supporting the research objectives. It reviews interest rate spreads and its determinant. Interest rate spread consists of several components: operating cost, profits, reserves and provisions for bad debts based on the accounting perspective. These components are a reflection of micro and macro variables which affect the spread, such as efficiency, type of ownership, concentration of market power and the regulatory framework under which banks operate.

2.1 Overview of Interest rate spread

Over the past few years, interest rate spread of commercial banking system has caught researchers' attention throughout the world. As financial intermediaries, banks play a crucial role in the operation of most economies. The efficiency of financial intermediation can affect economic growth. Fundamentally, financial intermediation affects the net return to savings and the gross return to investment (Demirguc-Kunt & Huizinga, 1999).

Demirguc-Kunt and Huizinga again report that the bank interest rate spread is positively influenced by the ratio of equity to lagged total assets, by the ratio of loans to total assets, by the ratio of overhead costs to total assets, by inflation rate, and by the short-term market interest rate in real terms. The ratio of non-interest earning assets to total assets, on the other hand, is negatively related to the bank interest margin.

Another school of thought is concerned with the adjustments of bank interest rates to the market interest rate. These studies show that, in the long run, one cannot reject the hypothesis that bank interest rates follow the market interest rate in a one-to-one basis, that is, there is full adjustment to changes in the market interest rate. In the short-run, though, the departures of bank interest rates from the market interest rate are relevant and there is some evidence that adjustments towards the long run equilibrium are asymmetric, i.e the adjustment varies according to whether one observes positive or negative unbalances.

According to the prior researchers, interest rate spread (IRS) is described in several ways. IRS is a key variable in the financial system when it is too large. It is generally regarded as a considerable impediment to the expansion and development of financial intermediation. This often discourages potential savers with low returns on deposits and limits for financing potential borrowers, thereby reducing feasible investment opportunities and the potential growth of the economy (Barajas, Steiner, and Salazar, 1999). Robinson (2002) highlights that loan rates charged by commercial banks can be separated into two major components. One is the interest rate paid to depositors and the other rate is risk premium. IRS can also be defined as the difference between average interest rate earned on interest earning assets (loans) and average interest rate paid on deposits (Jayaraman and Sharma, 2003).

The magnitude of interest rate spread is dependent on the determinants or factors which determine the spread. Such determinants include inflation, growth of output and money market real interests which are all macroeconomic variables. Jayaraman and Sharma (2003) recognized the reasons for high IRS as lack of adequate competition, scale diseconomies due to small size of

markets, high fixed and operating costs, high transportation costs of funds perceived market risks and the risk profile of the bankers. Khawaja and Din (2007) examine to what extent macro-economic variables influence the IRS. The central bank influences the yield on treasury bills of a country, which in turn affects the deposit and lending rates.

There is some evidence of price rigidity in local deposit markets with decrease in deposit interest rates being more likely than increases in these rates in the face of changes in the market interest rate (Hannan and Berger, 1991). One reason for such behavior is market concentration: banks in concentrated markets were found to exacerbate the asymmetric adjustments (Neumark and Sharpe, 1992).

The same sluggishness has been observed for the loan interest rate. Cottarelli and Kourelis (1994) apply a two-step approach to investigate the reasons for the stickiness of bank lending rates for a sample of countries. In the first step, the impact multipliers of changes in the market interest rate are calculated for each country in the sample. In the second step, such impact multipliers are regressed against a large set of explanatory variables controlling for cross-country differences in the competition within the banking system, in the extent of money market development of the financial system.

The market or industry-specific determinants of spreads included account for the impacts of the structure and development of the banking sectors in the Ghana, prescribed reserve requirements, and economies/diseconomies of scale, as determined by market size. The structure and development of the banking sector is captured using two proxies- the Bank/GDP ratio and Real

Per Capita GDP. As in Demirguc-Kunt and Huizinga (1998) the bank/GDP ratio (BANKDEV) is calculated as the total assets of commercial banks divided by current GDP. This ratio reflects the overall level of development of the banking sector, and the level of inter-bank competition in well-developed banking sectors. This ratio is expected to have a negative correlation with the dependent variable, as an improvement in the level of banking sector development and competition should force down banking sector interest rate spreads (IRS). Real per capita GDP (RGDPpc) should have a similar effect on IRS, as it is as a general index of economic development, and should therefore reflect 'differences in banking technology and the mix of banking opportunities' (Demirguc-Kunt and Huizinga, 1998).

An argument has been made to explain the failure of spreads in developing countries to converge to international levels even after financial liberalization, suggests that high interest rate spreads in developing countries will persist if financial sector reforms do not significantly alter the structure within which banks operate (Chirwa and Mlachila, 2004). This structure refers to the market/industry and macroeconomic environment in developing countries. The market-specific determinants of commercial bank interest rate spreads highlighted in the literature typically include lack of adequate competition in the banking sector and consequent market power of commercial banks, the degree of development of the banking sector, and explicit and implicit taxation – such as profit taxes and reserve requirements. Cross-country studies have also established that interest rate spreads for Banks tend to fall as institutional factors improve. Such factors include the efficiency of the legal system, contract enforcement, and decreased levels of corruption, which are all critical elements of the basic infrastructure needed to support efficient banking.

2.2 Economy of Ghana

The economy of Ghana, Africa, has a diverse and rich resource base, and as such, has one of the highest GDP per capita in Africa. Ghana is one of the top-ten fastest growing economies in the world, and the fastest growing economy in Africa. Ghana remains somewhat dependent on international financial and technical assistance as well as the activities of the extensive Ghanaian diaspora. Gold, timber, cocoa, diamond, bauxite, manganese, and many other exports are major sources of foreign exchange. An oilfield which is reported to contain up to 3 billion barrels ($480 \times 10^6 \text{ m}^3$) of light oil was discovered in 2007. Oil exploration is ongoing and, the amount of oil continues to increase. The six (6) main industries that contribute strongly to the economy and therefore the GDP of Ghana are Agriculture, Mining, Petroleum, Manufacturing, Energy and Services which include tourism.

The domestic economy revolves around services, which accounts for 48.5% of GDP and employs 28% of the work force. On the negative side, public sector wage increases and regional peacekeeping commitments have led to continued inflationary deficit financing, depreciation of the Cedi, and rising public discontent with Ghana's austerity measures. Furthermore, according to the World Bank, Ghana's per capita income has barely doubled over the past 45 years. Even so, Ghana remains one of the more economically sound countries in all of Africa.

The country has, since July 2007, embarked on a currency re-denomination exercise, from Cedi (¢) to the new currency, the Ghana Cedi (GH¢). The transfer rate is 1 Ghana Cedi for every 10,000 Cedis. Ghana has embarked upon an aggressive media campaign to educate the public about what re-denomination entails.

Value Added Tax is a consumption tax administered in Ghana. The tax regime which started in 1998 had a single rate but since September 2007 entered into a multiple rate regime. In 1998, the rate of tax was 10% and amended in 2000 to 12.5%.

2.3 Interest Rates and Monetary Policy

The 2002 Bank of Ghana Act sets the stage for the transition to inflation targeting by recognizing the independence of the central bank to set interest rates. The Act mandates that the primary objective of the Bank of Ghana's monetary policy is price stability (in the law, growth and exchange rate stability are secondary policy objectives). The Monetary Policy Committee (MPC) was created in 2002 and was charged with the formulation of monetary policy. Formal inflation targeting started in May 2007, but in the preceding period the Bank of Ghana developed the institutional capacity necessary for implementing the inflation targeting regime (Addison, 2008), and during this transition period Ghana's central bank moved away from the traditional monetary policy framework that was focused on targeting a monetary aggregate, towards analyzing a broader range of indicators to assess its monetary policy stance.

The shift to inflation targeting was preceded by other important changes in the financial system, including the liberalization of exchange and interest rate controls, and the partial opening of Ghana's external capital account, which allowed for the first time foreigners to participate in the longer-end of the domestic bond market, while Ghanaian residents would be able to hold foreign currency bank accounts. The exchange rate is floating but has remained remarkably stable against the U.S. dollar during the past year. Domestic capital markets have also started to

develop, which has brought new investment options to the Ghanaians (such as stocks, treasury bills and bonds). Furthermore, new payment instruments, such as credit and debit cards, have started making inroads in the Ghanaian economy and are expected to reduce the demand for cash in daily transactions, while modern payment technology and electronic banking are expected to expand banking services to the rural communities deprived of such options (see, for instance, Buchs and Mathisen (2005) and International Monetary Fund (2011) for discussion on Ghana's financial system).

Such changes in the financial system often lead to instability in the demand for money and can cause important shifts in the monetary transmission mechanism, complicating monetary policy implementation. In particular, when a central bank in such instances continues to target a money aggregate, such as reserve money, policy effectiveness resting on the stability of the monetary transmission mechanism and the constancy of money velocity may be compromised due to the loss of stability in reality. An important argument, therefore, for moving to inflation targeting, and adopting a short-term interest rate as the operating target, is that such a regime does not depend on the stability of money demand (for instance, Mishkin, 1999). When the relationship between money and inflation is subjected to unexpected shifts, as is often the case when the financial sector goes through significant reforms, monetary targets lose their transparency and cannot accurately signal the underlying stance of monetary policy.

Through open market operations, the central bank is able to manage liquidity in the interbank market and thereby the cost of borrowing in this market. In the long-run, therefore, the interbank interest rate is expected to reflect the Monetary Authorities' Policy stance. In the absence of

expected liquidity injections or leakages by the central bank, the bank's end-of-day settlement needs are symmetrically distributed around a zero mean (see, for instance, Henckel, Ize, and Kovanen (1999)). Assuming that the central bank leaves the money market short in the end of the day (in the model denoted by the term u), this will increase the demand for bank reserves at the central bank.

Furthermore, Kovanen (1999) introduces uncertainty in the bank's end-of-day settlement positions, denoted by v in the model, which provides another link to central bank's reserves. In the absence of any uncertainty, provided that borrowing from and lending to the central bank is always costly, banks would not come to the central bank window for funds. However, sometimes incoming or outgoing payment transactions do not arrive as planned, but are subject to delays or arrive earlier than initially thought, suggesting that banks do not usually know ex ante their end-of-day balances with full certainty. As discussed in Henckel, Ize, and Kovanen (1999), settlement uncertainty will be higher when the interbank and securities markets do not operate efficiently and the clearing and settlement systems are weak. Uncertainty about the central bank's liquidity management would also increase settlement uncertainty, hence the demand for reserves, and when the central bank does not offset the liquidity impact of its own operations but leaves the wholesale market in aggregate short or long.

2.4 Theories of Interest Rates

Interest rate is the price of money that is the amount of interest paid per unit of time expressed as a percentage of the amount borrowed. The cost of borrowing money, measured in cedis, per year per cedis, borrowed, is the interest rate. Interest rates differ mainly in term/maturity that is the

length of time for repayment and liquidity that is quick conversion of assets to funds. When maturity and liquidity together with other factors are considered, many different financial instruments and so many different interest rates will emerge (Anyanwu, 1997). Interest rates can either be nominal or real. Nominal interest rate can be measured in naira terms, not in terms of goods. The nominal interest rate measures the yield in cedi per year, per cedi invested while the real interest rate is corrected for inflation and is calculated as the nominal interest rate minus the rate of inflation (Pandey, 1999).

Anyanwu (1990) explicated the following interest rate theories: (a) the classical theory, (b) the loanable funds theory, (c) the Keynesian theory and (d) the modern theory of interest or the Hicks-Hanson IS - LM Model.

2.4.1 The Classical Theory

The classical theory of interest otherwise called the supply and demand theory of saving maintained that the rate of interest is determined by the supply and demand for capital by businessmen and house hold respectively. The supply of capital is governed by the time preference and the demand for capital by the expected productivity of capital. The classical theory fails to proffer solution hence indeterminate.

2.4.2 The Loanable Funds Theory

This is a flow theory that determines the interest rate by the interaction of demand for and supply of loanable funds or credit. It involves the linking of the interest rate with non-saving, investment and hoarding of funds sourced from government, businessmen and consumers, on the

demand side with saving, dishoarding and bank money on the supply side from private individuals and corporate bodies. Hansen asserted that the loanable funds theory like the classical and the Keynesian theories of interest are indeterminate unless the income level is already known.

2.4.3 Keynesian Liquidity Preference Theory

Keynesian liquidity preference theory is a stock theory. The theory determines the interest rate by the demand for and supply of money. It emphasizes that the rate of interest is a purely monetary phenomenon as distinct from the real theory of the classics. It is a stock analysis because it takes the supply of money as given during the short run and determines the interest rate by liquidity preference or demand for money.

2.5 Interest Rate Spreads

Interest rate spread is defined by market microstructure characteristics of the banking sector and the policy environment. In differentiating between the pure spread and the actual spread Ho and Saunders (1981) observe that pure spread is a microstructure phenomenon, influenced by the degree of bank risk management, the size of bank transactions, interest rate elasticity and interest rate variability. Zarruk (1989), considering risk management by the bank, found that risk-averse banks operate with a smaller spread than risk-neutral banks, while Paroush (1994) explains that risk aversion raises the bank's optimal interest rate and reduces the amount of credit supplied. Actual spread, which incorporates the pure spread, is in addition influenced by macroeconomic variables including monetary and fiscal policy activities. Hanson and Rocha (1986) emphasize

the role of direct taxes, reserve requirements, cost of transactions and forced investment in defining interest rate spread.

2.5.1 Market structure

Market structure encompasses the degree of competition, which reflects the number of market players and the diversity of financial assets, the market share of individual participants, ownership structure and control, policy regime (controlled vs uncontrolled), and the adequacy of the legal and regulatory framework (Fry, 1995). In a market where the government sets interest rates and credit ceilings, allocation of resources is inefficient because of uneven credit rationing criteria and the lack of incentive by banks to compete for public deposits. In addition, the allocation of funds to poor performing sectors increases the credit risk for commercial banks. With interest ceilings, however, banks are constrained in charging the appropriate interest rate on loans, and the only option is to offer the minimum possible interest rate on deposits. Further, the presence of government owned and controlled banks create an uncompetitive environment and to some extent make it difficult to enforce the set regulatory framework, weakening the stability of the banking sector.

Financial reform emphasizes the abolition of interest rate and credit ceilings and the promotion of a competitive environment with reduced government control and ownership. Although achieving competitiveness does not imply nonexistence of an interest rate spread, Ho and Saunders (1981) note that the size of the spread is much higher in a non-competitive market, which also calls for strengthening the regulatory and legal framework to enhance the stability of the market. Caprio (1996) notes that a weak legal system, where the courts are not oriented

toward prompt enforcement of contracts and property rights are ill defined, increases credit riskiness and banks have no incentive to charge lower rates.

Cho (1988), in addition, observes that the liberalization theory overlooks endogenous constraints to efficient allocation of resources by the banking sector, where, in the absence of a well-functioning equities market, efficient allocation of capital is not realized even with financial liberalization. Fry (1995) explains that in the absence of direct financial markets and an equity and bonds market, financial institutions absorb too much risk, as business enterprises rely excessively on debt finance. Thus, conclude Demirguc-Kunt and Huizinga (1997), the interest spread fluctuates, reflecting the substitution between debt and equity financing. As the equity market expands, offering competitive returns, banks increase their deposit rates to compete for funds from the public. The expanded market also reduces the risk absorbed by the banking sector and banks charge competitive lower lending rates, reducing the interest rate margin. Thus, remarks Fry (1995), even in an oligopolistic banking system, there is need for competition from the direct financial market.

Empirical results show that market imperfections widen the interest rate spread. Ho and Saunders (1981), approximating market power with bank size, found a significant difference in spread between large and small banks, where smaller banks had higher spreads than the large banks. Barajas et al. (1996) also show a significant influence of loan market power on the interest spread. Elkayam (1996) observes that in a competitive banking system. The interest rate spread derives solely from central bank variables (including the discount window loans, reserve requirement and interest on liquid assets on deposit with the central bank), while under a

monopolistic (or oligopolistic) structure the interest rate spread is in addition affected by elasticity of demand for credit and deposits. He also found that there was more market power in the credit market than the deposit market. In addition, considering monetary policy, Elkayam (1996) found that an increase in money supply under elastic demand reduces the spread more in a monopolistic than in a competitive market.

2.5.2 Legal and regulatory framework

The regulatory and legal framework influences the functional efficiency of banking institutions and thus defines financial stability. In the reform process, financial stability is identified as a prerequisite for successful financial liberalization. Financial instability, with unsound and improperly supervised lending practices, increases the risk premium charged on loan rates and widens the spread. This is because weak supervision gives rise to moral hazard and adverse selection problems. With adequate supervision an increase in interest rates results in banks' rationing credit instead of taking new borrowers. However, regulatory differences across financial institutions destabilize the financial sector by diverting intermediation into the informal, less regulated and less taxed part of the sector. The legal framework incorporates the adequacy of commercial law and the efficiency with which the judicial system makes and enforces legal decisions. Weaknesses in enforcement of financial contracts create credit management problems and the premium charged on credit increases. This is because banks are unable to make agreements that limit the ability of borrowers to divert funds away from the intended purpose, to disclose accurate information on borrowers, and to write easily enforceable legal contracts. On the other hand, a weak legal system without clearly spelled out property rights denies the diversity of institutions a chance to diversify risk. Banks have no incentive to invest in

information and human capital, which propels the information asymmetry problem. In their study, Demirguc-Kunt and Huizinga (1997) found that better contract enforcement, efficiency of the legal system and lack of corruption are associated with lower realized interest margins. This is because of the reduced risk premium attached to the bank lending rate. As Fry (1995) explains, liberalization in the presence of inadequate prudential supervision and regulation magnifies the impact of exogenous shocks by accommodating distress borrowing. Notable is that in developing countries, regulations exist on paper but in practice, they are not enforced consistently and effectively.

A deposit insurance scheme is instituted to protect the depositors and maintain the stability of the financial sector. However, insurance (explicit or implicit) promotes moral hazard and adverse selection problems. Fry (1995) argues that adverse selection arises with deposit insurance schemes, especially if they are accompanied with high macro instability. On the other hand, banks never seek to reduce adverse selection in credit rationing, especially if there is a positive relationship between instability and returns on alternative banking financed projects. With protection for depositors provided, banks choose riskier lending strategies especially if macro instability produces strongly correlated outcomes. Thus, in setting up explicit insurance schemes, the banking system must be fairly stable, prudential regulation and bank supervision effective, and funding for the depository fund adequate. Also, the fund should have the necessary backup support that may be required to get the system through a period of stress.

2.5.3 Taxation

Both implicit and explicit taxes widen the interest spread as they increase the intermediation costs. These include: reserve requirement, withholding taxes, stamp duties, transaction taxes, value added taxes, profit taxes and license fees. Reserve and liquidity requirements, mandatory investment levels, and interest controls are categorized as implicit taxes. A reserve requirement with no interest payment tends to have a higher opportunity cost as it squeezes the excess reserve available for banks to advance credit, reducing the bank's income earning asset. However, Fry (1995) observes that the impact of a reserve requirement will depend on the elasticity of loan and deposit interest rates. On the other hand, mandatory investment, where banks continue providing funds to priority sectors despite the rate of return, squeezes the bank profit margin if the sector's investment yield is low. And interest rate controls limit the bank's efforts to capture high yielding investments.

Explicit taxes, just like the implicit taxes on the financial intermediation process, may provide a negative effective protection to the domestic financial system and encourage financial intermediation abroad especially if there is tax discrimination. Discriminatory taxation of financial intermediation reduces the flexibility of the system by significantly reducing the funds for discretionary lending. Tax discrimination also leads to financial sector instability by driving intermediation into the informal, less regulated and less taxed part of the market. The presence of explicit and implicit taxes also discourages the development of the inter-bank market, which can play a major role in improving resource allocation and the effectiveness of monetary policy. With heavy taxation at the interbank market, all financial transactions make short-term overnight borrowing uneconomical, and increase the reliance on central bank discount

facilities that provide inexpensive and unlimited loans to banks in need of funds. In case the discount facility is restrictive, however, then banks may face liquidity problems and be forced to offer attractive deposit rates to attract more deposits. Conversely, interest ceilings prevent banks from negotiating terms of inter-bank loans and insufficient penalties for shortfalls in required reserves. Barajas et al. (1996) and Demirguc-Kunt and Huizinga (1997) saw a positive relationship between high interest rate spreads and high levels of taxation of the intermediation.

2.5.4 Macroeconomic environment

The macroeconomic environment affects the performance of the banking sector by influencing the ability to repay borrowed loans; the demand for loans with the unpredictable returns from investment and the quality of collateral determine the amount of premium charged and therefore the cost of borrowed funds to the investors. With an unstable macroeconomic environment and poor economic growth, investors face uncertainty about investment return and these raise the lending rates as the level of nonperforming loans goes up, reducing the bank margin. For example, poor output prices reduce firm profitability while reduced asset prices reduce the value of assets for collateral and therefore the credit-worthiness of the borrowers. As a result, return on investment declines, increasing the level of non-performing loans, and banks charge high-risk premiums to cover their default risk.

Cukierman and Hercowitz (1990) attempt to explain the relationship between anticipated inflation and the degree of market power measured as the spread between the debit and credit rates. They find that when the number of banking firms is finite, an increase in anticipated inflation leads to an increase in interest spread. When banking firms approach infinity

(competitive case), there is no correlation between interest spread and inflation because the spread tends towards marginal cost of intermediation as the number of banks increases.

i. Real Money Supply (RMS)

Money supply (also referred to as money stock) is the amount of money in an economy, measured according to the varying methods or principles. One such method incorporates only money that is usually used to purchase goods and services. Money supply can also be said to the entire stock of currency and other liquid instruments in a country's economy as of a particular time. The money supply can include cash, coins and balances held in checking and savings accounts. Economists analyze the money supply and develop policies revolving around it through controlling interest rates and increasing or decreasing the amount of money flowing in the economy.

An increase in the supply of money typically lowers interest rates, which in turns generates more investment and puts more money in the hands of consumers, thereby stimulating spending. Businesses respond by ordering more raw materials and increasing production. The increased business activity raises the demand for labor. The opposite can occur if the money supply falls or when its growth rate declines.

ii. Risk factors

Banks are exposed to various risks, including interest risk, credit risk, foreign exchange risk and legal risk, as a result of uncertainty, information asymmetry and the policy environment. For

example, when banks hold unmatched maturities of deposits and loans they are exposed to interest rate risk. This is especially so when banks raise funds through short-term deposits to finance long-term loans or purchase security with longer maturity. Interest rate risk is also defined by variability of the market interest rate. Banks are exposed to credit risk due to information asymmetry. Banks do not know ex ante the proportion of loans that will perform and even when they carry out appraisals, credit losses are not fully eliminated. To cover credit risk, banks charge a premium whose size depends on the bank credit policy, interest on alternative assets, amount borrowed, type of client and size of collateral. This increases the effective rates paid by borrowers and reduces the demand for loans. Foreign exchange risk arises especially when banks fund themselves abroad, while legal risk is faced when the legal framework for collateral and bankruptcy is not clear. Liquidity risk arises if depositors demand to withdraw their funds and leave the banks with insufficient reserves (for example during a bank run customers withdraw their deposits in response to their loss of confidence with the bank).

iii. Interest rate elasticity

Interest rate elasticity reflects market power. The lower the elasticity, the greater the monopolistic power and the wider the spread. The effect is greater with an undiversified asset basket and with an underdeveloped money market. Elkayam (1996), assuming market power in both the deposit and the loan markets, concludes that interest spread depends on the elasticities of demand for credit and deposit. The higher the elasticity, the more competitive the market and the narrower the spread.

2.6 Empirical Studies on Interest Rate Spread

Brock and Franken (2003) studies interest rate spread in Chile, showing that that the influence of industry concentration, business cycle variables, and monetary policy variables on interest rate spreads differs markedly depending on whether the spreads are computed from balance sheet data or from disaggregated loan and deposit data. Gambacorta (2004) studies factors explaining cross-sectional differences in bank interest rates of Italian banks by considering both micro and macroeconomic factors. The variables considered include:

- (i) loan and deposit demand
- (ii) operating cost, credit risk and interest rate volatility
- (iii) impact of monetary policy through changes in policy rates and reserve requirements and
- (iv) the structure of the industry. Results showed that interest rates on short term lending of liquid and well capitalised banks react less to monetary policy shocks.

In addition, banks that predominantly lend for long term do not change their interest rates more frequently as those whose lending is largely for short term. Bank size was found to be irrelevant in influencing interest rate margins. According to Gambacorta (2004), lending rates have a positive relationship with real GDP and inflation. An increase in real economic activity makes projects that would otherwise appear unfeasible become profitable when discounted to the present. The increase in economic activity therefore increases demand for credit. An increase in real GDP and inflation are negatively related with deposit rates. When the economy is booming, it pushes up demand for deposits and therefore banks have no incentive to increase deposit rates.

With respect to operating cost and credit risk, an increase in the cost of financial intermediation leads to higher lending rates as banks attempt to recoup the costs. These include costs incurred in assessing the risk profile of borrowers, monitoring of the various projects for which loans have been advanced and reaching out to as many people and geographical areas as possible through expansion of branch network. On the other hand, an increase in the volatility of the money market interest rate drives up both deposit and lending rates. According to Gambacorta (2004), changes in monetary policy can affect deposit and lending rates through the interest rate, bank lending and bank capital channels. For instance, a monetary tightening that raises policy rate and short term interest rates makes it more costly for banks to get funds and they pass these costs to borrowers through higher lending rates. The bank lending channel works through moral hazard and adverse selection. Following monetary tightening that leads to higher interest rates, banks tend to attract more risky customers and to compensate for the higher risk they increase lending rates.

McShane and Sharpe (1984) postulates a theoretical model of determining bank interest margins based on hedging behavior of interest margin determination – the dealer model of bank interest margin determination – and applies this model to Australian banks. Their model assumes the following about banks in undertaking intermediation between depositors (suppliers of funds) and borrowers (demanders of funds): (i) maximization of expected utility (ii) risk aversion in loan and deposit markets.

Loan/deposit interest margins are defined in the study as fees for financial intermediation given the randomness of loan requests and receipt of deposits, and the uncertainty in short term interest

rates. However, the study notes the narrowness of this definition of interest rate margin and embeds their model in a more general model of profit maximization. The a priori expectations are that there is a positive relationship between bank interest margins and market power, the degree of bank risk aversion, interest rate uncertainty and average transaction size.

Demirgüç-Kunt and Huizinga (1999) examines interest spreads in a cross-country set up using data covering commercial banks from 80 countries across the world. The study finds that differences in interest margins and bank profitability are explained by several factors such as bank characteristics, macroeconomic variables, explicit and implicit bank taxation and deposit insurance regulation. After controlling for factors such as differences in bank activity, the extent to which banks are leveraged, and the macroeconomic environment, they show that lower interest margins and lower profits are associated with larger banks asset to GDP ratio and a lower market concentration ratio. Additionally, foreign banks are associated with higher interest margins and higher profits compared to local banks in developing countries while the opposite is true for developed countries. Mannasoo (2012) investigates the role of the recent global financial crisis on interest spreads in Estonia. The approach follows works of Ho and Saunders (1981) in which the spread is decomposed into a pure spread and the remaining component that is explained by market structure, regulation and idiosyncratic bank factors. The pure spread is explained by the degree of bank risk aversion and the market structure of the banking sector. The volatility of money market interest rates is found to have a long-run impact on the spread. Other factors that drive the interest margins are the regulatory variables, efficiency of banks and bank-portfolio effects. Credit risk was found to play a minimal role while higher bank liquidity was associated with lower interest margin.

Grenade (2007) estimates the determinants of commercial banks interest rate spreads in the Eastern Caribbean Currency Union using annual panel data of commercial banks. The empirical model includes regulatory variables (statutory minimum savings deposit rate) as well as market power, operating costs as a ratio of earning assets, ratio of provisions for loan losses to total earning assets as a measure of credit risk, liquidity risk proxied by the ratio of liquid assets to total assets and real GDP as an indicator of economic activity. Market power is proxied by the Herfindahl-Hirschman index (HHI) computed using the market shares of loans and advances in the banking industry. The spread is found to increase with an increase in market power, the regulated savings deposit rate, real GDP growth, reserve requirements, provision for loan losses and operating costs.

Siddiqui (2012) estimates the interest rate spread in Pakistan based on individual bank specific factors using annual panel data of 22 banks. The variables include market share measured as a bank's deposits as a percentage of total deposits of the banking sector, liquidity risk variable, administrative expenses as a percentage of total assets, nonperforming loans as a percentage of net advances, net interest income as a percent of total income and return on assets after payment of tax as a percent of average assets. The spread is found to be significantly affected by administrative costs, non-performing loans and return on assets in all the regressions (pooled, fixed and random effects regressions).

Afanasieff et al (2002) applies the two-step approach of Ho and Saunders (1981) to study the interest rate spread in Brazil by estimating an unbalanced panel data model of 142 commercial banks using monthly data from February 1997 to November 2000. In the first step, it estimated a

panel model with time dummy coefficients which are then used in the second step as the dependent variable on which a measure of interest rate risk and selected macroeconomic variables are used as regressors. Unlike most studies that define the interest rate margin based on interest income and interest expense, Afanasieff et al (2002) defines the spread on the basis of lending and deposit rates as posted by banks. They find that the spread is higher the larger a bank is, the larger the operating costs, bank leverage, ratio of service revenues to operational revenues and ratio of non-interest bearing deposits to total operating assets. However, the spread is found to be negatively related to the ratio of interest-bearing funds to earning assets and foreign-ownership of banks. In a separate study that extends Ho and Saunders (1981) model, Allen (1988) treats banks as passive dealers akin to specialists on securities exchanges and consequently argues that banks change their prices as a way of changing demand for their products – deposits and loans. Lending rates are set by discounting default-risk adjusted true prices of the loan while deposit rates are determined by putting a mark-up on default-risk adjusted true price of the deposit. According to Allen (1988), the spread is therefore influenced by monopoly power and risk premium.

It has been observed that the financial systems in developing countries exhibit larger IRS than those in developed countries (Hanson and Rocha 1986, Morris *et al.* 1990, Fry 1995, Randall 1998, Barajas, Steiner and Salazar 2000, Saunders and Schumacher 2000). Researchers have attributed the existence of high IRS in developing countries to several factors, such as high operating costs, financial repression, lack of competition and market power of a few large dominant banks enabling them to manipulate industry variables including lending and deposit rates, high inflation rates, high risk premiums in formal credit markets due to widely prevailing

perception relating to high risk for most borrowers, and similar other factors (see, Agu 1992, Aryeetey, Hettige, Nissanke and Steel 1997, Barajas *et al.* 1999, Brock and Rojas-Suarez 2000, Smirlock 1985, Mujeri and Islam 2008).

In situations of risk neutrality, interest spreads are minimized since there is no need for a risk premium to compensate banks for the uncertainty surrounding the arrival of deposits and request for loans. Studies on interest rate spread with respect to African countries include those by Folawewol and Tennant (2008), Beck and Hesse (2006), Aboagye et al (2008), Ikhide (2009) and Ndung'u and Ngugi (2000). Using dynamic panel data model, Folawewol and Tennant (2008) study the determinants of interest rate spread in 33 Sub-Saharan African (SSA) countries focusing on macroeconomic variables. Their results show that interest rate spread is influenced by the extent of the crowding out effect of government borrowing, public sector deficits, discount rate, inflation, level of money supply, reserve requirement, level of economic development and population size. A more recent study on determinants of bank interest margins in SSA is by Ahokposi (2013) using a sample of 456 banks in 41 SSA countries. The results show that bank-specific factors such as credit risk, liquidity risk and bank equity are important, determinants of interest margins, but such spreads are not sensitive to economic growth. Aboagye, et al (2008) studies the response of net interest margin of banks to changes in factors that are bank-specific, banking industry specific and Ghanaian economy macroeconomic factors. It finds that an increase in the following factors increases the net interest margin of banks: bank market power (or concentration), bank size, staff costs, administrative costs, extent to which a bank is risk averse and inflation. On the other hand, an increase in excess reserves of banks, central bank lending rate and management efficiency decreases the net interest margin of banks.

Beck and Hesse (2006) uses bank-level dataset on the Ugandan banking system to examine the factors behind the consistently high interest rate spreads and margins. While foreign banks have lower interest rate spreads, there is no robust and economically significant relationship between interest spread and privatization, foreign bank entry, market structure and banking efficiency. Similarly, macroeconomic variables explain little of the over-time variation in bank spreads. Bank-level characteristics, on the other hand, such as bank size, operating costs, and composition of loan portfolio, explain a large proportion of cross bank, cross-time variation in spreads and margins. However, time-invariant bank-level fixed effects explain the largest part of bank variation in spreads and margins. Further, the study finds evidence that banks targeting the low end of the market incurred higher costs and therefore had higher margins.

Nampewo (2013) studies the determinants of the interest rate spread of the banking sector in Uganda using time series data for the period 1995 – 2010. The study applies the Engle and Granger two-step procedure to test for cointegration between the bank rate, treasury bill rate, exchange rate volatilities, the ratio of money supply to gross domestic product (M2/GDP) and the proportion of non-performing loans to total private sector credit. Results show that the interest rate spread in Uganda is positively affected by the bank rate, the Treasury bill rate and non-performing loans. On the other hand, M2/GDP ratio and real GDP have a negative influence on the spread. However the analysis is undertaken at macro level hence concealing micro and bank-specific characteristics.

2.7 Modeling interest rate spread

In modeling interest rate spread two models are used to define the spread: the accounting value of net interest margin and the firm maximization behavior. The accounting value of net interest margin uses the income statement of commercial banks, defining the bank interest rate margin as the difference between the banks' interest income and interest expenses, which is expressed as a percentage of average earning assets. However, both Hanson and Rocha (1986) and Barajas et al. (1996) criticize the accounting approach, saying that it does not indicate if there is equilibrium in economic sense or the type of market structure generated.

The firm maximization behavior, on the other hand, allows derivation of profit maximization rule for interest rate and captures features of market structure. Depending on the market structure and risk management, the banking firm is assumed to maximize either the expected utility of profits or the expected profits. And, depending on the assumed market structure, the interest spread components vary. For example, assuming a competitive deposit rate and market power in the loan market, the interest rate spread is traced using the variations in loan rate. But with market power in both markets, the interest spread is defined as the difference between the lending rate and the deposit rate.

Barajas et al. (1996) uses a combination of firm maximization behavior and the accounting approach to model the interest rate spread. The study assumes a competitive deposit rate market and market power in the loans market. When elasticity is infinite, there is no market power ($\varphi = 1$), while definite elasticity implies existence of market power ($\varphi < 1$). Super competitive solutions exist when ($\varphi > 1$). Given the competitive deposit rate and assuming linear function of

real level of financial intermediation, he defines the lending rate as a function of policy and marginal cost variables. Interest rate spread is equated to loan rate. Demircuc-Kunt and Huizinga (1997) use the accounting method, defining the spread as the interest margin. Assuming a linear relationship between the spread and various variables, they use cross-sectional data for both developed and underdeveloped countries. Zarruk (1989) compares a risk averse and a risk neutral situation and considers interest risk assuming no default risk and implicit tax (reserve requirements). A bank is assumed to be an interest spread setter as it sets both loan and deposit rates simultaneously.

Wong (1997) took the cost of goods sold and the firm maximization behavior to evaluate the determinants of the optimal bank interest margin. The model features a risk averse bank with credit risk and interest risk. The bank is assumed to be a loan rate setter and a quantity setter in the deposit market, so that deposit rate is not a choice variable and the properties of the optimal bank interest margin are similar to the optimal loan rate. The concept of market power is captured by the reciprocal of interest elasticity where a high value indicates the bank possesses more market power. Paroush (1994) models a risk neutral bank whose objective is to maximize expected profits. Credit risk in addition to the deposit and lending rates is considered as a decision variable. Collateral is used to categorize a short-run and medium-term period. Gheva et al. (1992) also assume the bank has two decision variables, loan rates and deposit rates. The bank sets both rates and allows the volumes to be set by public demand for credit and supply of deposits. The model assumes a risk neutral bank, thus a bank is out to maximize expected profits.

In addition, the model assumes that a bank is out to minimize the difference between actual (short-run) and desired (long-run) returns. To capture the adjustment process a partial adjustment model is fitted and a linear relationship assumed. Ho and Saunders (1981) integrate the hedging and expected utility approaches to analyse determinants of bank margins. Their approach assumes a bank is a dealer in the credit market, acting as an intermediary between demanders and suppliers of funds and aiming to maximize the utility of expected terminal wealth. New loans and deposits are made in a passive way so that prices and quantities are determined exogenously. The authors define the prices of loan and deposit as:

$$P_L = P - b$$

$$P_D = P + a$$

Where P is the bank's opinion of the price of loan or deposit, and (a) and (b) are fees for provision of intermediation services. Spread was defined as $(a + b)$.

Demirguc-Kunt and Huizinga (1997) note that interest margin and interest spread are different unless there are zero non-interest bearing funds. However, spread is superior to margin as an indicator of the bank policy in determining the conditions and volume of intermediation. Interest spread can be measured ex post and ex ante. Ex ante spread equals the difference between the contractual rates charged on loans and the rates paid on deposits. Ex post spread measures the difference between the bank interest revenues and their actual interest expenses. Ex ante spread is biased, however, as perceived risks are reflected in the ex-ante yields. The ex post spread problem is in terms of interest income and loan loss reserve associated with a particular loan that tend to materialize in different time periods.

CHAPTER 2

METHODOLOGY

3.0 Introduction

This chapter consists of sources of data collection and data analysis. It also constitutes the method of study, the specification of the model, the justification of the variables and the estimation procedures.

3.1 Research Design

This study used exploratory and explanatory approaches. The exploratory methodology was used to identify the factors affecting determination of interest rate spreads. Saunders et al (2007) described exploratory studies as a valuable means of finding out, seeking new insights, asking questions and assessing a phenomenon in a new context.

An explanatory approach is employed to establish how the factors affect the determination of interest spread in Ghana. Saunders et al (2007) indicated that explanatory studies establish a causal relationship between variables. The case study design is employed to find answers to the afore-mentioned research questions. The justification for this method is that it generates answers to questions such as why, what and how the factors affect interest rate spread. A case study strategy can be used in exploratory and explanatory research (Saunders et al, 2007).

3.2 Population and Sampling

The study population was banks in Ghana who were operating as at the time of the research. Due to resource constraints, purposive sampling technique was used for this study. This sampling

method is a form of non-probability sampling in which decisions concerning the individuals or sources of data to be included in the sample are taken by the researcher, based upon a variety of criteria. Some types of research design necessitate researchers taking a decision about the individual participants or sources of data which would be most likely to contribute appropriate data, both in terms of relevance and depth (Oliver, (2006).

3.3 Method of the Study

Secondary data was used in this study. Before estimation procedure, data on Interest Rates Spread, Real GDP per capita, Inflation, Exchange Rate, Prime Rate and Treasury Rate from 2004 to 2012 were obtained from the Bank of Ghana and the Ghana Statistical Service. Other relevant data were also obtained same sources on liquidity, overhead cost, loan loss provisioning and profit margins of the banks.

Prior to the above, both the theoretical and empirical data were gathered from other related studies. The analysis done in this study used secondary data because the verification process is more rapid and the reliability, availability and convenience of information regarding test research questions and its conclusion are greatly enhanced.

3.4 Model Specification and Data Analysis

The determinants of interest rate spread of the banks were identified using Multiple Regression Model Pearson's Correlation with the help of Microsoft Excel Spreadsheet. Interest Rate Spread was taken as the dependent variable while the independent variables which influence interest rate spread were taken as GDP, inflation, exchange rate, policy rate, treasury rate, liquidity, overhead

cost, loan loss provisioning and profit margin. The empirical estimation of equation is carried out using Pearson Correlation which was used in determining the relationship between the dependent variable and independent variables.

The relations between IRS and the various Economic Indicators can be expressed by the Multiple Linear Models below:

$$y = b_0 + b_1x_1 + b_2x_2 + \dots + b_px_p + \varepsilon \quad (1)$$

$$y = b_0 + \sum_i b_ix_i + \varepsilon \quad i = 1, 2, \dots, p \quad (1a)$$

Where

- y - dependent variable (predicted by a regression model)
- p - number of independent variables (number of coefficients)
- $x_i (i=1,2, \dots, p)$ - i th independent variable from total set of p variables
- $b_i (i=1,2, \dots, p)$ - i th coefficient corresponding to x_i
- b_0 - intercept (or constant)
- ε - (Epsilon) error term

Furthermore, Microsoft Excel Spread Sheet was used to process the data and generate tables and statistical diagrams like bar charts, pie charts and line graphs for the purpose of presentation.

CHAPTER 4

RESULTS AND DISCUSSION

4.0 Introduction

This chapter presents the results and analysis of data obtained from the field work through secondary sources. The chapter discusses the findings relating to the factors affecting interest rate and interest rate spreads of banks in Ghana.

4.1 Factors of Interest Rate - Economic Indicators

In order to ascertain the factors affecting interest rate in Ghana, the interests from 2004 to 2012 were correlated with individual factors and these GDP, Inflation, Exchange Rate, BoG Prime rate and T-Bill Rate covering 2004 to 2012. The purpose of this was to help find whether the any relationship between interest rate and the above factors. The table below illustrates the interest rate and the selected factors for 2004 to 2012

Table 4.1 Descriptive Statistics of the Variables

Economic Indicators						
Year	Lending Interest Rate	GDP	Inflation (period average)	Exchange Rate (GHS to USD)	BoG Prime Rate	T-Bill Rate
2004	28.8	5.3	12.6	0.9	18.5	16.4
2005	26.0	6.0	15.1	0.9	15.5	11.4
2006	23.3	6.1	10.2	0.9	12.5	9.9
2007	24.2	6.5	10.7	0.9	13.5	10.3
2008	27.3	8.4	16.5	1.1	17.0	23.2
2009	32.8	4.0	19.3	1.4	18.0	22.4
2010	27.6	7.7	15.8	1.5	13.5	11.9
2011	18.2	14.4	8.7	1.8	12.5	23.1
2012	25.7	7.1	9.2	1.9	15.0	23.1

Source: Field Data, 2013

From the table above (Table 4.1) Pearson' Correlation model, thus relationship between lending interest rate and the economic factors was employed with help of Microsoft Excel Spreadsheet. The results from the correlation operations are given in the table below.

Table 4.2 Correlation between interest rate and macroeconomic factors

Dependent Variable	Independent Variables	Correlation
LIR	GDP	-0.80
LIR	INFL	0.81
LIR	EXR	0.20
LIR	PRIMR	0.80
LIR	TBIL	0.09
Final Outcome		1.1

Source Field Data, 2013

Gross Domestic Products

From the Table 4.2, it can be seen that the relationship between lending interest rate and GDP is - 0.80 (negative relationship). This implies that the banks do not necessary base their lending interest rate on GDP. This is evident in Table 4.1, thus in 2004 GDP increased from 5.3% to 6.0% in 2006 and at the same time the banks' lending rate reduced from 28.8% to 26.0%, showing a negative relationship. The same indication is shown in 2007 to 2012.

It is important to state that the above findings are very opposite to the idea that the effect of real GDP on interest rates is essentially equivalent to the effect of domestic economic growth on interest rates, according to the economist Steven M. Suranovic. A risen in GDP, according to Suranovic, will lead to a rise in interest rates, as demands for funds increase. This is because when a country's economy is booming, more investors will be investing money into that

economy. This would increase demand for funds which subsequently lead to lenders asking for higher interest rates. Secondly, as an economy booms, inflation will generally increase. This will lead to an increase in the interest rate commanded by lenders, so as to keep pace with inflation.

Inflation

The results shown in Table 4.2 indicate that the correlation between lending interest rate and inflation rate is 0.81 (positive). This outcome implies that when there is an increase in the level of Inflation, there was an increase in Bank Lending Rate and vice versa. This is evident in Table 4.1 where the Inflation Rate decreased in from 15.1% in 2005 to 10.2% in 2006 resulting in a decrease in Lending Interest Rate of 26.0% to 23.3% in the same period. However, in 2007 when there was an increase in Inflation from 10.2% in 2006 to 10.7% in 2007, the same trend was witnessed with regards Lending Interest Rate. This trend continued till 2010 when Inflation dropped (15.8%) and further dropped in 2011 (8.7%) resulting in decrease in Lending Interest Rate of 27.6% in 2010 and further decreased to 18.2% in 2011. Likewise, when Inflation increased in 2012 (9.2), it attracted an increase in Lending Interest Rate of 25.7% in the same year.

Inflation as a rise in the general level of prices of goods and services in an economy over a period over a period of time can be said to have an impact on Lending Interest Rate. This means that when the general price level rises, each unit of currency buys fewer goods and services. Consequently, inflation also reflects erosion in the purchasing power of money, thus a loss of real value in the internal medium of exchange and unit of account within the economy. Lower interest rates put more borrowing power in the hands of consumers and when consumers spend more, the economy grows thereby creating natural inflation. If the Central Bank decides that the

economy is growing too fast that demand will greatly outpace supply, then it can raise interest rates, slowing the amount of cash entering the economy.

Exchange Rate

With regards to the relationship between interest rate and inflation, the results as shown Table 4.2 indicate that the relationship is positive (0.20). This outcome means that increases in exchange rate will affect lending rate to increase and vice versa. Implying that the value of one country's currency in terms of another currency, which is opened to a wide range of different types of buyers and sellers where currency trading is continuous. It must be noted that that interest rates, inflation and exchange rates are all highly correlated. By manipulating interest rates, central banks exert influence over both inflation and exchange rates, and changing interest rates impact inflation and currency values. Higher interest rates offer lenders in an economy a higher return relative to other countries. Therefore, higher interest rates attract foreign capital and cause the exchange rate to rise. The impact of higher interest rates is mitigated, however, if inflation in the country is much higher than in others, or if additional factors serve to drive the currency down. The opposite relationship exists for decreasing interest rates - that is, lower interest rates tend to decrease exchange rates.

BoG Prime Rate and Treasury Bill Rate

From Table 4.2, it is shown that the relationships between interest rate and BoG prime rate, and treasury bill rate are 0.80 and 0.09 respectively. From Table 4.1, in 2005 to 2006 there were reductions in the prime and treasury bill rate, banks followed suit by reducing their lending rate from 28.8% in 2004 to 26.0% in 2005. These are also evident in the years 2007 to 2012. This

means that the Central Bank as the determiner of prime rate and treasury bill rate, sets the base rate and treasury bill rate and when these happen, the banks are expected to follow suit. However the banks' decision to follow suit is also informed by other factors such as inflations, exchange rate and banks' own factors.

Overall Correlation Result

The mean average of the various correlations is determined using the model below:

$$LIR = \frac{GDP + INFL + EXR + PRIMR + TBIL}{N} \dots \dots \dots \text{equation 1}$$

Where:

- LIR is the Lending Interest Rate
- GDP is the Gross Domestic Product
- INFL is the inflation (year-on-year)
- EXR is the Exchange Rate
- PRIMR is the BoG Prime Rate
- TBIL is the Treasury Bill

From the above model, the mean average of the correlations between LIR and GDP + INFL + EXR + PRIMR + TBIL is calculated as follows:

$$LIR = \frac{GDP + INFL + EXR + PRIMR + TBIL}{N}$$

$$LIR = \frac{-0.8 + 0.81 + 0.20 + 0.80 + 0.09}{5}$$

$$LIR = \frac{-0.8 + 0.81 + 0.20 + 0.80 + 0.09}{5}$$

$$LIR = 0.22$$

From the calculations above, it is shown that the correlation between LIR and GDP + INFL + EXR + PRIMR + TBIL is 1.1 which represents a positive relationship, thus an increase in the economic factors such as GDP, inflation, exchange rate, prime rate and treasury rate cause interest rate to rise as well. This means that interest rate of the banks are affected by GDP, inflation, exchange rate, prime rate and treasury bill rate.

Interest Rate as a Relation between the Various Economic Indicators using Multiple Regression Model:

Using the model (1a) defined above resulted in the following Statistical Relations:

Table 4.3 Regression Statistic

Multiple R	0.99
R Square (R^2)	0.98
Adjusted R Square	0.94
Standard Error	0.97
Observations	9

Where R is the Correlation between interest rate and all the other factors combined indicating a strong positive relation. The R^2 (the coefficient of determination) usually shows how well the model predicts or forecasts future events. In table 4.3, the R^2 is 98% indicating that 98% of changes in the interest rate is as a result of changes in the economic indicators as shown in table 4.3 above and also indicates the model indeed predicts well.

Using the multiple regression model, as defined above, between interest rate and the other economic indicators resulted in an intercept of 12.53 which was calculated using the Excel (which would be attached as an appendix) and the corresponding slopes for the various Economic indicators as shown in table 4.4 in the next page;

So given an intercept of 12.53, it implies that the interest rate is also 12.53 if the slope is zero.

Table 4.4 Economic Indicators and their Slops

<i>Parameter</i>	<i>Coefficients</i>
GDP (m)	-0.71
Inflation (period average) (n)	0.43
Exchange Rate (GHS to USD) (o)	3.21
BoG Prime Rate (p)	0.69
T-Bill Rate (q)	-0.09

This can be expressed mathematically as

$$y = 12.53 + (-0.71m + 0.43n + 3.21o + 0.69p - 0.09q) + \varepsilon$$

Where

y = Interest Rate

A test of the accuracy of the mathematical relations as developed between the economic indicators and interest rate resulted in the table on the next page;

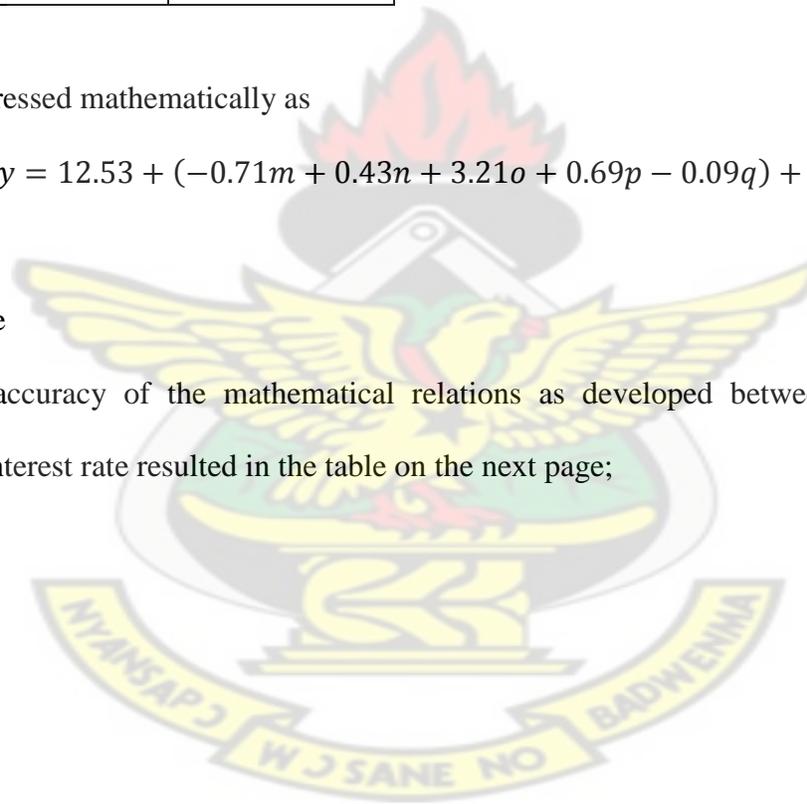


Table 4.5 Residue of Actual and Predicted Lending Interest Rate for the Economic Indicators

<i>Year</i>	<i>Predicted Lending Interest Rate (A)</i>	<i>Actual Lending Interest Rate (B)</i>	<i>Residuals (B-A)</i>
2004	28.40	28.8	0.40
2005	27.34	26.0	-1.34
2006	23.23	23.3	0.07
2007	23.81	24.2	0.39
2008	26.90	27.3	0.40
2009	32.94	32.8	-0.14
2010	26.95	27.6	0.65
2011	18.45	18.2	-0.25
2012	25.88	25.7	-0.18

Given the relatively insignificance of the residue, which is the difference between the actual interest rates and the predicted interest rate, the accuracy is reinforced.

4.2 Factors affecting Interest Rate – Banking Sector Indicators

This section examines the banking sector factor affecting interest of banks. To do this, some selected factors were used and these are liquidity, overhead cost of banks, loan loss (quality of loans) and profit margin. The following table in the next page shows the interest rate and the selected banking sector factors.

Table 4.6 Interest rate and the selected banking sector factors

Banking Sector Indicators					
Year	Lending Interest Rate	Liquidity	Overhead Cost	Loan Loss	Profit Margin
Yr 2006	23.3	31.5	29.7	6.8	38.8
Yr 2007	24.2	39.3	32.2	7.4	42.9
Yr 2008	27.3	36.1	31.5	11.7	48.1
Yr 2009	32.8	35.8	27.6	12.8	49.4
Yr 2010	27.6	35.8	24.1	18.0	48.5
Yr 2011	18.2	35.3	17.1	16.0	48.1

Source: Field Data, 2013

Using the Table 4.6 above, the results from the correlation operations are given in the table below.

Table 4.7 Correlation between Interest rate and Banking Sector Indicators

Dependent Variable	Independent Variables	Correlation
LIR	Liquidity	0.2
LIR	Overheads	0.5
LIR	Loan Loss	0.1
LIR	Profit Margin	0.4
Final Outcome		0.3

Source Field Data, 2013

Liquidity

From Table 4.7 above, it is shown that the relationship between interest rate and liquidity is 0.2 indicating a positive relationship. This mean that where there is excess liquidity in the banking system, banks' exposures to liquidity risks is low and this should contribute to increase in

interest spread. Hence where risk is high (increase) banks may tend to increase the interest rate to cover such risk. Liquidity risk is proxied by the total liquid assets kept in the bank to meet contingency of payments. Such assets normally earn no income as they are balance kept in the bank. The expected sign is positive. Brock and Franken (2002) found that bank liquidity was associated with higher interest.

Overhead Costs

According to the results shown in Table 4.7 above, the relationship between interest rate and overhead costs is 0.5 showing a positive relationship. What this implies that as cost operation rises, the banks will also increase interest rate so as to cover their cost of operation (see Table 4.6 above). Operating costs arise in processing loans and the servicing of deposits as well as other administration overheads, such as staff costs.

Loan Loss Provisioning

For this study the provision for loan losses is used as the proxy for quality of loans and for that matter the result indicates that the relationship between interest rate and loan loss has been given as 0.1 (see Table 4.7) indicating a positive relationship. Which means that each variable go the same direction thus as one increases the other increases. This outcome is also evident in Table 4.3 where loan loss provisioning continued to rise from 2008 to 2010, interest rate for the same period also rose accordingly but when loan loss provisioning decreased in 2011, interest rate also decreased (Table 4.6). The positive relationship also implies that banks' interest rate reflect a situation where the banks tend to push the cost of nonperforming loans to customers. Therefore,

as the risk of lending to customers is high then it is expected that the banks will also raise the lending rate to reflect or contain the high risk, hence a positive relationship.

Profit Margin

With regards to the relationship between interest rate and profit margins of the banks, the results showed that it has a positive relationship (0.4) as seen in Table 4.4 above. The implication of this outcome is that profit margins on loans depend largely on cost of funds to the banks, and if cost of funds is high and expected returns from owners of capital are also high, the margin of profit on loans would automatically be high as well.

Interest Rate as a Relation between the Various Banking Sector Indicators using Multiple Regression Model:

An analysis of the relationship between the interest rate and other banking sector indicator shows a strong positive correlation between interest rate and other banking sector indicators such as the overhead cost, profit margin, Loan loss and liquidity. A coefficient of 74% indicates that 74% of changes in Lending Interest Rate is caused by changes in these banking indicators. The table below provides further details of these relations.

Table 4.8 Correlations Statistics using Multiple Regression model

<i>Regression Statistics</i>	
Multiple R	0.86
R Square	0.74
Adjusted R Square	-0.28
Standard Error	5.55
Observations	6.00

A linear model was developed between the Lending Interest Rate and the banking indicators using the Multiple Regression model. This resulted in an intercept of -18.73. The slope of the other banking sector indicators is presented in table 4.9 below;

Table 4.9 Banking Indicators and their Slopes

	<i>Coefficients</i>
Liquidity (e)	-0.69
Overhead Cost (f)	0.92
Loan Loss (g)	0.29
Profit Margin (h)	0.88

The mathematical relationship is therefore expressed as

$$y = -18.73 + (-0.69e + 0.92f + 0.29g + 0.88h) + \varepsilon$$

Where

y = Lending Interest Rate

This model developed was subjected to an accuracy test resulted in the predicted Lending Interest Rates shown in the table below. A comparison between the predicted Interest Rate and the Actual Interest Rate attests to the accuracy of the model. Table 5.1 provides further details;

Table 5.1 Residue of Actual and Predicted Lending Interest Rate for the Banking Sector Indicators

<i>Observation</i>	<i>Predicted Lending Interest Rate</i>	<i>Actual Lending Interest Rate</i>	<i>Residuals</i>
2006	23.02	23.3	0.28
2007	23.73	24.2	0.47
2008	31.11	27.3	-3.81
2009	29.19	32.8	3.61
2010	26.70	27.6	0.90
2011	19.65	18.2	-1.45

4.3 Interest Rate Spread

Having analyzed and discussed the factors determining interest rate hence interest rate spread (IRS), it is also important to examine how wide is the interest rate with respect to total deposits and total credits (lending). The IRS was measured as the difference between lending and deposit interest rates. It is the difference between the average rate charged on loans and the average rate paid on deposits. In other words, the average rate charged on loans is calculated by dividing total interest income received on loans and advances by the average stock of loans and advances, while the average rate paid on deposits is calculated by dividing total interest expense by the average stock of total deposits. There are, however, alternative ways of measuring IRS. This study used exp-post interest spread approach in absolute figures which is the difference between interest income and interest expense. The table below shows the deposit interest rate, lending interest and the resultant interest rate spread.

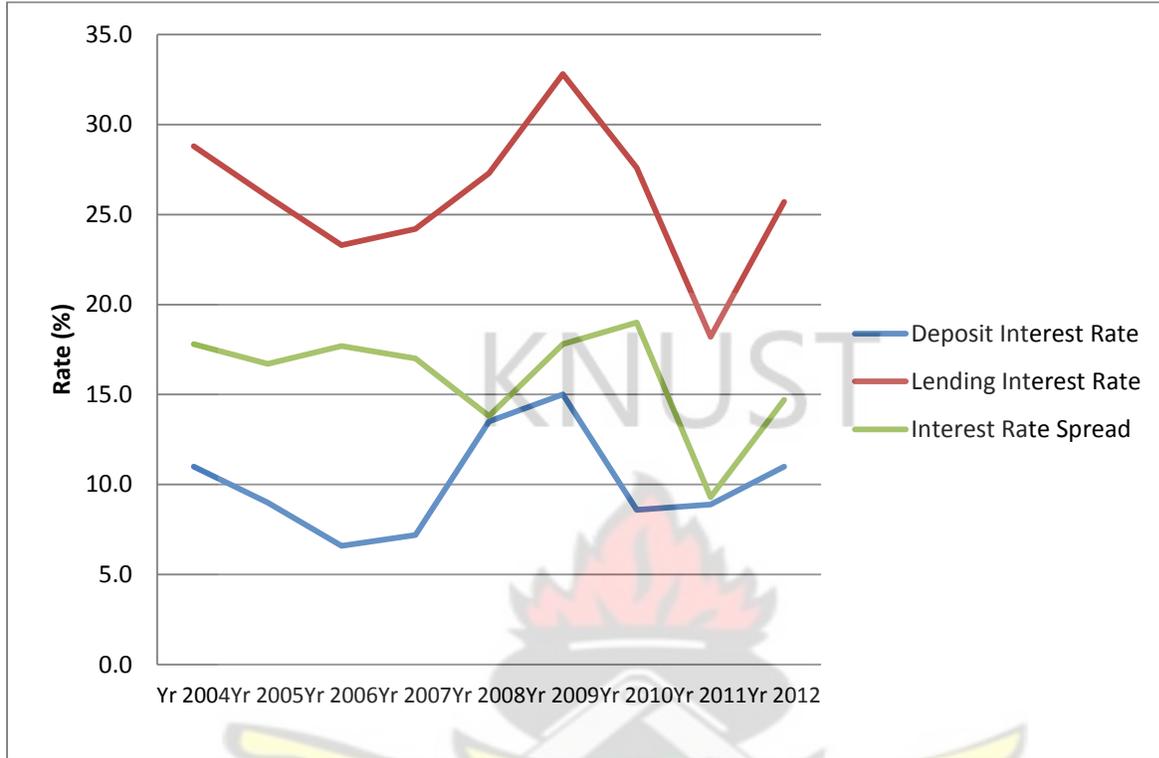
Table 5.2 Interest Rate Spread

Year	Deposit Interest Rate	Lending Interest Rate	Interest Rate Spread
2004	11.0	28.8	17.8
2005	9.0	26.0	16.7
2006	6.6	23.3	17.7
2007	7.2	24.2	17.0
2008	13.5	27.3	13.8
2009	15.0	32.8	17.8
2010	8.6	27.6	19.0
2011	8.9	18.2	9.3
2012	11.0	25.7	14.7
Mean	10.1	26.0	15.9

Source: Field Data, 2013

From Table 5.1 above, it is obvious to state that as deposit rate decrease over the years thus 2004 to 2006 and 2010 lending rate also decreases and as it increases in 2007 to 2009 and 2012, lending rate also does same except in 2010 where deposit rate decreased but lending rate increased. From the perspective of the banks, IRS shows the additional cost of borrowing that the banks take on to perform intermediation activities between borrowers and fund lenders. The IRS is also a premium for the risk that the banks undertake; it compensates for loan defaults and for risk related to cost of funding. IRS is an important determinant of the efficacy of the financial system in a country. The line chart below illustrates the trend of deposit rate, lending rate and the resultant interest spread.

Figure 4.1 Trend of deposit rate, lending rate and Spread



Source: Field Data, 2013

From Figure 4.1 above, it is shown that there is a vast difference between lending rate and deposit rate which reflects high IRS. This is evident in Table 5.2 where there was an average mean in difference between deposit rate and lending of 15.9. A high IRS acts as an impediment to the expansion of financial intermediation necessary for growth and development of an economy. It is often argued that the higher the IRS, the higher would be the cost of credit to the borrowers for any given deposit rate. Alternatively, according to Bawumia et al (2005) a high IRS could mean unusually low deposit rates discouraging savings and limiting resources available to finance bank credit a high IRS raises the cost of credit restricting the access of potential borrowers to credit markets thus reducing investments and limiting growth potential of the economy. They also stated further that the problems become more acute for small businesses, household enterprises

and rural industries which are vital to promoting equitable growth and reducing poverty in low income countries.

Interest Rate Spread as a Relation between the Various Economic Indicators using Multiple Regression Model:

An analysis of the relations between interest rate spread and the economic indicators resulted in a correlations coefficient of 0.97 indicating a strong positive relationship between the spread of interest rates and GDP, Inflation, Exchange Rate, Treasury Bill Rate and Prime Rate. The coefficient of determinations between interest rate spread and the economic indicators as listed is 95% portraying that 95% of changes in the interest rate spread is as a result of changes in these economic indicators. The table in the next pa shows furthers such details:

Table 5.3 Correlation Summary using Multiple Regression Model

<i>Regression Statistics</i>	
Multiple R	0.97
R Square	0.95
Adjusted R Square	0.86
Standard Error	1.12
Observations	9.00

A mathematical expression of these relations was developed using the multiple linear regression model. This resulted in a relationship between interest rate spread and the other economic indicators having an intercept of 17.20. The slop of the other economic indicators is shown in table 5.4

Table 5.4 Slope of the Relation between Interest Rate Spread and Economic Indicators

<i>Parameters</i>	<i>Coefficients</i>
GDP (m)	-0.61
Inflation (period average) (n)	0.14
Exchange Rate (GHS to USD) (o)	2.87
BoG Prime Rate (p)	0.28
T-Bill Rate (q)	-0.38

This is expressed mathematically as

$$y = 17.20 + [-0.61m + 0.14n + 2.87o + 0.28 - 0.38q] + \varepsilon$$

Where

y is the interest Rate Spread.

As a test of the accuracy of the model above, the actual interest rate spread was compared to the predicted interest rate spread. It was released that the difference between the two was insignificant attesting to the accuracy of the model. Table 5.5 provides further details of such comparism.

Table 5.5 Residue of Actual and Predicted Lending Interest Rate for the Banking Sector Indicators

<i>Year</i>	<i>Predicted Interest Rate Spread A</i>	<i>Actual Interest Rate Spread B</i>	<i>Residuals (B-A)</i>
2004	17.19	17.8	0.61
2005	18.19	16.7	-1.49
2006	17.19	17.7	0.51
2007	17.14	17.0	-0.14
2008	13.43	13.8	0.37
2009	17.94	17.8	-0.14
2010	18.24	19.0	0.76
2011	9.50	9.3	-0.20
2012	14.98	14.7	-0.28

Testing for the Significance of Regression Coefficients

The significance of a regression coefficient in a regression model is determined by dividing the estimated coefficient over the standard deviation of this estimate to give the t -ratio. For statistical significance we expect the absolute value of the t -ratio to be greater than 2 or the P -value to be less than the significance level $\alpha = 0.10$ or 10%

From appendix I (where regression for the Banking Sector Indicators can be found), the P -values for liquidity, overhead cost, loan loss and profit margin are 0.67, 0.44, 0.88 and 0.63 respectively whilst their corresponding absolute t -values are 0.57, 1.21, 0.19 and 0.67. It can be observed that the P -values are all greater than $\alpha = 0.10$ and all the absolute values of t on the other hand are less than 2. This therefore implies that the significance of regression coefficient for the banking sector indicators is negative. This can however not be said that the banking sector indicators are not related to interest rate.

Again, from Appendix II where the regression analysis for the interest rate spread is found, the absolute t -values for GDP, Inflation, Exchange rate, BoG Prime Rate and T-Bill Rate are 2.50, 1.00, 1.56, 0.64 and 2.27 respectively. Since the t -values for GDP and T-Bill Rate are both greater than the threshold value of 2. This indicates that regression coefficient of GDP and T-Bill Rates are significant by the use of the t -test. However, the other three (3) indicators, namely Inflation, Exchange Rate and BoG Prime rate are not significant according to the t -test.

Appendix III indicates the analysis for Economic Indicators. These indicators are GDP, Inflation, Exchange rate, BoG Prime Rate and T-Bill Rate and their corresponding absolute t -values for

these indicators are 3.36, 3.53, 2.01, 1.85 and 0.59. The first three (3) indicators have their regression coefficients to be significant since their individual (absolute) t -values are greater than 2. The regression coefficients of the last two (2) indicators are insignificant because their t -values are less than 2.

The insignificance of the various variables does not mean they do not affect the IRS but it could be attributed to the error (ϵ) term/factor being large.

Testing for the Significance of Correlation Coefficients

Again, from Appendix IV where the analysis for the Pearson's Correlation Coefficient for the Economic Variables and the Banking Sector Indicators are located, table 5.5 and table 5.6 give a summary of the significance of the correlation coefficient.

Table 5.6 Pearson Correlation Coefficients, N = 9 for Economic Variables
Prob > |r| under H_0 : $\rho=0$

	<i>Lending Interest Rate</i>	<i>GDP</i>	<i>Inflation (period average)</i>	<i>Exchange Rate (GHS to USD)</i>	<i>BoG Prime Rate</i>	<i>T-Bill Rate</i>
Lending Interest Rate	1.0000					
GDP	-0.80105 (0.0095)	1.0000				
Inflation (period average)	0.81199 (0.0079)	-0.47977 (0.1912)	1.0000			
Exchange Rate (GHS to USD)	-0.20339 (0.5997)	0.52533 (0.1464)	-0.20961 (0.5883)	1.0000		
BoG Prime Rate	0.80031 (0.0096)	-0.53932 (0.1340)	0.62056 (0.0746)	-0.21446 (0.5795)	1.0000	
T-Bill Rate	0.08560 (0.8267)	0.35643 (0.3464)	0.08850 (0.8209)	0.65495 (0.0556)	0.39396 (0.2941)	1.0000

Note:

- The p-value is in the bracket
- The p-values that are bolded and are in italics are not significant at 10%.

Table 5.7 Pearson Correlation Coefficients, N = 6 for Banking Sector Indicators
 Prob > |r| under H₀: Rho=0

	<i>Lending Interest Rate</i>	<i>Liquidity</i>	<i>Over Head Cost</i>	<i>Loan Loss</i>	<i>Profit Margin</i>
Lending Interest Rate	1.0000				
Liquidity	0.15005 <i>(0.7766)</i>	1.0000			
Over Head Cost	0.47249 <i>(0.3440)</i>	0.18298 <i>(0.7286)</i>	1.0000		
Loan Loss	0.05504 <i>(0.9175)</i>	0.07677 <i>(0.8851)</i>	-0.75142 <i>(0.0850)</i>	1.0000	
Profit Margin	0.37242 <i>(0.4672)</i>	0.37672 <i>(0.4617)</i>	-0.43707 <i>(0.3861)</i>	0.81929 <i>(0.0460)</i>	1.0000

Note:

- The p-values are in the bracket
- The p-values that are bolded and are in italics are not significant at 10%.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Findings

The study sought to examine the determination of bank interest spreads in Ghana. The study also having critically examined selected economic and bank specific factors, made the following findings:

- i. The economic factors affecting the determination of interest rate in Ghana are:
 - Gross Domestic Product (GDP) – A rise in GDP will lead to a rise in interest rates and vice versa.
 - Inflation - when there was an increase in the level of Inflation, there was also an increase in Bank Lending Rate but when it (inflation) decreased, the Bank Lending Rate does not follow suit and this depends on considering other factors affecting interest rate.
 - Exchange Rate - means that increases in exchange rate will affect lending rate to increase. The exchange rate was stated to be the value of one country's currency in terms of another currency, which is opened to a wide range of different types of buyers and sellers where currency trading is continuous.
 - BoG Prime Rate and Treasury Bill Rate - the Central Bank as the determiner of prime rate and treasury bill rate, sets the base rate and treasury bill rate and when these happen,

the banks are expected to follow suit but the banks' decision to do so is informed by other factors such as inflations, exchange rate and banks' own factors.

ii. The banks' own factors affecting the determination of interest rate in Ghana are:

- Liquidity - where there is excess liquidity in the banking system, banks' exposures to liquidity risks is low and this should contribute to increase in interest spread. Hence where risk is high (increase) banks may tend to increase the interest rate to cover such risk.
- Overhead cost of banks - As cost operation rises, the banks increase interest rate so as to cover their cost of operation.
- Loan loss provisioning - as the risk of lending to customers is high then it is expected that the banks will also raise the lending rate to reflect or contain the high risk.
- Profit Margin - The banks' profit margins on loans depend largely on cost of funds to the banks, and if cost of funds is high and expected returns from owners of capital are also high, the margin of profit on loans would automatically be high.

iii. There is high lending rate but low deposit rate which reflects high IRS. The low deposit rates could discourage savings and limiting resources available to finance bank credit and that a high IRS raises the cost of credit restricting the access of potential borrowers to credit markets thus reducing investments and limiting growth potential of the economy.

5.2 Conclusion

Generally, interest rate spreads in Ghana still remain high and continues to present a subject of debate for stakeholders in the banking and business sectors in the economy. The study to this end conclude that the factors determining this high interest rate spreads are GDP, inflation, exchange rate, prime rate, treasury bill rate, liquidity position of banks, overhead costs, loan loss provisioning and profit margins of the banks. It must however be stated that apart from these factors there are others that this study could not cover.

5.3 Recommendations

The study recommended that macroeconomic stability is critical to reducing the market's perceived risks for which it seeks compensation in high interest rates. As a principal determinant of macroeconomic stability, fiscal policy has a key role to play in reducing risks. In the same vein, government must curb its spending and borrowing to reduce the pressure on interest rates and crowding out of the private sector. The Central Bank must act decisively to curb the high level of banks' lending rates and spreads, which cannot be justified on the basis of their costs, especially in light of their continued high profitability. The banks should be allowed to continue to set the levels of their lending and deposit rates.

Measures required to reduce interest rates follow directly from the causal factors enumerated above. Primarily, macroeconomic stability is critical to reducing the market's perceived risks for which it seeks compensation in high interest rates. As a principal determinant of macroeconomic stability, fiscal policy has a key role to play in reducing risks. In the same vein, government must

curb its spending and borrowing to reduce the pressure on interest rates and crowding out of the private sector.

Reducing interest rates will require addressing some structural weaknesses in the banking industry. Despite the fast growth of the industry, competition remains low, an indication that size alone may not be sufficient in generating competition.

Coupled with low competition in the banking industry is the problem of banks' own high operational costs, including administrative costs, the costs associated with inadequate financial infrastructure, and the high costs of administering numerous small deposits and borrowers who lack sufficient identity and credit reference.

The Central Bank must act decisively to curb the high level of banks' lending rates and spreads, which cannot be justified on the basis of their costs, especially in light of their continued high profitability.

The banks should be allowed to continue to set the levels of their lending and deposit rates. Since deposits represent banks principal source of funds for lending, imposing a limited markup of lending rates over deposit rates would not appear to be out of order. If this measure even results in both lending and deposit rates remaining high, it will at least achieve the useful purpose of ensuring that due return is paid on savings.

It is worth emphasizing that it is the collective responsibility of all relevant parties, in particular government, banks, and the monetary authorities, to bring interest rates down. This will be mutually beneficial.

5.4 Suggestions for Future Studies

The study intended to examine the determining factors for interest rate spread in Ghana but could not examine all the other equally important factors such as statutory reserve ratio, borrowing risk, market power, cost of fund, and competition actions among others. The limitations for this study were time constraint as well as inability of the researcher to obtain adequate data to cover all those factors. These limitations suggest that further studies could be conducted to include all those factors that were not covered in this study.



APPENDIX V

Pearson Correlation Coefficients, N = 9

Prob > |r| under H₀: Rho=0

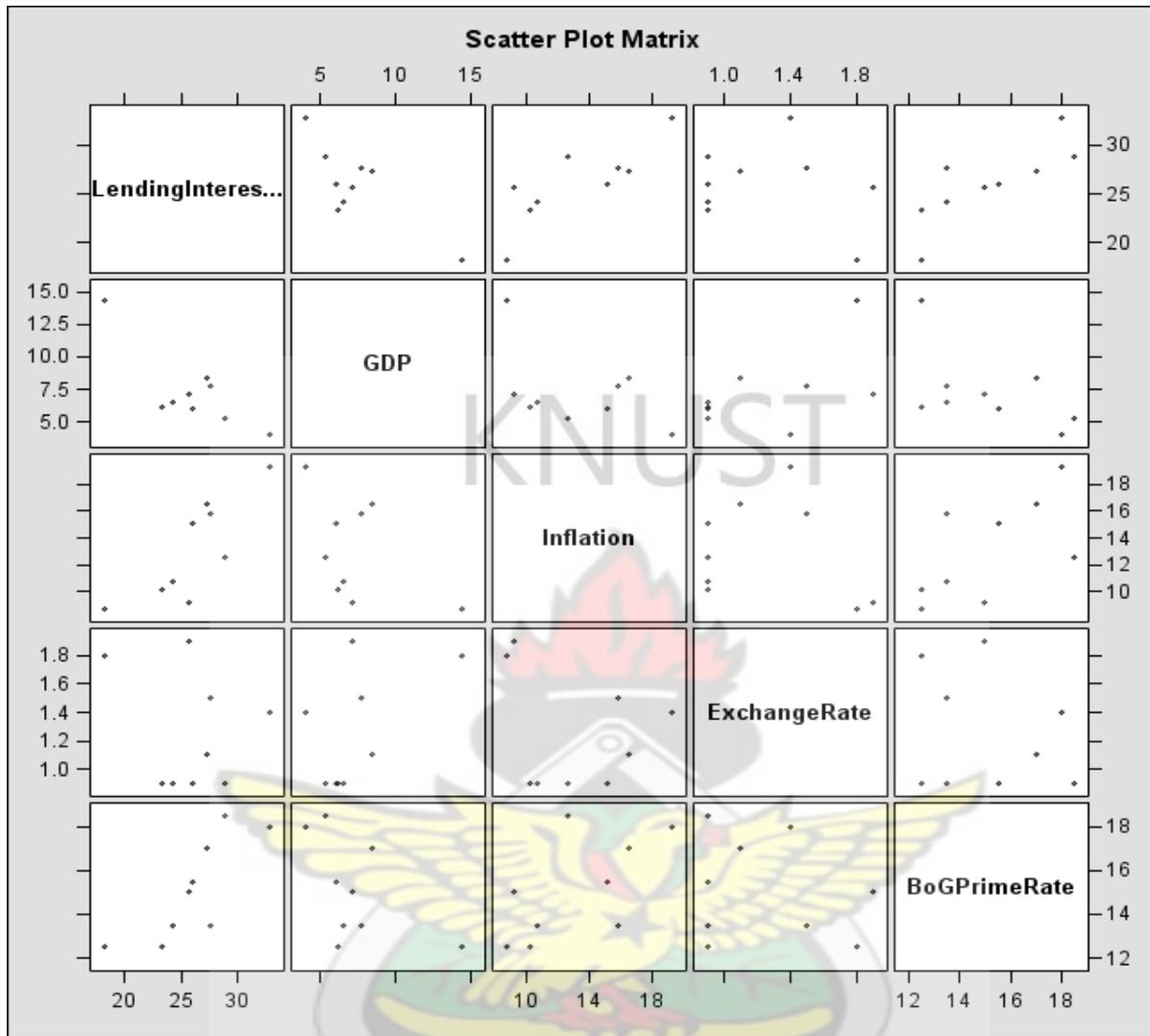
	Lending Interest Rate	GDP	Inflation	Exchange Rate	BoG Prime Rate	TBill Rate
LendingInterestRate	1.00000 0.0095	-0.80105 0.0095	0.81199 0.0079	-0.20339 0.5997	0.80031 0.0096	0.08560 0.8267
GDP	-0.80105 0.0095	1.00000	-0.47977 0.1912	0.52533 0.1464	-0.53932 0.1340	0.35643 0.3464
Inflation	0.81199 0.0079	-0.47977 0.1912	1.00000	-0.20961 0.5883	0.62056 0.0746	0.08850 0.8209
Exchange Rate	-0.20339 0.5997	0.52533 0.1464	-0.20961 0.5883	1.00000	-0.21446 0.5795	0.65495 0.0556
BoGPrimeRate	0.80031 0.0096	-0.53932 0.1340	0.62056 0.0746	-0.21446 0.5795	1.00000	0.39396 0.2941
TBillRate	0.08560 0.8267	0.35643 0.3464	0.08850 0.8209	0.65495 0.0556	0.39396 0.2941	1.00000

Pearson Correlation Coefficients, N = 9 for Economic Variables. Prob > |r| under H₀: Rho=0

	<i>Lending Interest Rate</i>	<i>GDP</i>	<i>Inflation (period average)</i>	<i>Exchange Rate (GHS to USD)</i>	<i>BoG Prime Rate</i>	<i>T-Bill Rate</i>
Lending Interest Rate	1.0000					
GDP	-0.80105 (0.0095)	1.0000				
Inflation (period average)	0.81199 (0.0079)	-0.47977 <i>(0.1912)</i>	1.0000			
Exchange Rate (GHS to USD)	-0.20339 <i>(0.5997)</i>	0.52533 <i>(0.1464)</i>	-0.20961 <i>(0.5883)</i>	1.0000		
BoG Prime Rate	0.80031 (0.0096)	-0.53932 <i>(0.1340)</i>	0.62056 (0.0746)	-0.21446 <i>(0.5795)</i>	1.0000	
T-Bill Rate	0.08560 <i>(0.8267)</i>	0.35643 <i>(0.3464)</i>	0.08850 <i>(0.8209)</i>	0.65495 (0.0556)	0.39396 <i>(0.2941)</i>	1.0000

Note:

- The p-value is in the bracket
- The p-values that are bolded and are in italics are not significant at 10%.



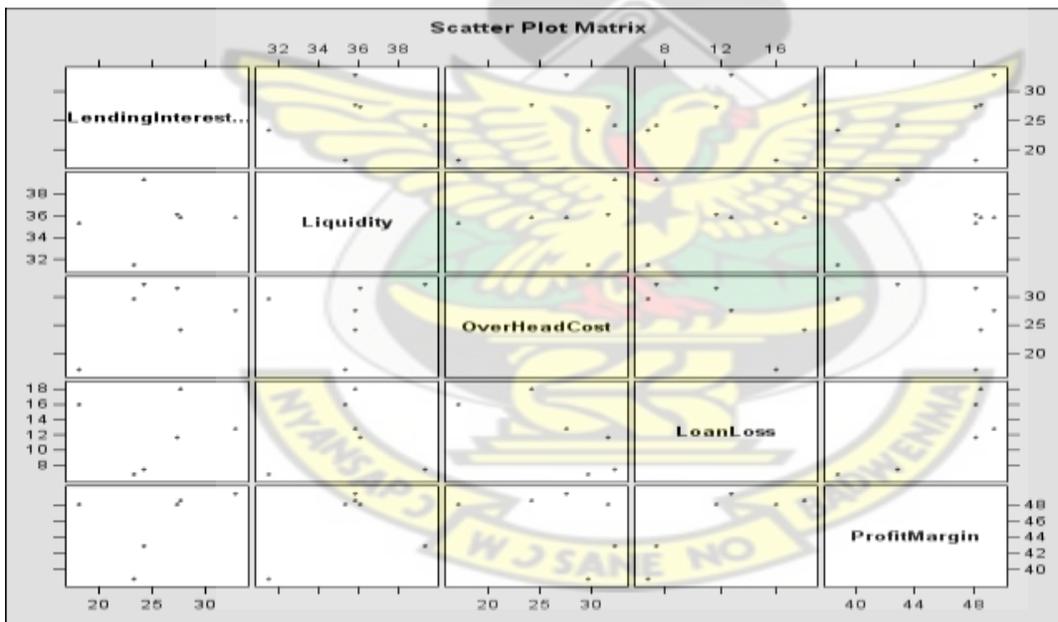
Pearson Correlation Coefficients, N = 6 Prob > r under H0: Rho=0					
	LendingInterest Rate	Liquidity	OverHeadCost	LoanLoss	ProfitMargin
LendingInterest Rate	1.00000	0.15005	0.47249	0.05504	0.37242
		0.7766	0.3440	0.9175	0.4672
Liquidity	0.15005	1.00000	0.18298	0.07677	0.37672
	0.7766		0.7286	0.8851	0.4617
OverHeadCost	0.47249	0.18298	1.00000	-0.75142	-0.43707
	0.3440	0.7286		0.0850	0.3861
LoanLoss	0.05504	0.07677	-0.75142	1.00000	0.81929
	0.9175	0.8851	0.0850		0.0460
ProfitMargin	0.37242	0.37672	-0.43707	0.81929	1.00000
	0.4672	0.4617	0.3861	0.0460	

Pearson Correlation Coefficients, N = 6 for Banking Sector Indicators. Prob > |r| under H₀:
Rho=0

	<i>Lending Interest Rate</i>	<i>Liquidity</i>	<i>Over Head Cost</i>	<i>Loan Loss</i>	<i>Profit Margin</i>
Lending Interest Rate	1.0000				
Liquidity	0.15005 <i>(0.7766)</i>	1.0000			
Over Head Cost	0.47249 <i>(0.3440)</i>	0.18298 <i>(0.7286)</i>	1.0000		
Loan Loss	0.05504 <i>(0.9175)</i>	0.07677 <i>(0.8851)</i>	-0.75142 <i>(0.0850)</i>	1.0000	
Profit Margin	0.37242 <i>(0.4672)</i>	0.37672 <i>(0.4617)</i>	-0.43707 <i>(0.3861)</i>	0.81929 <i>(0.0460)</i>	1.0000

Note:

- The p-values are in the bracket
- The p-values that are bolded and are in italics are not significant at 10%.



REFERENCES

- Randall, Ruby (1998). Interest Rate Spreads in the Eastern Caribbean. IMF Working Paper, pp. 59 and pp. 98.
- Gelbard, Enrique and Pereira Leite, Sergio (1999). Measuring Financial Development in Sub-Saharan Africa. IMF Working Paper, pp. 99 – 105.
- Brock, Philip and Franken, Helmut (2003). Measuring the Determinants of Average and Marginal Bank Interest Rate Spreads in Chile, 1994-2001. www.econ.washington.edu/user/plbrock/ChileSpreads091603.pdf
- Sologoub, Dimitry (2006). The determinants of Bank Interest Margins and Profitability: Case of Ukraine. www.bof.fi/bofit/seminar/bofcef06/sologub.pdf.
- Robinson, John W. (2002). Commercial Bank Interest Rate Spreads in Jamaica: Measurement, Trend and Prospects. www.boj.org.jm/uploads/pdf/papers_pamphlets.pdf
- Stiglitz, J. E and Weiss A. M. (1981) Credit Rationing in Markets with imperfect Information. American Economic Review. Pp 313-440
- Barajas, R. S and Salazar (1999). Foreign Investment in Colombia's Financial Sector of IMF working Paper. Vol. 99. Pp 9.
- Jayaraman, K. and Sharma, R. (2003). Determinant of Interest Rate Spread in the Pacific Island Countries: Some Evidences from Fiji. Pp. 8-9
- Khawaja and M. Din (2007). Determinants of Interest Rate Spreads in Pakistan- the Pakistan Development Review. Vol. 46. Pp 129-143
- Hannan, T.H and A.N. Berger (1991). The Rigidity of Prices: Evidence from the Banking Industry. Vol. 81. Pp 938-983
- Nuemark, David and Sharpe (1992). Market Structure and Nature of Price Rigidity: Evidence from the Market for Consumer Deposits. MIT Press, Vol. 107. Pp 657-737.
- Cottarellic, C. and Kourelis A. (1994). Financial Structure, Bank Lending Rates and the Transmission Mechanism of Monetary Policy. Pp 15-20.
- Chirwa E.W. and Mlachila (2004). Financial Reforms and Interest Rate Spreads in Commercial Banking System in Malawi. Vol. 51. Pp 5.
- Buchs T.D and Mathisen (2005). Competition and Efficiency in Banking: Behavioral Evidence from Ghana. Pp 1-25.

Mishkin S. Frederic (1999). Financial Consolidation: Dangers and Opportunities. Journal of Banking and Finance. Vol. 23. Pp. 675-691.

Ize A. Kovanen and Henckel T. (1999). Central Banking without Central Bank Money. Pp 23-35

Anyanwu J. C. (1990). Monetary Economics Theory Policy and Institutions Hybrid Publishers Ltd. Pp 247- 274

Pandey I.M. (1999) Financial Management. 10th Edition. Pp 20-24.

Ho T.S.Y and Saunders. (1981). The Determinants of Bank Interest Margins: Theory and Empirical Evidence. Pp. 15-58.

Cho, Y.J (1988). The Effect of Financial Liberalization on the Efficiency of Credit Allocation: Some Evidences from South Korea. Journal Development Economics. Vol. 29. Pp. 101-110.

Bawumia, M., Belnye, F. and Ofori, M. E. (2005) The Determination of Bank Interest Spreads in Ghana: An Empirical Analysis of Panel Data, Working Paper, Monetary Policy Committee, Bank of Ghana.

Brock, P. and Franken, H. (2003). Measuring the Determinants of Average and Marginal Bank Interest Rate Spreads in Chile, 1994-2001, Working Papers UWEC- 2003-25, University of Washington, Department of Economics.

Caprio, G., Jr. 1996. "Banking on financial reform? A case of sensitive dependence on initial conditions". In G. Caprio, Jr., I. Atiyas and W.J. Hanson, eds., *Financial Reform: Theory and Experience*. New York: Cambridge University Press.

Demirguc-Kunt, A. and Huizinga, H. (1998) Determinants of Commercial Bank Interest Margins and Profitability: Some International Evidence, World Bank Economic Review, Vol. 13 No. 2, pp. 379-408.

Fry, M. 1995. *Money, Interest, and Banking in Economic Development*, Second Edition. Baltimore: Johns Hopkins University Press.

Ho, T. and Saunders, A. (1981). The Determinants of Bank Interest Margins: Theory and Empirical Evidence, Journal of Financial and Quantitative Analysis, Vol. 16, No. 4, pp. 581-600.