

# “Credit Risk, Capital Structure and Lending Decisions of Banks In Ghana”

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## **CREDIT RISK, CAPITAL STRUCTURE AND LENDING DECISIONS OF BANKS IN GHANA**

Mohammed Amidu, Robert Hinson

### **Abstract**

Risk management is a very important concept for any business as most financial decisions revolve around the corporate cost of holding risk. This issue is particularly important to banks since risk constitutes their core business processes. This paper examines how credit risk affects a bank's capital structure, profitability and lending decisions. The study employs panel regression analysis to investigate the relationship between credit risk exposure and bank capital structure, profitability and lending decisions. The results indicate that less than 1% of Ghanaian banks are exposed to credit risk, and that more than 86% of their assets are financed by debts. The banks' average lending rate is around 28%. The results also show that capital structure (equity to total assets) of banks is positively related to banks' credit risk, profitability and risk and negatively related to banks' size, liquid assets and lending.

**Key words:** Risk Management, Capital Structure, Lending, Banks, Ghana.

### **Introduction**

The cost of holding risk matters to every organization. Most financial decisions: whether on capital structure, dividends, investments, etc., revolve around the costs of holding risk. This issue is particularly important to banks since risk management constitutes their core business. By its very nature, banking is an attempt to manage multiple and seemingly opposing needs. Banks provide liquidity on demand to depositors through the current account and extend credit as well as liquidity to their borrowers through lines of credit (Kashyap, Rajan and Stein, 1999). Due to these fundamental roles, banks have always been concerned with both solvency and liquidity. Traditionally, banks hold capital as a buffer against insolvency, and they hold liquid assets to guard against unexpected withdrawals by depositors (Saidenberg and Straham, 1999). These have made banks actively evaluate and take risks on a daily basis as part of their core business processes. Given the central role of market and credit risk in their core business, the banks' success requires that they are able to identify, assess, monitor and manage these risks in a sound and sophisticated way. Llewellyn (1992) confirmed that competitive and regulatory pressures are likely to reinforce the central strategic issue of capital and profitability and cost of equity capital in shaping banking strategy.

In recent times, banks' risk management has come under increasing scrutiny in both academia and practice. Banks have attempted to sell sophisticated credit risk management systems that can account for borrower risk and perhaps more importantly, the risk-reducing benefits of diversification across borrowers in a large portfolio. Regulators have even begun to consider using banks' international credit models to devise a capital adequacy standard (Bank for International Settlements, 2001).

In order to assess and manage risks, banks must have effective ways to determine the appropriate amount of capital that is necessary to absorb unexpected losses arising from their market, credit and operational risk exposures. In addition to this, profits that arise from various business activities of the banks need to be evaluated relative to the capital necessary to cover the associated risks.

Currently, there is no clear understanding of how banks choose their capital structure and what factors influence their corporate lending behaviour. Houston, James and Marcus (1997) found that lending at large banks is less subject to changes in cash flow and capital. Jayaratne and Morgan (1999) on their part found that shift in deposit supply affects lending at small banks that do not have access to large internal capital market. Akhavein, Berger and Humphrey (1997) reveal that large banks following mergers tend to decrease their capital and increase their lending. Bank size seems to allow banks to operate with less capital and, at the same time, engage in more lending.

Banking literature has not emphasised the link between risk management, capital structure and lending. Recent studies have rather viewed bank loans and advances as a response to regulatory costs (Benveniste and Berger, 1987), as a source of non local bank capital to support local investments (Carlstrom and Samolyk, 1995; Pennacchi, 1988), as a function of funding costs and risks (Gorton and Pennacchi, 1995) and possibly as a way to diversify (Demsetz, and Strahan, 1997).

### **The Research Gap**

Astute risk management is critical for businesses; both large and small, because an immeasurable number of financial decisions tend to hang critically in a firm's ability to manage its risk exposures. Research on credit risk has blossomed in the last five years (and in the new millennium) with several scholars researching and writing on various aspects of risk management. Notable research on credit risk in the last five years have included Bryne 2000; Vipond, 2000; Stirk, 2000; Leung and Lai, 2001; Van der Mass, 2001; Page and Winter, 2001; Mainelli, 2002; Thirwell, 2002; Badu, Daniels and Amagoh, 2002; Fiedler, Brown and Maloney, 2002; Ong, Habbibullah, Radam and azali, 2003; Pryce, 2003; O'Donovan, 2004; Gabbi, 2004; Louberge and Schlesinger, 2005 and Guimon, 2005. The research on West Africa and Ghana on credit risk and its effect on banks' operations is rather limited and this study attempts to fill this research gap by examining how credit risk affects a bank's capital structure, profitability and lending decisions. The remainder of the paper is organised as follows: The next section looks at the overview of banking system in Ghana; section four reviews the extant literature on the subject. Section five presents the research methodology. Discussion of the findings is included in section six. Finally, section seven gives the summary and concludes.

### **Overview of Ghanaian Banking System**

The financial services sector seems to be undergoing changes worldwide. These changes have arisen as a result of economic deregulation, government policies, globalization and information communication technology. The consequence of these factors of change is intense competition in the financial service industry. In order to remain competitive, financial institutions are providing an increasingly assorted bouquet of financial services. In Ghana, the banking sector has traditionally been segmented into merchant, commercial (retail) and development banks. While merchant banks have been restricted to corporate clients, the commercial and development banks have traditionally had customers across the entire financial market segments. It is against this backdrop and the need to create a level playing field for all banks that the idea of Universal Banking was adopted. The aim is to allow all banks that comply with the prescribed capital requirements, the freedom to engage in permissible banking business without restrictions and thereby eliminate the compartmentalization. Hinson (2004) has noted that "before the passage of the Universal Banking Law, banking was conducted along such narrow scopes as commercial, developmental or merchant banking. With the passage of the Universal Banking Law however, all types of banking can be conducted under a single corporate banking entity and this greatly reorganizes the competitive scopes of several banking products in Ghana". He further noted that banks in Ghana have been thrust "firmly into the competitive arena in terms of customers and products" and also that banks throughout Ghana are also "seeking unique ways of differentiating their offering".

The banking system in Ghana consists of a national network of licensed and statutory financial institutions engaged in the business of banking under the banking laws of Ghana. Bank of Ghana is the central bank and it regulates the activities of all the banks. The banking sector over the last decade has seen appreciable growth and improvements in performance as a result of reforms instituted by governments before this period. Some of the reforms implemented include the Financial Sector Adjustment Programme (FINSAP II and I), Non-Performing Assets Recovery Trust (NPART) and the Foreign Exchange Bureau legislation. A new Banking Law was also promulgated. The Bank of Ghana was strengthened to enhance its capacity to play its regulatory role. These reforms have:

- ◆ strengthened the banks in terms of their capital base and managerial competence;
- ◆ enhanced supervisory capabilities of Bank of Ghana;
- ◆ improved the quality of assets being held by banks; and
- ◆ increased profitability of the banks.

From independence to 1983, there were twelve (12) banks. These banks were Standard Chartered Bank (SCB), Barclays Bank of Ghana Limited (BBG), Ghana Commercial Bank (GCB), Bank for Housing and Construction (BHC), Agriculture Development Bank (ADB), Bank of Credit and Commerce (BCC), Merchants Bank of Ghana Limited (MBG), Social Security Bank (SSB), National Investment Bank, Ghana Corporative Bank (Co-op), Cal Merchant Bank (CAL), Ecobank (ECO). Over the last decade (1993-2003) and beyond eleven (11) new banks have been incorporated namely: Prudential Bank Ltd (PBL), Metropolitan Allied Bank (METRO), First Atlantic Merchant Bank (FAMB), The Trust Bank (TTB), International Commercial Bank (ICB), Stanbic Bank, Amalgamated Bank (AMALBANK), HFC Bank, Unibank, Prestige Bank and Standard Trust Bank.

Some significant events have occurred during this period such as mergers (SSB and National Savings and Credit Bank), liquidation (BHC, Co-op), privatization of state owned banks and change of ownership (GCB, SSB, NIB). Competition in the banking sector has escalated over the period. Commercial and development banks have gone beyond their limit and have ventured into international trade financing, commerce and corporate lending, treasury services payment financing, syndication etc., which should have been the preserve of merchant banks.

One area that has seen fierce competition in the banking industry is the area of product development. New products such as international funds transfer, school fees loan, negotiable certificate of deposit, car loans, consumer/hire purchase loan, travellers' cheques etc. have been developed. Another development that has occurred over the last decade is computerization and networking of branches. Some of the banks have nationwide network whilst others have reached advanced stage of networking all their branches. Banks operations and information processing have vastly increased.

Automated teller machines (ATMs) have become common giving clients the freedom to transact business at their own convenience. Also home banking, for example telephone banking, SMS banking etc. have been introduced. The banks have pursued consistent programmes of sponsorship, promotion, advertisement of services and products in the print and electronic media etc. The banking sector landscape can be said to be evolving, competitive and promising in terms of savings mobilization, development financing and service delivery.

## Literature Review

Though a significant amount of work has been done on analysing risk management in banking (Bank for International Settlements, 2001), the issues are not limited to banks. Non-financial firms also manage their risk exposures extensively, which in turn affect their investment decisions, profitability and shareholders' value. Allayannis and Weston (1999) examined the use of foreign currency derivatives in non-financial firms and concluded that there is a positive relationship between firm value and the use of foreign currency derivatives. These evidences suggest that hedging raises firm value. In addition, firms, which are able to minimise cash flow volatility, seem to be able to invest more. Minton and Schrand (1999) find that cash flow volatility leads to international cash flow shortfalls, which in turn lead to higher costs of capital and forgone investment.

Banks hold private information about their borrowers that makes sales of loan difficult due to adverse selection. Dahiya, Puri and Saunders (2000) examine whether sale of loan announcements provide a negative signal about the prospects of the borrower whose bank is selling its loan. They found that stock prices fall at the announcement of a loan sale and that many of the firms whose loans have been sold subsequently go bankrupt. Empirical banking literature also emphasizes the link between the internal capital markets and bank lending. Houston, James and Mar-

cus (1997) revealed that lending of multinational banks is less subject to changes in cash flow and capital. Jayaratne and Morgan (1999) found that shifts in deposit supply affects lending of small and unaffiliated banks that do not have access to large internal capital markets.

Size plays an important role in determining capital structure of a firm and lending behaviour of banks. Researchers have taken the view that large firms are less susceptible to bankruptcy because they turn to be more diversified than smaller companies (Warner, 1977; Ang and McConnell, 1982). Bank size affects its capital level and lending decision. Demsetz and Strahan (1997) show that larger and multinational banks manage to hold less capital and are in position to pursue higher risk activities, particularly commercial and industrial lending. There also appears to be evidence that off balance sheet activities in general and loan sales in particular aid banking firms lower their capital levels to avoid regulatory taxes and improve their risk tolerance (Gorton and Haubrich, 1990).

## Research Methods

The study examines how bank credit risk affects capital structure, lending, profits and risk. The researcher used a sample of all banks supervised by the country's Central Bank (Bank of Ghana). Nineteen banks qualified for the study. The study uses financial data of the banks. The data was collected from Bank of Ghana and the selected banks' annual reports. The proposed period was from 1998 to 2003. The statistical method of analysis follows that by (Cebenoyan and Strahan, 2001; Demsetz and Strahan, 1997; Houston, James and Marcus, 1997). These have been cross-sectional regression analyses with credit risk exposure as the dependent variable. The explanatory variables include capital (CAP), liquidity (LQT), lending (LDG), profitability (PRE), risk (RSK) and size (SZE). The entire variable for this study is based on book value in line with the argument by Myers (1984) that book values are proxies for the value of assets in place.

Panel data involves the pooling of observations on a cross-section of units over several time periods and facilitates identification of effects that are simply not detectable in pure cross-sections or pure time-series studies. The panel regression equation differs from a regular time-series or cross section regression by the double subscript attached to each variable. The general form of the panel data model can be specified more compactly as:

$$Y_{it} = \alpha + \beta X_{it} + \epsilon_{it} \dots, \quad (1)$$

where the subscript  $i$  represents the cross-sectional dimension and  $t$  denotes the time-series dimension. The left-hand variable  $Y_{it}$ , represents the dependent variable in the model, which is the firm's debt ratios.  $X_{it}$  contains the set of independent variables in the estimation model,  $\alpha$  is taken to be constant overtime  $t$  and specific to the individual cross-sectional unit  $i$ . If  $\alpha$  is taken to be the same across units, Ordinary Least Squares (OLS) provides a consistent and efficient estimate of  $\alpha$  and  $\beta$ .

## Credit Portfolio Modelling

Credit risk modelling is concerned with the tail properties of the loss distribution for a given portfolio of credit assets such as loans or bonds. This is an attempt to provide quantitative analysis of the extent to which the loss distribution varies with changes to firm/industry – specific, national and global risk factors. According to Pesaran et al. (2004) this type of modelling can be approached from the perspective of the individual loans that make up the portfolio, or by considering the return on the loan portfolio directly. The model for this study follows the one used by Cebenoyan and Strahan (2001) to explain the relationship between credit risk exposure and the capital structure, profitability and lending. This takes the following form:

$$CRE_{i,t} = \beta_0 + \beta_1 CAP_{i,t} + \beta_2 LQT_{i,t} + \beta_3 LDG_{i,t} + \beta_4 PRE_{i,t} + \beta_5 RSK_{i,t} + \beta_6 SZE_{i,t} + \epsilon, \quad (2)$$

where:  $CRE_{it}$  = the squared difference between the firm's loan in time  $t$  and the mean loan for firm  $I$  in period  $t$

$CAP_{it}$  = book value of equity to total assets for firm  $i$  in period  $t$

$LQT_{it}$  = cash and cash equivalent to asset for firm  $i$  in period  $t$

$LDG_{it}$  = loan and advances to total assets for firm  $i$  in period  $t$

$PRE_{it}$  = ratio of pre-tax profits to total assets for firm  $i$  in period  $t$

$RSK_{it}$  = the squared difference between the firm's pre-tax profit in time  $t$  and the mean pre-tax profit for firm  $I$  in period  $t$

$SZE_{it}$  = log of total assets for firm  $i$  in period  $t$

$\epsilon$  = the error term.

## Empirical Results

### Descriptive Statistics

Table 1 provides a summary of the descriptive statistics of the dependent and independent variables. The mean (median) credit risk exposure (the squared difference between the firm's loan sales) of sampled banks was 0.0044 (0.0015). This suggests that Ghanaian banks credit risk exposure is less than 1 %. The average equity capital structure suggests that it represents around 14%. This means that 86% of total assets of the banks sampled are financed with debts. The relatively high levels of debts financing are consistent with existing empirical evidence. The mean (median) liquidity was 0.1668 (0.1403). The mean (median) loan and advances of Ghanaian banks was 0.2825 (0.3004). This highlights that more than 82% of total assets are invested outside extending credit and loans. Profitability, given as the ratio of pre-tax profit to total assets, registered a mean value of 0.0449 indicating a return on assets of 4.49%. Risk is measured as the squared difference between the bank's pre-tax earnings and this shows an average (median) of 0.0017 (0.0002). Size, determined as the natural logarithm of total assets had an average (median) of 790320 (365386).

Table 1

Descriptive statistics of dependent and explanatory variables

	Mean	Std. Dev.	Minimum	Median	Maximum
CRE	0.0044	0.0109	9.3900	0.0015	0.1003
CAP	0.1357	0.1084	-0.1491	0.1188	0.8027
LQT	0.1668	0.1066	0.0008	0.1403	0.5901
LDG	0.2825	0.1139	0.0036	0.3004	0.4874
PRE	0.0449	0.0568	-0.2895	0.0491	0.1551
RSK	0.0017	0.0067	-1.0001	0.0002	0.0625
SZE	790320	103560	12788.0	365386	509468

### Regression Analysis

Table 2 reports regression results between the dependent variable (credit risk exposure) and explanatory variables. The results show a positive relationship between bank's credit risk and equity capital. Banks turn to hold large amount of capital as an incentive to avoid failure. This finding is consistent with empirical evidence. The results also show a negative relationship between credit risk and banks liquidity. Banks that have low credit risk keep sufficient of their fund as liquid. The outcome for liquid assets (the cash + cash equivalents) provides further support that banks can afford to increase their buffer of liquid assets as their credit risk reduces.

The results also indicate that credit risk is positive, but statistically insignificant related to loans and advances. Thus the advancement of loan and credit of Ghanaian banks do not necessar-

ily depend on the level of credit risk exposure. The results also indicate a statistically significant negative relationship between profitability on one hand and bank credit risk exposure on the other. Profitable banks may generate sufficient resource to manage their credit risk. The results, which are also consistent with previous studies (Froot et al., 1993; Froot and Stein, 1998) show that, higher profits increase the level of internal financing and increasing financing enables firms to have a capital buffer of sufficient size, hold enough liquid assets and engage in risk management.

Table 2 again shows that the coefficient of risk variable is positive and statistically significant for the panel data estimations. The results seem to suggest that for Ghanaian banks, risk influences their credit risk exposure. The results also indicate a positive relationship between size and credit risk. The results suggest that the bigger the banks are, the more they are exposed to credit risk.

Table 2

Regression Model Results (Dependent Variable: CRE)

Explanatory Variables	Coefficient	t-Statistic	Prob.
CAP	0.0063	4.7369	0.0000
LQT	-0.0025	-1.6351	0.1056
LDG	0.0006	0.2597	0.7957
PRE	-0.0108	-3.1577	0.0022
RSK	0.0594	2.0765	0.0408
SZE	1.2511	3.2535	0.0016
R-squared	0.040982		
S.E. of regression	0.008528		
F-statistic	0.626758		
Prob (F-statistics)	0.708416		

The result of the Ordinary Least Square regression between dependent variables (capital structure) and the six explanatory variables are reported in Table 3. The results show negative relationship between capital structure (total equity to total assets) and liquidity position of banks. This indicates that the more a bank holds liquid assets, the less its equity capitals. The results also show a negative correlation between loan sales and the capital of banks. This means that significant portion of banks assets are financed by debt. The results support the empirical findings.

Table 3

Regression Model Results (Dependent Variable: CAP)

Explanatory Variables	Coefficient	t-Statistic	Prob.
CRE	0.7733	9.7707	0.0000
LQT	-0.0485	-2.0418	0.0442
LDG	-0.0922	-3.7674	0.0003
PRE	0.6543	4.8152	0.0000
RSK	13.4949	20.2850	0.0000
SZE	-8.4312	-6.5636	0.0000
R-squared	0.805043		
S.E. of regression	0.075361		
F-statistic	60.56357		
Probe (F-statistics)	0.000000		

The results also indicate a statistically significant positive relationship between profitability and capital structure on the other hand. The results support previous studies (Myers, 1984; Titman and Wessel, 1988 and Barton *et al.*, 1989) that, higher profits increase the level of internal financing. Banks that generate internal funds generally tend to depend less on debt. While profitable banks may have better access to debt finance than less profitable ones, the need for debt finance may possibly be lower for highly profitable banks if the accumulated reserves are sufficient to finance new investments. The findings provide support for the pecking order theory that denotes that profitable firms prefer internal financing to debt financing.

The results show a positive relationship between risk and equity capital. This is consistent with static frame model that the more likely a firm is exposed to risk, the greater their incentive to reduce their level of debt within the capital. The results also show a negative relationship between bank size and capital. The banks' size seems to allow banks to operate with the less equity capital. The finding confirms earlier empirical studies and supports financial theory.

Table 4 reports interaction results between the dependent variable (loans sales and advance) and explanatory variables. The results show a positive though statistically insignificant relationship between loan sales and liquidity. As banks are sources of capital to other firms, a bank with more liquid assets is in position to advance loans and credits. The results also show a positive correlation between loan sales and banks' profit and risk. The results show a statistically significant and positive relationship between bank loans and advances and the size. The larger banks are more diversified and are able to attract more deposits than the smaller banks. This confirms Jayaratne and Morgan (1999) study that shifts in deposit supply affects lending by most small banks.

Table 4

Regression Model Results (Dependent Variable: LDG)

Explanatory Variables	Coefficient	t-Statistic	Prob.
CRE	1.2116	1.7272	0.0876
CAP	-0.2056	-1.4317	0.1558
LQT	0.1733	1.2988	0.1974
PRE	0.2316	0.6888	0.4928
RSK	0.1171	0.0375	0.9702
SZE	3.4511	2.6816	0.0087
R-squared		0.218345	
S.E. of regression		0.104096	
F-statistic		4.096938	
Prob (F-statistics)		0.001134	

## Conclusion

The focus in the banking literature has been on how banks use their internal capital markets. This paper illustrates how credit risk affects a bank's capital structure, profitability and lending decisions. The analyses are performed using data derived from the financial statements of banks supervise by the Central Bank during the most recent six-year period. The Ordinary Least Square model is used to estimate the regression equation. The results support earlier studies, as the study reveals that larger banks enjoy lower capital ratios and higher lending. Firm's size plays a significant role in determining the credit risk level of banks in Ghana. The results show that larger banks have higher credit risk. The study also shows that, banks that are exposed to higher credit risk turn to have larger equity capital, low liquidity and lower profits.

The results indicate that less than 1% of Ghanaian banks are exposed to credit risk, and that more than 86% of their assets are financed by debts. The banks' average lending rate is around 28%. The study also reveals that capital structure (equity to total assets) of banks is positively re-



lated to banks' credit risk, profitability, and risk and inversely related to bank's size, liquid assets and lending.

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