

BANK CAPITAL AND PROFITABILITY: A STUDY OF SELECTED BANKS IN GHANA

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ABSTRACT: *The study investigated the relationship between bank equity capital and profitability by sampling fourteen (14) banks, using the purposive sampling technique, out of the twentyeight (28) universal banks operating in Ghana at the time, with data covering an eleven- year period (2005-2015). The study adopted the panel data methodology to examine the effect of bank capital on profitability. The random-effects Generalised Least Square (GLS) regression was adopted as an estimation technique for the research. The study revealed that equity capital is significantly and positively related to Net Interest Margin (NIM), and Return-on-Equity (ROE). Bank size is significantly and negatively related to ROE, and insignificantly inversely related to NIM. Regulated bank capital is a disincentive to inclusive financial intermediation in Ghana.*

KEYWORDS: Bank, Capital, Ghana, Size, Equity, Profitability

INTRODUCTION

In Ghana, there is currently a raging debate concerning the low capital base of banks and the need to increase the minimum capital requirement by encouraging mergers and acquisitions in the industry. Whereas some argue that the inevitably pending consolidation of the capital level of the banks should be left to the market forces to determine, others are of the view that the re-capitalisation should be triggered by the regulator.

Some industry players and academics believe that higher minimum capital requirements empower the banks to underwrite the big ticket transactions thereby retaining much needed foreign currency and higher profitability for the banks. However, others also opine that equity capital is costly, and should be minimised as much as possible. They suggested that banks should finance their operations by enhancing their deposit base and by acquiring debt; both of which are relatively less costly. According to Admati, Dermazo, Hellwig and Pfleiderer (2011), the belief that equity is comparatively costly and should be economised is a fallacy, and that the only reason for doing so is because deposits and debt are subsidised; largely because of the existence of deposit insurance and bailout provisions. Admati Dermazo, Hellwig and Pfleiderer (2012) concluded that the main reason why banks are resistant to deleverage reveals their ‘addiction’ to leverage, which they attribute to debt overhang effect.

It is also believed that when the banks in Ghana have large balance sheet sizes the annual Ghana Cocoa Board loan syndication which is done by foreign banks in Europe and America could be done by the banks in Ghana. Some also argue that the banks in Ghana need to re-capitalise to enable them participate in the nascent oil and gas sector which requires huge capital outlays. Others, however, believe that the banks should be allowed to play in the different market segments of the economy which will determine the capital base they should hold; and that all banks should not be “forced” to be big by re-capitalisation.

Higher capital is expected to be costly for banks which implies that higher capital results in lower profitability, but conventional corporate finance literature suggests that higher capital reduces cost of bankruptcy and hence the premium returns demanded by shareholders for the high cost of bankruptcy (Mensah & Abor, 2012). According to Osborne, Fuertes and Milne (2012), a bank at equilibrium will desire to hold only privately optimal capital that trades off cost and benefits thereby resulting in a zero relationship at the margin. However, minimum capital requirements imposed by regulators, if binding, force banks to hold capital higher than the private optimum they would have wished to hold thereby making the banks incur additional cost that leads to reduction in profitability (Miller, 1995; Buser, Chen & Kane, 1991).

Berger (1995a, b) concentrated specifically on understanding the relationship between bank equity capital and accounting Return on Equity of banks in the US between the periods 1983 to 1989. He found that higher capital Granger-causes higher earnings and vice versa. This result was explained by the fact that banks retain marginal increases in earnings. Hutchison and Cox (2007) argued that the relationship between capital and profitability as well as capital structure and ROE is of considerable concern to all banks. This is because the banking industry is very sensitive to financial leverage due to their low levels of equity capital to total assets; also because the capital of banks is highly regulated.

Since the seminal works of Gallick (1976) on bank profitability and bank size in the United States of America which covered the 1954-74 periods, this for the first time focused on the extent to which bank size is associated with bank profitability. According to Gallick (1976) the small banks exhibit the lowest average rate of return while the medium to larger banks show progressively higher rate of profitability. The largest banks exhibit the largest rate of return.

Subsequent studies concentrated on the relationship between bank size and bank profitability which produced mixed results. Boyd and Runkle (1993) discovered a negative relationship between the rate of return on assets and bank size; and a positive relationship between financial leverage and bank size when they studied banks in the United States of America from 1971 to 1990.

Berger, Hanweck, and Humphrey (1987) studied the competitive viability of firms using a set of scale and product mix measures they developed and applied it to a 1983 data. They realised that banks experience some diseconomies of scale, which implies a negative relationship between bank size and returns.

Short (1979) posited that there is a strong positive relationship between bank size and capital adequacy since relatively large banks have the propensity to raise less expensive capital and deposit and therefore appear to be profitable. It is also agreed that larger banks that command a sizable market share in their domestic environment but operate in a noncompetitive market are considered safe for depositors and they therefore attract cheap deposits (even if lending rates are high) which is employed in their core business of financial intermediation hence earning more than average rates of return (Flavini, McDonald, & Schumacher, 2009)

In Ghana, larger banks are suffering from diseconomies of scale which has resulted in higher costs and high net interest margin (Mensah & Abor, 2013). This is in contrast to contemporary intermediation literature that argues that larger banks enjoy efficiency gains that directly relate to their size, which is derived from economies of scale.

Gatsi and Akoto (2010), when researching into capital structure and profitability in Ghanaian Banks, came to the conclusion that there is a strong negative relationship between bank size and bank profitability in Ghana. This conclusion is in consonance with the theory that large banks experience scale inefficiencies. In contrast to the conclusions drawn by Gatsi and Akoto (2010) and Mensah and Abor (2013), Aboagye, Akoema, Antwi-Asare, and Gockel (2008) found a positive correlation between bank size and net interest margin in a study of Ghanaian banks.

Despite these mixed results from the various research works, banks in Ghana are being encouraged to merge and expand in size which will be triggered by a regulator led recapitalisation requirement. This encouragement has been buoyed by a recent study undertaken by Ecobank Research which drew largely on categorisation of banks in Ghana into tier 1, 2, 3, and 4 by PriceWaterhouseCoopers in the 2014 Ghana Banking Surveys, (PricewaterhouseCoopers, 2014; Ecobank Research, 2014). The study found that tier 1 banks are the most profitable in Ghana and the desire of banks to join the league of tier 1 banks triggered some mergers and takeovers in the industry over the past few years.

All these studies however, concentrated only on establishing the relationship between bank size and profitability in Ghana. And the results gotten so far have been mixed; some studies established positive relationship between bank size and profitability, and others concluded that the relationship is negative. Also, there has not been a single research that is specifically dedicated to investigate the relationship between bank capital and profitability in Ghana. There is therefore the need for this research which is dedicated solely to investigate the relationship between bank capital and profitability in Ghana.

Objectives

The general objective of this study was to examine the relationship between bank capital and profitability of Ghanaian banks. The under-listed specific objectives guided the research;

- 1 Identify the factors that influence bank equity capital and profitability.
- 2 Analyse the relationship between bank equity capital and profitability.

Hypotheses

H1_o: Bank equity capital has a significant impact on Return on Equity (ROE)

H2_o: Bank equity capital has a significant impact on Net Interest Margin (NIM)

H3_o: Bank Capital Adequacy Ratio (BCAD) has a significant impact on Return on Equity (ROE)

H4_o: Bank Capital Adequacy Ratio (BCAD) has a significant impact on Net Interest Margin

H5_o: Bank size has a significant impact on ROE

H6_o: Bank size has a significant impact on NIM

LITERATURE/THEORETICAL UNDERPINNING

The review of literature is in two segments; a theoretical review and an empirical review.

Theoretical review

The theoretical review concentrates on the concepts of bank size, bank capital and the theories that underpin bank size and profitability.

Structure-conduct-performance paradigm in banking

This theory posits that collusive profits occur in banks, especially in the big-size banks. It is generally perceived that as bank concentration increases, anti-competition practices emerge and fester. These large banks emerge either through government encouragement or through workings of market mechanisms. This is one of the first models used to study the profitability of banks and the model postulates that highly concentrated banks collude and fix interest rate spreads hence their profitability.

Evanoff and Fortier (1998) argued that the traditional-structure- collision hypothesis made markets to be characterised by significant entry barriers. The argument is made that the competing market efficiency hypothesis (to be treated next) and the structure-conduct performance hypothesis may actually be complementary, and that the negative role of entry barriers may be more important than previously thought (Evanoff and Fortier, 1998).

Hannan (1991) studied the relationship between market structure in one instance, and bank loan, rates, bank deposit rates, and bank profit rates in another instance.

Molyneux and Forbes (1995) investigated the traditional structure-conduct –performance model and the market efficiency hypothesis in European banking using pooled and annual data for the period 1986 to 1989. The results suggested that the European banking market is characterised by the traditional structure-collision model. However, Goldberg and Rai (1996) found no positive and significant relationship between concentration and profitability for a sample of banks in 11 European countries over a four-year period, 1988-1991. Based on this result, Goldberg and Rai (1996) advised that strict limitations on cross border acquisitions of banks should not be warranted. Again, when Molyneux, LloydWilliams and Thornton (1994) used the Rosse-Panzar static to assess the competitive conditions in European banks between 1986 and 1989, the results indicated that banks in Germany, the United Kingdom, France and Spain achieved revenues as if under conditions of monopolistic competition.

Nabieu (2013) empirically investigated the structure, conduct and performance of commercial banks in Ghana and found that market concentration and market share significantly influence profitability of banks in Ghana. The finding of her research was an endorsement of the SCP hypothesis.

Efficiency hypothesis

Demstez (1973) posited the efficiency hypothesis which was his attempt to offer an alternative explanation to the traditional structure-collision model. He argued that the high profits of some banks relative to others is not out of collusive behaviour but rather from efficiency in operations that lead to larger market share and hence profitability. Gygorenko (2009) concluded that

higher profitability achieved by banks do not come as a result of market concentration but by operational efficiency that results in low operational cost.

Results obtained from empirical research are mixed. Smirlock (1985) found no relationship between market concentration and bank profitability but concluded that there was a significant relationship between market share and bank profitability. However, Roades (1985) argued that the relationship between market share and bank profitability could not be due to efficiency but may be as a result of product diversification and also the ability of some banks to charge more than industry average prices for their products.

Buchs and Mathisen (2005) studied the level of competition in the Ghanaian banking space and also assessed the efficiency in relation to the financial intermediation role of Ghanaian banks. They concluded that size has a significant and strong influence on total and interest revenue. In the authors' concluding views, this signifies strong economies of scale effect which shows clearly that profitability profile of the banking structure in Ghana favours the larger banks and with the implication of 'definite disadvantage' within the industry for small banks. They advocated for greater consolidation in the banking space to cure the disadvantages that the small banks suffer from.

When Akoena, Aboagye and Antwi-Asare (2012) investigated technical and scale efficiencies in banks in Ghana, they found out that small banks are doing better than the bigger banks on the return to scale properties but did not find any statistically significant difference in the small and bigger banks in their intermediation model reported. The authors therefore advised that the central bank should be cautious about encouraging banks to merge and become bigger with the objective of increasing bank efficiency. Their advice was based on the facts that were reported by their research findings.

Modigliani and Miller Theory (M-M Theory)

Franco Modigliani and Merton Miller, the two noble laureates originated the theory on capital structure using what has become known as M and M proposition I and M and M proposition II.

M and M proposition I

M and M proposition I states that it is irrelevant how a firm chooses to arrange its capital between debt and equity or in other words the value of the firm is independent of its capital structure. In their first publication in 1963, Modigliani and Miller (as cited in Ross, Westerfield, & Jordan, 1998) adopted the pie model to explain the M and M proposition I. Two firms were imagined from the left hand side of the balance sheet with assets and operations being exactly the same. The right hand sides were different because the two firms were presumed to finance their operations differently.

M and M proposition II

The M and M proposition II postulates that although changing the capital structure does not change the total value of the firm, it does cause important changes in the firm's debt and equity. Modigliani and Miller (1963), by ignoring taxes concluded that a firm's cost of equity capital is a positive linear function of the firm's capital structure.

Regulatory requirements

Another major determinant of bank capital ratio is explicit regulatory requirements in the form of minimum capital requirements, single obligor limits, legal lending limits and capital adequacy ratio. Osborne, Fuertes and Milne (2012) argued that such regulatory pressures are additional cost to banks that ultimately have effects on the level of capital that the bank holds. For instance, in Ghana, Deposit Money Banks DMB are required to keep their primary reserve requirements on both foreign and local currency deposits in local currency (Bank of Ghana, 2013). The consequences of falling below the minimum capital requirements may lead to suspension of permissions and bans from playing in certain banking activities, replacement of management team, imposition of tough plans to restore the institution to the required minimum capital, and in severe circumstances, revocation of banking licence or charter. This may lead to owners of the bank losing a valuable franchise value (Merton, 1978; Bhattacharya, Plank, Strobl, & Zechner, 2002).

To empirically test the widely held view that banks hold buffer capital above the regulatory minimum capital requirements, several studies were undertaken. It was generally agreed by the conclusions drawn that banks analyse the trade-off between the benefits of holding lower capital ratios below the regulatory requirement and the cost of regulatory interventions (Estrella, 2004; Milne & Whalley, 2002; Peura & Keppo, 2006; Barrios & Blanco, 2003; Repullo & Suarez, 2008; Heid, 2007). In the same vein, the optimal capital buffer is likely to increase with increase in portfolio risk, though it is difficult to measure as risk averse banks may hold higher capital although their portfolio risks are low, and in the short run banks with low capital buffers may 'gamble for resurrection' by engaging in risky business deals (Lindquist, 2003; Jokipii & Milne, 2011; Peura & Keppo, 2006). In addition, the choice of capital buffer may also be a function of profitability, since highly profitable banks in the past expects to draw on retained earnings to protect against falling below the regulatory minimum requirements (Milne & Whalley, 2002).

Market discipline

Also, market discipline is another important factor that determines the capital ratio of banks. Osborne, Fuertes and Milne (2012) argued that Market discipline restricts banks to limit their leverage as investors are sensitive to banks likely to default and fail and therefore demand higher premiums on their investments on uninsured deposits with such banks (Nier & Baumann, 2006; Flannery & Rangan, 2008; Berger, 1995; Flannery & Sorescu, 1996; Covitz, Hancock, & Kwast, 2004; Jagtiani, George, & Lemieux, 2002; Morgan & Stiroh, 2001; Flannery, 1998; Sironi, 2003; Gropp, & Heider, 2006). The effect of market discipline may not be observed due to government guarantees, and may only be observed in times when it is perceived that government guarantees have been withdrawn, such as in the Omnibus Budget Reconciliation Act of 1993 subordinated non-deposit claims to a failed bank's deposits (Flannery & Rangan, 2008; Osborne, Fuertes & Milne, 2012).

It seems plausible that higher portfolio risks lead to higher optimal capital ratios of banks, more especially when that bank is subject to greater market discipline. An increase in portfolio risk results in a more negative relationship between capital and profitability of banks, in the short-run, until the bank is able to adjust to its new optimal capital level (Osborne, Fuertes & Milne, 2012).

However, there is a positive effect on capital ratios of market discipline from liability holders-managers and owners of banks, who may reinforce market discipline because they tend to lose when the bank fails. They lose the bank charter or licence which is a valuable asset and not easy to come by. They also lose future rents from the bank. 'The charter or franchise value of a bank is the net present value of future rents which accrue to the owners or managers, such as larger interest margins arising from market power or established relationships, and provide incentives for banks to limit banks' risk taking at the expense of liability holders', according to Osborne, Fuertes & Milne(2012), pp. 9. Marcus (1984); Keeley (1990); Demsetz, Saldenberg, & Strahan (1996); Hellmann, Murdoch, & Stiglitz (2000); Bhattacharya (1982); and Rochet (1992). Hence, higher profitability improves the future prospects of the bank, and therefore creates incentive for the bank to hold higher capital ratios and limit portfolio risk.

Recently, some studies have explored the possibility of higher capital reducing the agency problems arising from information asymmetries in the bank-investor and bank-borrower relationships (Holmstrom & Tirole, 1997; Mehran & Thakor, 2011; Allen, Carletti & Marquez, 2011, Mensah & Abor, 2012). A bank with a higher capital ratio has better chance of future survival and therefore is incentivised to monitor borrowers, and investors take this into consideration when valuing claims on a bank. It is argued that this may lead to banks voluntarily holding buffer capital in competitive markets, since higher capital ratio is the only guarantee that the bank has the incentive to monitor borrowers and offer them surplus. The result is a higher bank capital ratio (Allen, Carletti & Marquez, 2011).

In contrast, explicit or implicit government guarantees and deposit insurance schemes reduce optimal bank capital. Deposit insurance schemes and government guarantees of bank liabilities if there is a default limit the market discipline effect of depositors' required rate of return, as argued Merton (1978). Also, when perceptions amongst investors that government guarantee for banks' liabilities in times of default for uninsured debt increase it affects the disciplining effect of banks hence lower capital ratios. The increase in perception of a greater safety net results in lower capital ratios for banks and vice versa

(O'Hara & Shaw, 1990; Nier & Baumann, 2006; Flannery & Rangan, 2008). In Ghana, increases in primary reserve requirements and the requirement for secondary reserve requirements reduce optimal bank capital and therefore reduce the disciplining effect of banks and vice versa.

Business plan

Another important determinant of bank capital ratios is the business plan of the bank. A bank with an aggressive posture aimed at increasing market share will quickly leverage up thereby lowering the capital ratio. Also, a bank with a future aggressive business strategy may build up higher capital ratios presently to be used to execute their future strategy. However, a bank that plans to grow organically by acquisitions may maintain high capital ratio to satisfy regulators that the resulting entity will be adequately capitalised (Berger, DeYoung, Flannery, Lee, & Öztekin, 2008). A bank that is increasing its market share may, in the short run, have lower capital ratio consistent with its higher risk outlook or growth in its loan products may simply have outpaced the ability to grow the capital base or to retain capital (Goddard, Molyneux, & Wilson, 2004; Osborne, Fuertes & Milne, 2012). In the long run, a bank with aggressive business strategy may have been successful in building a strong market share and profitability thereby attracting less costly capital. The bank will in the long run maintain higher capital ratios.

The pecking order theory

This is one of the best known theories in corporate finance. The theory, which was pioneered by Myers (1984), studied corporate managers' preferences for sources of financing for their companies. Myers found out that managers prefer to meet the finance needs of their organisations from internal sources; and if funds from internal sources are inadequate, they borrow (Lin, Hun, & Chen, 2007, p. 2; Myers & Majluf, 1984)

In this theory, sources of financing for corporate organisations are listed in hierarchical order from internal to external sources (Donaldson, 1961). If internal sources fall short in financing the investment, business organizations need to make a choice according to risk degree of the source (Myers, 1984, p. 580).

The pecking order theory is considered to be at variance to the trade-off theory. Myers (1984) suggested that the pecking order preference by managers of firms comes about because of information asymmetry between the firm and the capital market. His findings were supported by other studies carried out by Frank and Goyal (2003), Shyam-Sunder and Myers (1999). A similar study was conducted and the field research confirmed that managerial optimism was bolstered by pecking order preferences in decisions regarding financing needs for their firms (Graham & Harvey, 2001).

Managers of firms have more information regarding the future prospects of the firm than outside investors. Outside investors know this and would therefore demand higher premium for their investments (Gatsi & Akoto, 2010). This information 'gap' between managers and investors makes investors demand risk premium on their investments. Managers therefore conclude that external financing is more expensive to the firm than internal sources, according to Barclay and Smith (2005). Managers, also being aware of this phenomenon, will only issue equity when they know that they are overpriced; and will hold on from issuing equity when they are under-priced. However, because of information asymmetry between investors and managers of the firm there will never be a time that the price of equity will be correctly valued.

In conclusion, managers of firms when faced with financing needs will first of all look at their retained earnings. When the retained earnings of the firm cannot meet their financing needs, the managers opt for debt financing. It is only when debt financing is not available to meet their needs that they issue equity.

The static trade-off theory

The static trade-off theory is also called the static theory of capital structure. Ross, Westerfield, and Jordan (1998) clarified the model thus the firm is fixed in terms of its assets and operations and only considers possible changes in debt-equity ratio. Firms borrow up to the point where the tax benefit from an extra dollar in debt is exactly off set by the cost that comes from the increased probability of financial distress (Ross, Westerfield, & Jordan, 1998). The firm then attains its optimal capital structure at this point where an extra dollar of additional debt gives tax benefit that is less than the cost of financial distress, and therefore any extra borrowing pushes the firm closer to higher probability of financial distress and bankruptcy.

This theory therefore presupposes that banks will continue to leverage until an extra dollar from debt equals the cost of financial distress to the bank. Banks with less debt will borrow in order to benefit from the tax shield that comes with debt until the additional dollar of debt is off-set by the cost of bankruptcy. Banks in Ghana, apart from their corporate taxes are charged

national stabilisation levies on their profits. This levy also serves as a tax shield since it is applied on the pre-tax profit.

Signalling theory

Signalling theory is based on the proposition that managers of firms have superior information on the future prospects of the firm than outside investors and will 'signal' the outside investors and the rest of the capital market by increasing leveraging. There is information asymmetry between managers of firms and the investor public (unless there is insider trading). However, in contrast to market timing theory where the managers of the firm increase or engage in securities offering because they want to raise 'cheap' capital, in signalling theory the managers undertake financing decisions in order to convey their confidence in the future prospects of the firm to the investor public (Barclay & Smith, 2005). Managers will normally undertake the financing decision when they believe the shares of their firm is undervalued.

Gatsi and Akoto (2010) argued that debt mandates firms to make regular periodic payments to debt-holders and inability to meet such an obligation could lead to bankruptcy. Bankruptcy is costly for managers as they will lose their jobs. They also agreed that managers are not unaware of this development and will therefore do everything within their power to avoid financial distress.

On the other hand, dividend payment is not obligatory, and the managers have more control over its payment and may even decide not to pay when the performance of the firm is not encouraging (Barclay & Smith, 2005; Gatsi & Akoto, 2010). For these aforementioned reasons, adding more debt to the firm may serve as a credible signal to higher expected future prospects of the firm in the form of cash flows and profitability (Ross, Westerfield, & Jordan, 1977). In this vein, it has been suggested that increasing leverage is one of the potent signalling devices that a firm can employ. Different researchers have suggested different signalling models in which they demonstrated what determines more debt use by firms. However, they all reviewed the models within the framework of information asymmetry. These models are reviewed in turn.

Akerlof (1970) argued that managers with informational advantage have the incentive to signal their private information through the leverage levels they take. He opined that firms with higher expected future cash flows are motivated to take on higher debt relative to other firms because of the probability of courting financial distress.

Also, Leland and Pyle (1977) provided another framework to demonstrate why managers send signal to the market due to their access to privileged corporate information. They argued that owners of high value firms signal the market by retaining substantial ownership of their companies thereby taking on higher debt than their low quality counterparts. In that regard, Ross (1977) predicted a positive correlation between firm quality and financial leverage in their model.

Further, Heinken (1982) also developed a signalling model in which the information asymmetry is about the mean and the variance of the returns. In his model, he assumed a positive correlation between the means and the variance which drives signalling equilibrium in which higher-value firms signal their quality by taking on higher debt levels. He concluded that higher value firms were relatively riskier than their low-value counterparts.

In addition, Blazenko (1987) averred that risk-averse managers will let risky but profitable opportunities pass by thereby decreasing firm value. As a result, these managers will avoid debt as they believe it increases the probability of bankruptcy for the firm. However, managers of high-value firms will distinguish themselves by using higher debt. This model just like the ones reviewed above shows that there is a positive correlation between firm value and financial leverage.

It is also generally agreed among some academics that dividend payment to shareholders is an important variable in signalling firm value to outside investors (Ravid & Sarig, 1991). Managers of the firm, who have superior information on the future cash flow of the firm, relative to outside market participants will signal the quality of the firm and its future prospects by paying dividends to shareholders instead of retaining such earnings.

Empirical review

The empirical review focuses on the studies that established negative relationships between bank capital and bank profitability as well as those that found a positive relationship between bank capital and bank profitability.

Negative relationship between bank capital and bank profitability

Very few studies found a negative relationship between bank capital and profitability. Berger (1995b), in investigating the relationship between capital and earnings in banks, found a negative relationship between the variables in the 1990-1992 periods in the US. Osborne, Fuertes and Milne (2012) extended the study by Berger and found a negative relationship between capital and profitability ratios for banks in the US, for the periods 1990s to 2000s.

Positive relationship between bank capital and bank profitability

Most empirical studies that investigated the relationship between capital and profitability found a positive relationship, across a variety of different markets and time periods (Angbazo, 1997; Demirgüç-Kunt & Huizinga, 1999; Vennet, 2002; Nier & Baumann, 2006; Flannery & Rangan, 2008). Berger (1995b) investigated the relationship between capital and earnings and came to the conclusion that capital granger-causes earnings and vice versa, in the 1983-1989 period in the US; but the relationship proved negative in the

1990-1992 period. Hutchison and Cox (2007) also found a positive relationship between financial leverage and ROE for US banks between the periods 1983-1989 and 1996-2002. When the study was extended, a positive relationship was confirmed between equity capital and Return-on-Assets (ROA). Athanoglou, Delis, and Staikouras (2006) also found a significantly positive effect of capital on profitability when they modelled Greek banks. These results could be attributed to the pecking order theory since high earnings in the past drive higher capital in the present, according to Osborne, Fuertes and Milne (2012). In addition, Morgan and Stiroh (2001) investigated directly the relationship between capital ratio and spreads paid on debt and find a relationship that is positive but weak.

An overview of banking in Ghana

Banking in Ghana underwent several developmental phases from the colonial past to the very early independence days. This is a historical trace of the path of the many legislations and regulatory reforms after the economic malaise of the 1970s and 1980s to modernise the sector.

Modern banking started in the Gold Coast (pre independence name for Ghana) in the late nineteenth century when the Post Office Savings Bank (POSB) began operations in 1888, using the facilities of the post offices in the era. Later, the British Bank of West Africa, now Standard Chartered Bank (SCB) was established in the then Gold Coast in 1896. Barclays Bank DCO, now Barclays Bank Ghana Ltd (BBG), was subsequently established in 1917. These banks were overseas subsidiaries of banks incorporated in the United Kingdom. These banks were established in the Gold Coast to facilitate trade between the UK and the Gold Coast (Antwi-Asare & Addison, 2000).

Meanwhile The British government established the West African Currency Board (WACB) in 1912 to issue currency of various denominations in the British colonies in West Africa (Gold Coast, Sierra Leone, Nigeria, and The Gambia), and to redeem the British pounds (Antwi-Asare & Addison, 2000). Considerable pressure from the locals was mounted on the colonial government to set up a bank to meet their aspirations, as the two major banks in existence at the time(Barclays and The British Bank of West Africa) favoured only the expatriates-Europeans, Levantines and Asians. Sir Cecil Trevor, who was consulted in 1951 to advise on the possibility of setting up a national bank in the Gold Coast on commercial lines to address the agitation from the local business people, recommended that a bank be set up to be partly owned by government and staffed by locals. He emphasised that the aim of the bank was to meet the banking needs of the local private sector while maintaining government accounts. Based on Sir Trevor's recommendations, the Bank of the Gold Coast was established and started operations in 1953.

After independence, Ghana left the WACB and split The Bank of the Gold Coast into two; a new Bank of Ghana was established and empowered to act as the central bank and the commercial activities of the erstwhile Bank of the Gold Coast was hived off to the Ghana Commercial Bank. According to Antwi-Asare and Addison (2000), immediately after independence Ghana lacked the critical private capital coupled with the socialist-biased policies of the government led to active government-led development in the banking sector in terms of activities and establishment of more banks.

From 1963, Ghana started experiencing serious economic challenges which culminated in the first coup d'état in February, 1966, which also sent the country on a spiral of political instability characterised by coups, economic policy inconsistency, economic indiscipline, corruption and general mismanagement of state resources. The banking sector was affected by the general institutional decay. Antwi-Asare and Addison (2000) reported that the banking sector since the 1970s had built up a large portfolio of non-performing assets which were rolled over from year to year. The World Bank also reported that 'Ghana's three largest banks had never undergone a comprehensive examination... Most banks had high concentrations of risk, insufficient capital, unrecognized loan losses, and reported inflated non-existent profits' (World Bank, 1994: pp. 51-53). The Bank of Ghana, however, failed in exercising its powers (powers conferred on it by the Banking Act of 1970) to investigate and monitor the performance of banks and to carry out on-site inspections.

In 1983, the government approached the World Bank and the International Monetary Fund to help re-structure the economy and inject some efficiency and apply the brakes on the general economic malaise. As a result, the Economic Recovery Programme (ERP) was launched with broad principles of free market economy. Under this, privatisation of stateowned enterprises (SOE); liberalisation of trade, exchange rate re-alignment and financial restrictions; and the

divestiture of government control in Public Corporations were heightened to promote efficiency, effectiveness and to revive the economy (Gatsi & Akoto, 2010).

In 1988, the government introduced the Financial Sector Adjustment Programme (FINSAP) as part of the ERP to re-structure and re-vitalise the financial services sector to promote financial intermediation and economic growth. Specifically, the FINSAP sought to clean up the toxic asset portfolio of the state-owned banks through diversification, and remove restrictions on financial services and inject new capital. Furthermore, it was meant to introduce robust and modern regulatory regime into the sector (Gatsi & Akoto, 2010).

Pursuant to the objectives of FINSAP, a new banking act was promulgated in 1989, PNDC Law 225. The law was meant to among other things: introduce new minimum capital requirements; define and enforce capital adequacy; guidelines for prudential lending were introduced; banks were explicitly allowed to engage in non- bank businesses only through subsidiaries, this is to ring-fence depositors' monies; the office of the Chief Examiner, now Banking Supervision Division was introduced in the law; Accounting Manuals were issued to standardise accounting systems for all banks; and also, suitably locally incorporated bodies were encouraged to apply for licences to operate banking business in Ghana (Amidu, 2007; Gatsi & Akoto, 2010; Antwi-Asare & Addison, 2000; Ghana Banking Law, 1989).

The banking law was tested in a dramatic way in 1992 when The Co-operative Bank was closed down for its inability to meet capital adequacy requirements and inter-bank settlements. Apart from 1992 when the law was applied, the Banking Supervision Department of the Bank of Ghana has been criticised for lack of application of powers within its ambit. This led to the liquidation in 2000 of the Bank for Housing and Construction, Ghana Co-Operative Bank, and the Bank for Credit and Commerce. Amidu (2007) concluded that the banking sector in Ghana has not witnessed much progress and development in spite of the vigorous legislative instruments introduced for reformation. In conclusion, adequate and up-to-date legislation and rigorous application of the law is needed to safeguard the survival of banks. Prudent risk management practices and skilled management team to be supervised by effective, skilled and functional boards should be encouraged to enhance the performance of the banks and ensure a sane financial services sector.

The New Basel Capital Accord (Basel III) and the minimum capital requirements

Saunders and Cornett (2004) posited that a minimum capital requirement on banks effectively constrains them and prevents bank failure. Minimum capital and capital adequacy requirements constrain banks on the maximum level of risk asset that a bank can partake in. The level of capital a bank holds also limits the single obligor risk level that the bank can take. This effectively prevents bank failure and the desire of managers to underwrite excessive risk assets to the detriment of the survival of the bank.

The Bank of Ghana has increased the minimum capital requirements of banks from GHS60 million to GHS120 million. However, this directive affects only new entrants onto the market applying for banking licence. The Banking Amendment Act, 2007, Act 738 also maintains the capital adequacy ratio at 10.00 per cent which is above the Basel III requirement of 8 per cent. Basel III stipulates that total capital (Tier 1 capital plus Tier 2 capital) must be at least 8.00% of risk-weighted assets at all times (BIS, 2010). These measures in addition to others are expected to prevent failure of banks by controlling excessive risk taking and promoting prudent management of bank resources.

Implications of the new minimum capital requirements under Basel III on banks' operations

The new minimum capital requirements set out by the Bank of Ghana on new entrants onto the market will increase the total capital base of the banks in the economy. This will enhance the ability of the banks in Ghana to underwrite the big ticket transactions in the oil and gas, power, telecommunications and cocoa sectors on their own balance sheets. This could be done through loan syndications. An instance is cited in Nigeria where the banks are well capitalised, a development triggered by the regulator. This led to Nigerian banks partaking in the recent power sector liberalisation programme of the government.

Enhanced minimum capital base of the banks will lead to well capitalised and robust financial services sector ready to boost economic growth. The average capital adequacy profile of the Ghanaian banking sector moved from a pre-recapitalisation capital adequacy ratio (CAR) of 13.8% in 2008 to 18.5% in 2013, and 17.9% in 2014 (Ecobank Research, 2014; Bank of Ghana, 2014). Adequately capitalised banks are poised to take advantage of any opportunity in the economy, however, the huge capital outlays that will be on the balance sheet of banks will be unprecedented in the history of banking in Ghana, and this will carry along with its risk profile that the banks in Ghana may be unfamiliar with (PricewaterhouseCoopers, 2008).

Higher minimum capital levels also offer a wide range of opportunities to the banks in terms of single obligor limit restrictions. A higher capital means ability to meet a higher single obligor limit. This offers a bank with higher minimum capital base the unrestricted ability to meet the credit requirements of clients with higher credit requirements without the need to syndicate or refer to the Bank of Ghana for clearance.

METHODOLOGY

The methodology adopted in this study is purely quantitative and random-effect panel data regression and correlation. Gatsi and Akoto (2012) argued that panel data is an important method of longitudinal data analysis. According to Baltagi (1995a), panel data employs the pooling of observations on a cross-section of units over several time periods and generate results that are simply not detectable in pure cross-sections or pure time-series studies. The panel data methodology was adopted in this study because the research involved the pooling of observations on a cross-section of units over 11 years. Besides that, the method effectively addressed the objectives of the study. The regression and correlation matrix were specifically employed to determine the relationship between the dependent and independent variables and the extent of such relationships, if any.

Advantages of adopting panel data as a study design include the ability to control for individual heterogeneity in the variables. Inability to control for these unobserved individual specific effects leads to bias in the estimates. Another advantage is the ability to deal with a much larger data set with more variability and less collinearity among the variables as compared to cross-section or time-series data. Also, panel data makes it possible to include variables at different levels of analysis thereby making it suitable for multilevel or hierarchical modelling (Baltagi, 1995b).

The disadvantages of adopting panel data as indicated in Baltagi (1995b) are data collection difficulties in sampling design, coverage (incomplete account of the population of interest),

non-response (due to lack of co-operation from respondents or due to interviewer error), recall (respondent not remembering correctly), frequency of interviewing, interview spacing and correlation between variables. Measurement error is another disadvantage that may occur by adopting panel data. Measurement error may arise because of faulty response due to unclear questions, memory error, and deliberate distortion of responses (eg. prestige bias), miss-recording of responses, interviewer effects and inappropriate informants. Although these problems can occur in cross-section studies, they are more pronounced in panel data studies.

Quantitative research refers to numbers and the observation of observed facts (Cooper & Schindler, 2001). They explained further that it involved observation of hard facts for which data is collected, analysed and described in term of numbers. Such observed facts lend themselves to be quantified in numbers and the conclusions drawn from the observations are objective and can be verified by another researcher.

Cooper and Schindler (2001) argued that quantitative research methodology allows for specification of dependent variables and the longitudinal measure of data collected. This study qualified to be conducted on the quantitative research methodology because it allowed for specification of the research problem and the dependent and independent variables. It followed the original research objectives by, and arriving at more objective conclusions by testing hypotheses, determining causality and eliminating subjectivity of results.

Population

The target population for this study was the twenty-eight (28) registered banks, licensed and regulated by the Bank of Ghana to operate as universal banks as disclosed in Appendix A.

Sample and sampling procedure

The purposive sampling technique was employed to purposively select fourteen (14) banks in Ghana. The data on these banks was collected for an eleven-year, 2005 to 2015. The choice of the eleven-year period was based on the regression assumption that the larger the data in terms of time frame, the more suitable the conclusions for predictions or forecasting. Also, the data available covered the eleven-year period.

The selection of this sampling technique was appropriate because some of the banks operated under different licensing regimes before they were given the universal banking license. For instance, First Capital Plus Savings and Loans and First National Bank operated as savings and loans before they were licensed with the universal banking licence and were rebranded as Capital Bank and GN Bank respectively.

Also, FNB started operations in 2015 hence do not have four-year financial statements for analysis. In addition, the selected fourteen banks have their financial statements covering the period 2011 to 2014 available, except for Prudential Bank whose 2014 financial statements the researcher was unable to obtain.

Into the bargain, it was important to have a mix of banks with majority foreign ownership and banks with majority local ownership in the analyses. This was to avoid skewed results that might arise from not having a mix or the right mix of foreign and locally-owned banks. Foreign banks are usually more resourced, have higher technology and talent compared to their local counterparts. They are also more likely to be better managed since the local subsidiaries follow the corporate governance structure and regulations of their parent firms. 'The foreign banks

usually 'cherry pick' the most creditworthy customers, and are therefore less likely to suffer from non-performing assets' (Mensah & Abor, 2012, p. 7).

Instrument

The Ghana Association of Bankers (GAB) is an umbrella body of all universal banks operating in Ghana. The association produces annually, a comparative analysis of the balance sheets and profit and loss accounts of the banks. Apart from that the association produces a comparative analysis of the key ratios, also annually, for the banks. Ratios such as ROA, ROE, equity/assets, advances/deposits are calculated. The researcher obtained these comparative analyses of balance sheets and profit and loss accounts with the corresponding comparative analyses of key ratios for the eleven-year period, 2005-2015, and extracted the relevant data suitable for the study.

Data collection procedure

Data from secondary sources, specifically from the Ghana Association of Bankers, published financial statements of banks covering the period 2005 to 2015 are used. The financial data were extracted from an annual publication of the Ghana Association Bankers, the annual reports of the banks as published in the various newspapers, the websites of the banks and the annual report publications of the banks. Also, scholarly articles from academic journals, textbooks on the subject matter as well as internet search engines were used in the thesis.

Variables

Two variable groups are used in the study. Two dependent variables and nine independent variables are employed in this study. Return on Equity (ROE), and Net Interest Margin (NIM) are used as dependent variables; and Equity capital, Bank size, Bank-ownership, Bank risk, Bank liquidity, Bank capital adequacy, Bank concentration, Non-performing loan ratio, Gross Domestic Product and inflation are considered in the study as independent variables.

Return on Equity (ROE)

Return on Equity is defined as a ratio of net income [in this study we used profit before tax (PBT)] to total equity. It is defined as pre-tax profit to total equity capital (Van Horne & Wachowicz, 2008; Turkson, 2011).

The use of ROE as a measure of profitability is appropriate as it determines the portion of profitability that goes to shareholders rather than all the profitability that comes to the firm as measured by ROA.

Net Interest Margin (NIM)

Abor and Mensah (2012) defined Net Interest Margin as the net interest income scaled by total assets. They also assert that it is the interest margin which is the ex post interest spread. Net Interest Margin is the interest income received by the bank minus the interest expense paid by the bank, and scaled by the total assets. This measures the income gotten from the core business of banks, thus financial intermediation. It is used as a proxy for bank efficiency as it measures operations of the core business of banks. It also measures the difference between interest paid by banks on deposits and income received by banks on loans. A high NIM presupposes income for the bank but points to inefficiency in financial intermediation in the economy and vice versa.

Equity Capital

The Bank for International Settlements (BIS) defines bank capital in different categories when Basel III was issued. The Bank capital adopted for this study is the Common Equity Tier 1 Capital and defined thus;

- 1 Common shares issued by the bank that meet the criteria for classification as common shares for regulatory purposes (or the equivalent for non-joint stock companies);
- 2 Stock surplus (share premium) resulting from the issue of instruments included

Common Equity Tier 1;

- 3 Retained earnings;
- 4 Accumulated other comprehensive income and other disclosed reserves;
- 5 Common shares issued by consolidated subsidiaries of the bank and held by third parties (i.e. minority interest) that meet the criteria for inclusion in Common Equity Tier 1 capital; and
- 6 Regulatory adjustments applied in the calculation of Common Equity Tier 1 (BIS, 2010, pp.12-13).

In Ghana, bank capital constitutes stated capital, income reserves, statutory reserves and capital reserves (PricewaterhouseCoopers, 2008). The regulator in 2008 announced that banks operating in Ghana or intend to operate in Ghana should hold a minimum stated capital of not less than GHS60 million. According to PricewaterhouseCoopers (2008), the

Bank of Ghana gave the following timelines for full compliance;

1 End of 2009 for banks with majority foreign shareholding (foreign banks); and 2 End of 2012 for banks with majority Ghanaian shareholding (local banks). However, the banks with majority local shareholding are expected to increase their stated capital to at least GHS25 million by the end of 2009. This presupposes that between years 2005 and 2015 that the data for this study was concentrated the capital base of the banks with majority local shareholding increased their stated capital from at least GHS25 million in 2009 to GHS60 million in 2012 (PriceWaterhouseCoopers, 2008; Bank of Ghana, 2008).

Bank Size

Bank size is introduced to determine whether there are economies or diseconomies of scale of banks in Ghana, and also serve as a control variable.

Bank size has been taken as the natural logarithm of total asset of bank. The use of logarithm has made it possible to get the real total assets of bank due to its capability to standardise values thus bringing them same platform for more efficient analyses. A positive or negative relationship is expected from dependent profitability variables (ROE, and NIM) and the independent variable bank size. A negative statistically significant relationship between NIM and bank size will imply scale economies in the Ghanaian banking sector and vice versa.

Non-Performing Loan Ratio

A positive relationship is expected between NPL and Net Interest Margin (NIM), but a negative correlation is expected between NPL and ROE. A high NPL ratio erodes the margin on loans hence lower NIM; however, a high NPL ratio will reduce profitability and given same amount of equity ROE decreases. A high NPL ratio takes away a chunk of profit to be declared and results in lower profitability and vice versa. A bank with high bad and doubtful loans is expected to declare lower profits compared to another bank with lower bad and doubtful loans. NPL ratio is also used as a proxy for credit risk in banks. Credit risk measures the quality of the loan book of the bank. However, banks exposed to higher credit risk demands premium interest margin to compensate for the risk of nonpayment or default of the loan (Doliente, 2005; Siaw, 2013). A higher NPL ratio is also an indication of a weak institutional credit risk management culture. A bank with a wellstructured credit management outfit manned by qualified and experienced staff tends to have low NPL ratio and vice versa.

Capital Adequacy

In literature, the equity to asset ratio is used as proxy for capital adequacy which is an important determinant of profitability and survival. A bank with robust capital can withstand shocks easily and the higher capital levels can cover loan loss provisions. An adequately capitalised bank is also able to attract cheaper deposits without the depositors demanding for a premium return on their deposits as the likelihood of bankruptcy is minimal. A bank that is able to attract cheaper deposits, all things equal, tends to be profitable and vice versa.

In Ghana the regulator requires all banks to maintain a risk-weighted capital to a riskweighted-asset at a minimum of 10.00%, which is above the 8.00% required by Basel III. The CAR of banks in Ghana has been high, especially after the recapitalisation exercise undertaken by the Bank of Ghana between the years 2009 to 2012. According to the Bank of Ghana, the CAR of the industry increased from 14.7% in July 2009 to 15.5% in July 2012, increased further to 16.2% in July 2014, settled at 17.9% in December 2014 before dropping marginally to 17.8% in December 2015. A positive relationship is expected between NIM with CAR; but a negative relationship is expected from ROE and CAR. This is because a highly leveraged bank will operate with less equity and given same level of profitability and decreasing denominator, ROE will increase.

Bank Concentration

The author adopted the bank concentration in the model to measure the market structure of the Ghanaian banking industry and its effect on bank profitability. The Ghanaian banking industry is said to be competitive as the players in the industry jostle for deposits by running promotions, applying creative customer service tools, catchy advertisements in the media; both mainstream and social, and attracting and retention of high performing staff. The fierce competition in the industry was brought about by the influx of Nigerian and Asian banks, who introduced pioneering banking innovations into the industry. They introduced modern relationship banking and electronic banking platforms that enhanced customer experience. Demand deposits are the first source of cheaper and stable funds for banks; savings deposits come in second followed by time deposits. A bank that is able to attract cheaper deposits tends to be profitable as the cheap deposits results in profitable financial intermediation. Their cost of funds tends to be low and the net interest spread is attractive and profitable.

Competition among firms in an industry is measured by the Herfindahl-Hirschman Index (HHI), named after economists Orris C. Herfindahl and Albert O. Hirschman. It is taken as a summation of the squares of the market shares of each firm in the industry, where the market shares are expressed as fractions or whole numbers. The results can range from 0 to 1.0, moving from a large number of small producers to a single monopolistic player. Increase in Herfindahl index generally indicates a decrease in competition and increase in market power, whereas decreases indicate the opposite. Alternatively, whole numbers can be used in measuring HHI index. Where whole numbers are used the index ranges from 0 to 10,000 'points'. Siaw (2013) opined that the results are divided into three; an unconcentrated industry (HHI is below 10,000 or 0.1), moderately concentrated (HHI between 10,000 or 0.1 and 18,000 or 1.80), highly concentrated (HHI above 1.80 or 18,000). In this study, the researcher employed deposit market shares of the banks in calculating the HHI. It is expected that an un-concentrated industry will be competitive and market players will be unable to charge extractive rent. On the other hand, a highly concentrated industry will have few players who can exact monopolistic rents thereby being profitable. In 2015, only ten out of the twenty-nine banks control about 70% share of the total banking industry deposits. Flamini, McDonald and Schumacher (2009) posited that due to diseconomies of scale as banks grew bigger, a negative but statistically insignificant coefficient is evidence of market power which empowers the banks to pass on costs to customers, thereby leaving their profits un-affected. Mensah and Abor (2012) found a statistically positive relationship between industry concentration and net interest margin in Ghana. Amidu and Wolfe (2012) also found a positive effect of industry concentration on net interest spread in emerging and developing economies. Bank Liquidity

A liquid asset is said to be an asset that can be converted to cash or cash equivalent within a reasonable time and without incurring additional costs. The Basel Committee on Banking Supervision (2008), as quoted in Siaw (2013) defined liquidity as the ability of a bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses. A profitable but illiquid bank could experience a run on its operations. Holding liquid assets is not profitable to banks as there is less to no returns on holding liquid assets. Banks therefore walk a tight rope of balancing liquidity risk to avoid runs and profitability. Empirical studies to determine the impact of liquidity risk on bank profitability is mixed; Molyneux and Thornton (1992) establish a weak relationship between the liquidity level and bank profitability, while Bourke (1989) found a strong and positive relationship between them. In this study, a net loan to deposits is employed as a measure of bank liquidity. A negative impact is expected between bank liquidity and NIM; and a positive relationship is expected between loan to deposits and ROE.

Bank Ownership

Foreign-owned banks are usually well resourced and structurally efficient. They recruit the best local talents and send not-locally-available experts as expatriates to manage the banks. Mensah and Abor (2012) suggested that foreign-owned banks 'cherry pick' the most credit-worthy customers and are therefore less likely to suffer from high non-performing loans. Their parent companies also have access to developed financial markets and instruments, as well as sophisticated software and resources that enhance their operations and give them competitive edge over their local counterparts. Most of the empirical literature suggests a negative relationship between foreign ownership of banks and net interest margin. Demircug and Huizinga (1999) concluded that foreign-owned banks have higher margins and profits than domestic banks in developing countries, but the opposite holds in industrial countries.

Claessens, Demirguc-Kunt, and Huizinga (2001) found that the entry of foreign-owned banks resulted in reduction in profitability for locally-owned banks. Beck and Hesse (2009) also found that foreign-owned banks operating in Uganda do not charge significantly higher spreads than their local ones. However, Mensah and Abor (2012) found a positive but statistically insignificant relationship between foreign ownership of banks in Ghana and net interest margin. The expected relationship could be positive or negative.

Gross Domestic Product

Gross Domestic Product measures in money terms the total value of goods and services produced in a country within a period. GDP is used in measuring the expansion, stagnation or contraction in an economy and signals business cycle to banks and other players in the economy. A high consistent GDP growth signals economic boom to banks and other economic players, and expansion in the loan book and other ancillary businesses to banking. A positive relationship is expected between GDP and ROE; and a negative impact of GDP on NIM. As the economy booms and banks expand their business operations, they improve their financial intermediation role effectively, thereby reducing the net interest spread, and vice versa. However, as the financial institutions expand business when the economy is in the boom cycle, their efficiency that results in lower net interest spread leads to increased impact of GDP on ROE. Demirgüç-Kunt and Huizinga (1998), and Bikker and Hu (2002) found a positive relationship between business cycle and profitability of banks, which was confirmed by Flamini, McDonald and Schumacher (2009), who also found a statistically significant impact of GDP output on bank returns; however GDP per capita did not produce any significant relationship. In another study, empirical evidence shows that the macroeconomic environment has limited impact on bank returns in SubSahara Africa (SSA), according to Al-Hashimi (2007). This conclusion was supported by other country-specific studies like Chirwa and Mlachila (2004) for Malawi, and Beck and Hesse (2006) for Uganda.

Inflation

Inflation is measured by the Consumer Price Index (CPI), which indicates the average price changes in goods and services over time acquired for consumption, with 2002 as the base year in Ghana. Flamini, McDonald and Schumacher (2009) opined that the impact of inflation on bank profitability depends, on whether future movement in inflation is fully anticipated, which, in turn, depends on whether banks could accurately forecast future movements and incorporate the anticipated changes in their pricing scheme. Movements in inflation that is fully anticipated results in increase bank performance, as banks adjust their interest rates to cater for the anticipated changes; and an unanticipated change leads to decrease in margins as banks are unable to adjust their interest rates to cater for the unanticipated changes. Studies undertaken by Bourke (1989), Molyneux and Thornton (1992) and Demirguc-Kunt and Huizinga (1998) confirmed a positive correlation between inflation and long term interest rates with bank performance.

Figure 1 shows the trend of the bank profitability ratios over the 2005-2015 periods. NIM and ROA are virtually flat over the eleven-year period whiles ROE dips flat from the 2006 high of over 25% to less than 20% in 2009, and is almost flat till 2008, due mainly to the re-capitalisation exercise undertaken by the BOG.

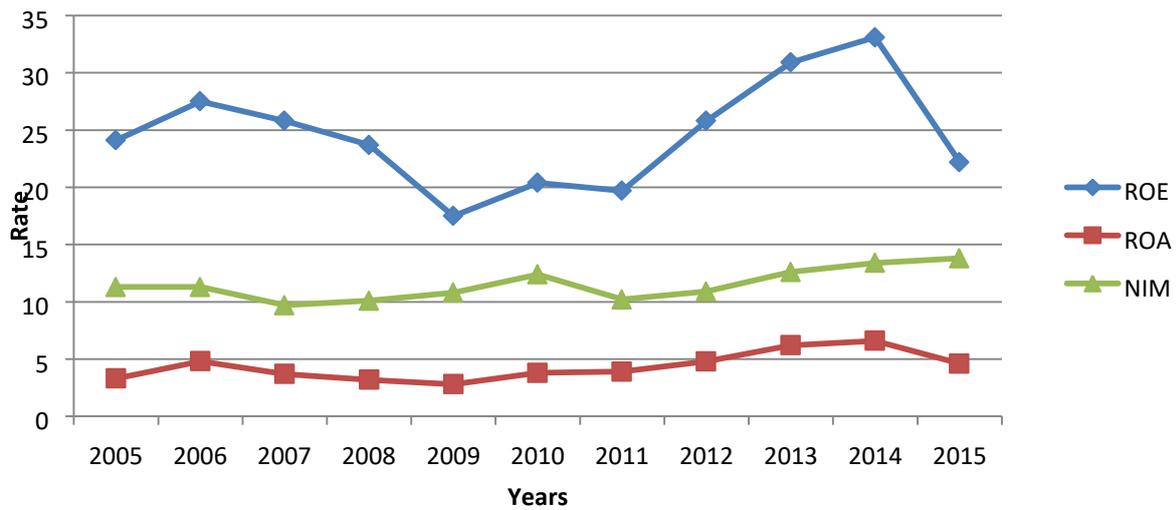


Figure 1: Trend of ROE ROA and NIM using industry mean Source: Bank of Ghana, 2015

Figure 2 depicts the Ghanaian banking industry is well capitalised over the 2007-2015 period. The Capital Adequacy Ratio and the Tier 1 capital have been above the 10% regulatory and prudential levels. The re-capitalisation undertaken by the Bank of Ghana, in the years 2009-2012 moved the CAR and Tier 1 capital above the less-than-15% levels in 2008 to almost 20% in 2009 before settling at an average of 15% in 2012 to 2015.

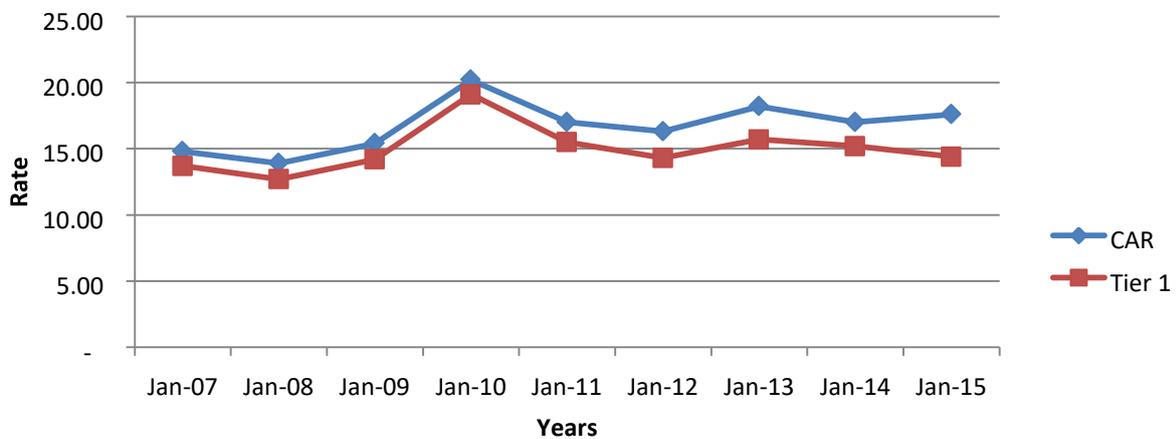


Figure 2: Trend of CAR and Tier 1 Capital using industry mean Source: Bank of Ghana, 2015

Figure 3 depicts the movement of GDP and Inflation over the 2005-2015 periods; and shows the apparent movement between the two variables. A rising inflation is accompanied by a fall in GDP and vice versa.

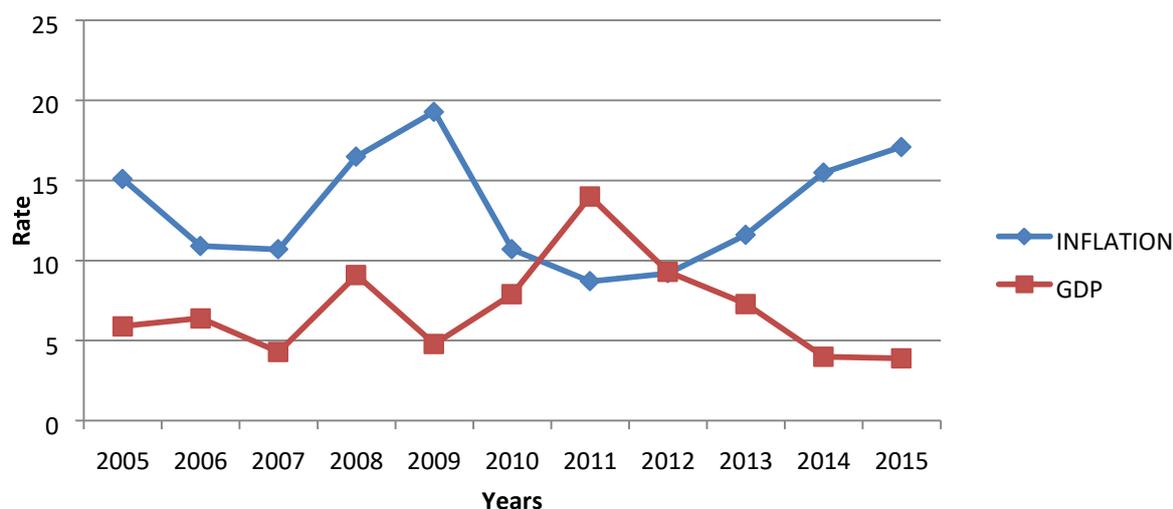


Figure 3: Trend of GDP and Inflation Source: Bank of Ghana, 2015; World Bank, 2015

Table 1 displays the variables used for the study, their definition or calculation and source of the information.

Table 1: Dependent and independent variables used for the study

Variable	Definition	Source
<i>Dependent Variable</i>		
Return on Equity(ROE)	(Profit before Tax/Total Equity) *100	Ghana Association of Bankers
Net Interest Margin	(Profit before Tax/Total Assets)*100	Ghana Association of Bankers
<i>Independent Variables</i>		
Equity Capital	Log of Stated Capital, statutory Reserves, capital surplus, Income surplus	Ghana Association of Bankers
Bank Size	Defined as the Log of Total Assets	Author's computation
NPL	Bad and doubtful loans/Total Advances	Ghana Association of Bankers
Capital Adequacy	Equity/ Total Assets	Ghana Association of Bankers
Bank Specific Risk	Total Loans/ Total Assets	Ghana Association of Bankers
Bank Liquidity	Advances / Deposits	
Bank Concentration	Sum of squares of deposit market shares of banks	
HH Index		
Bank Ownership	A dummy variable taking 1 if foreigners own more than 50% of the shares of a bank, 0 otherwise	
<i>Macroeconomic Factors</i>		

Inflation	Represents changes in CPI	percentage	World Indicators	Development
Gross Domestic Product	Annual percentage growth in GDP	growth in	World Development Indicator	

Source: Author's construct Model estimation and specification

This study employed Random-effects Generalised Least Square (GLS) panel data method for the estimation. The panel regression model differs from the regular time-series or crosssection regression by the double subscript it can accommodate. The theoretical and empirical dimension of this study is to establish the relationship, if any, between bank equity capital and bank profitability, and the strength of the relationship. Bank profitability is determined by using the ratios; Net Interest Margin (NIM), and Return on Equity (ROE). The relationship between bank equity capital and bank profitability is thus estimated in the following regression model;

$$Y_{it} = \beta_0 + \beta_1 EC_{it} + \beta_2 BS_{it} + \beta_3 BSR_{it} + \beta_4 BCON_{it} + \beta_5 BCAD_{it} + \beta_6 BLIQ_{it} + \beta_7 BOWN_{it} + \beta_8 NPL_{it} + \beta_9 GDP_{it} + \beta_{10} Inflation_{it} + \lambda_i + \gamma_t + \varepsilon_{it} \dots \dots \dots 1$$

Where;

Y_{it} Represents Return on Equity (ROE) and Net Interest Margin (NIM) for Bank i within time t .

EC_{it} Represents Equity Capital for Bank i within time t .

BS_{it} Represents Bank Size for Bank i within time t .

BSR_{it} Represents Bank Specific Risk for Bank i within time t .

$BCON_{it}$ Represents Bank Concentration for Bank i within time t .

$BCAD_{it}$ Represents Bank Capital Adequacy for Bank i within time t .

$BLIQ_{it}$ Represents Bank Liquidity for Bank i within time t .

$BOWN_{it}$ Represents Bank Ownership for Bank i within time t .

NPL_{it} Represents Bank NPL for Bank i within time t .

GDP_{it} Represents GDP within time t .

$Inflation_{it}$ Represents Inflation within time t .

λ_i Represents the unobserved individual effect that varies across

banks but not over time

γ_t Represents the time-varying effect ε_{it} is the error term

The error term represents other factors that might have effect on the variables, but for the purpose of this research were not taken into account.

Panel estimator approach

There are two main approaches used in panel estimation; the fixed effect and the random effect approaches. The Fixed-effect (FE) approach assumes that the variables being analysed are time-invariant and that the variables are unique to the individual and should not be correlated with other characteristics. Torres-Reyna (2007) opined that FE is adopted when a characteristic within the individual variable may impact or bias the outcome and the need to control for it. This is the reason for the assumption of correlation between the variable's error term and the predictor variables. FE eliminates those individual timeinvariant effects so the impact of the predictor variables on the dependent one can be assessed. Torres-Reyna (2007) advised that the FE be adopted whenever a researcher is only interested in analysing the impact of variables that vary over time. Unlike the FE the Random Effects RE assumes that the variations across variables are random and uncorrelated with the predictor or independent variables. Torres-Reyna (2007) advised that if you have reason to believe that differences between entities have some impact on the dependent variable, it is appropriate to adopt the RE. The Hausman test is generally adopted in determining whether to apply the FE or the RE. One advantage of RE is the ability to generalise the inferences beyond the sample used in the model.

Multicollinearity

Multicollinearity occurs when there is significant correlation between variables in a model. It can be detected by examining the signs of the independent variables in the model, and if the signs are different from anticipated or theory. Also an analysis of the Correlation Matrix could reveal cases of Multicollinearity if the explanatory variables are significantly correlated above 70%.

The Variance Inflation Factor (VIF) can be used to detect serious occurrences of Multicollinearity. If VIF is greater than or equal to 10, there is serious multicollinearity, if otherwise; there is no serious issue of Multicollinearity. Serious issues of multicollinearity are resolved by dropping the variables or by not including the suspected variables in one model.

RESULTS/FINDINGS

The main purpose of the choice of statistical analysis was to determine whether or not:

H1_o: Bank equity capital has a significant impact on Return on Equity (ROE)

H2_o: Bank equity capital has a significant impact on Net Interest Margin (NIM)

H3_o: Bank Capital Adequacy Ratio (BCAD) has a significant impact on Return on Equity (ROE)

H4_o: Bank Capital Adequacy Ratio (BCAD) has a significant impact on Net Interest Margin

H5_o: Bank size has a significant impact on ROE

H6_o: Bank size has a significant impact on NIM

Table 2 outlines the mean, standard deviation, minimum and maximum values of the variables used for the study. The mean value for NIM is 7% with a minimum value of 2% and a maximum

of 16%. This reveals the wide variation in the Net Interest Margin regime of banks in Ghana. The wide variation in ROE is as much as 45% as revealed by the standard deviation score. Some banks in Ghana within the sample are churning out ROE of -438.81% while others are doing as much as 71% within the period covered in the study. Bank size has a mean of 8.9% but with little standard deviation of 0.5%. Banks in Ghana are almost equally sized. Inflation averaged 13.2% within the period of the research with a standard deviation of 3%. Gross Domestic Product, a measure of economic output averaged 6.9% within the period covered in the study. NPL ratio has a maximum value of 14.17%. This depicts the very high NPL ratio that banks in Ghana have to contend with, one of the reasons bankers give for their inability to reduce lending rates. About 42.86% of banks within the sample are foreign-owned. This reveals the high number of investment by foreigners in Ghana's banking sector. Bank Liquidity, with advances to deposits used as surrogate reveals that on average 73% of deposits are in loans with a wide variation of 27%, a minimum value of 5% and a maximum of 185%. Bank Capital Adequacy has a mean of 13.89% above the regulatory and prudential requirement of 10% for banks in Ghana. Some banks in Ghana are adequately capitalised but some are barely meeting the regulatory and prudential requirement with a standard deviation of GHS193, 000,000.00. The banking market structure is fairly concentrated with a value of 0.067.

Table 2: Descriptive statistics

Variable	Obs	Mean	Std Dev	Min	Max
NIM	148	0.0703	0.0249	0.0200	0.1600
ROE	148	22.6991	45.7603	-438.81	71.0000
BANKSIZE	148	8.9174	0.5016	7.4600	9.9300
INFLATION	148	13.2091	3.4331	8.7000	19.3000
GDP	154	6.9909	2.9000	3.9000	14.000
NPL	145	2.2396	2.3981	0.0000	14.1700
BOWNERSHIP	154	0.4286	0.4965	0.0000	1.0000
BLIQUIDITY	145	73.3232	27.3400	5.4600	185.3400
BCAD	145	0.1389	0.0871	0.0089	0.8524
BCON	154	0.0670	0.0242	0.0011	0.0950
ECAPITAL	148	180000000	193000000	3697802	890000000
BSRISK	144	53.1107	16.3883	4.0300	77.9600

Source: Field Data, 2015

Table 3 maps the Correlation Matrix of the dependent and independent variables used in the research without necessarily imputing causation.

Table 3: Correlation matrix

	NIM	ROE	BANK SIZE	INFL ATIO N	GDP	NPL	BOWN ERS	BLIQUI DITY	BCAD	BCON	ECAPIT A	BSRIS K
NIM	1											
ROE	0.3139	1										
BANKS IZ	0.50	0.3648	1									
INFLA TIO	0.0678	0.0583	0.0294	1								
GDP	-0.129	-0.032	--0.089	-	1							
BOWN ER	0.000	0.0401	-0.016	0.5718	0.0018	0.003	1					
BLIQUI DI	0.004	0.0957	0.017	0.0001	-0.047	-0.19	0.3061	1				
BCAD	0.1179	0.0054	-0.204	0.0948	-0.035	0.013	-0.2117	0.2154	1			
BCON	-0.2581	-	-0.3132	-	0.2073	-0.04	-0.0079	-0.0174	-0.0448	1		
ECAPI TAL	0.6333	0.0364	0.8089	0.3211	0-0.25	-0.008	-0.0429	-0.0257	-0.0091	-0.2665	1	
BRISK	-0.0132	0.063	0.0958	0.1962	0.0631	-0.19	0.3492	0.7499	-0.2483	0.0032	-0.0327	1

Source: Field Data, 2015

The Correlation Matrix reveals a possibility of multicollinearity between BANKLIQUIDITY and BSRISK, and between ECAPITAL and BANKSIZE. A VIF analysis (see Appendix B) is conducted on the variables that which is less than 10, hence there is no serious problem of multicollinearity.

Table 4 shows the outcome of the regression of the dependent variable NIM and the independent variables for the study. Ecapital entered the regression positive but has an insignificant impact on NIM. It is insignificant at the 5% significance level but significant at the 10% significance level. BCAD also comes out insignificant but positive. The measures of capital adopted in the study (Ecapital and BCAD) positively impact NIM but insignificantly. However, curiously, NPL which is a measure of the risk appetite of bank management and a measure of their credit risk policy entered the regression positive and significant at the 5% significance level. This finding is in consonance with conventional finance literature that banks with high risk appetite demand risk premium on the interest they charge their customers for the risk. This result is at variance with the conclusion drawn by Siaw (2013).

The model is robust. (Wald Chi2 (10) of 71.85 and probability > chi2 =0.0000). About 39.82% of variation in the dependent variable is attributable to the explanatory variables.

Bank size posted a negative relationship with NIM but insignificant. This could be that as banks increase in size they enjoy economies of scale which reflects in their net interest margin. Also, banking literature argue that large size banks are able to attract cheap funds to finance their operations. Ability to attract cheap deposits should lead to reduction in net interest margin. This result confirms the conclusions drawn by Short (1997) that size is closely related to capital adequacy of banks since large size banks are relatively able to raise more cheap funds and therefore appear to be profitable. Buchs and Mathisen (2005) found strong evidence of size determining bank profitability in Ghana and even recommended consolidation in the sector. Gatsi and Akoto (2010) also found that size is important in determining bank profitability in

Ghana but conceded that as bank size increases profitability falls and vice versa. Other studies found out that scale economies are only achieved for small to medium sized banks and diseconomies of scale set in for large size banks (Berger, 1995b; Akoena, Aboagye & Antwi-Asare, 2012).

However, Moussu and Petit-Romec (2013) opined that larger size banks usually have more opaque assets and funding structures which are exposed during crisis. Their findings are in consonance with evidence gotten by Stiroh (2004) and Demirgüç-Kunt and Huizinga (2010), that a large share of non-income generating-activities is associated with higher risk. Research undertaken by Fahlenbrach, Prilmeier and Stulz (2012) also pointed to the fact that US banks that performed poorly in the 1998 and 2008 crises experienced a higher growth in size in the year preceding each crisis.

Inflation is insignificant in predicting the dependent variable, albeit with a positive correlation. The result is in consonance with literature that when banks anticipate changes in inflation and promptly adjust their lending rates accordingly, it leads to profitability but when banks are unable to anticipate changes in inflation and are therefore slow in adjusting their lending rates to reflect this change, banks incur losses. Bank Concentration, though statistically insignificant, reveals that in Ghana as banks get concentrated their NIM falls and vice versa. Foreign ownership of banks in Ghana, though statistically insignificant is positively correlated to NIM.

Table 4: Regression with NIM as dependent variable

NIM	Coef.	Std. Err.	Z	P > Z
BANKSIZE	-.0035388	.0099343	-0.36	0.722
INFLATION	.0001155	.000609	0.19	0.850
GDP	-.0005017	.0006471	-0.78	0.438
NPL	.0019039	.0006717	2.83	0.005
BOWNERS	.0027783	.0055751	0.50	0.618
BLIQUID	-0.0000828	.0001343	-0.62	0.538
BCAD	.0341566	.0307671	1.11	0.267
BCON	-.0643626	.0810524	-0.79	0.427
ECAPITAL	.0104735	.0038489	2.72	0.007
BSRISK	.0001245	.0002109	0.59	0.555
_cons	-.0953881	.0419558	-2.27	0.023
sigma_u	.00775481			
sigma_e	.01716188			
Rho	.16955912			
R-sq: within	=	0.3222	No of obs.	= 145
between	=	0.7099	No of groups	= 14
overall	=	0.3982	Obs per grp.: min.	= 8
Wald chi2 (10) =	71.85		avg.	= 10.4
Prob. > chi2	=	0.0000	max.	= 11

Source: Field Data, 2015

Bank size in Table 5 entered the model correlating significantly with ROE with a negative coefficient. It is significant at the 5% significance level. This means that profitability decreases for banks as they become bigger. Some level of scale economies is revealed in banks in Ghana within the period that this study covered. This confirms an empirical conclusion drawn by Gatsi and Akoto (2010), and Titman and Wessel (1988). Finance literature suggests that larger banks are said to exhibit lower returns because of the enhanced economies of scale which they may pass on to their customers in the form of lower lending rates. This finance literature was backed by empirical evidence by Zuzana and Poghosyan (2011), and Poghosyan (2012), Goddard, Molyneux and Wilson (2004). A study undertaken in Uganda by Beck and Hesse (2009) found some evidence that larger banks in Uganda charge lower spreads suggesting scale economies. Contrary to these earlier findings pointing to scale efficiencies in relation to size, Mensah and Abor (2013), Aboagye, Akoema, Antwi-Asare, and Gockel (2008), found in a Ghanaian context that, bank size has a significantly positive relationship with net interest margins, suggesting scale inefficiency being passed on to clients. Mensah and Abor (2013) even concluded that larger banks in Ghana are suffering from diseconomies of scale as a result of their huge investments in technology, and expanded branch networks.

Inflation came out of the model insignificant with a positive correlation. The positive correlation means that banks in Ghana anticipate changes in inflation rate and promptly realign their lending rates to incorporate such anticipated changes (Flamini, McDonald & Schumacher, 2009). GDP also posts a positive correlation with ROE but the relationship is insignificant. As economic output increases, ROE increases, and vice versa. In Table 4, GDP entered the regression with a negative relationship with NIM; but shows a positive correlation with ROE. In times of economic boom, as GDP grows, the interest spread charged by banks reduces because of the lower risk of default, hence the negative relationship with NIM, and vice versa. Regards the positive relationship between ROE and GDP, in times of economic boom, as GDP expands, the banks engage in more business and increase their returns, given same level of equity, ROE increases as GDP expands. NPL which used NPL to advances entered the model significant at the 95% confidence level. The result suggests NPL as a determinant of ROE of banks in Ghana within the period of the study. For banks in Ghana to increase profitability, for instance ROE, they need to improve their credit risk management structure, which will invariably lead to a favourable NPL ratio. Foreign ownership of banks in Ghana is insignificant in determining ROE although the relationship is positive. Banks in Ghana with majority of over 50% shareholding held by foreign investors post higher ROE than their local counterparts. Advances to deposits, was used as a proxy to measure bank liquidity and level of financial intermediation. The regression coefficient is positive although insignificant at the 95% confidence level. This means that banks in Ghana that advance higher part of their deposits reports higher returns than those who do not. Bank capital adequacy ratio is negatively correlated to ROE. Equity to total assets is used as proxy for bank capital adequacy. The relationship is significant at the 5% significance level. In other terms, the more level of equity forming part of a bank's total assets, the lower the returns to shareholders. This confirms the 'equity is costly' to shareholders theory. The model also confirms that banks that engage in intermediation by lending a higher proportion of their deposits reap higher returns.

Bank Capital Adequacy which is measured using equity to total assets is used to determine the level of equity in assets. It measures the value of equity forming part of total assets. Bank capital adequacy is significant at the 5% significant level. Bank capital adequacy is negatively

related to ROE, which implies that holding higher equity capital is costly for banks. However, banks are under obligation to maintain a prudential and regulatory minimum capital requirement. Banks in Ghana maintain capital adequacy above the regulatory minimum as depicted in Figure 2. This is to avoid sanctions and in extreme cases, bankruptcy, and replacement of the board and management team as provided for by the banking law in Ghana, (Banking Amendment Act, 2007, Act 738). Conventional finance literature suggests that banks in equilibrium will desire to hold privately optimal capital that ‘trades-off’ the cost of bankruptcy occasioned by holding capital below the optimal level; and a reduction in risk of bankruptcy, hence the risk premium demanded by shareholders for the cost of possible bankruptcy. Therefore minimum capital requirements impose a burden on banks to keep capital above the internal optimal level thereby imposing cost on banks. This results in lower returns.

Bank concentration is positively related to ROE, albeit insignificant at the 95% confidence interval. It is significant at the 10% significance level. As the market structure consolidates nearing a single monopolistic player, Returns on Equity (ROE) increases as the monopolistic player would adopt excessive rent-seeking culture, and vice versa. Ecapital is statistically and positively correlated to ROE. This confirms results found by Athanasoglou, Delis, and Staikouras (2006). It is significant at the 5% significance level. Ecapital which is not risk-weighted is positively related to ROE, unlike the more regulated risk-weighted capital adequacy ratio. The more regulated CAR imposes cost on banks as banks maintain capital above the regulatory minimum, and also above their internal optimal minimum. This is in consonance with finance literature.

Bank advances to total assets is used as a surrogate for Bank Specific Risk (BSRISK). Banks that expend most part of their total assets into loans are likely to reap more returns; therefore a positive impact is expected between BSRISK and ROE. Banks that extract more returns by disbursing most part of their total assets as advances are also likely to experience higher default rate of loans; hence a negative relationship is expected between ROE and BSRISK. The regression outcome shows a negative coefficient and the relationship is significant at the 95% confidence interval. Banks that avail larger proportion of their total assets as loan are likely to experience higher default rate. The impact is strong signifying that banks that give more of their total assets in loans impact ROE negatively, and vice versa.

The model is robust, with 41% of variation in the dependent variable being accounted for by the explanatory variables. The Wald chi² (10) = 94.71 and the prob. >chi² = 0.0000.

Table 5 displays the results of the regression analysis carried out, using ROE as the dependent variable.

Table 5: Regression with ROE as dependent variable

ROE	Coef	Std. Err.	Z	P > Z
BANKSIZE	-69.67291	19.4583	-3.58	0.000
INFLATION	1.785934	1.220005	1.46	0.143
GDP	1.299285	1.317966	0.99	0.324
NPL	-6.808713	1.315679	-5.18	0.000
BOWNERS	9.176441	6.900629	1.33	0.184
BLIQUIDITY	.364991	.2365271	1.54	0.123
BCAD	-130.8886	57.6718	-2.27	0.023
BCON	281.5132	162.8655	1.73	0.084

ECAPITAL	43.32659	7.485506	5.79	0.000
BSRISK	-.8513685	.3841474	-2.22	0.027
_cons	-156.494	78.29684	-2.00	0.046
sigma_u	0			
sigma_e		36.909603		
Rho	0			

R-sq: within	=	0.3311	No of obs.	=	145
Between	=	0.7756	No of groups	=	14
Overall	=	0.4141	Wald Chi2 (10)	=	94.71
Obs. per group: min	=	8	Prob. > chi2	=	0.0000
avg	=	10.4			
max	=	11			

Source: Field Data, 2015

DISCUSSION

Banks play a vital role in every economy, and the survival and operation of efficient and adequately capitalised banks is a sine qua nom to rapid economic development. Banks are expected to allocate economic resources in the country efficiently. They leverage on their charter and collect resources from the surplus market and allocate such resources to the deficit market. By this, banks create liquidity. Without banks, anyone one or any institution that has surplus resources need to 'look' for anyone one institution in the deficit market and make the resource available. But there is also information asymmetry in financial intermediation which will be difficult for an individual or a non-financial institution to intermediate. Banks create 'private information' of their clients and are well aware of the surplus market and the deficit market. Banks employ the 'private information' they create to mitigate the risk of moral hazard and adverse selection in allocating the resources from the surplus market to the deficit sector.

With these risks of moral hazard and adverse selection in financial intermediation coupled with other risks brought about by complex product offerings, banks may easily experience runs on their operations leading to liquidation which erodes public confidence in the financial system. The financial crisis in the US and other developed economies over the years led the Bank for International Settlements (BIS) to develop the Basel Accords I, II, and III. These accords are drafted to strengthen bank capital and to measure and monitor risk in relation to weighted-risk taken. So, it is important to understand the benefits of banks being adequately financed apart from preventing their collapse. And one of the benefits this study tried to examine was the relationship between bank capital and profitability. By this, stakeholders will be encouraged to adequately capitalise the banks for profitability.

IMPLICATION TO RESEARCH AND PRACTICE

In the first instance, it was observed that the average Capital Adequacy ratio of banks in Ghana within the period that the research covered averaged 13.89%, above the regulatory minimum of 10%. However, the study revealed that some banks have a minimum CAD of less than 1%, which means they are not meeting the minimum capital adequacy ratio, while others maintain as much as 85%. The average bank size was 8.91% and confirms the notion that the Ghanaian banking industry is made up of relatively less large size Bank Holding Companies (BHC).

Also, the results suggest a statistically significant positive relationship between NPL and NIM ($P > |Z| = 0.005$), and between NPL and ROE ($P > |Z| = 0.000$). High NPL ratio has a significant impact on bank profitability in Ghana, and policy initiatives to curtail the very high non-performing loans in the industry should be pursued vigorously. Ecapital has a direct and significant impact on NIM ($P > |Z| = 0.007$), and between Ecapital and ROE ($P > |Z| = 0.000$). These results confirm the pecking order theory as NIM and ROE represent the earnings of a bank. The policy implication of this is that there is a significant association between bank capital levels and income from their core business. This also interprets as a confirmation of the equity-is-costly theory. Because equity is expensive as compared to debt and deposits, NIM increases as equity increases. The difference between the rate banks pay on deposits and the rate banks charge on loans rakes up as equity goes up. Bank size has an insignificantly inverse impact on NIM. As bank size increases, NIM drops. This confirms some level of economies of scale in the Ghanaian banking industry within the period the study covered, passed on by the banks to their clients; as the gap between deposit rates and lending rates narrows as bank size goes up. Research suggests that the large scale banks are inefficient and that they pass on the cost of their inefficiencies to the customer, resulting in high interest rates on loans. There is evidence that point to the fact that Ghana has one of the highest interest rate spreads in Africa (Bawumia, Belnye, & Ofori, 2005). Capital Adequacy (BCAD) has a direct but statistically insignificant impact on NIM. This confirms the relatively costly nature of regulated equity which imposes additional cost on players in financial intermediation. The regulatory compulsion exacted on banks by the central bank undermines efficient intermediation as it impacts NIM directly. About 40 % of the variation in NIM is explained jointly by the independent parameter. Bank size is negatively but insignificantly related to NIM, and negatively and significantly related to ROE. The result confirms evidence by earlier studies of economies of scale in Ghana. However, all other studies point to the evidence that scale economies are experienced by the small to medium size banks in the banking sector in Ghana, and policies to consolidate banks and increase their size should be discouraged above a certain size.

The under listed recommendations have implications on research and practice.

- 1 Equity is costly for banks and contributes to financial dis-intermediation. The Bank of Ghana and the Ministry of Finance need to craft policy initiatives to encourage banks to finance their operations from internal sources, like retain a large portion of their earnings, and other reserves.
- 2 The Bank of Ghana should, in consultation with the banks through the Ghana Association of Bankers, formulate policies and strategies to reduce the structural and socioeconomic challenges militating against reducing the high NPL ratio in the industry. Proper national identification system, enforcing the laws concerning operations of Credit Reference Bureaus, education of the populace on the need to honour their obligations to the banks,

and proper well-thought-out address, house-numbering and street-naming systems should be done.

- 3 The Ministry of Finance and the Bank of Ghana to chart economic policy growth initiatives to promote high consistent economic growth and policies to encourage the private sector to benefit from the high consistent economic growth through allocation of financial resources to the productive sectors of the economy

CONCLUSION

The results of the research indicated that NIM is significantly and positively related to equity capital, but insignificantly and negatively related to bank size. ROE is negatively and significantly related to bank size; but positively and significantly related to equity capital.

The results of the study confirm the following hypotheses;

- H1_o: Bank equity capital has a significant impact on Return on Equity (ROE)
- H2_o: Bank equity capital has a significant impact on Net Interest Margin (NIM)
- H3_o: Bank Capital Adequacy Ratio (BCAD) has a significant impact on Return on Equity (ROE)
- H5_o: Bank size has a significant impact on ROE

The empirical evidence suggests that the under-listed hypotheses be rejected;

- H6_o: Bank size has a significant impact on NIM
- H4_o: Bank Capital Adequacy Ratio (BCAD) has a significant impact on Net Interest Margin

The findings of the research have confirmed studies in other countries that concluded that there is a positive relationship between bank capital and interest spread and returns. This research has also brought to the fore the widely held view that banks in Ghana are inefficient. The result indicated some level of efficiency in Ghanaian banks.

Size is also a determinant of profitability of banks in Ghana, and the evidence points to size leading to allocation to the productive sectors of the economy as the relationship between NIM and bank size is inverse but insignificant.

The relationship between bank size and ROE is significant and indirect. This implies that banks are allocating resources to non-interest income-earning activities. This is associated with higher risk and could result in bankruptcy of banks in times of economic challenges.

FUTURE RESEARCH

The findings of this research have opened up the possibility of future study in the following areas;

- 1 A study of the relationship between bank capital and profitability that will include data from all the banks in Ghana
- 2 A comparative study of banks in Ghana and other African countries in terms of bank capital and profitability.
- 3 A comparative study of banking firms and non-banking firms in Ghana to ascertain the association between capital and profitability.
- 4 A study of banks in Ghana to examine the role of bank capital on bank profitability in times of market and bank crises.

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APPENDICES APPENDIX A Banks in Ghana as at December 2015

NAME BANK	OF INCORPORATIO N	YEAR	OF MAJORITY OWNERSHIP	CHIEF EXECUTIVE OFFICER(as at December 2015)
Access (Ghana) Limited*	Bank	2008	Foreign	Dolapo Ogundimu
Agricultural Development Bank Limited		1965	Local	Stephen Kpordzih
Bank Of Africa Ghana Limited*		1997	Foreign	Kobby Andah
Bank of Baroda Ghana Limited		2007	Foreign	R. Mohan
BSIC Limited	Ghana	2008	Foreign	Adama Diop
Barclays Ghana Limited	Bank of	1917	Foreign	Patience Akyianu
CAL Limited*	Bank	1990	Local	Frank Brako Adu Jr.
Ecobank Limited*	Ghana	1990	Foreign	Samuel Ashietey Adjei
Energy Ghana Limited	Bank	2010	Foreign	Isaac Adeyemi Shedowo
FBN Bank Limited	Ghana	1996	Foreign	Seyi Oyefeso
Fidelity Limited*	Bank	2006	Local	Edward Effah
First Limited	Atlantic Bank	1994	Foreign	Gabriel Edgal
Capital Limited	Bank	2009	Local	Rev. Fitzgerald Odonkor
First Bank Limited	National Ghana	2015	Foreign	Richard Hudson
GCB Limited*	Bank	1953	Local	Simon Dornoo
GN Bank Limited		1997	Local	Patrick Anumel
Guaranty Bank Limited*	Trust Ghana	2004	Foreign	Olalekan Sanusi
HFC Bank Limited	Ghana	1990	Foreign	Robert Le Hunt
National Investment Bank Limited		1963	Local	Ernest Mawuli Agbesi

Societe Ghana Limited*	General	1975	Foreign	Gilbert Hie
Stanbic Ghana Limited	Bank	1999	Foreign	Alhassan Andani
Standard Chartered Ghana Limited*	Bank	1896	Foreign	Kweku Bedu- Addo
The Royal Bank Limited		2011	Local	Robert Ekow Bentil
Prudential Limited*	Bank	1993	Local	Stephen Sekyere Abankwa
Unibank Limited*	Ghana	1997	Local	Felix NyarkoPong
UMB Ghana Limited		1971	Local	John Awuah
United Bank for Africa Ghana Limited*		2004	Foreign	Abiola Bawuah
UT Bank Limited*		1995	Local	Stephen AntwiAsimeng
Zenith Bank Ghana Limited*		2005	Foreign	Daniel Asiedu

Source: Author's construct, 2015; PricewaterhouseCoopers (2014)

*Banks included in the sample

Appendix B: Variance Inflation Factor for Independent variables

Variable	VIF	1/VIF
BANKSIZE	1.274	0.785
INFLATION	1.951	0.512
GDP	1.686	0.593
NPL	1.078	0.927
BOWNERSHIP	1.242	0.805
BLIQUIDITY	2.640	0.379
BCAD	1.195	0.837
BCON	1.281	0.781
ECAPITAL	1.094	0.914
BRISK	2.527	0.396
MEAN VIF	1.5968	

APPENDIX C

Random-effects GLS regression Number of obs = 145

Group variable: BANK Number of groups = 14

R-sq: within = 0.3222 Obs per group: min = 8 between = 0.7099

avg = 10.4 overall = 0.3982 max = 11

Wald chi2(10) = 71.85 corr(u_i, X) = 0 (assumed)

Prob > chi2 = 0.0000

NIM	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
BANKSIZE	-.0035388	.0099343	-0.36	0.722	-.0230097	.0159322
INFLATION	.0001155	.000609	0.19	0.850	-.0010781	.0013092
GDP	-.0005017	.0006471	-0.78	0.438	-.0017701	.0007667
NPL	.0019039	.0006717	2.83	0.005	.0005873	.0032204
BOWNERSHIP	.0027783	.0055751	0.50	0.618	-.0081487	.0137053
BLIQUIDITY	-.0000828	.0001343	-0.62	0.538	-.0003459	.0001804
BCAD	.0341566	.0307671	1.11	0.267	-.0261459	.094459
BCON	-.0643626	.0810524	-0.79	0.427	-.2232225	.0944972
log_ECAPITAL	.0104735	.0038489	2.72	0.007	.0029297	.0180173
BSRISK	.0001245	.0002109	0.59	0.555	-.0002889	.0005379
_cons	-.0953881	.0419558	-2.27	0.023	-.1776199	-.0131563
sigma_u	.00775481					
sigma_e	.01716188					
rho	.16955912 (fraction of variance due to u_i)					

