**Capital Adequacy and Performance of Listed Universal Banks; considering the Basel Accord Framework**

**Abstract**

This study examines the impact of banks’ capital on the performance of banks. We adopted the multiple ordinary least squares (OLS) regression model in the analyses and heteroscedasticity test was used to check how homogeneous or heterogeneous the variables are. Time-series data covering the period of 2008-2017 for Ghanaian listed universal banks were considered for this study. The confirmed that banks with adequate capital perform better. In addition, the study found that banks net profit after tax, banks outstanding loans and banks capital have a positive and significant relationship with banks total asset base as a performance indicator. It also discovered through correlational analysis that there is a strong link between banks outstanding loans (credit advancement) and banks performance.

**Key words:** Adequacy, Banking, Basel, Capital, Equity

# 1. Introduction

Banks and Bankers have always won the love of many civilians in a given economy due to the crucial role they play in the distribution of wealth (Soludo, 2004). As many professionals in the field of Finance and Economics believe, banking has been going on since ancient era. Evidences have been found with the archaeological symbols to prove that indeed our ancestors had a system similar to our present-day banking.

Banking is basically the act of keeping a client deposit safe and giving it back to them when the times comes and also providing loans to people who are in-need within a particular period of time. Banking can be simply defined as the art of buying and selling money at a fee. The functions of modern-day banking are more than just what is stipulate above. They buy money through collection of deposit and make sales through the issuing out of loans to individuals and entities. There is a case law that dates back to 1901, where a judge in England, Justice Holmes wrote, in an Irish case: that the real business of the bank is obtaining lots money as deposit; which they use for their own profit by lending it out again (Mwenda, 2000).

In finance, deposit can be termed as liabilities and loans as assets. For us to achieve the going concern concept, the assets must match the liabilities so that in case of liquidity challenges depositor will not lose their funds. Balancing the assets and liabilities comes with huge risk. There are various types of risks associated with bank, banking and financial institutions, which ranges from small theft to liquidation or collapsing. (Kashyap, Rajan, & Stein, 2002). With regards to these risks associated with banking, banks have various control measures to mitigate actual and expected risks. However, some of these risk and other unexpected local and international economic conditions can bring a strong problem to a bank in a good standing to its knees. Ensuring sanity and stability in the banking industry national and international entities commissioned by governments and world recognized or legal institutions have been set up to regulate their activities (Ezeoha, 2006). Such institutions includes the central or federal banks of various countries, states and kingdoms, the World Bank, the IMF, the Basel Committee on Banking (BCBS), the Bank of International settlement, International Organization of Securities Commissions and etcetera (Barr & Miller, 2006).

In a given country, law of the Government, backs the establishment of a Central or Federal bank whose primary functions is to act as “the mother” of all other banks. One of the Mysterious institutions that keeps its activities from the general public is the central bank. The complete specifics of their central mechanisms are so mysterious that very few outsiders, even economists, fully understand them. Their activities are very essential in the development of the financial sector and the economy at large(Blinder, 2008)

Most Central banks have been granted a monopoly by their central government over the issuance of currency. This power allows them to function as a regulator of the price of credit and interest rates hence to govern how much money flows through the economy. They also have the responsibility to regulate and supervise all financial institutions in the country. One of the major areas of concern of the central bank is the minimum paid up-capital required to be kept by banking organizations(Eyo & Offiong, 2015)

The 20th century gave birth to minimum capital requirement and we can find evidence at the continental Europe. Back then, the minimum paid-up capital was postulated by law and its primary statutory purpose was to protect creditors and nurture confidence in financial markets (Thakor, 1996). In other to meet and maintain the capital requirement required by the central bank, internal and external sources of capital are considered by banks.

 Bank capital is the equity of the bank. It is important, as it is the cushion that absorbs any unreserved losses that the bank incurs (Choudhry, 2012). Capital Adequacy is sufficiency of the amount of equity to absorb any unexpected shocks that a bank may encounter (Abdul, 2017). The regulators of banking institutions and non-banking financial institutions guarantee that the risk exposures of financial institutions and banks are cushioned by required amount of capital which can bear unexpected losses arising in the future. In an event of liquidation challenges, banks can utilize such funds to bailout themselves. When a bank capital is not sufficient to absorb losses but still maintain the viability of the bank as a going concern it is considered as inadequate and not fit for purpose. The Basel Committee introduced capital adequacy regulations in the 1988. The regulations demand banks across the globe to maintain a minimum of 8 per cent of their risk adjust assets (Abdul, 2017). Under Basel Accord 1 which focuses on capital adequacy of financial institutions bank capital was divided in two categories- namely Tier I Core Capital and Tier II Supplementary capital. The Basel Committee on Banking Supervision (BCBS) is to ensure that financial institutions have enough capital on account to meet its obligations and absorb financial operations and reputational losses. According to Basel Accord (2008), the nature of their capital should be in the following mode.

1. Core capital (Primary or Tier 1 capital)
2. Supplemental capital (Secondary or Tier 2 Capital).

Equity capital comprise of common stocks, and perpetual preferred stock, surplus funds, bonus issue reserve, and minority equity interest. Core capital is made up of equity capital and goodwill. Supplemental capital encompasses provision for loan loss, preferential shares, and convertible shares (hybrid capital instruments and revaluation reserves) (Balin, 2008).

 There is no doubt that banks performance directly affects the growth of a given economy. Stability of the economy of various countries especially developing ones like Ghana is significantly related to the finance and banking activity not only within that country,, but also other countries that have economic and financial trade transaction. It is therefore important to regulate the activities of Banking and Non-Banking financial institution since their relevance cannot be over-emphasized. This is the reason why Basel II was drafted by BCBS to add supervision and market discipline to the capital adequacy of financial institutions prescribed in Basel I. Since those who are investing funds wish to remain liquid and to maximize the return on their investment. Also borrowers wish to generate maximum net profit, which require continuous investment in plant, equipment, human resources and so on. To facilitate the efficient operation of financial markets and the price mechanism, intermediaries exist to bring together the needs of lenders and borrowers. A bank is the best example of this. Banks creates liability by mobilizing funds from the surplus economic unit and those funds from depositors to the deficit economic unit for the funds to be used for investment.

 It has been asserted by banks that Banks higher capital requirements set by regulatory bodies will put their performance in jeopardize. The chance of this happening is high especially when the banks cost of financing is to rise in greater proportion due to more capital holding. These higher funding costs could have an adverse effect on lending and lower performance. According to Goddard et al. (2004), the relationship between profitability and capital must be negative. When the capital of banks’ is in excess it results in under-utilization of investment opportunities, which is generally in line with the results founded by(Goddard et al, 2004). Some researchers conversely argue that, when banks are well capitalized, the need for external financing is partially or totally avoided extinct, which may lead to improved profitability.

## The Bank of Ghana

The bank of Ghana is the central bank of Ghana as it acts as the main banker’s bank of the nation and control the affairs of all banks and non-banking financial institutions. In 2017, the Bank of Ghana announces a new minimum capital requirement, as part of a holistic financial sector reform plan to further develop, strengthen, and modernize the financial sector to support the government’s economic vision and transformational agenda. in accordance with Section 28 (1) of the Banks and Specialised Deposit-Taking Institutions Act, 2016 (Act 930), the Bank of Ghana announces for the information of Banks and the general public that it has revised upward the minimum paid up capital for existing banks and new entrants from GH¢120,000,000.00 (One Hundred and Twenty Million Ghana Cedis) to a new level of GH¢400,000,000.00 (Four Hundred Million Ghana Cedis) effective Monday, September 11, 2017 under the following conditions:

Banks would be required to meet the required minimum capital through;

a) Fresh capital injection.

b) Capitalization of income surplus.

c) A combination of fresh capital injection and capitalization of income surplus.

d) Business Consolidations

Banks are not allowed to capitalize revaluation reserves, reserves on financial instruments through other comprehensive income, statutory reserves, credit risk reserves and unaudited profit.

 Due to changes brought out by the Bank of Ghana, banks in Ghana have had to merge or combine their operations in mutually agreed terms or one institution takes over another’s operations acquisitions. We can site the case of GBC Bank Ghana Limited taking over UT Bank Ghana Limited and Capital Bank Ghana limited early 2018. In August 2018, Beige Bank Ghana Limited, Construction bank Ghana Limited, Royal bank Ghana Limited, uniBank Ghana Limited and Sovereign bank Ghana Limited all of Ghanaian origin were merged by their regulator to form the Consolidated bank Ghana Limited. The main reasons put forward for mergers and acquisitions are to meet the increased levels of capital requirement. However, there were other reason why Bank of Ghana (BoG) brought these banks under one umbrella. For instance, The Royal Bank was guilty of some irregularities. Their non-performing loans was 78.9 percent of total loans granted which is way too high, and they had poor credit risk and liquidity risk management controls. The report of Bank of Ghana stated that Beige Bank Construction Bank and Sovereign Bank got their license under false pretenses and used non-existing capital which were inaccessible to them to obtain their license. In the case of UniBank Ghana their right to operate was taken because Capital Adequacy Ratio (CAR) fell below 50% of the required minimum of 10%. The Merger was aimed at enabling the banks meet the Central Bank of Ghana’s requirement for banks to increase their core capital to at least 400million Ghana cedis.

## Statement of the Problem

The challenging question in capital regulation is that while regulators believe that increased capital requirement of banks is driven by efforts to lower systemic risk and protect the depositors and the financial institutions as well, banking regulation critics build their attitudes on the presumption that it decreased profitability in banks is as a result of tightened capital requirement which will lead to inability of banks to maintain their current business by (Elliott et al, 2015).

This gives rise to an argument that if banks sound profitability is not limited by capital requirement then it would be a better way to guarantee stability as it would allow banks to naturally build a solid cushion base and to cover potential losses from recurrent earnings (Rose-Ackerman, 2010). However, Demirguc and Huizinga (2010) argued for the need to increase capital requirement for banks, but the question remains, what is the right benchmark to enforce capital regulations without it affecting the performance of banks. To properly address this question, it was necessary to thoroughly analyze the relationship between capital requirements and banks performance (Demirgüç-Kunt & Huizinga, 2010).

This study focuses on the Capital requirement and Performance of selected universal banks Ghana, considering the Basel Accord Framework. The Basel Committees focuses on capital levels and the quality of capital, therefore the objective of this study is to establish whether there is a link between the bank’s capital and bank performance.

**Hypothesis**

H1 There is no significant relationship between Banks’ capital and banks’ performance

H2 There is no significant relation between banks’ Asset base and Credit/loan advancement

H3 The size of capital requirements is not positively correlated with bank performance

# Literature Review

## The Theory of Capital Requirement

Financial regulator in a given economy requires banks and other financial institutions to hold an amount of money which is been referred to as Capital requirements (Keitany, 2013). This is in the context of fractional reserve banking and is usually expressed as a capital adequacy ratio of liquid assets that must be held compared to the amount of money that is lent out. Tahyar et al (2010) comes up with two broad categories of capital which are regulatory and economic capital (Tahyar et al, 2010).

## Bank Capital and Capital Adequacy Requirements

Capital is often regarded in banking as those funds contributed by the owners consisting principally of stocks, surplus (reserves) for contingencies and retained earnings. Ordinary share capital or equity reserves and preference shares are what is classified by bank sheet as the capital of the bank. Banks’ capital may be defined as the value of its net assets (total assets minus total liabilities). Thus, capital is the sum of the paid-up share capital and its accumulated reserves (Torbira & Zaagha, 2016). According to (Nzotta, 2004), bank capital is the equity value of a bank reduced to the present value of its future earnings. Generally, bank capital represents the owners’ net worth in a bank and it includes the pay in capital and all additions to the capital resources of the bank (Ejoh & Iwara, 2014).

## Capital Adequacy

The concept of ensuring that a bank has adequate or sufficient capital to address risks is what is commonly referred to as capital adequacy. The term or phrase “capital adequacy” has been referred to the adequacy of a bank’s aggregate capital in relation to the risks which arise from its assets, its off-balance sheet transactions, its dealing operations and all other risks associated with its business*.* Prior to the concept of capital adequacy becoming embodied in Basel 1, banks existed in an era characterized by individual and inconsistent ways of addressing capital adequacy. In the early 1970s through to the early 1980s, banks understood the importance of the need to set aside capital which could be used to address the risks inherent in banking business. However, it took the occurrence of a series of banking and financial crises in the early 1980s to spark some kind of response from countries to formally address this issue.

*Bank’s capital in Ghana*

Following the promulgation of the Banking Law 1989 (PNDCL 225), when the first capital requirement was set at a minimum to pay-up capital equivalent to about $740,700, increases that have come through thereafter have not matched this proposed new increase. In 2003, the Bank of Ghana (BoG) issued a directive to commercial banks to increase their capital to a minimum of ¢7 million as part of measures to strengthen their capital base. In 2008, it increased the capital to ¢60 million in a bid to make the banks more resilient against unforeseen or expected losses. The Central Bank later proposed ¢120 million for new entrants and later asked the existing banks to increase their capital to that level. Bank capital in Ghana or shareholders’ funds comprises of stated capital, income reserves, statutory reserves, and capital reserves. Ghana banking survey 2008 report determined total bank capital to be GH¢805million. As a proportion of 2007 fiscal year end GDP, bank capital is estimated at 8%.

#### **Table 1**

#### **Event Analysis of Minimum Capital requirement in Ghana**

|  |  |  |
| --- | --- | --- |
| **Date** | **Minimum Capital Requirement** | **Event Type** |
| 14/02/2008 | 60 million | Announcement |
| 31/12/2009 | 60 million | Regulations Implemented |
| 31/12/2012 | 120million | Announcement |
| 30/12/2013 | 120million | Regulations Implemented |
| 11/09/2017 | 400million | Announcement |
| 31/12/2018 | 400million | Regulations Implemented |

Source: Authors’s Own work

When, Bank of Ghana made a demand in the year 2013 of GH¢7million (equivalent of ¢70billion) minimum capital requirement from all universal and gave a deadline of up to the end of 2006. This directive was fulfilled by all banks before expiry of the deadline. The majority of banks relied on their retained earnings and income surpluses to beef-up their capital. Resulting from the directive we witness, an increase in the industry stated capital more than five times after 2003 fiscal year from GH¢29million (2003) to GH¢181million (2007). A key result of compliance with this directive was that bank lending increased from GH¢1.055billion (2003) to GH¢2.464billion (2007), representing a 66% increase in one year. Prior to 2007, industry net loans and advances had been growing at a simple average of 32% between 2003 and 2006.

### ***Composition of Regulatory Capital***

A bank is required to maintain a risk-based capital ratio of at least 10%. The regulatory capital ratios applied to each tier of regulatory capital as follows:

CET1 ratio = CET1 CAPITAL

 Risk Exposure RWA

Tier 1 capital ratio = Eligible Tier 1 Capital

 Risk Exposure RWA

Total capital ratio =Eligible Total Capital

 Risk Exposure RWA

The components of regulatory capital will be divided into different components as described

below:

a. CET1 must be at least 6.5% of RWAs i.e. for credit risk + market risk + operational risk on an ongoing basis.

b. Tier 1 capital must be at least 8.0% of RWAs on an ongoing basis. Thus, within the minimum Tier 1 capital, Additional Tier 1 capital can be admitted maximum at 1.5%

of RWAs.

c. Total Capital (Tier 1 Capital plus Tier 2 Capital) must be at least 10.0% of RWAs on

an ongoing basis. Thus, within the minimum CAR of 10.0%, Tier 2 capital can be admitted maximum up to 2%.

d. If a bank has complied with the minimum CET1 and Tier 1 capital ratios, then the excess Additional Tier 1 capital can be admitted for compliance with the minimum CAR of 10.0% of RWAs. In addition to the minimum CET1:

e. banks are required to maintain additional CET1 as a capital conservation buffer

(CCB1)

f. banks may be required to hold a countercyclical buffer (CCB2)

g. any bank BOG deems to be Domestic Systemically Important Banks (DSIBs) may be required to hold additional capital buffers.

The full complement of capital ratio requirements across the components of capital are summarized in the Table:

#### Table 2

 **Internal Ratio above the Minimum Ratio**

|  |  |  |
| --- | --- | --- |
|  | Regulatory Capital | RWA (%) |
| 1 | Minimum CET1 | 6.8 |
| 2 | Capital Conservation Buffer (CCD1)-CET1 only | 3.0 |
| 3 | CET Ration Plus CCB (1-+) | 9.5 |
| 4 | Maximum AT1 | 1.5 |
| 5 | Minimum Tier 1 Capital Ratio (1+4) | 8.0 |
| 6 | Maximum T2 (Tier 2) | 2.0 |
| 7 | Minimum Capital Adequacy Ratio (CAR) (5+6) | 10.0 |
| 8 | Minimum Car plus CCB1 (7+6) | 13.0 |
| 9 | Countercyclical Buffer (CCB2)  | 0.0 |
| 10 | DSIB Buffer | 0.0 |
| 11 | Minimum CAR plus CCB1 plus DISB (2+7+9+10 | 13.0 |

Source: Bank of Ghana

### ***The concept of risk-based capital***

Risk-based capital requirement seeks to match bank’s capital to its relevant risks that the bank is exposed. Having a risk-based capital regime ensures that financial institutions have sufficient capital on hand to withstand losses while maintaining a safe and efficient market. This serves as a protection to financial institutions, investors, depositors and the economy as a whole.

## Basel Framework

in 1988 the G-10 countries adopted the International Convergence of Capital Measurement and Standards. These were set up by the Basel Committee on Banking Supervision dub Basel I. Basel I is critical on making available capital for credit risk because lending is regarded as an important function of bank. With Basel I capital ratios are calculated through applying predetermined risk weights to a bank’s credit exposure. The Bank’s capital is set up at 8 % of risk-adjusted assets which 4% must be Tier 1 Capital. Basel, I had some challenges; with the emergence of new financial instruments, sufficient methods of risk management and mitigation techniques were not readily available and this led to the exposure of banks to operational, market sovereign risk and other risks. To solve challenges of Basel 1, the final version of the International Convergence of Capital Measurements and Capital Standards, drafted by the Basel Committees, which referred to as Basel II, which focuses on three pillars.

### ***Pillar I***

This is about Minimum Capital Requirements, which enables banks to obtain capital levels that are in line with its risks. Its core objective is to make sure that regulatory capital set up by the regulator matches up to economic capital as per the bank’s internal business processes.

### ***Pillar II***

This talks about Supervisory Framework issues**.** The Supervisory Review process defines the supervisory review of an institution’s capital to support all the risks of the business and to encourage the development and use of better risk management techniques in monitoring and managing the risks

### ***Pillar III***

Pillar III is about Market Discipline**; it** explains the lowest levels of disclosures by banks when in case of publication on their accounts to project absolute transparency and accountability from bank management.

## Measures of performance of a commercial Bank

CAMELS rating system is coin by Oyetan as a measure of a banks’ financial condition Oyetan (1997). North American Commercial Banks was the first to adopt this system. CAMELS rating is an abbreviation which stands for: **C**apital Adequacy, **A**sset quality, **M**anagement quality, **E**arnings ability and **L**iquidity and System and sensibility (Oyetan, 1997).

## Capital Adequacy and Bank Performance

According to Whitehead (1997) adequately capitalized banking institutions can venture into greater business expansion and move resources so as to develop capacity to be more competitive effectively and efficiently in a democratic environment among high class banks thereby prompting them to be improving technologically as well as come up with innovative financial products ideas to remain competitive (Whitehead, 1997) . (Alaribe, 2017) continues the argument by stating that the scope of banks activities enlarges when there is an increase in the capital base of banks, it also improve performance of banks within the industry, reduce risk, ensure quality asset management as well as puts banks in a strong liquidity position .Whitehead (2005) in another context claims that if sufficiently capitalized, banks will have the following advantage over less-financed or inadequately finance banks; be more competitive more products on offer both local and offshore’ wider network cover, price products competitively, and finance a large number of diverse transactions across sectors. Also, on asset management, capitalized banks will be likely to off their clients with longer loan repayment periods and have more efficient systems as compared to other banks with the help of new information technology systems. to reduce excessive risk taking by shareholders adequate capitalization can be used as a tool, this will ensure the spread of risk between the owners and the depositors henceforth limiting the risk of the banks collapsing; the is bank by a research on Financial Markets and Policy conducted by the Kenya Centre for Research. In another view it acts as a buffer against financial costs of financial distress thereby reducing the probability of bank insolvency. Nevertheless, some scholars have argued that capital requirements are huge cost to banks which cause some but to fold-up and forcibly merge against their will. Imposing higher capital requirement constrain banks’ competitive pressure due to competition on loans, deposits as well as sources of debt and equity investment (Bolt & Tieman, 2004). In moments of high capitalizations banks might respond by giving limited credit, reduce their interest rate on deposits and other time deposits in an effort to maintain the required high capital base, this in a way will restrain the operations of the banks. The “too-big-to-fail” syndrome may affect financial institutions with adequate capital and this might lead to riskier investments (T. Berger, 2008).

## Capital requirements and new entrants

Basel accord aimed at creating equal platform all banks that participate aggressively in the financial Markets. In the case of Ghana, the introduction of new capital minimum of 400million which banks are to meet by the end of 2018 has created serious challenges to both the economy as well as the banking system putting two banks out of business (Capital Bank and UT bank). According to Diamond and P. Dybving (1986) regulatory policy driven solely by macro-economic goals may destroy banks by averting them from providing the services that are major to banks(Diamond & Dybvig, 1983).

## Bank Capitalisation and profitability

The final goal of management of banks is to record profit as the end of the financial year. In a study conduct by Berger et al (1995) in United States for the era from 1983-1992, which was on the relationship between the return on equity and the capital asset ratio for a number of banks and his results depicted that return on equity and capital asset ratio tend to be positively related (A. N. Berger, Herring, & Szegö, 1995). Insufficient capital requirements or in ability of a bank to meet the capital requirement might cause deposited to refrain from dealing with the banks which will therefore have an adverse effect on the overall profitability of the bank.

This positive correlation between capital and profitability has also been concurred to by Furlong and Keeley (1989), Keeley and Furlong (1990), Berger (1995) and Kwan and Eisenbe is (2005) who all assert that increase in minimum capital requirements reduce the risk of bank distress which will then result in increased profitability. Various scholars point to the notion that an increase in bank capital results in an increase in banks overall returns. A study carried out in India indicated that banks with higher capital requirements have the ability to absorb unexpected losses easily and have reduced cost of capital which means their profit levels are usually high(Furlong & Keeley, 1989) and (Eisenbeis & Kwan, 2005). Evidence from studies carried out on United States Banks state that apart from regulatory pressures, a bank’s capital level may depend on their business plan. A bank that intends to take over another bank will adequately capitalized to impress regulator without necessarily being profitable (Berge et al 1995).

**Buffer capital adequacy**

Banks keeps internal non-required referred to as a bank’s buffer capital. This type of capital does not fluctuate over time. Buffer Capital refers to the ratio of excess capital over risk weighted assets. The buffer theory of Calem and Rob (1986) state that a bank whose capital is close to the regulatory minimum capital ratio may have an incentive to boost capital and reduce risk in order to evade regulatory costs triggered by breach of capital requirements. Some scholars also argue that a bank’s excess capital acts as insurance against costs that may occur due to losses on loans or due to random shocks and the insurance premium is usually equal to the return on equity or interest rate on subordinated debt that the bank pays in order to attract new capital. To know the level of buffer capital required from one period to another, banks needs structures, systems and tools sufficient enough to of accurately assessing the risk innate in the banking portfolios – often at very granular levels (Rime, 2001). This may demand review of frameworks of banks and considering making the required investments to bring these up to the level capable of accurately quantifying risk exposure. When in the event of economic recession because there is a positive linkage between risk exposure and buffer capital, banks will be force to top up their minimum capital levels. This exercise will put pressure on banks however, depositors experience comfort.

## Empirical Evidence

According to Jalloh (2017) in his research “Impact of Capital Adequacy on the Performance of Nigerian Banks using the Basel Accord Framework” banks’ regulators should not only focus on capital adequacy but also on supervisory review and market discipline (1-R2) to maintain banks’

financial strength and stability in Nigeria (Jalloh 2017).

In the case of Kenya, the Central Bank of Kenya as opine by Jagongo and Ndede (2017), tended to maintain its rules, so that if banks in Kenya whose capital had fallen below the regulatory thresholds were required to raise additional capital. Their study was guided by the, Economic theory of regulation, the liquidity theory and agency theory (Jagongo & Molonko, 2017).

Staikouras and Wood (2004) claim that there exists a positive link between greater equity and profitability among EU banks. Abreu and Mendes (2001) also trace a positive impact of the equity level on profitability (Anbar & Alper, 2011). Goddard et al., (2004) support a prior finding of a positive relationship between the capital/asset ratio and a bank’s earnings (Goddard, Molyneux, & Wilson, 2004). However, the direction of the relationship between bank capital and bank profitability cannot be unanimously predicted in advance (Staikouras & Wood, 2004).

So far, only C Barnor and TA Odonkor (2012) have investigated Capital Adequacy and the Performance of Ghanaian Banks. Their study used a panel data methodology constructed from the financial statements of 21 commercial banks out of the 25 banks in Ghana covering the periods of 2000-2010. Their study findings indicated a negative and insignificant relationship between capital adequacy ratios (CAR), bank performance (Return on Assets (ROA)) but observed a negative but significant relationship between capital adequacy ratio (CAR) and performance (Return on Equity). Which implies that, as more capital is set aside as a buffer for banks safety; it affects the performance of Ghanaian banks.

# Methodology

## Research design

According to the nature of research problem and the research perspective, a research design and method to be considered, in research is based on the both of quantitative and qualitative or a combination of these two approaches, a mixed method approach.

## Target population and sample size

The study targeted all universal banks listed on the Ghana Stock Exchange. Eight commercial banks were listed as at the time of the study. We will be able get access to their data. The data were taken from websites of the banks under study. Secondary data sources are considered in order to avoid sampling biases. The sample for this study considers only five of the universal banks listed on the Ghana Stock Exchange as at 31 December 2017. The final selected banks include; Ecobank Ghana Limited, adb Bank Ghana Limited, CAL Bank Ghana Limited, GCB Bank Ghana Limited and Access Bank Ghana Limited. These banks were selected because they had significant international operations during the period under review was selected with another reason being that, Basel Accord applies majorly to international deposit money banks. Therefore, only these banks’ financial statements covering the period 2008 to 2017 were collated. The Basel Capital Accord is an international standard for calculating the capital adequacy ratio. In its analysis in 1999, the accord incorporated various variables that affect a bank’s soundness and safety in its framework. The framework considers a bank's capital adequacy, asset quality, management, earnings, profitability, liquidity and sensitivity to market risk. These elements correspond to our listed variables for this research.

#### Table 3

#### Profile of selected Universal banks as of 2017

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name**  | **Date Incorporated** | **Date Listed** | **Issued Shares (GH) (Mil.)** | Type of services |
| Ecobank Ghana Limited | Feb 19,1990 | July, 2006 | 293.23 | Financial Services-Banking |
| adb Bank Ghana Limited | 1965 | December 12, 2016 | N/A | Banking and Other Banking-Related Activities |
| Cal Bank Ghana Limited | N/A | November 5, 2004 | 548.26  | Financial Services-Banking |
| GCB Bank Ghana Limited | 17th May. 1996 | 17th May. 1996 | ‎265.00 | Banking and related services |
| Access Bank Ghana Limited | N/A | N/A | N/A | Financial Services-Banking |

Author’s own work

## Model specification

This paper employs ordinary least square (OLS) regression model to analyze the panel data and examine the

effects of firm specific factors and macroeconomics on profitability of insurers.

The Following baseline model was used,

***Y*it *= b0 + b1 (X1*it) *+ b2 (X2*it) *+ b3 (X3*it) *+ e***

Where ROA is return on assets, Xit is dependent variables for banks “i” at time “t”, C is constant, β is the coefficient and *e* is the error term.

The final model will be

**TABi,t= αi+α ⋅NPAi,t +α ⋅BTCi,t + α. BOLi,t+ εi,t”………………………………equation 1**

Where

*TAB= Total Asset Base*

*NPA=Net profit After tax*

*BTC= Bank’s Total Capital*

*TOL=Bank’s Outstanding Loans*

# Findings, results and discussion

## Testing autocorrelation problem

Durbin-Watson test is a statistical test, which determines the autocorrelation using the regression. Using the Durbin-Watson test, we tried to determine whether there is a link between bank’s capital and Bank’s performance (ROA Return on Asset or Net Profit Margin) in Ghana. For the calculations we used the " Stata: Software for Statistics and Data Science" version 14(Stata 14); regression analysis method that calculates a measure of representativeness, called coefficient of determination. The coefficient of determination **r 2**, measures the percentage of variation of the independent variables based on the deviation of the dependent variable. The values obtained for the Durbin-Watson, are generally between 0 and 4. Indicator value 2 indicates that there is an autocorrelation between variables. Values between 0 and 2 show a positive autocorrelation and a value of the between 2 and 4, shows the negative autocorrelation.

The Durbin-Watson is a test of the hypothesis (ρ=0) in the specification:

***uit = ρ uit-1 + εit***

If there is no serial correlation, the DW statistic will be around 2. The DW statistic will fall below 2 if there is positive serial correlation (in the worst case, it will be near zero). If there is negative correlation, the statistic will lie somewhere between 2 and 4. A rule of thumb is that test statistic values in the range of 1.5 to 2.5 are relatively normal. The results show that DW statistic in our model equals to 1.45, which means DW is relatively normal and there is no serial correlation.

###  ***Durbin Watson Results***

**Number of gaps in sample: 2**

**Durbin-Watson d-statistic (4, 48) = 1.447586**

### ***Testing for Heteroskedasticity***

Heteroskedasticity occurs when the variance of the error terms differ across observations. The model now becomes Yi = b 0 + b 1Xi + ei. The Breusch–Pagan test tests for conditional heteroskedasticity. It is a chi-squared test: the test statistic is nχ2 with k degrees of freedom. It tests the null hypothesis of homoskedasticity. If the Chi Squared value is significant with p-value below an appropriate threshold (e.g. p<0.05) then the null hypothesis of homoskedasticity is rejected and heteroskedasticity assumed.

**Test of Heteroscedasticity: Breusch-Pagen/ Cook-Weisberg test for heteroscedasticity**

#### **Test Results**

Chi 2 (1) =1.07

Prob> Chi2 =0.3014

## Regression Analysis

Considering our multiple regression model “**TABi,t= αi+α ⋅NPAi,t +α ⋅BTCi,t + α. BOLi,t+ εi,t”** We would run a regression and correlation analysis and discuss our finding relating it to our hypothesis

However, let’s look at the sum statistics of our observation, mean, standard deviation, minimum, maximum values of both our dependent and independent variables.

#### **Table 4**

**Statistical Analysis**

|  |
| --- |
| TOTALCAPITAL | 50 3.64e+08 2.87e+08 85360 1.11e+09 |
|  lnTAB | 50 21.40252 .8077848 19.64122 22.98066 |
|  lnNPA | 48 17.79147 1.10071 15.93213 19.60707 |
|  lnBOL | 50 20.67605 .7312505 19.06746 22.24183 |
|  lnBTC | 50 19.28281 1.388422 11.35463 20.83046 |
|  Time | 50 25.5 14.57738 1 50 |

The number observations for all variable is 50 except lnNPA (the natural of net profit after tax) this because from the original data one bank record losses for two years in a row. the natural logarithm of the explanatory and the dependent variable was generated to bring all the variable to a common base. Because the years is not in a sequential order, we time-set our data by creating a time dummy variable called Time.

## *4.2.1 Regression Model*

Our original equation will be modified because of the introduction of natural logarithm of the varibales.

“**TABi,t= αi+α ⋅NPAi,t +α ⋅BTCi,t + α. BOLi,t+ εi,t”………………………………equation 1**

“**lnTABi,t= αi+α ⋅lnNPAi,t +α ⋅lnBTCi,t + α. lnBOLi,t+ εi,t”………………………equation 2**

We will therefore run the second regression model for our analysis.

Table 5

**Anova Analysis of the Variable**

Number of obs = 48

 F(3, 44) = 108.80

 Prob > F = 0.0000

 R-squared = 0.8812

 Adj R-squared = 0.8731

 Root MSE = .2929

|  |  |  |  |
| --- | --- | --- | --- |
| Source  | SS |  df |  MS  |
|  Model  | 28.0011304 |  3 | 9.33371015  |
|  Residual  | 3.77468009 |  44 | .085788184  |
|  Total  | 31.7758105 |  47  | .676081075  |

|  |
| --- |
|  **lnTAB | Coef. Std. Err. t P>|t| [95% Conf. Interval]** |
|  **lnNPA** | .1693486 .0593597 2.85 0.007 .0497171 .2889802 |
|  **lnBOL** | .6510734 .0961956 6.77 0.000 .4572039 .8449429 |
|  **lnBTC** | .1278055 .041187 3.10 0.003 .0447986 .2108123 |
|  \_cons | 2.458002 1.244109 1.98 0.054 -.0493363 4.965339 |

 **Regression Analysis**

**Authors’ Own work**

### ***Number of Observation***

From the regression analysis in **Table 5** the number of observations for the regress variables are 48 instead of 50 because we recorded negative values for one variable in two continues years. The R2 or R-square value for our model is 0.8812. This mean our model is able to explain 87.3 percent of the situation we are researching about.

Our model will be

***“lnTABi,t= 2.458i+0.1693 ⋅lnNPAi,t + 0.6510 ⋅lnBOLi,t+0.1278 ⋅lnBTCi,t + εi,t”……equation 3***

 (t=1.98) (t=2.85) (t=6.77) t=0.1278

R2 (R-squared) = 0.8812 Adjusted R2 (R-squared) = 0.8731 F= 108.80

### ***Bank’s capital has no significant impact on and bank’s performance.***

The regression result in “table 6” shows banks’ capital have positive impact on banks’ performance as proxied by total assets base of the bank. The coeffiecent value shows the direction and the impact of the relationship between the two variables. In this case, the coefficient is positive 0.1278 and with significant p-value of 0.054. This is an indication that when the banks’ capital (lnBTC) increases, its Total assets base (lnTAB) of the banks will rise by 12.7percent. This is in line with Goddard et al., (2004) prior finding of a positive relationship between the capital/asset ratio and a bank’s earnings. We therefore reject the null hypotheses which states that “***Bank’s capital has no significant impact on bank’s performance”*** and accept the alternative hypothesis which shows that there is a positive significant relationship*.* With lnNPA, that is Net-profit After tax, the coefficient is 0.1651, which expresses positive influence the variable has on dependent variable total asset base. It means a change in the independent variable will cause 16.93 percentage change in the dependent variable lnTAB. An increase in the independent variable lnNPA is expected to cause a rise in the dependent variable.

### ***H2: There is no significant influence that banks’ asset base has on Credit/loan advancement***

As the empirical finding suggest there are positive statistically significant relationship between commercial bank lending and its size (total Asset Base) which is consistent to Cole et al. (2004) and Dietrich & Wanzenried and (2009) finding. The study also finds statistically significant positive impact that listed universal bank outstanding loans has on its total asset base from the regression table (table 6) the impact is positive between total asset base and banks’ outstanding loans with a coefficient of 0.6510. This means that a change (increase) in banks’ lending will cause a positive (rise) in banks total asset base.

We can therefore reject the null hypothesis, which states that, “There is no significant relation between banks’ asset base and Credit/loan advancement”,and accept the alternative hypothesis, which is line with the research that, “there is a positive significant between banks’ asset base and Credit/loan advancement”

###  ***H3 -The size of capital requirements is not positively correlated with bank performance***

We therefore run a correlational analysis for both the dependent and the predictor variables.

#### **Table 6**

**Correlational Analysis**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | lnTAB | lnNPA | lnBOL | lnBTC |
|  lnTAB  | 1.0000 |  |  |  |
|  lnNPA  | 0.7967 | 1.0000 |  |  |
|  lnBOL  | 0.9080 | 0.7497 | 1.0000 |  |
|  lnBTC  | 0.7464 | 0.5778 | 0.6695 | 1.0000  |

Authors’ Own work

We reject the null hypothesis that “***The size of capital requirements is not positively correlated with bank performance***”, looking at the result of the analysis because; Banks’ capital is positively correlation with banks’ performance using total asset base as proxy. This research indicates that Banks’ net-profit after tax, Banks’ outstanding loans and Banks’ total capital positively affect the financial performance of universal banks, a finding that is similar to the one of Demiurge-Kunt (1999).

## Conclusion

The capital adequacy and minimum capital requirement determine the amount of capital a bank retains compared to its risk. National regulators such the Bank of Ghana must track the capital adequacy of banks under its jurisdiction to determine how effectively it can sustain a reasonable amount of loss. The capital adequacy and minimum capital requirement is vital to shareholders because it is an important indicator of the financial soundness of a bank. After applying the Durbin-Watson test, based on data from the period 2008-2017, we checked with multiple OLS regression to see whether the Banks’ Capital influences their Performances, considering selected universal banks listed on the Ghana Stock Exchange. From the calculations made, it revealed that between Bank capital has a positive impact on bank’s performance (using total asset base as proxy of performance).

Moreover, Banks’ Performance is influence by Banks total outstanding loan and net-profit after tax. From the analysis, we can affirm that Capital adequacy in banks’ influenced performance of banks in Ghana. As a result of the research, we support the fact made by the BASEL framework that banks capital can be considered an active factor in the performance, banks safety and banks soundness (Claessens, Demirgüç-Kunt, & Huizinga, 2001). These findings will help banks in Ghana to be more prepare for future capital requirement adjustments. In the case of the selected banks, the revelation is that capital, asset and loans are an element, which conditions the performance of banks, and they must sever as indicators when planning for or restructuring program of capital requirement and or capital adequacy.

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