Determinants of Capital Adequacy among the Commercial Banks in Ghana

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Authors' contributions

This work was carried out in collaboration among all authors. Author ESA gathered secondary data from annual reports of respective banks used in this study. Author FSO did the literature review and proof reading of the whole text. Author NON analyzed and did the interpretation of outcomes from the regression run on data. All authors read and approved the final manuscript.

Original Research Article

ABSTRACT

The study examined the determinants of capital adequacy among selected commercial banks in Ghana. Eight banks were sampled for the periods 2009-2016, secondary data was gathered from the annual reports of selected banks as well as the Ghana Banking Survey authored by Price Waterhouse Coopers Ghana (PWC). A balanced panel approach was employed in investigating the determinants of capital adequacy among selected commercial banks in Ghana whilst comparing estimates of pooled OLS, random and fixed effects models and the generalized least square models to ascertain the robustness of the model. The finding suggests that all the independent variables statistically and significantly influence capital adequacy. While non-performing loans negatively relate to CAR, LFTD and ROA positively impact CAR or asset quality. It is recommended that the central bank and various banks operating in Ghana pay attention to strict compliance with the regulatory regimes to keep banks sound and fit to withstand distress and losses which may, in turn, affect the banking system and economy in entirety.

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1. INTRODUCTION

Capital adequacy issues of banks and their impact on their economies have caught the attention of intentional banking regulatory bodies dating from 1988 till now. As a result of a global disturbance in international currency and banking markets, governors of central banks of ten countries in 1975 converged to establish the Basel Committee on Banking Supervision to regulate and supervise banking practices across the world. This led to the Basel accords I, II and III. The Basel I accord in 1988 demanded that banks with international branches should keep a minimum ratio of capital to risk-weighted assets of 8% by close of 1992. Basel II sought to expand and enhance minimum capital requirements, enhance discipline and encourage sound banking practices through effective disclosure. Finally, the Basel III is seen as continuation of the three pillars including further requirements that requires banks to maintain a minimum amount of common equity and minimum liquidity ratios. The implementation of the Basel III has been gradual and expected to complete in 2019 upon its inception in January 2013. Banks capital plays a very important role in maintaining safety and solidarity of banks and the security of banking systems in general as it represents the buffer gate that prevents any unexpected loss that banks might face, which might reach depositors funds, given that banks operate in a highly uncertain environment that might lead to their exposure to various risks, and losses, that might result from risks facing banks, and can be divided into two major types (considering the ability to predict losses occurrences and their size), Vis a Vis: expected losses: losses that occur frequently to any bank, and their size is often small [17].

The Bank of Ghana (BOG) describes capital as the cornerstone of the financial strength of a bank and its ability to absorb unexpected losses. In the quest to tighten and strengthen the financial sector of Ghana, the Bank of Ghana has increased the minimum capital requirement from ¢7 million in 2003 to ¢60 million in 2008, ¢120 million in 2012 then finally to GH¢400 million in 2017. Another factor leading to the astronomical nature of the rise in the minimum capital requirement of Ghana is the erosion of the cedi to dollar parity. These reviews were all done in order for commercial banks to stay effective and efficient in the discharge of their activities. Price

Water House Coopers [2] in the survey of banks in Ghana indicated that commercial banks have three options in their quest to raise capital to meet the new minimum capital requirement being enforced by the bank of Ghana. These options include (i) injection of fresh capital (ii) capitalization of reserves (iii) business consolidation. The choice of the option depends on the tier of banking and ownership of the bank.

The implementation of Basel II and III by the BOG in 2017 was met with mixed reactions. Whilst some banking industry players saw the move as a means of killing banks majorly owned by Ghanaians, others saw it as a means of causing banks with limited capital to merge to grow and consolidate their capital base. Two distressed commercial banks namely Capital bank and UT bank were taken over by the Ghana commercial bank limited whilst five others were consolidated and bailed out by the government of Ghana. This thus brought to fore the capital and liquidity positions of these banks. It has further exposed the lapses in the supervisory functions the central bank is playing in the banking space.

According to Abba et al. [3], the capital adequacy ratio is one of the fundamental measures of the strength and wellness of banks worldwide. This is because capital adequacy has been found to have an association with the profitability of banks. This assertion may not be out of place since the capital adequacy ratio is an important measure of "safety and soundness" for banks and depository institutions because it serves as a buffer or cushion for absorbing losses. For banks, the inadequate capital reduces their ability to absorb losses accruing in business undertakings probably resulting from changes in the economic environment thereby leading to deterioration in asset quality. It has also been explained that adequate capital levels serve as cushion for operational loss absorption; enhances depositors' confidence in deposit-taking institutions, it creates shareholders' confidence in the bank, it projects the bank's ability to finance its long term projects and capital expenditure [4].

1.1 Rationale of the Study

It is the objective of every bank to make and consolidate profits whilst performing their functions of credit creation, taking of deposits among others. Crucial to the maximization of

profits is the ability of banks to maintain optimal capital levels whilst investing in long-term high yielding ventures. Upon the production of oil in commercial quantities and upgrading of the Ghanaian economy from a lower middle income to a middle income one, investors and other players in the economy have had their need for credit facilities to promote their projects and businesses rise significantly. Unfortunately, banks operating in Ghana have had to syndicate to finance the activities of larger firms with huge funding needs. Due to poor supervision and implementation of the globally accepted banking regulation (Basel accords) in Ghana by the central bank, banks especially local ones have abused these regulations leading to huge bad loans or assets sitting on the books of most banks in Ghana [5]. Seven commercial banks in Ghana were consolidated and taken over by the central bank on behalf of the government of Ghana due to liquidity concerns, inadequate capital to cushion the deposits of depositors against the inherent risks associated with the credit creation and intermediary roles played by banks. Various researchers have emphasized the crucial role capital adequacy plays in the vibrancy and strength of banks. Afriyie and Akotey [6], Bokhari and Sultan [7] and Abba et al. [3] suggest that banks with optimal levels of capital as well as ones with adequate liquidity after meeting their regulatory requirements do report good profits. It is the aim of this study to uncover the determinants of capital adequacy of commercial banks in Ghana. The motivation of this study is to understand what factors determine capital adequacy of banks.

1.2 Research Hypothesis

H_0: Profitability is not a determinant of Capital adequacy ratio of banks in Ghana.

H_0: Non-performing loans ratio is not a determinant of Capital adequacy ratio of banks in Ghana.

H_0: Liquid funds to Total deposit ratio is not a determinant of Capital adequacy ratio of banks in Ghana.

H_1: Profitability is a determinant of Capital adequacy ratio of banks in Ghana.

H_1: Non-performing loans ratio is a determinant of Capital adequacy ratio of banks in Ghana.

H_1: Liquid funds to Total deposit ratio is a determinant of Capital adequacy ratio of banks in Ghana.

2. LITERATURE REVIEW

The theory underpinning most studies in finance and capital has been the Modigliani and Miller theory, thus as the title of the study suggest, capital adequacy, the study then adopt the Modigliani-Miller irrelevance theorem. The theory was developed in 1958 by Modigliani and Miller and it state that a firm's financing decision has no significant effect on its value, that it is irrelevant [8]. This could mean that the value of the firm is determined by the income generated by its assets' composition, and not by how the assets are being financed or how the income from the asset utilisation is derived. Some authors argue that this theory is only applicable in the perfect world, where there is asymmetry information. The regulatory pressures on banks to maintain capital is asymmetric since regulators only raise alarm when capital ratios are too low, but often have little or no query when capital ratios are too high [9]. According to Olarewaju and Akande [10], in evaluating a bank's capital position, the bank must consider both the fixed costs attached with any capital gains and the variable costs attached with the process of changing it. All these costs are considered by the regulators setting the adequate capital ratios.

Capital as described by the Bank of Ghana (BOG) is the cornerstone of the financial strength and soundness of banks. The capital strength of banks undoubtedly affects the credit creation and intermediary functions that banks render to sectors of an economy that requires funding. Non- compliance of regulatory requirement of banks may result in shrinkages and reduced growth in such economies. It, therefore, becomes prudent for central banks to supervise the compliance and adherence to banking regulatory directives by banking institutions [11,12].

In general, there have been several arguments advanced on capital adequacy in the banking industry. Most of these arguments revolve around two themes—who should set the required capital; and what should be the minimum standard for banks [8]. For the arguments in favour of capital adequacy, regulators purposely regulate bank capital so as to minimize bank's failure, stabilize the public confidence in banking services and limit losses accruing to the central government through deposit insurance claims because there has been an underlying assumption that private market place will not be able to accomplish all those aforementioned objectives simultaneously because financial

market shifts bank's failure on the activities of the banking systems and not to the financial market.

Empirically, determinants of capital adequacy have been examined in various economies, this study, therefore, finds it necessary to re-examine the factors in Ghana's economy. Dreca et al. [13] using OLS regression, evaluated the determinants of capital adequacy in Bosnian banks and found that loan, ROA, deposit, size, ROE and leverage significantly influence capital adequacy ratio while loan loss ratio and net interest margin were insignificant. Even though the results were moderately fair, one issue they lost sight was the fact that they used banks in different states and as such should have made use of a more robust technique that would take care of the individual heterogeneity. Similarly, Allen et al. [4] using mixed factors found profitability, bad loan and GDP posing negative effects on leverage in Thai banks. In Nigeria, Olarewaju and Akande [10] found that profitability, growth and bank's risk level pose significant but inverse relationship with capital level. They also discovered that there was an inverse relationship of tangibility and tax charged with capital adequacy, but dividend payout and size of the banks were found to be positively and significantly related to their capital levels.

Moreover, in the study of Ikpefan [14], it was revealed that there was a significant negative relationship between CAR and asset quality in the Nigerian Deposit Money Banks. The reason is that most Nigerians have perfect information on banks and as such do business with viable and credible banks. The study moreover admonished that for profitability to improve significantly, they should reduce their non-performing loans. Musyoka [15] in his study of the effect of capital adequacy on the financial performance of commercial banks in Kenya suggested in his findings an adverse and significant relationship between asset quality and ROA. This finding suggests that strict adherence to minimum capital requirement leaves banks raising funds only to meet the requirement but with less liquidity to invest in profitable ventures.

Abba et al. [3] mentioned that banks with more loan loss reserves are more aggressive in their lending practices, and are willing to accept losses instead of negotiating concession with loan defaulters. Whereas the presence of enough capital base would have helped them to sieve through clients and get the quality ones, but for limited capital, any customer would be admitted. In addition, Moh'd Al-Tamimi and Obeidat [9] stated that a high loan loss reserves may signal banks that are willing to write-off problem loans which are expected to reduce bank credit risk. Thus, there exists a negative and significant relationship between CAR and asset quality which he called loan provision ratio (LPR). Moreover, Bokhari et al. [7] observed that there was a negative relationship between increased loan loss reserves accounts and their credit risks buffer (CAR) among Pakistani banks.

3. METHODOLOGY

3.1 Study Design

The study employed a descriptive study design. This design was also situated within the quantitative method and also employs a balanced panel technique. The choice of the study design is motivated by the strengths embedded in this type of the design which is, the design affords good control over the measurement process and has greater control over the precision of estimates. A panel design involves the repeated collection of data from the same unit(s), allowing for the tracking of changes at both the aggregate level and the individual level [7]. It also allows for causal analysis which may be used to establish temporal order of events and this is necessary because the basic tenet of causal reasoning is that a cause must precede its effect in time.

3.2 Data and Empirical Model

The study sampled 8 commercial banks in Ghana. Data for the study was generated from the annual financial report of these banks between the years 2009 to 2016. The choice of the bank and the period were informed by the availability of data. To examine the determinant of capital adequacy of banks the balanced panel approach was employed. As a way to determine the robustness of the results, compared estimates of pooled OLS, random and fixed effects models and the generalized least square models. The OLS was used as a basis of comparison with previous empirical studies. However, using traditional OLS alone may produce spurious regression problem that can lead to statistical bias [16]. As such, random effect and fixed effect models were adopted after which Hausman's specification test was carried out which suggested the adoption of a random effect model. The model in a general form is specified below;

$$Y_{it} = \beta_0 + \Sigma\beta_iX_{it} + \varepsilon_{it} \qquad (1)$$

The functional form is also specified as follows;
CAR = f(NPL, LFTD, ROA, ROE)

The reduced form therefore of the study is specified as

$$CAR_{it} = \alpha_0 + \alpha_1NPL_{it} + \alpha_2LFTD_{it} + \alpha_3ROA_{it} + \alpha_4ROE_{it} + \varepsilon_{it} \qquad (2)$$

Where; α_0 is the constant term. α_i: i = 1,2,3… are the coefficients of the variables and ε is the error term. CAR is capital adequacy ratio, ROA is return on asset, NPL is non-performing loans, LFTD is liquid funds to total deposits and ROE is return on equity.

4. RESULTS AND DISCUSSION

Generally, summary statistics are done to check for the distribution of the data or the variables. Table 1 illustrates these statistics and it could be observed from the table that all the variables have positive average values (means). The minimal deviations of the variables from their means as shown by the standard deviation give indication of slow rate of fluctuation of these variables over the period. Moreover, the Jarque-Bera statistic (probabilities) showed that the null hypotheses that all the series were drawn from a normally distributed random process could not be rejected for all the variables. In terms of skewness, Table 1 indicates that apart from ROE and LFTD which were negatively skewed, all the other variables were positively skewed.

Table 2 is a correlation matrix of the variables; the essence is to test whether there exist multicollinearity in the variable. The presence, of multicollinearity weakens the power of a model.

The results showed that there were minimal correlations among the variables. Though the matrix on Table was good, normally the variance inflation test is done to confirm the level of tolerance. According to Torres-Reyna [11], a rule of thumb at tolerance (1/VIF) of 0.1 or less (equivalently mean VIF of 10 or greater) is a cause for concern. The test results of the mean VIF (1.004) showed that there the model was good.

Table 3 represent the results of three models, first was an ordinary least squares (OLS), the second model which is in column 2 is random effect model and the third which is a GLS model in column 3. For the results of the models, the coefficient is presented above with the probability (p-values) in parenthesis. The random effect model was adopted for this study but, before the random effect was chosen, the Hausman selection test was done and it preferred the random effect model. In model 2, all the variables except return on equity were statistically significant. The results showed that NPL was at 10% significant level, significant but negatively related to CAR. This, therefore, indicates that the lower the NPL the better for asset quality or capital adequacy. Meaning that when a bank is able to reduce the level of non-performing loans, the better it is for the bank to build capital for other investment purposes. This may not be an isolated result because it conforms to the study of Ikpefan [14] and Abba et al. [3]. For instance, Ikpefan [14] mentioned that there was a significant negative relationship between CAR and asset quality with the reason that clients of Nigerian Deposit Money Banks do business with viable banks. The study again emphasized that for the profitability of banks to improve significantly, they should reduce their non-performing loans.

Table 1. Summary statistics of the variables

Statistics	CAR	LFTD	NPL	ROA	ROE
Mean	0.203750	0.690000	0.140208	0.071792	0.216583
Median	0.190000	0.700000	0.130000	0.040000	0.223000
Maximum	0.470000	1.120000	0.930000	0.390000	0.490000
Minimum	0.110000	0.090000	0.020000	-0.030000	-0.270000
Std. Dev.	0.070216	0.176503	0.130929	0.091800	0.141359
Skewness	1.537629	-0.571683	4.647524	2.047341	-1.164049
Kurtosis	6.244602	4.590270	28.89036	6.324397	5.924267
Jarque-Bera	39.96932	7.672492	1513.418	55.63606	27.94275
Probability	0.000000	0.021574	0.000000	0.000000	0.000001
Sum	9.780000	33.12000	6.730000	3.446000	10.39600
Sum Sq. Dev.	0.231725	1.464200	0.805698	0.396082	0.939176
Observations	56	56	56	56	56

Table 2. Correlation matrix of the variables

Variables	CAR	NPL	LFTD	ROA	ROE
CAR	1.0000				
NPL	-0.0866	1.0000			
LFTD	0.3200	0.0048	1.0000		
ROA	-0.0062	-0.1223	0.1474	1.0000	
ROE	0.2251	-0.2159	-0.2694	0.2880	1.0000

Table 3. Results of the effects of the variables on CAR

Variable	OLS	Random effect	GLS
NPL	-.01417	-.00771	-.13711
	(0.848)	(0.091*)	(0.900)
LFTD	.18111	.18230	.18230
	(0.003**)	(0.001**)	(0.071*)
ROE	-.09483	-.09270	-.09206
	(0.190)	(0.199)	(0.225)
ROA	.30382	.30776	.37061
	(0.011**)	(0.007**)	(0.050*)
Constant	.07948	.07700	.07700
	(0.079)	(0.081*)	(0.048**)
	R^2 = 0.285	Wald(4) = (0.008**) R^2	D-W stat. = 1.835
	$F_{(4, 43)}$ = 3.37**	= 0.672	R^2 = 0.5204
		D-W stat. = 1.617	

*, and ** represent 10% and 5% significance level

In addition, the loan fund to total deposit (LFTD) positively influences CAR at 5% significance level. The results imply that a unit increase in LFTD increases CAR or asset quality of the banks by 18230. Loan fund of a bank may be the amount of money available at the disposal of the bank to loan it to possible customers with recourse to the deposits of customers. Every bank would not see it as prudent to advance money more than what it can give to depositors. Thus for this result, what it means is as a bank's LFTD increases, it is then that the bank can have the luxury to advance more loans and meet other credit risks since banks profit a lot from the loans they advance. These results also support the view of Abba et al. [3] who stated that banks with lower levels of capital base, are not able to make or negotiate concessions with loan defaulters but just accept losses instead. In the real sense, banks with good capital adequacy are able to flex their muscle at clients, they are also able to make concessions and write-off certain part of the debts and still considers the debtor in other products of the bank.

Moreover, ROA was significant and positively related to capital adequacy ratio. According to the results in Table 3, an increase in ROA at 5% significance level, increase CAR by 30776. Implying the higher the ROA the higher the CAR.

Generally, ROA measures the amount of profit or revenue banks earn from their total asset. It may also represent a ratio of net profit to average total assets of the bank and naturally, the earning of a satisfactory return is the most desirable objective of every bank. Thus, higher ROAs is a boost to capital adequacy and a means to embark on risky but profitable investments. Stated differently, banks are risk-averse and would always design investment strategies that would preserve capital and cushion against the effect of rising risk levels. The banks are again well aware that increasing risk level raises their risk of business failure and generally, the riskier a venture is, the more it pays on the return as such, in order to take-in more risks, banks tend to increase their capital base. On the other hand, where there is a reduction in capital as a result of losses, this tends to affect their future capacity to take-in more risks. This result is consistent with Abusharba et al. [8]; Olarewaju and Akande [10] and Abba et al. [3]. The study also passed all the tests, for instance, the R^2 is 67% and this value means that approximately 67% of the total variation in CAR was explained by the independent variables. The value of the other factors which may influence capital adequacy economic was not captured by this model is 33%. Also, overall, the regression equation for the determinant of CAR was

statistically significant since the Wald test was 0.008 which is less than 0.05. In addition, the value of the DW statistics is 1.61 which lies between 1.5 and 2.5 meaning there is no evidence of autocorrelation presence. The results obtained from this model are acceptable since the value of the DW (1.61) is greater than the value of the R^2 (0.672). It indicates that the results were not spurious and this may allow for further inferences from the findings.

5. CONCLUSIONS

This study empirically assessed the determinants of capital adequacy ratio among commercial banks in Ghana. The data for the study were sourced from the annual financial report of the banks and it span between the years 2009 to 2016 and it reflects data availability as evidence in the dataset. The findings suggest that all the independent variables (Return on assets, liquid funds to total deposit ratio, non-performing loans ratio, return on equity) statistically and significantly influence capital adequacy. While non-performing loans negatively relate to CAR, LFTD and ROA positively impact CAR or asset quality. ROE was nonetheless not statistically significant. The results suggest that capital adequacy was good for the health and sustenance of commercial banks. This is because capital adequacy is able to cushion the banks against losses and banking risks. The study, therefore, recommends that banks should also ensure strict compliance with regulatory requirements concerning CAR, risk management and loans administration since they may have a toll on the profitability and sustenance of the banks. Again, banks ought to adopt a risk-based approach in managing capital instead of focusing on the paid-up capital and retained earnings only.

DISCLAIMER

This paper is based on the preliminary dataset. Readers are requested to consider this paper as a preliminary research article, as authors wanted to publish the initial data as early as possible. Authors are aware that a bigger sample size is required to get a scientifically established conclusion. Readers are requested to use the conclusion of this paper judiciously as authors have worked with a small sample size. Authors also recommend working with a bigger sample size for similar future studies.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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