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Effect of Capital Adequacy Requirement on Profitability of Selected Banks Listed on Ghana Stock Exchange

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ABSTRACT

The study assessed the effect of capital adequacy requirement on profitability of the Ghana Stock Exchange banks between 2013 and 2018. The analyses were based on the Ghana Stock Exchange secondary statistics. The analyzes specifically assessed trends in the capital adequacy ratios and Ghana Stock Exchange profitability of banks and determine the effect of capital Adequacy Ratio on profitability of listed banks. The study found that the banks' average Capital Adequacy Ratio was (Mean=17.21%) in the time. While the mean Return on Equity (Mean=25.46%) and the mean Return on Asset was found to be (Mean=3.05%). While the profitability was adverse and insignificantly affected by the Capital Adequacy Ratio, they were adverse and small in terms of the Return on Equity, while Capital Adequacy Ratio had a positive and important impact on the Return on Equity. Bank size did not have a major effect on Return on Equity and Return on Asset. For local banks, the mean Capital Adequacy Ratio for international banks was approximately the same. Therefore, the study suggested that businesses continue to operate, if not, to guarantee banks are able to cope with any 'credit crunch' economic recession. Banks can ensure that surplus capital is transformed into investment to maximize investment returns.

Introduction

The financial sector reform by the Financial Sector Adjustment Program Strategy (FINSAP) adopted by the World Bank was an achievement of Ghana. The project resulted in a prosperous and more competitive banking industry. The transition in Ghana's financial sector was also orchestrated, which resulted in improving the service quality and quantity of financial products that the banks and Ghanaians have been provided and the bank capital adequacy ratio.

Many studies have investigated and found the criterion of capital adequacy as one of the major factors in the sustainability of banking firms [1,2]. Other studies say that in a world with a smooth stock market, the financial structure and thus capital regulation are redundant [3]. The growing competition among financial institutions combined with sharp swings in economic activity has put tremendous strains on commercial banks in recent years. Inflation has depleted most banks' capital base with a demand deposit accounting for more than 76% of the overall long-term lending deposit of the private industry [4].

According to the Bank of Ghana (BoG), the banking industry was faced by several factors of which corporate governance and false financial statements or creative accounting were the dominated. The BoG has therefore set up a comprehensive reform plan to purify the industry and reinforce regulatory initiatives in order to make the banking sector more robust. This resulted in seven (7) insolvent banks' revocation of licenses. Furthermore, the BOG published on 11 September 2017 the minimum capital guideline (BG/GOV/SEC/2017/19) to impose a minimum pay-off capital increase of GH ₵400 million for all Universal banks before 31 December 2018. Banks were expected to (i) inject fresh capital (ii) capitalisation surplus income (iii) to meet the current minimum pay-up requirement through a combination of influx of fresh capital and income surplus capitalization. Capital is important to the continuing life of a bank as a permanent issue. The least amount of capital is important to guarantee the security and soundness of banks and to build confidence and trust between clients. A bank that has a sound capital base is capable of searching more actively for growth opportunities and has time and flexibility to deal with unexpected setbacks [5].

Most policymakers use capital requirements to restrict the growth of credit. This explains why bank management is driven to analyze the relationship between variables like total credit lending, deposit demand, inflation, political instability, money supply, liquidity risk, procurement, assets, etc., indicating whether major capital pressures banks meet or pursue additional capital to fulfill the demands of capital adequacy [6]. A variety of internal and external banking features have been employed to forecast profitability and the findings have shown that high capital attributed to high profitability. Well-capitalized banks encounter less expected losses and thus lower borrowing rates, leading to greater profits [7].

The bigger the loan, the higher the risk, it is important to negotiate an agreement between the two. The business is increasingly risky. The danger is to have a negative effect on the bank's assets and earnings, as both expect and unpredictable events. Even though anticipated losses are normally protected by the pricing methodology needed, both the exposures and the entire portfolio, cause the unexpected losses, and thus the necessary capital, both by the bank itself. There is also a need for an appropriate capital structure and enough capital adequacy requirements [8].

A. Statement of the Problem

Banks in Ghana typically hold the level of capital adequacy far above the 10.0% regulatory requirements. Higher CAR ratios have been shown to be favorable for profitability [9]. The greater the capital stability, the lower the need for extra funding and, therefore, the higher the profitability. It has also been shown that well-capitalized banks face lower insolvency costs and lower debt costs. There was a positive relationship between bank productivity and capitalization [10]. Ref. [11] found a strong association of ROA with capital. The results indicate that well-capitalized banks profit themselves and their customers from lower expected bankruptcy costs, thereby reducing their cost of capital.

A bank that has a strong capital base is capable of searching more actively for growth opportunities and could cater for unexpected losses within time [5]. However, Ref. [2] found the opposite: among capital and profitability there is a negative relation. Ref. [12] have explained that they require banks to retain equity equal to a certain percentof the total risk weighted assets. The Bank for International Settlement (BIS) shall maintain a capital base of 10% of its assets under the capital adequacy requirement. However, the assessment of a capital adequacy ratio for precautionary reasons is, at best, problematic due to the continually changing economic and financial markets in Ghana. However, there is paucity of empirical investigation in Ghana into the effect on profitability of listed banks by the capital adequacy criterion. This study therefore examines how capital adequacy requirements influence the profitability of listed banks (2013-2018).

B. Purpose of the Study and Objectives

The study aimed to assess the effect of capital adequacy requirement on the profitability of selected listed banks on GSE (2013-2018). The study was explicitly sought to:

- Evaluate the trends of Capital adequacy and profitability of listed banks from 2013-2018;
- Determine the effect of CAR on the profitability of listed banks;
- Compare the CAR of listed local banks and listed foreign banks.

Methods

The study utilized a quantitative approach. With this, the researcher sought to test a theory by specifying narrow hypotheses and the data collection to support or refute the hypotheses. It normally involves the use of statistics to analyse the data and presents the results in the form of statistical jargon, numbers and graphs [13]. This approach shaped the study by allowing it to utilized quantitative data from the GSE to analysed the causa-and-effect relationship between CAR and performance of listed banks.

A. Research Design

The study used explanatory design which are intended primarily to describe the effect of Capital Adequacy on profitability of selected banks in the Ghana (2013-2018). Secondary information (panel data) was used on the GSE listed banks. In terms of the scale of their capital adjustment ratios and profitability metrics, such as return on investment and return on investment, the data were collected (ROA). This design is quantifying in nature and has used Multi-linear regression in relation to the CAR, interpreted on each of the selected measures of profitability by bank features such as Bank size (log of total assets).

B. Data Screening Procedure

The study focused on commercial banks listed on the Ghana Stock Exchange. Eight banks were listed during the study. The study considered only banks with up to date records of CAR and ROE and ROA. All listed banks were selected for the analysis, with the exception of UT bank. The explanation is that in 2008 UT bank had been listed and did not completely cover the study period. The target banks selected for the study include "Ghana Commercial Bank Limited; CAL Bank Ghana Limited; ECOBANK; The Trust Bank; HFC Bank Ghana Limited; SG-SSB Limited and Standard Chartered Bank Ghana Limited".

C. Data Sources

Data for the study was mainly gathered from the financial records of selected banks listed on the on the GSE. The study focused also on unpublished and published documents such as the annual reports of the selected banks, articles from thematic papers and the internet. Secondary findings were properly noted in the reference portion of the paper.

D. Data Processing and Analysis

1. Descriptive Statistical Analysis

   The descriptive statistics were part of this research. Descriptive statistics allow researchers to report on the data collected according to Ref. [14] in an ordered, reliable and condensed way. Descriptive statistics such as line charts were used to display the pattern of selected banks' vehicles, ROE and ROA. Also, measures such as mean and standard deviations have been used to define the average values of the variables.

2. Inferential Statistical Analysis

Inferential statistics were also used in this study. According to Ref. [13], inferential statistics enable researchers to decide the relationship of the two variables, differences in a variable between different subgroups and how many independent variables might explain the variance in a dependent variable.

In order to test the hypotheses formulated:

H_{1a}: There is significant effect of CAR on the profitability of banks

To determine the relationship between the CAR and profitability of the listed banks, a Multiple-linear regression model was used.

Table 1. Definition of variables

Capital Adequacy requirement Definitions	
Component	Equation
Capital Adequacy Ratio (CAR)	Capital/Risk Weighted Assets
Size of bank	ln(Total Asset[TA])
Profitability indicators	
Return on Equity (ROE)	Profit after tax/Shareholder's Equity
Return on Asset (ROA)	Profit after tax/Total Asset

E. Model Specification

The models proposed for the study by the researchers are:

$$ROE_t = \beta_{o1} + \beta_{11}CAR_t + \beta_{21}CAR_{t-1} + \beta_{31}In(Total\ Asset) + \varepsilon_1 \ldots\ldots\ldots\ldots\ldots(1)$$

Where: β_o, (Constant) and β_1, β_2, and β_3, , representing the coefficients terms for the Capital Adequacy Ratio of accounting year (t), Capital Adequacy Ratio of the previous year (t-1) and Firm Size (In Total Asset) for each of the equations (1 and 2) respectively.

The coefficients were examined with MINITAB statistical tools (Version 14). To evaluate the adequacy of the latter model, analysis of variance (ANOVA) was used.

$$ROA_t = \beta_{o2} + \beta_{12}CAR_t + \beta_{22}CAR_{t-1} + \beta_{32}In(Total\ Asset) + \varepsilon_2 \ldots\ldots\ldots\ldots\ldots(2)$$

Where: β_o, (Constant) and β_1, β_2, and β_3, , representing the coefficients terms for the Capital Adequacy Ratio of accounting year (t), Capital Adequacy Ratio of the previous year (t-1) and Firm Size (In Total Asset[TA]) for each of the equations (1 and 2) respectively.

The coefficients were evaluated with the help of the statistical software MINITAB (Version 14). ANOVA was employed to determine the adequacy of the above model.

H_{1b}: The profitability and Capital Adequacy Ratio (CAR) of local banks is significantly different from that of foreign banks listed on the Ghana Stock Exchange.

To compare the mean profitability indicators and mean Capital Adequacy ratio of Local Banks and Foreign banks, a t-test was performed at 95% confidence level. The CAR of each of the banks was also compared to the 10% standard set by the Central Bank of Ghana.

Results and Discussion

The key objectives the study sought to examine were; "evaluate the trends of capital adequacy ratio and profitability of banks listed on the Ghana Stock Exchange (GSE) from 2013-2018, determine the effect of capital adequacy ratio on the profitability of the banks listed on the GSE and compare the profitability and capital adequacy ratio of local banks and foreign banks listed on the GSE". In line with these specified objectives in introductory section one and methods used respectively, the chapter presents the findings and discussion of the results based on these key objectives. Results were presented using tables and figures.

This section describes the trends of Capital Adequacy and profitability of the seven selected banks from 2013-2018 listed on the Ghana Stock Exchange (GSE). The seven selected banks include; "CAL Bank, The Trust Bank, Ghana Commercial Bank Limited (GCB), HFC, Standard Chartered Bank (SCB), SG-SSB, and ECOBANK".

Figure 2 illustrates the 2013-2018 trend in capital adjustment for the seven banks selected listed on the Ghana Stock Exchanges. The findings suggest that, during the analysis period, all selected banks have a Capital Adequacy Ratio (CAR) of over 10 per cent. The assumption is that all banks meet Ghana Central Bank's minimum 10% (CAR) capital adequacy criteria.

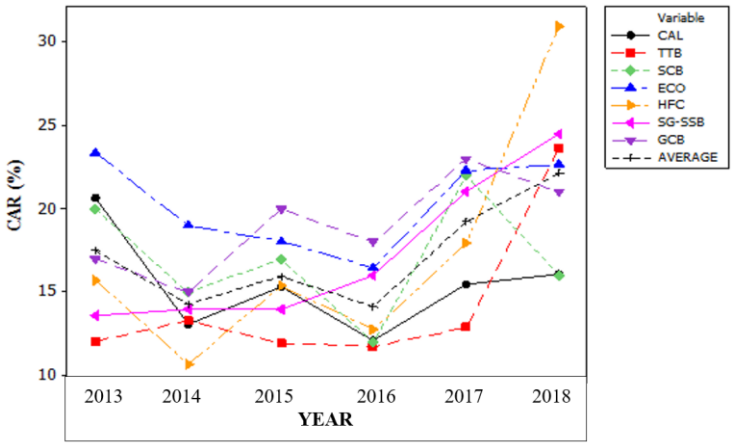

Fig. 1. Trend of Capital Adequacy of the Banks

The trend of CAR for the individual banks did not show a particular pattern. The CAR for each bank fluctuated, that is, increasing and decreasing at some point in time. The average of the seven banks initially decreased from 17.5% (2013) to 14.3% (2014) where it increased slightly in 2015 to about 16% then dropped marginally to about 14% in 2016. It then saw a

large increase from 2016 (14%) to 22% in 2018. The arithmetic mean of CAR of the seven banks of the period is (Mean=17.21%, Standard deviation=3.09%).

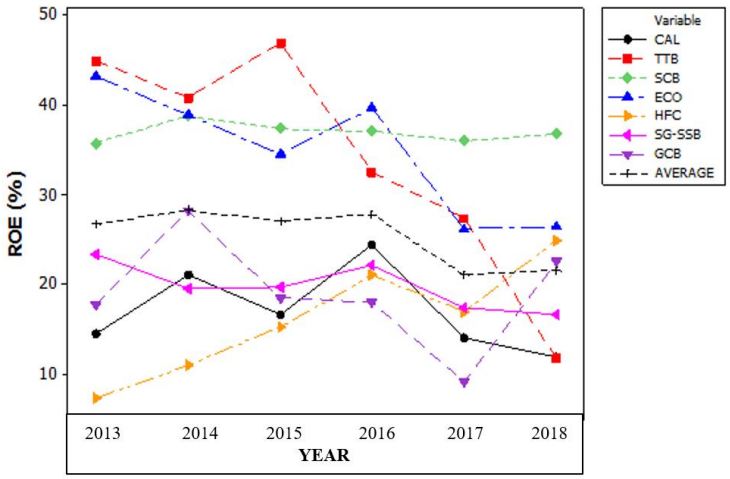

Fig. 2. ROE Trend of the Selected Banks

Figure 3 shows the ROE trend of the selected banks. Though the ROE fluctuated in each time, it appears to have trended downwards from 2013 to 2018 for all the selected banks except for HFC Bank. The mean ROE of the selected banks staggered within the period, increasing and decreasing marginally until 2016, where it finally decreased until 2018. The mean ROE of the banks within the period is (Mean=25.46%, Standard deviation= 3.23%).

Figure 4 represents the ROA trend of the selected banks. Again, the ROA fluctuated in each time and appears to have declined from 2013 to 2018 for all the selected banks as shown by the trend of the average ROA. The mean ROA of the selected banks stood at (Mean =3.05%, Standard deviation=0.15%).

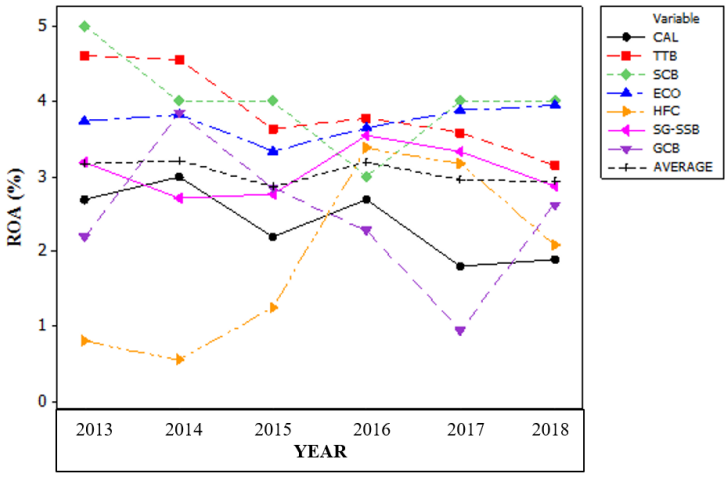

Fig. 3. ROA Trend for the Selected Banks

The relationship between CAR and profitability of the banks listed on the GSE was established using a multiple-linear regression. The coefficients of the regression of CAR on ROE were found and summarized in Table 2.

Table 2. The effect of CAR on ROE

Predictor		**Coefficient**	**SE Coefficient**	**T-statistics**	***Prob.***
Constant	(β_{01})	0.96	44.92	0.02	0.983
CAR_t	(β_{11})	-0.5216	0.4452	-1.17	0.249
CAR_{t-1}	(β_{21})	0.0253	0.5682	3.46	0.044*
In (TA)	(β_{31})	1.655	2.543	0.65	0.519

*p<0.05 S = 11.0271 R-Sq = 20.8% R-Sq (adj) = 19.7%

The regression equation is:

ROE% = 1.0 - 0.522 CAR (t) % + 0.025 CAR (t-1) % + 1.65 In (Total Asset)

The output in Table 2 shows that the Capital Adequacy Ratio for a particular fiscal year of the banks (CAR) correlated negatively with the ROE. However, this relationship was not significant (β = -0.526, P > 0.05). Contrary, CAR of the banks (CAR_{t-1}) had positive and significant effect on the return on equity of the banks (β = 0.0253, P < 0.05). Size of the bank [In (Total Asset) had positive effect on the return on equity (ROE) but the effect was found to be statistically insignificant at 5% significance level. Analysis of variance was run to assess the adequacy of the selected model in explaining the effect of CAR on ROE. The result depicts that CAR caused 20.8% (Adjusted R^2 = 0.208) of the variation of ROE within the set period. Thus, other factors, not considered in this study, accounted for the remaining 79.2% of the variation in ROE.

Table 3. Analysis of Variance for the Proposed Model of ROE and CAR

Source	Df	SS	MS	F-value	Prob.
Factor	3	171.3	57.1	5.47	0.030
Error	38	395.2	10.4		
Total	41	566.5			

The coefficients of the regression of CAR on ROA were also found and summarized in Table 4.

Table 4. Effect of CAR on ROA

Predictor		Coefficient	SE Coefficient	T-statistics	*Prob.*
Constant	(β_{02})	-2.064	4.237	-0.49	0.629
CAR_t	(β_{12})	-0.02680	0.04199	-0.64	0.527
CAR_{t-1}	(β_{22})	-0.01806	0.05359	-0.34	0.738
In (TA)	(β_{32})	0.2938	0.2399	1.23	0.228

*Statistically significant at 95% confidence level

The regression equation is

ROA% = - 2.06 - 0.0268 CAR (t) % - 0.0181 CAR (t-1) % + 0.294 In (Total Asset)

Again, the output shows that the Capital Adequacy Ratio for a particular fiscal year of the banks (CAR_t) correlated negatively with the ROA (β = -0.0268, $P > 0.05$) though it was not statistically significant. In addition, the CAR of the bank of the previous year (CAR_{t-1}) had negative but not significant effect on the return on asset of the banks (β =-0.018, $P > 0.05$). Size of the bank [In (Total Asset[TA]) had insignificant positive effect on the return on asset (ROA).

Variance analysis for the description of CAR and ROA relation was carried out to assess the adequateness of the selected model. The results indicate that the model is insufficient to clarify the relationship. But the decision coefficient, R-sq. It is 3.9%, suggesting that during the time being investigated the CAR clarified 3,9% of the ROA variance. This means that the remaining 96.1 percent of the difference in ROA was substantially accounted for by other variables not included in this analysis.

Table 5. Analysis of Variance for the Proposed Model of ROA and CAR

Source	Df	SS	MS	F-value	Prob.
Factor	3	1.668	0.556	0.51	0.675
Error	38	41.115	1.082		
Total	41	42.783			

S = 1.04018 R-Sq = 3.9% R-Sq (adj) = 2.3%

In order to create the correlation of the different variables included in the analysis, the inter-item correlation matrix was computed at the 5% significance level. Table 6 displays the

findings of the study. The output shows a moderately strong relationship between ROE and CAR_{t-1} (r =0.410, P < 0.05). ROE had a very strong relationship with ROA (r = 0.786) at 95% confidence level.

Table 6. Inter-item correlation Matrix

	CAR(t)	CAR(t-1)	ln (TA)	ROE (%)	ROA (%)
CAR(t)	1.000				
CAR(t-1)	0.280	1.000			
ln (TA)	0.485	0.478	1.000		
ROE (%)	-0.149	0.410	0.030	1.000	
ROA (%)	-0.015	-0.023	0.158	0.786	1.000

"r > 0.70 = very strong relationship; 0.50 ≤ r < 0.70 = "strong relationship" ; 0.20 ≤ r ≤ 0.50 = "moderate relationship" ; 0.10 ≤ r < 0.20 = "weak relationship" ; r < 0.10 = "none or negative relationship"" (Oyesiku, 1995).

This section compares the average CAR for local and foreign banks listed on the GSE for the period under review using unpaired t-test at 95% confidence level. For the local banks, the average for ECOBANK and GCB was computed while the average for CAL Bank, Ecobank, SCB, HFC, and SG-SSB were computed as foreign banks. The output is summarized in Table 7.

Table 7. CAR for Local and Foreign Banks Compared

	Local Banks	Foreign Banks	t-statistics	P-value
Count	6	6		
Average CAR %	17.50	16.72	0.395	0.70
Standard deviation, %	3.39	3.44		
Minimum, %	14.50	13.2		
Maximum, %	23.13	21.89		

The findings posit that there was no statistically significant difference during the time of analysis (t = 0.39, P > 0.05) between the CAR of local banks and international banks. The consequences are, that both groups of banks were have similar mean ratio of capital adequacy. The study also compared the mean CAR of the individual bank over the period to that 10% standard set by the Bank of Ghana using One-sampled t-test and findings summarized in Table 8.

The outcome shows that the CAR for all the banks except ECOBANK was significantly higher than the 10% standard set by the Central Bank of Ghana under the period under review. The CAR for ECOBANK was not significantly different from that of the standard value. The average for the seven banks was found to be significantly higher than the standard. The implication is that except for the ECOBANK, all the banks maintained a minimum capital adequacy requirement well above the standard set by the Central Banks of Ghana.

Table 8. CAR of Banks Compared to 10% Standard by Bank of Ghana

Bank	Standard CAR	Mean CAR of banks	Stdev.	t-statistics	P-value
CAL	10	15.46	2.98	4.49	0.006*
ECO	10	20.32	2.85	8.87	0.000*
GCB	10	19.00	2.90	7.60	0.001*
HFC	10	17.24	7.16	2.63	0.046*
SCB	10	17.00	3.58	4.42	0.007*
SG-SSB	10	17.19	4.54	3.88	0.012*
ECOBANK	10	14.26	4.64	2.25	0.074
AVERAGE	10	17.21	3.09	5.72	0.002*

*statistically significant at 5% significant level

Discussion

A. H1a: There is significant effect of CAR on the profitability of banks listed on GSE.

The Capital Adequacy Ratio of the banks (CAR_t) correlated negatively but insignificantly with the banks' performance (β = -0.526, P > 0.05). CAR (CAR_{t-1}) had positive and significant effect on the return on equity of the banks (β = 0.0253, P < 0.05). In addition, Capital Adequacy Ratio of the banks (CAR_t) correlated negatively and insignificantly with the ROA (β = -0.0268, P > 0.05) and CAR (CAR_{t-1}) had negative but not significant effect on the return on asset of the banks (β = -0.018, P > 0.05). The results of this somewhat validate the analysis by Ref. [15], with the finding that high capital contributes to high profitability. Instead, the current study showed that the CAR of the time or year chosen had a detrimental and important impact on ROE and ROA. However, the bank's CAR (t-1) had a strong and meaningful impact on ROE in previous years, but a negative and negligible effect on ROA.

Ref. [2] reported that in the absence of empirical evidence it would seem to be self-evident a negative relationship between the bank's capital-to-asset ratio (CAR) and their return on equity. They found an inversely link between capital and profitability. The current research has shown that CAR's association with ROE in a given year was negative but marginal and therefore backed the findings from Navapan and Tripe.

Another Ref. [16] showed a close correlation between the core capital ratio and the risk-based capital ratio of Tier 1. The analysis also shows that the share capital ratio and equity are negatively correlated over the period, utilizing return on assets for the purposes of bank profitability and return on capital. This is more in line with the report's actual results.

B. H1b: The profitability and Capital Adequacy Ratio (CAR) of local banks is significantly different from that of foreign banks listed on the Ghana Stock Exchange

The mean CAR of local banks and Foreign banks within the period under review was not statistically different (t = 0.39, P > 0.05). All the banks except for ECOBANK had significantly higher CAR than the 10% standard set by the Central Bank of Ghana within the period under review. This study thus rejected the null hypothesis that the CAR for local and foreign banks

listed on the GSE does not vary substantially. This may be so because the banks are in the same regulatory environment adhering to the standards set by the Central Bank of Ghana to be 10% of its risk-weighted asset. Empirical literature on these findings is hard to come by; therefore, the current findings may set the tone for future research. This finding was contrary to that of Ref. [17] who used a two-equator reduced form of vector auto regression model (VAR) to examine the link between growth — measured by logarithmic change in size (total assets) in a one-year period — and return on capital gains (ROE). They concluded that there are few structural effects on bank development, with the exception of a negative association between capital-to-asset (CAR) and bank performance.

Conclusion

CAR of the fiscal year had negative and insignificant effect on both ROE and ROA but while the CAR of the previous year had positive and significant influence on ROE, it had negative and insignificant influence on ROA. Size of bank did not play an important mediating effect on ROE and ROA. Similarly, the mean CAR for local banks was about the same for that of foreign banks. Each bank, except ECOBANK, had minimum CAR well above the 10% standard set by the Central Bank of Ghana. The mean ROE and ROA of the banks were positive and well above zero. The indication is that, the banks made tremendous profit after tax. This goes to show that the banks performed well within the period. Such performance should be maintained if not, be improved to ensure that the banks can withstand any economic recession of "credit crunch". The banks should ensure that they convert excess of their capital into investment to increase their return on investment. Moreover, the CAR for ECOBANK was not significantly higher than the standard set by the Bank of Ghana. The bank is advised to have CAR significantly above that of the Bank of Ghana to avoid the risk of eroding its capital base. Therefore, it is recommended that further study should be extended to include all Ghana banks, whether listed. Furthermore, future study should consider mediating CAR and profitability relationship with the capital structure (debt/equity) of the banks and effect of CAR on risk-adjusted profitability of Banks should be considered for future studies.

Conflict of Interest

The authors declare that there is no conflict of interest.

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