

2017

Ghanaian Bank Performance and Ownership, Size, Risk, and Efficiency

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Walden University

College of Management and Technology

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Rebecca Attah

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Walden University
2017

Abstract

Ghanaian Bank Performance and Ownership, Size, Risk, and Efficiency

by

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MBA, Western International University, 2011

MSC, University of Idaho, 2004

BA, University of Ghana, 1998

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

Walden University

October 2017

Abstract

Ghanaian banks struggle to maintain sufficient capital after the Bank of Ghana increased the minimum capital requirement as a buffer against the 2008 financial crisis. Grounded in the efficient structure theory (EST), the purpose of this correlational study was to examine the relationships between efficiency, size, risk, and ownership structure on banks' performance when minimum capital requirement increases. Archival data were collected from PricewaterhouseCoopers website covering all Ghanaian banks with available data for the 5-year period ending 2013. Initial one tail paired sample t tests revealed significant increases over time for efficiency, $t(21) = 3.849, p = .001$, net interest margin (NIM), $t(21) = 5.201, p \leq .001$, return on equity (ROE), $t(21) = 1.833, p = .041$, and risk $t(21) = 3.614, p = .001$. The results of the multiple regression analysis indicated the EST models could significantly predict bank performance for the 5-year period ending 2013. X-efficiency model could predict NIM $F(8, 123) = 6.94, p = .00, R^2 = .288$, efficiency and ownership type were statistically significant with efficiency ($t = 6.09, p = .001$) denoting higher to the model than foreign banks ($t = 2.96, p = .004$). While, scale efficiency model could predict ROE, $F(8, 123) = 5.18, p = .00, R^2 = .133$, ownership type and size were statistically significant with State banks ($t = -2.26, p = .025$) denoting more to the model than size ($t = 2.00, p = .047$). Society can benefit from the results of this doctoral study because investors, bank of Ghana, and bank managers could better predict the banks' performance based on the information from the study, which may lead to a higher families' confidence in the positive contribution of banks in their communities.

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Dedication

I dedicate this work to my late father Mr. Dick Attah and late husband Mr. Mark Annor for their sacrifices, understanding, and confidence in me that I could do it. I also dedicate this work to my children Evonn, Emmanuel, and Rebecca Annor for their sacrifices, understanding, support, and unwavering love towards me during this journey.

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Section 1: Foundation of the Study

Banks play vital role in society through provision of credit supply and facilitating payment systems; however, without regulations bank managers have incentives to increase risk and inefficiency to maximize short-term profit (Aiyar, Calomiris, & Wieladek, 2015). Thus, regulators are interested in preventing crisis because it affects both institutions and ordinary citizens (Gilsinan, Islam, Seitz, & Fisher, 2015). Hence, financial performance evaluation is important to both regulators and bank executives because it is a vital indicator in supervising banks (Álvarez-Franco & Restrepo-Tobón, 2016). Therefore, regulators evaluate performance to address banks that are in distress while banks review their performance indicators to address existing problems to prevent bank failure (Ibrahim, 2015).

Background of the Problem

The 2008 global financial crisis posed a challenge for economic and social developers in emerging countries in the form of negative financial inflow (Mohapatra & Gopaldaswamy, 2016). Thus, banks with external capital dependancy and weaker regulations were negatively affected during the crises compared to banks with stronger regulations (Ting, 2017). As a result, regulators instituted stricter minimum capital requirements (Baker & Wurgler, 2015). Hence, the objective of regulators was to use regulations to sustain financial stability (Allen, Goldstein, Jagtiani, & Lang, 2016). Accordingly, Bank of Ghana introduced financial reforms including an increase in minimum capital requirement (MCR) for existing banks. The Bank of Ghana increased

the minimum capital requirement from GH¢7.0 million to GH¢60.0 million in 2008, and again in 2013 to GH¢120.0 million as a buffer against the crisis (BOG, 2013) for universal banks. Although financial regulations may improve efficiency and performance; researchers have mixed views on the relationship between bank ownership structure, size, risk, efficiency, and profitability when regulations changes. For example, Adjei-Frimpong, Gan, and Hu (2014) reported a negative relationship between adequate capital, bank capitalization, and cost efficiency, and no correlation between bank size and efficiency in Ghana. However, Bokpin, (2013) found a significant relationship between bank ownership, size, capital adequacy ratio, and Ghanaian bank performance.

Problem Statement

Increases in minimum capital requirement for banks without cost benefit analysis led to the 2007-2008 financial crises (Possner, 2014). In addition, Tanda (2015) argued that changes in financial regulations might affect banks strategies. The BOG increased the bank's minimum capital requirement by 757%, from 7 million cedis to 60 million in 2008, and then by 100% to 120 million in 2013 (BOG, 2008, 2013). The general business problem is that financial institutions struggle to meet the incremental changes in minimum capital requirement. The specific business problem is that some bank executives do not know the relationship between efficiency, size, risk, ownership structure, and banks' profitability when minimum capital requirement increases.

Purpose Statement

The purpose of this quantitative, correlational study was to examine the relationship between efficiency, size, risk, and ownership structure, and banks' performance when minimum capital requirement increases. Independent variables included efficiency, size, risk, and ownership and the dependent variable was bank performance. The targeted population consisted of all universal banks in Ghana from 2008 to 2013 with available data. The implication for positive social change included a better understanding of the effect of independent variables on the dependent variable when minimum capital requirement increases. Thus, a better understanding of these effects is likely to enhance bank managers' abilities to deal effectively with changes in the minimum capital requirement for sustainability in the banking system in Ghana. Therefore, the possible social benefits of bank sustainability include public confidence in the financial system, creation of viable businesses, and a decrease in unemployment and social crimes.

Nature of the Study

Quantitative, qualitative, and mixed methodologies are the three methods of research (Fassinger & Morrow, 2013). Fassinger and Morrow (2013) clarified that quantitative research is for the evaluation and analysis of trends and other variables with statistical accuracy to confirm or reject hypotheses. Thus, the quantitative method is appropriate for this study, because the purpose of the study is to analyze numerical data and apply the results to the universal banks in Ghana. McCusker and Gunavdin, (2015)

posited that the qualitative method allows researchers to gain deep insight into phenomena by answering the questions *how*, *why*, or *what*. Therefore, the qualitative method is not suitable for this study. Also, Caruth (2013) elucidated that researchers use a mixed-method approach by combining elements from both quantitative and qualitative processes in structuring their understanding of phenomena. In researching this topic, the quantitative approach was adequate to fulfill the purpose of the study. I used numerical data to compare possible bank changes in efficiency, size, and ownership structure without the element of exploration in the analysis; hence, the quantitative method was appropriate for the study.

Concerning the quantitative approach, there are two main forms: experimental and nonexperimental (Ary, Jacobs, Sorensen, & Walker 2014). The authors clarified that in an experimental study, the researcher assigns the participants randomly to either a treatment or a control group, but the researcher does not assign the participants randomly in a nonexperimental study. The correlational research design is a nonexperimental research method without manipulation of any of the variables, in which the researcher investigates the relationships among the variables (Polit & Hungler, 2013). A correlational design is appropriate for the study because none of the variables in the study require manipulation. Experimental and quasiexperimental components of the quantitative method require manipulation of the variables (Cokley & Awad, 2013). The purpose of this study was to obtain secondary data and to analyze the data to examine the relationship between Ghanaian banks efficiency, ownership structure, and size after the

increase in the minimum capital requirement. Hence, a correlational design is appropriate for the study.

Research Question

The following was the research question guiding the study: What is the relationship between efficiency, size, risk, ownership structure, and Ghanaian banks' performance when minimum capital requirement changes?

Hypotheses

H_0 : There is no significant statistical relationship between banks efficiency, size, risk, ownership structure, and Ghanaian banks performance when minimum capital requirement increases.

H_a : There is a significant statistical relationship between banks efficiency, size, risk, ownership structure, and Ghanaian banks performance when minimum capital requirement increases.

Theoretical Framework

Demsetz initiated the efficient structure theory (EST) in 1973, which states that banks gain competitive advantage by effectively managing the cost of production. Berger (1995) further developed the efficient hypotheses theory by connecting the two hypotheses: First, under the X-efficiency hypothesis (ESX), researchers assume that banks with superior management fully utilize their assets, and thus minimize costs to increase profits (Berger, 1995). According to Berger efficient banks simultaneously tend to grow due to their strong profits and management, which may lead to increased market

shares and bank concentration. Berger added that firms can achieve higher profits due to higher X-efficiency. X-efficiency measures to what extent (the management of) the firm is successful in earning maximum profits given input and output prices, or in minimizing costs given input prices and output quantities. Hence, it is often interpreted as an indication of the level of managerial efficiency (Said & Masoud, 2014).

The second hypothesis related to the EST is the scale-efficiency hypothesis (ESS). Berger further, argued that profits are realized through efficiencies of scale, and any observed relationship with market share is simply a proxy for bank size. Scale efficiency investigates the effect of scale economies (Tina Zhang, & Wang, 2014). Huljak (2015) used the EST in explaining the positive relationship between profitability and either concentration or market share with regards to banks performance. Here, the efficiency of individual bank stimulates both high profitability and a high market share. Under the ESS hypothesis, the difference in profitability between firms is not the result of differences in the quality of management, but due to discrepancies in the level of scale efficiency at which a firm is operating (Huljak, 2015). The concept of EST applies to this study because the goal is to examine variables that may relate to the performance of Ghanaian banks.

Operational Definitions

Bank failure: Bank failure refers to a situation when banks are not able to withstand external shock because of insolvency risk and or illiquid risk (Postel-Vinay, 2016)

Capital buffer: Capital buffer is the threshold of capital to asset ratio above the required minimum level defined by capital adequacy regulation that banks are required to keep (Noreen, Alamdar, & Tariq, 2016).

Financial crisis: Financial crisis is an event characterized by a major decline in asset and institutions (Chaudhary & Abbas, 2017).

Efficiency: Efficiency is the ability of individual bank to maximize output given an amount of input (Othman, Mohd-Zamil, Abdul Rasid, Vakilbashi, & Mokhber, 2016)

Minimum capital requirements: Government guarantees deposits up to a certain value. The government, in turn, requires banks to hold a minimum amount of capital as a reserve against losses (Acharya & Richardson, 2009).

Profitability: Banks profit by earning more money than what they pay in expenses (Ametei, 2014).

Technical efficiency: Technical efficiency is the level at which a bank attains its maximum potential output given its current input (Majeed & Zanib, 2016).

Assumptions, Limitations, and Delimitations

Assumptions

Assumptions are fundamental facts without which the findings of the research will not hold (Kirkwood & Price, 2013). This doctoral study postulated the following assumptions: First, an analysis of efficiency based on data envelopment analysis (DEA) will reveal input–output variables that bank executives must monitor to improve efficiency. This makes DEA appropriate for studying of bank performance. Second,

financial reform study has relevance for the financial industry and regulations. Finally, the secondary data used in the study are accurate and complete.

Limitations

Limitations are possible weaknesses in the study over which the researcher has no control (Griffin, 2015). A limitation of this study may be the use of secondary data, which can be a potential source of error. For this study, PricewaterhouseCoopers and the BOG are the sources of data. Potential availability bias is likely to result from the exclusion of two banks from the study because of lack of data. Some of the assumptions proposed for this study may not be accurate, thereby causing model and structural errors. To this end, the DEA is apt for resolving model and structural errors.

The design of the study will not permit a generalization of the findings to developed countries, because of the differences in business cycles. However, the study will include a comprehensive set of variables on Ghanaian banks performance. It is reasonable to omit some variables, including economic variables that the banks cannot control and others that are unique to the developed countries such as the United States and Germany, from the analysis. Future researchers can build on this work by including economic variables in addition to variables pertaining to the developed countries based on their unique variables and assumptions.

Delimitations

Delimitations describe the scope and boundaries of the study (Munoz, Vargas, & Marco, 2014). Although the financial crisis stretched from 2008 to 2014, this study will

only compare the efficiency, sizes, and ownership structures of universal banks in Ghana in the years 2008 and 2013. There are three types of bank licenses in Ghana known as general banking, universal banking, and offshore banking (BOG, 2008). However, only universal banks in Ghana are included in the study.

Significance of the Study

Bank executives and individual investors stand to benefit from this study. First, bank managers may identify new ways to improve their performance during economic and regulatory changes from the result of this doctoral study. Second, BOG may benefit from the results of this doctoral study as they may have a better understanding of relationship between banks performance and banks management strategies during regulatory changes. Further, investors may benefit from the findings of this doctoral study as the finding might add value to knowledge of how banks would manage their funds during changes in economic and regulatory environment.

Contribution to Business Practice

The results from this study may help bank managers to identify dimensions of bank operations that adversely affect bank efficiency and to subject those dimensions to constant improvement to enhance efficiency in banking operations. Enhancing efficiency in the banking system may help in avoiding bank failures during financial crises. The findings of the study may provide commercial bank stakeholders within sights to monitor the changes of financial regulations and the effect those changes will have on the efficiency of the banking system. Consequentially, monitoring the impact of changes in

regulations on efficiency in the banking system may prevent bank failure and financial crisis.

Implications for Social Change

Stephan, Patterson, Kelly, and Mair (2016) stated that concept of social change refers to a positive, change in thought and behaviors of institutions, which benefits go beyond the initiator of the change. Maintaining efficiency by universal banks enhances the banks' sustainability during a financial crisis. Thus, a better understanding of how bank managers deal effectively with changes in the minimum capital requirement during a financial crisis may improve the sustainability of the banking system during a financial crisis. Bank failure has a negative impact on depositors' incomes in Ghana because no guaranteed insurance for depositors exist in Ghana. As a result, in the case of bank failure depositors can only get back 11% of their deposits, which the BOG maintains in the form of the regulatory reserve requirement (BOG, 2014). Thus, bank failure erodes public confidence in the financial system. Hence, the possible social benefits of bank financial sufficiency and technical efficiency include a stable economy for communities in which the banks operate and public confidence in the financial system to promote viable business growth, reduce unemployment and social crisis.

A Review of the Professional and Academic Literature

Financial crises have negative impacts on the flow of funds in both developed and developing countries. As a result, regulators and managers implement internal and external reforms to protect themselves against or minimize the impact of external shocks

(Morar, Oros, & Pece, 2014). Thus, the banking system in Ghana has gone through several reforms since 1988, including the one in 2008, which increased the minimum capital requirement by 757%.

Reviewing studies on the impact of financial reforms and changes in minimum capital requirement provide information on how scholars perceive the effects of financial crises. The review of the literature revealed information on the relationship between financial reforms and minimum capital requirement, and their relationships with banks' efficiency, size, and ownership structure in other countries or different periods in Ghana. Thus, the study examined the relationships between, and differences in bank ownership, efficiency, size and profitability after the Bank of Ghana changed the minimum capital requirement in 2008.

The keywords used in identifying information for the studies were as follows: *banking efficiency, banking efficiency and ownership, the financial crisis, financial reforms, minimum capital requirement, bank performance, Risk, ownership and size*. The following databases are the sources of information for the review of the professional literature: ABI/INFORM Complete, Business Source Complete, EBSCO host, Google Scholar, ProQuest Central, Science Direct, and scholarly seminal books. The organization of the professional and academic review is as follows: first an analysis of the global financial crises and financial reforms, followed by minimum capital requirements and issues relating to efficiencies. Of the articles appearing in the review of the literature, 90% are five years old or less, and 85% are peer-reviewed articles. Finally, the

literature review discusses professional and academic views on the methodology and design.

Table 1

The Source of the Literature Review Used

Sources of Literature	Count	Percentage
Peer-reviewed journals within last 5 years of 2017	129	77%
Non-peer-reviewed journals within 5 years	8	5%
Peer-reviewed journals more than 5 years of 2017	17	10%
Non-peer-reviewed journals more than 5 years of 2017	0	0.0%
Dissertations/ Doctoral studies within 5 years of 2017	2	1%
Dissertations/ Doctoral studies more than 5 years of 2017	0	0.0%
Books published within the last 5 years of 2017	11	7%
Books published more than 5 years of 2017	0	0.0%
Total	167	100%

Note. Count = numerical count; Percentage = percentage out of the total count 167.

A review of the literature provides information on the method and design appropriate for the study and reveals a gap in the literature on changes in minimum capital requirement during the 2008 financial crisis. Hence, this study will be among the first to examine effects of efficiency, size, risk, ownership structure, and profitability when the minimum capital requirement increased for universal banks in Ghana during the 2008 global financial crisis.

Demsetz in 1973 initiated the intuition that undergirds the efficient structure theory, which states that banks gain competitive advantage by effectively managing the cost of production. Berger (1995) further developed the efficient hypotheses theory by connecting the two hypotheses: First, under the X-efficiency hypothesis (ESX), banks with superior management are assumed to fully utilize their assets, and thus minimize costs to increase profits (Berger, 1995). According to Berger efficient banks simultaneously tend to grow due to their strong profits and management, which may lead to increased market shares and bank concentration. Berger added that firms can achieve higher profits due to higher ESX. X-efficiency measures to what extent (the management of) the firm is successful in earning maximum profits given input and output prices, or in minimizing costs given input prices and output quantities. Hence, it is often interpreted as an indication of the level of managerial efficiency (Said & Masoud, 2014).

The second hypothesis related to the EST is the ESS. Berger (1995) further, argued that profits are realized through efficiencies of scale, and any observed relationship with market share is simply a proxy for bank size. Scale efficiency investigates the effect of technical factors and scale economies (Tina Zhang & Wang, 2014). Huljak (2015) used the ESX in explaining the positive relationship between profitability and either concentration or market share with regards to banks performance. Here, the efficiency of individual bank stimulates both high profitability and a high market share. Under the ESS hypothesis, the difference in profitability between firms is not the result of differences in the quality of management, but due to discrepancies in the

level of scale efficiency at which a firm is operating (Huljak, 2015). The concept of EST applies to this study because the goal is to examine variables that may relate to the performance of Ghanaian banks.

The alternative theory for this study is based on buffer capital theory of capital adequacy developed by Calem and Rob in 1996. Calem and Rob argued that higher capital requirement may lead to increase in risk taking behavior by banks, thereby increasing their risk portfolios. As applied to this study, this theory holds that we will expect the independent variables banks risk portfolio to influence or explain the dependent variable which is banks profitability. Because without effective and efficient credit risk management banks profitability, liquidity, and solvency would not be possible during financial crisis. The buffer capital theory applies to this study because the goal is to examine the relationship between increases in banks size through increases in minimum capital requirement, risk taking behaviors, and Ghanaian banks performance.

The theories above are appropriate in informing Bank of Ghana and universal bank executives the relationship between efficiency, size, risk, ownership structure, and banks' profitability when minimum capital requirement increases. Maintaining a sustainable capital adequacy ratio ensures stability in the financial system and prevents banks' from taking unnecessarily risky ventures. However, the question remains regarding whether regulators should have increased minimum capital requirement during the financial crisis instead of allowing the economic variables such as disposal incomes and gross domestic product to stabilize the financial system.

Several researchers have gauged efficiency levels in different countries using EST. Rafay, Sadiq, and Khan (2016) examined the efficiency of Pakistan using DEA in gauging ESX of the banking industry after the 2007 financial crisis. The authors found constant efficiency among foreign and local banks. In addition, Farrag and Lang (2015) examined the efficiency of Egyptian banks based on ESX from 2000 to 2006 when there was an increase in regulations and structural changes in the banking industry. Farrag and Lang found positive relationship between bank size and efficiency. In addition, Said and Masoud (2014) used ESX in gauging Tanzanian banks by employing DEA for the analysis based on data from 1998 to 2011. Said and Masoud concluded that Tanzanian banks performed better in terms of profit efficiency than cost efficiency with foreign banks being more profit efficient than local banks. The authors argued that larger banks in Tanzania were more efficient than smaller banks within the period under investigation.

The alternative theory for this study is based on buffer capital theory of capital adequacy developed by Calem and Rob in 1996. This theory states that higher capital requirement imposed by regulators may lead to increase in risk taking behavior by banks, thereby increasing their risk portfolios. As applied to this study, this theory holds that the banks independent variables of risk portfolio, size, ownership and efficiency will influence or explain the dependent variable which is banks profitability. Because without effective and efficient management of the determinants of banks performance, profitability, liquidity, solvency would not be possible during changes in minimum

capital requirement. Scholars who have used regulatory reforms in the form of buffer theory in studying banks performance and risk behavior include Pereira and Saito (2015), who argued that financial reforms using regulatory pressure enhances banks risk behaviors.

Guidara, Lai, Soumare, and Tchana (2013) supported reforms that increases minimum capital requirement and risk management, stating that banks with strong capitalization did well during the 2008 financial crisis. Olalekan and Adeyinka (2013) subsequently argued in support of a positive relationship between capital adequacy and banks' efficiency. Conversely, Schliephake and Kirstein (2013) were of the view that increases in minimum capital requirement have a negative effect on efficiency because it increases the cost of intermediation.

Thus, minimum capital requirement might protect depositors and creditors in case of bank failure because it increases their ability to absorb losses (Toader, 2015). However, researchers have different views on the reasons why regulators implement minimum capital requirement policies to increase bank sizes. For instance, Barth, Lin, Ma, Seade, and Song (2013) contended that financial reforms had a positive impact on profitability and efficiency in the new European states. Berger and Bouwman (2013) supported minimum capital requirement implementation to help in the accomplishment of a sound financial system. They argued that a financial reform that enhanced the capital base helped improve small banks survival and improved the performance of medium and large banks during financial crises.

Despite the advantages attributed to financial reform, including an increase in minimum capital requirement, the reform increased the cost of intermediation, which may hurt banks' profitability (Schliephake & Kirstein, 2013). Repullo and Suarez (2013) also argued that increasing banks' capital requirements during the financial crisis had the unintended consequences of worsening the banks performance. As indicated, an increase in the minimum capital requirement may be detrimental to the performance of the banking system. Consequently, financial reforms have either positive or negative effects on banks' performance. This study will examine whether the 2008 financial reforms in Ghana affected the efficiency of banks in Ghana.

Overview of Universal Banks in Ghana

The Bank of Ghana Act 612 (2002), Section 1, states that the Bank of Ghana handles statistical information for the formulation of monetary policies. However, the bank is an independent corporate entity that can sue, and that others can sue. The Bank of Ghana is a corporate entity with the banks in Ghana among its primary stakeholders, because the Bank of Ghana has a dual relationship with the banks (Bank of Ghana, 2002). The Bank of Ghana regulates, supervises, and directs banking and credit, and, in addition, lends to its stakeholder banks in the ordinary course of business (Bank of Ghana, 2002).

In 2007, the Bank of Ghana enacted Banking Act 738, which established three types of banks on the basis of licenses acquired its stakeholder banks (Bank of Ghana, 2007). Bank of Ghana further grouped its stakeholder banks into three categories of banking services, namely: general banking, universal banking, and offshore banking. As

described in Act 738, general banks can undertake both domestic and foreign banking activities, while universal banks can transact domestic service businesses, and the offshore banking license enables the holder to do transactions in foreign currency. The Bank of Ghana has guidelines on permissible activities for each of the licensed (Bank of Ghana, 2007).

The universal banks in Ghana, as authorized by the Bank of Ghana Act 738 (2007), are permitted to perform the following activities: (a) accept deposits and other repayable funds from the public, including lending, investment in financial securities, and money transmission services; (b) issue and administer means of payments, guarantees, and commitments; (c) conduct trading for their accounts or accounts of customers in money market instruments, foreign exchange, or transferable securities, and participation in securities issues; (d) give advice to undertakings on capital structure, acquisition and merger of businesses; and (e) keep and administer securities, credit reference services, safe custody of valuables, electronic banking, and other services (Bank of Ghana Act 738, 2007).

The Bank of Ghana stated in its 2009 financial stability report that Ghanaian banks direct link to the 2008 financial crisis was their exposure to counterparts abroad in the form of international accounts, which is their Nostro. The Nostro account accounted for 46% to 55% of the bank's net worth (Bank of Ghana, 2009). Stress analysis conducted by BOG in its 2009 report showed that a recall of borrowing or default in excess of 50% could pose a significant threat to the stability of the financial system in

Ghana. The BOG further elucidated that the required capital adequacy for Ghanaian banks at the end of 2008 was 13.8%, which fell below the industry threshold of 15.6% (BOG, 2009). As a result, in 2008, the BOG revised its financial laws and regulations as part of its regular business functions. These reforms included an increase in the minimum capital requirement (MCR) for commercial banks to enhance the banks' ability to withstand any financial shock (BOG, 2008). As of December 31, 2008, only 3 banks out of the 23 commercial banks in Ghana could meet the new minimum capital requirement without soliciting extra funds (PricewaterhouseCoopers, 2009). From the preceding figures universal banks, in an attempt to meet the new minimum capital requirement, may have to go public, merge, or consolidate their operations with other financial entities. Any of these actions may result in an increase in bank size.

Available research shows that there is a direct correlation between an increase in bank size and efficiency (Shehzad, deHaan, & Scholtens, 2013). Therefore, policies that increase in capitalization for Ghanaian banks enhanced their performance (Ametei, 2014). However, Tetteh (2014) argued that smaller banks had better efficiency than bigger banks in Ghana. Based on this argument, the consolidation of banks into larger ones might not increase efficiency in the financial system over the long-term. The efficiency of the financial system is a *sine qua non* to business growth (Hermes & Lensink, 2013). Hence, the purpose of this study was to evaluate whether the increases in the minimum capital requirement by 7.57 times in 2008 influenced the efficiency of

Ghanaian banks. Tables 1 and 2 give some essential information about the banks in Ghana in 2008 and 2013.

Table 2

Banks in Ghana 2008

Type of Bank	Number of branches	Share of Industry deposits (%)	Share of industry loan and advances (%)
State	226	21.6	29.3
Private	106	20.2	22.0
Foreign	322	58.2	48.7
Total	654	100	100

Data adapted from PricewaterhouseCoopers 2013

Table 3

Banks in Ghana 2013

Type of Bank	Number of branches	Share of Industry Deposits %	Share of industry loan and advances %
State	263	19.4	17.1
Private	178	25.3	30.8
Foreign	381	55.3	52.1
Total	822	100	100

Numerical data from PricewaterhouseCoopers (2013,14).

Despite the 2008 financial crisis, the Ghanaian banking industry witnessed an increase in the number of banks from 25 to 26 between 2008 and 2013 (PricewaterhouseCoopers, 2013). The Ghana banking survey further showed an unparalleled growth in the number of universal bank branches from 654 to 822 branches. The largest contribution came from private banks which increased their number of branches from 106 to 178, an increase of about 60% (PricewaterhouseCoopers, 2013). Again, comparing the composition of the share of industry loans and advances, and deposits between 2008 and 2013, the private domestic banks' shares increased while State-owned domestic banks shares decreased. However, foreign banks still dominate the banking industry in Ghana with the highest percentage shares in both loans and advances for 2008 and 2013 (PricewaterhouseCoopers, 2009; 2013).

Global Financial Crises and Financial Reforms

Financial crisis leads to financial reforms, while, the type of crisis and the duration of the crisis determines the type of financial reforms (Hallerberg & Scartascini, 2015). Hallerberg et al. further argued that the success of reforms depends on other factors besides fiscal institution reforms. Therefore, the need to discuss other factor in relation to financial crisis, financial reforms and their effects on financial institution.

The extent of the crisis based on the country's structure. According to some scholars, the structure of the country's financial and economic systems determined the severity and duration of the 2008 global financial crisis on the country's financial system. For example, Karakurt, and Akdemir (2016) argued that the negative impact of the

financial crisis on countries varied depending pre-crisis economic indicators. Hence, the economic and financial system in a country determined the duration of the crisis in the country. The financial crisis did not affect Pakistan banks because they did not have significant integration with the global banks (Chaudhary & Abbas, 2017). Balmaceda, Fisher, and Ramirez (2013) argued that not only the structure of the financial system but, also, the market structure affect the effectiveness of financial liberalization of an economy. As indicated, researchers found a significant relationship between a country's financial and economic structure and the effect of the 2008 financial crisis on that country.

Change in economic variables based on the financial crisis. The 2008 financial crisis had a significant effect on economic variables, which in turn, had an adverse impact on economic growth (Shabbir & Rehman, 2016). In addition Maredza (2016) argued in support of financial regulations at both national and global levels to address the possibility of future financial crises. Maredza further explained that regulations are important because they protect investors by reducing the possibilities of insolvency and bank failure. Hanson, Kashyap, and Stein (2011) argued that academics and regulators agreed after the 2008 financial crisis on the need to enact new financial regulations. Hanson et al. stated that the new regulations would prevent the costly failure of individual financial institutions in the future. Financial regulations have negative and positive repercussions on the financial systems and, for this reason, financial experts and

managers need to have an in-depth understanding of the implications of such reforms before embarking on them.

Efficiency based on financial reforms. Multiple studies indicate a strong link between financial reforms and efficiency in the financial system. For example, Duramaz (2016) argued that financial regulators monitor financial institutions with the objective of maintaining the integrity of and instilling discipline in the financial system to enhance efficiency and stability during crisis. Thus, an efficient financial system is crucial for business growth, because the financial sector development increases funds availability for business activities through intermediation. As a result, an efficient financial system enhances business growth and development (Aiyar et al., 2015). Furthermore, Kaplanski and Levy (2013) argued that when banks have excess funds available, financial restructuring that increases capital requirement also increases the stability of the financial system, because the banks refrain from taking risky ventures. Thus, bank capital has positive effect on profitability hence sustainability (Rahman, Hamid, & Mannan Khan, 2015). Accordingly, financial directives help improve banks efficiency (Wang, Huang, Wu, & Lui, 2014). As clarified by Wang et al. financial sector regulation is crucial for business growth, because it increases soundness and the availability of funds in the banking system. The Bank of Ghana implemented the financial reforms in Ghana in 2008 with the goal of enhancing robustness and availability of funds in the financial system for economic development (Bank of Ghana, 2008).

Efficiency based on active monitoring. Available studies indicate that effective monitoring of commercial banks through financial reform improved efficiency and facilitated faster recovery from the financial crisis. For example, financial directives by regulators who control banks' activities helped to improve monitoring and supervision, which affects banks activities and efficiency (Redo, 2015). As a result, emphasis is on the idea that effective monitoring is necessary for an efficient financial system, because it is a necessity for a sound financial system in the case of a financial crisis.

Scholars have examined the impact of financial reforms on different countries around the world with various results. For instance, Iftikhar (2015) argued that financial liberalization has positive effect on financial sustainability while banking regulations have negative effect on financial fragility. Hsiao and Lin (2013) also argued that the second financial restructuring of the banking sector had a positive impact, improving the performance of smaller banks that merged voluntarily in Taiwan. While Hsiao and Lin reported a positive effect after financial reform experiences from their countries, the extent of the reform reported by researchers is not conclusive.

Efficiency based on more reforms. Some researchers suggested a need for more restructuring to achieve full benefits in the financial system. For instance, the 2008 financial crisis led to financial reforms globally with the objective to stabilizing the financial system, however, regulator are not sure of the right framework that combine both sustainability and innovation of the financial market (Allen et al., 2016). Owusu and Odhiambo (2015) also argued that banking reform in Ghana did not have a

significant impact on the economy. As a result, there was the need for regulators to increase capital to promote sector growth. Despite the benefits derived from various countries from banking reforms, some academics argue that financial reforms in different countries may have varying consequences for the banking system as well as the economy. Hence, this study will determine whether the 2008 financial reform in Ghana enhanced efficiency and performance in the banking industry, or there is a need for further reforms.

Multiple studies reveal that the lag effect of financial regulations should be a prime consideration of regulators, who need to ensure that they take the adjustment period for the banks into consideration. Baláz and Bayer (2015) argued that global authorities enacted structural reforms in reaction to financial crisis. Baláz et al. stated that EU was considering further structural reforms to reduce their vulnerability to the global financial system. Bank regulators have to consider the lag effect of regulations, because banks go through an adjustment period after changes in their financial structure. The reason is that regulations cause efficiency levels to increase or decrease initially before stabilizing or deteriorating (Bhattacharyya & Pal, 2013; Jaffry, Ghulam, & Cox, 2013). Finally, Redo (2015) argued that prudential regulation which has the objective of stabilizing the financial system and the economies also have the tendency of increasing risk-taking behavior of the banks. Therefore, there is the need to integrate monetary policies with prudential regulations. It is evident from the analyses above that financial restructuring might require an adjustment period or possibly have a negative impact on the banking system. The adjustment process and the negative impact of the restructuring

of the financial system as explained above could affect other drivers of business growth, such as credit availability and innovations in the banking system

Efficiency based on deregulation. In contrast to regulation enforcement in the banking sector, results from research in some countries show that financial liberalization, which constitutes the deregulation of the financial sector is good for attaining stability in the financial system. Abdallah, Amin, Mi, and Kusairi, (2014) clarified that financial liberalization improved competition, introduced new learning and improved efficiency in Tanzania. Again, deregulation increases efficiency in the banking system (Chortareas, Girardone, & Ventouri, 2013; Kumar, 2013). As indicated by the previous studies, constructive and thoughtful financial reforms are essential prerequisites for business growth and the stability of a country. Hossain, Jain, and Mitra (2013) revealed a middle position that shows that although tougher restrictions on banks activities reduced riskiness, they also suppressed innovation. While, Hermes and Meesters (2015) posited that the extent of the effect of liberalization on banks efficiency depends on previous regulations and supervision guidelines.

In contrast, Iftikhar (2015) argued that many studies on financial reforms suggest that financial crises follow financial liberalization. The temporary financial loss of the financial crisis outweighs the positive effects of liberalization. The authors further elucidated that the cost of financial liberalization was tremendous during the financial crisis. As indicated by the preceding analysis, changes in financial systems including changes in a minimum capital requirement may have a positive or negative impact on the

efficiency of a financial system during a financial crisis. These changes may depend on the timing and the type of policies in place at the time of the introduction of the deregulation measures.

Efficiency and banks risk portfolio based on increases in the minimum capital requirement. Academics argue that increases in minimum capital requirement can have a diverse impact on banks' stability, the cost of borrowing, and banks' takeovers. For instance, Obinne and Okpara (2015) argued that changes in capital requirement did not have a significant effect on risk taken behavior of the banks in Nigeria. However, Acharya and Richardson (2009) argued that the banks' efforts to circumvent changes in the capital-adequacy requirement as a safeguard against losses triggered the financial crisis. In addition, Redo (2015) posited that banks the purpose of financial regulation is to increase stability in the financial system, yet such regulations also increase the risk-taking behaviors of the banks. Again, when banks' risk-taking to increase short-term efficiency outweighed the benefits of a more cautious approach, it affected the viability of their operations during the financial crisis (Oliver, 2013). Thus, regulators need to do a meticulous analysis when introducing new regulations.

As indicated, although banks may be able to raise new funds at no cost, they would rather reduce loan availability, which hurts their efficiency and business growth in the future to consumers. Aiyar, Calomiris, and Wieladek (2014) supported the argument that an increase in minimum capital requirement encourages the relocation of funds by foreign banks to less regulated countries. Hence, reduction in the efficiency of the

financial system follows. Repullo and Suarez (2013) also argued that regulators must exercise restraint in further increasing bank capital levels, as unforeseen consequences may hurt the financial system and businesses. Thus, a wrong estimation of the minimum capital requirement, whether too high or too low will reduce efficiency Maredza (2016).

Efficiency and banks risk portfolios based on the increase in the minimum capital requirement. The risk-based capital requirement had an adverse effect on society through an increase in leverage and the risk-taking behavior of banks (Angeloni, & Faia, 2013). Nevertheless, other researchers, such as Beck, Demirgüç-Kunt, and Merrouche (2013), have argued that an increase in the minimum capital can help to improve the banking system. Busun, and Kasman (2015) elucidated that relatively better-capitalized banks had higher levels of efficiency and less exposure to risk, meaning relatively better-capitalized banks may perform better than other banks during a financial crisis.

Likewise, Carvallo, & Kasman (2013) argued that banks with high capital positions had higher revenue efficiency in Latin America. Evidence has shown that enforcement of the minimum bank capital requirement improves bank stability and effectiveness (Vighneswara, 2014). Similarly, Aiyar et al. (2015) explicated that implementing capital requirement directives with each bank's risk contribution in mind can enhance financial stability and reduce default risk. Therefore, bank regulators should not impose the same amount as a minimum capital requirement for all banks irrespective

of their risk contribution and efficiency levels. Since, risk and capital are inversely related, and capital and profitability are positively related (Maji, & De, 2015).

As stated by Demirguc-Kunt (2013), banks with strong capital positions had positive returns during the 2008 financial crisis. Thus, banks with strong capital positions performed better than banks with weak capital positions during the financial crisis (Demirguc-Kunt, 2013). Ionescu (2013) explained that minimum capital requirement helps to coordinate and regulate in the same way in order to eliminate the treat of capital policy instability. This evidence supports the view that an increase in the minimum capital requirement may improve efficiency, stakeholder's interest in the management of the banks, and public confidence in the financial system.

Nonetheless, the overall analyses indicate that an increase in the minimum capital requirement may have either a negative or a positive impact on the efficiency level of the financial system. The extent of the effect depends on whether regulators do a careful analysis prior to the formulation and implementation of the directives. Various studies on banks efficiency show that other factors besides financial reforms have an effect on the banks efficiency level. I will discuss some of these factors including ownership structure, bank size, managerial style, economic, and technological changes and their effects on banks' efficiency level in the subsequent sections.

Efficiency Variations Based on Size

Under the X-efficiency hypothesis banks can increase their performance based on their size and superior management (Berger, 1995). Past studies in various countries on

banks efficiency and size seem to be inconclusive. For instance, Tina Zhang and Wang, (2014) examined the productivity of Chinese banks in relation to their sizes and found negative relationship between bank size and efficiency. Conversely, Latif (2015) found a positive relationship between bank size and profitability in Ghana. However, Beck et al. (2013), Karim and Alam (2013) argued that factors that affect bank efficiency include bank size. Evidently, researchers disagree on how size affects bank efficiency. Therefore, the need to discuss the position of some scholars in relation to banks size and efficiency.

Efficiency based on smaller bank sizes. One school of thought believes that smaller banks have greater efficiency than larger banks. Those in support of the argument for smaller banks include Hsiao and Lin (2013). Again, smaller banks have a higher scale efficiency than bigger banks (Galán, Veiga, & Wiper, 2015; Singh & Thaker, 2016). Furthermore, Distinguin, Roulet, and Tarazi (2013) argued that small banks in Europe and America had better solvency standards than bigger banks when they faced increasing levels of illiquidity during the 2008 financial crisis. Thus, small banks tend to be more stable during a financial crisis than bigger banks. Additionally, Berger and Udell (2014) found that large banks focus on large firms while small banks concentrate on small businesses, consequently, limiting the contribution of large banks to the development of small and medium scale enterprises, hence, business growth and development.

Efficiency based on bigger bank sizes. Hadad, Hall, Santoso, and Simper (2013), arguing for bank consolidation, stated that the consolidation of state-owned banks would increase the cost efficiency of the banks in Indonesia. Likewise, Shehzad et al. (2013) found that bigger banks were more profitable than smaller banks in member countries of the Organization for Economic Cooperation and Development. Barros and Williams (2013) argued that the consolidation of local banks enhanced their long-term efficiency in Mexico. Similarly, Lee, Liang, and Huang (2013) reported a positive relationship between efficiency and banks' consolidation in Taiwan. On the other hand, Hsiao and Lin (2013) took a middle position and stated that although consolidation enhanced banks' performance in Taiwan after the second restructuring, only smaller banks that merged voluntarily increased their performance. According to Latif (2015) bank's sizes whether small or big has an impact on its performance. As indicated above, bank size has an effect on the bank's efficiency. However, scholars have divergent conclusions about whether bigger banks are more efficient than smaller banks or smaller banks are more efficient than bigger banks.

Efficiency Variations Based on Ownership Structure

The principal argument for ownership having an effect on the performance of banks started from public choice theory. The theory postulates that privately owned banks perform better than public banks because of the difference in monitoring by stakeholders (Figueria & Parker, 2009). Some scholars have examined the relationship between banks ownership structure and efficiency. These scholars include Casu, Ferrari,

and Zhao (2013), who concluded that bank ownership influenced cost efficiency. Casu et al. (2013) also concluded that different ownership types responded differently to the regulatory reform in India from 1992 to 2009, which affected their performance levels.

Efficiency based on foreign ownership. According to Andries, Mehdian, and Stoica (2013) foreign banks perform better than local banks in Romania. Other scholars who are in support of this view based on their studies include (Casu et al., 2013). Moreover, Tzeremes (2015) supported the view that foreign banks performed better than local banks in India between 2004 and 2012. Tzeremes further explained that all the banks made an improvement in technology before the financial crisis, but local banks could not sustain the change after the crisis. This evidence supports the idea that foreign banks are more efficient than domestic banks and that efficient banks can withstand a financial crisis. This indicates that foreign banks have strengths that give them a competitive advantage over their local competitors.

Adverse effects based on foreign ownership. Despite the preceding views that foreign-owned banks perform better than local banks, other researchers have different opinions about foreign-owned banks based on their studies and how they make their profits. For example, Claessens and Horen (2014) studied the trend and impact of foreign banks on 137 from 1995 to 2009. They concluded that foreign banks had a negative impact on credit in countries with limited available credit information. Similarly, Gormley (2010) argued that although foreign banks perform better, they only finance a small set of highly profitable firms in the economy thus contributing less to gross

domestic product. Foreign banks reduced their lending facilities to local stakeholders during and after the financial crisis (Fungáčová, Herrala, & Weill, 2013). Dombret and Ebner (2013) explicated that although foreign banks are agents of business growth through efficiency, their exit can be a threat to the host country's financial stability. As discussed above, although foreign banks may be more efficient than local banks, they lack loyalty to local stakeholders. Hence, foreign banks provide a minimal and inconsistent contribution to the growth and development of the local communities.

Again, other scholars are of the view that foreign banks are not the most efficient banks. For example, Singh and Thaker (2016) posited that public banks were the most effective followed by private banks and foreign banks in India between the years 2008 to 2012. Other scholars who support this view include Rahman and Reja (2015), and Waleed, Shah, and Mughal (2015) who argued that private banks perform better than other types of ownership structures. Although foreign banks were more profitable than local banks, they were less managerial efficient than the local banks (Alnaa, Adongo, & Juabin, 2016). Furthermore, Cava, Salgado, Junior, and Branco (2016) argued that Federal public banks were more efficient than their private counterparts in Brazil. As a result, foreign banks did not make any significant contribution to the development of the local economy, and researchers disagree on the bank ownership type with the best performance.

Performance and Efficiency Differences Based on Other Factors

Banks operate with the objective of making profits for their stakeholders and providing funds for business growth. Thus, bank shareholders seek equitable returns on their investments (Huljak, 2015). However, not all the banks operate at their most efficient level as expected by stakeholders due to managerial style, economic factors, and technological factors, as elucidated by some scholars. For example, Sharma and Dalip (2014) used the Hicks-Moorsteen approach in evaluating the performance of Indian banks. They posited that technological advancement enhanced banks' performance in India, indicating a strong link between management ability to deploy technology and efficiency. Likewise, Polovina and Peasnell (2015) reported a strong link between managerial skills and banks efficiency, stating that foreign banks chairman has positive effect on profitability in Turkey. This could be as a result of enhanced banking and risk management practices, because of bank-specific characteristics. Thus, controlling for risk references by management is crucial in determining bank efficiency (Jianhua, Qu, & Wang, 2013).

Other researchers had different conclusions based on other performance indicators. Suzuki and Sohrab (2014) argued that intense competition between banks and economic conditions had an adverse effect on banks' performance. In addition, Banks specific factors have a significant effect on their performance (Ongore, 2013). Again, market structure, bank risk taken behavior and regulation affected banks efficiency in the Gulf Cooperation council countries (Maghyereh & Awartani, 2014). Thus, higher market

share leads to higher bank profitability which had stability effect on economies (Mirzaei, Moore, & Lui, 2013). As indicated in the preceding arguments, other factors may affect the efficiency levels of the banks besides financial reforms, bank size, and ownership structure.

Professional and Academic Review on Methodology and Design

There are several methodologies that researchers choose based on the purpose of their study. Researchers use quantitative research methodology when emphasis is on the statistical analysis of relationships between variables (Lach, 2014). Researchers choose the design of their research following their choice of methodology. Below are examples of methodologies academic researchers used in studying efficiency and performance of banks in various countries.

Measuring performance based on other approaches besides DEA. Scholars have such as Alnaa, Adongo and Juabin (2016) analyzed the profitability of Ghanaian banks from 2008 to 2014 on six banks. The authors used profitability ratios such as return on assets (ROA), capital adequacy (CA), return on equity (ROE) and management efficiency (ME). Alnaa et al. concluded that in terms of management local banks were more efficient; however, the foreign banks were more profitable than the local banks.

Fethi, Shaban and Weyman-Jones (2013) examined the banking industry in Turkey when the regulator restructured the banking system. The authors employed panel data econometrics for the analysis. Fethi et al. asserted that restructuring of the banking system in the form of recapitalization had negative repercussions on bank productivity

growth in Turkey. Abdallah, Amin, Sanusi, and Kusairi, (2014) examined the efficiency of 21 commercial banks in Tanzania from 2003 to 2012 using stochastic frontier analysis the banks size and ownership structure. The authors analyzed large and small bank in addition to the ownership structure. Abdallah et al. concluded that large foreign and government banks performed better than small in terms of revenue generation. However, small banks were most cost efficient than the large banks.

Barua, Khan, and Barua (2017) studied the impact of internationalization on the performance of banks in Bangladesh. The authors examined 35 banks using panel regression with Driscoll-Kraay Standard Error, Prais-Winsten Panel Corrected Standard Error alongside Fixed Effect and Random Effect estimation techniques. The author then concluded that internationalization had negative effect on banks performance especially on the local banks.

Osei-Assibey and Asenso, (2015) studied the influence of central bank's regulatory capital on commercial banks performance in Ghana from 2002 to 2012. They employed system generalized methods of moment approach and estimate the equations in analyzing credit supply, interest rate spread and non-performing loans. The authors argued that net minimum capital ratio has a positive relationship with net interest margin suggesting wider interest spread.

Measuring efficiency based on DEA in combination with other approaches.

Researchers have used the DEA approach in conjunction with other approaches in analyzing bank performances. For example, Alhassan, Tetteh, and Brobbey (2016)

examined the efficiency of Ghanaian banking industry from 2003 to 2011 by analyzing data on 26 banks. The authors used data enveloped analysis in analyzing efficiency. Alhassan et al. then employed system generalized method in estimating profitability. The authors concluded that there is a negative relationship between bank size and efficiency. Baten, Kasim, and Rahman (2015) investigated efficiency and productivity change of banks in Bangladesh using DEA and Malmquist index. The authors argued that national private banks were more profit efficient than the national commercial banks, but less cost efficient compared to the national commercial banks.

Hemmati, Dalghandi and Nazari (2013) evaluated the efficiency of 16 government and private Iranian provincial banks with regards to electronic payment. The authors used multi-criteria decision-making techniques (DEA and technique for order preference by similarity to ideal solution) for the analysis. Inputs used for the efficiency analysis were the number of automated teller machines (ATMs), the number of issued cards, and the number of point-of-sale (POS) terminals. The outputs were the number of successful ATMs transactions and the number of successful POS transactions. The researchers concluded that private banks performed better than the state banks.

Additionally, Nguyen, Roca, and Sharma (2014) examined the trend and cost efficiency of the Vietnamese banking industry from 1995 to 2011. The authors used DEA and window analysis approach. Nguyen et al. contended that the state banks were more efficient than the private banks. Nguyen et al. further stated that the global financial crisis and the Asian financial crisis did not have a significant effect on the

Vietnamese banking industry confirming the growth in profit and stability in the banking industry.

Measuring banks 'efficiency and profitability by solitary using DEA.

Another group of researchers used only DEA in studying efficiency and profitability in banking around the world and concluded that there was a correlation between bank efficiency and ownership structure. For instance, Saez-Fernandez, Picazo-Tadeo, and Beltran-Esteve (2015) investigated the technical efficiency levels of the Latin American and Caribbean banking industries. The authors used DEA in analyzing the banks program and managerial efficiencies from 2001 to 2013. Subsequently, they concluded that foreign banks enjoyed more competitive advantage than domestic banks in terms of technical efficiency.

Kumar (2013) examined the trend of Indian public banking sector efficiency and the issue of convergence in cost, technical efficiency levels, and allocative efficiency levels during the de-regulation period between 1992/1993 and 2007/2008 using DEA for the analysis. The inputs for the analysis were physical capital, labor, and loanable funds, with net interest income and noninterest income as outputs. Kumar concluded that the Indian public banking sector was least cost efficient, because average banks spent 25.6% more on production than efficient banks mainly due to technical inefficiency. Regarding convergence, the study revealed that the banks that were inefficient at the beginning of the study became more efficient during the period under investigation. Said and Masoud, (2014) examined profit efficiency and management behavior for 25 Tanzania banks from

198 to 2011 using DEA. Said and Masoud further studied the effect of ownership, bank profile, size, and cooperate structure on bank efficiency. The authors concluded foreign banks were more profit efficient while local banks were more cost efficient. Again, bigger banks and listed banks were more cost efficient compared to unlisted banks.

Measuring efficiency based on regression and DEA approaches. Other scholars combined regressions and DEA instruments in measuring banks' efficiency and performance. For instance, Alam (2013) examined the relationship between efficiency, risk-taking behaviors, and regulation, monitoring and supervision of Islamic banks across the globe. Alam used DEA to measurement the efficiency and then employed seemingly unrelated regression approach in analyzing the relationships between the variables. Alam argued that a reduction in competition from related types of bank enhanced banks' efficiency levels while increases in regulation, supervision, and monitoring reduced the risk-taking behavior of the banks. Pham and Hong Nghiem (2015) studied the interrelationship among default risk capital, and efficiency of the Indian banking system over 1990 to 2001 considering the impact of ownership. The authors used DEA for the estimation of efficiency levels of the banks and regression for the interrelationship among the default risk, capital and efficiency. Pham et al. concluded negative relationship between efficiency and default risk, and between capital ratio and default risk. Nonetheless, Pham et al. found positive relationship between capital ratio and profit efficiency. In addition, Pham et al. argued that public banks had public banks out

performed private banks efficiency levels, but public banks had lower capital ratio and high chance of default risk.

In addition, Tina Zhang and Wang, (2014) studies the Chinese banking industry from 2004 to 2011 during the time that the industry had to go through changes in ownership and operational strategies. The authors used DEA in analyzing efficiency, the Malmquist index for the year to year productivity and regressions for bank characteristics and ownership structure effect and productivity efficiency. The authors established that larger banks were less efficient compared to smaller banks and foreign owned banks were more efficient than local banks. Further, Chaudhary and Abbas (2017) investigated the effect of the financial crisis on efficiency and performance of Pakistan commercial banks. Chaudhary et al. used DEA for the analysis of efficiency and regression model in analyzing the banks performance of the banks. The authors elicited the global financial crisis did not affect Pakistani banking sector performance.

In addition, Karim and Alam (2013) evaluated performance of private banks listed on the Bangladesh stock market from 2008 to 2012. Karim et al. used multiple regression in analyzing impact of bank size, credit risk, operational efficiency and asset management on financial performance. Karim et al., then found a significant impact of banks size, credit risk, operational efficiency, and asset management on the performance of Bangladesh commercial banks.

Transition and Summary

The preceding section describes the problem statement, the purpose statement, the nature of the study, research question, hypotheses, theoretical framework, operational definition, assumptions, limitations and delimitations, and literature review. The next section includes the purpose statement of the research, the role of the researcher and participants, method and design, population and sample, ethical research, data collection, organization and analysis, and the reliability and validity of the research. The final section will include fieldwork, data analysis and interpretation, the implications for social change, and recommendations for action and future studies.

Section 2: The Project

The purpose of Section 2 is to provide an overview of the implementation of quantitative correlational research methodological design to validate the analysis. As a researcher, I described the purpose of the study, my role, and justified the methodological design of this doctoral study. In this Section 2, the aim was to identify the population, samples, and sampling method, and then explained the data collecting instrument and processes. Further, this section included predata analyzing procedures, and postdata interpreting assumptions to validate the results.

Purpose Statement

The purpose of this quantitative, correlational study was to examine the relationship between efficiency, size, risk, and ownership structure, and banks' performance when minimum capital requirement increases. Independent variables included efficiency, size, risk, and ownership and the dependent variable was bank performance. The targeted population consisted of all universal banks in Ghana from 2008 to 2013 with available data. The implication for positive social change included a better understanding of the effect of independent variables on the dependent variable when minimum capital requirement increases. Thus, a better understanding of these effects is likely to enhance bank managers' abilities to deal effectively with changes in the minimum capital requirement for sustainability in the banking system in Ghana. Therefore, the possible social benefits of bank sustainability include public confidence in

the financial system, lending to viable businesses, decrease unemployment, and social crimes.

Role of the Researcher

The researcher in a quantitative research study is responsible for gathering, organizing, analyzing, and clarifying the data objectively (Luft & Shields, 2014). Furthermore, the quantitative researcher is to demonstrate ethical integrity by objectively separating the study from the influence of any organization (Ferrel, Fraedrich, & Ferrel, 2014). My role as a researcher is to comply with the ethical standards of the Belmont Report. The three ethical frameworks of the Belmont Report 1979 that researchers follow are respect, beneficent, and justice (U.S. Department of Health and Human Services, 2014). In this study, there was no boundary issue, because I do not work for the Bank of Ghana or any of the banks under investigation. The researcher is the instrument of data collection in qualitative research, because the researcher gathers data through interviews, focus groups, and observations (Caruth, 2013). In this study, I am not the instrument of data collection because secondary data is the source of data for the study. The ethical standard in business research is for researchers to be objective as much as possible (Ferrel et al., 2014). Hence, my role as a researcher is to be objective throughout the research process.

Participants

There are no human participants in this study. The participants in this study are the banks in Ghana that are listed on the PricewaterhouseCoopers annual banking surveys

and the Bank of Ghana reports. All reports are available to the public.

PricewaterhouseCoopers covers all of the banks in the country, except banks that do not make their data accessible to the public. Researchers use secondary data to access a large available set of collected data (Hennebel, Boon, Maes, & Lenz, 2015). Researchers can save more time by using secondary data as compared to using primary data (Fanning, 2014). The absence of the human element in this study limits the risk related to compliance with the 1976 Belmont Report's requirements. However, I was mindful of ethical considerations embedded in the Belmont Report related to research during the completion of this study. The selection of the banks that have data available through archival data bases of the Bank of Ghana and PricewaterhouseCoopers aligns with the study. Academic researchers, such as Adjei-frimpong, Gan, and Hu (2016), and Osei-Assibey, and Asenso (2015) used the same process when studying efficiency of the banking industry in Ghana.

Research Method and Design

There are several methodologies that researchers choose based on the purpose of their study. Researchers use quantitative research methodology when emphasis is on the statistical analysis of relationships between variables (Lach, 2014). Researchers choose the design of their research following their choice of methodology. The correlational design is the best option for researchers when trying to measure the relationships among variables without intervention in the research processes (Polit & Hungler, 2013). In this doctoral study, the main objective was to determine the extent of the relationship, if any,

between the banks efficiency, size, ownership, risk, and performance. Hence, the most apt research methodology and design for this doctoral study are quantitative and correlational respectively.

Research Method

Research methodology is a technique used by researchers in the collection, organization, and analysis of information to draw conclusions (Garcia & Zazueta, 2015). Quantitative and qualitative techniques are the two key methods of research, and a third one is a combination of quantitative and qualitative referred to as a mixed method (Fassinger & Morrow, 2013). McCusker and Gunavdin (2015) posited that the qualitative method allows researchers to gain deep insights into the phenomena by analyzing textual data. The mixed method helps in integrating both quantitative and qualitative types of data. Researchers use mixed methods by combining qualitative and quantitative methods in a single study (Caruth, 2013). In this study, I employed a quantitative method that allowed the use of numerical data to compare the change in efficiency based on financial reforms. Qualitative and mixed methods require the use of primary data as part of the analysis; however, I did not use primary data in the study. The quantitative method was suitable to fulfill the purpose of the research.

Research Design

Quantitative researchers use statistical methods in analyzing numerical data to explore the hypothesis (Ary et al, 2014). The quantitative method has two components: experimental and nonexperimental designs. The experimental design operates under a

controlled environment (Cokley & Awad, 2013). The authors explained that the nonexperimental component of the quantitative method comprises correlation and quasi-experimental designs. The correlation design is for assessing the relationship between variables, while a quasiexperimental design requires the manipulation of variables. The correlational research design is a non-experimental research method without manipulation of the variables that investigates the relationship between the variables (Polit & Hungler, 2013). In addition, researchers use correlational design to test a hypothesis with more than two related variables (Boslaugh, 2013). The correlational multiple-regression design was appropriate for the study because none of the variables in the study required manipulation. The purpose of this doctoral study is to measure the correlation between variables and regression of a dependent variable with several related independent. The reseracher analyzed secondary data to the relationship between bank size, risk, ownership structure, and efficiency on Ghanaian banks' performance and efficiency.

Population and Sampling

Researchers can create quantitative data from non-probability sampling, and they can generate qualitative data using probability sampling techniques (Palinkas et al., 2013). However, many studies fail to provide the rationale for the sampling procedure for their studies, which may affect the validity of the study. Hence, researchers should depict the details of their sampling strategies and provide the rationale for the strategy (Palinkas et al., 2013). Non-probability sampling has an advantage of cost effectiveness

and allows the use of one's prudent judgment (Bornstein, 2013). In this study, I used a non-probability purposive sampling. Nonprobability sampling does not require the justification of random selection (Apostolopoulos & Liargovas, 2016)

Purposive sampling is a non-probabilistic sampling process in which the investigator selects the participants based on the purpose of the study and pre-determined target group (Apostolopoulos & Liargovas, 2016). Thus, purposive sampling is non-probability sampling (Koçyigit & Karadag, 2016). Sedgwick (2013) argued that validity of the sampling data depends mainly on the characteristics of the sample members and the extent to which they represent the population. The sample data for this study is based on all banks in Ghana from 2008 to 2013 with available data. I analyzed the data for inconsistency, missing figures, and outliers. When determining the sample size and design, it is important for us to know the theory we intend to measure and the evidence we have for reliability and validity of those measures (DeNisi, 2013). Thus, researchers should consider the purpose of the study when choosing sample design (Landers & Behrend, 2015). Some scholars such as, Adjei-frimpong et al. (2016), Osei-Assibey and Asenso (2015), and Adusei (2016) studied banks in Ghana using the same source of data. I obtained my data from PricewaterhouseCoopers through a publicly available site. All banks in Ghana use the same accounting standards, namely International Financial Reporting Standards, which makes it convenient to obtain the data from a secondary source. In this study, all the banks in Ghana with available data

from 2008 to 2013 were the sample for the study. This sample represents all the banks in Ghana from 2008 to 2013 for which there was available data.

Ethical Research

The researcher must ensure that there is no ambiguity in the study setting by justifying the validity and reliability of their research method (Sekaran & Bougie, 2013). Thus, it is necessary to inform the participants of their rights, and to make the participation voluntary without any form of coercion (Ritchie, Lewis, & Nicholls, 2014). Regardless of the type of the research methodology, researchers have a responsibility to address issues related with ethical dilemma throughout the research process (Ferrel et al., 2014). There were no ethical issues about the data collection, because the data for the study was secondary data. However, the sources of data used for the study are reliable. I analyzed the results based on the DEA statistical test results, ROE, and nonperforming loans to total loans and advances, and net interest margin (NIM) which were based on reliable data. I do not work for any of the agencies or banks involved in the study, and I have no relationship with them. The source of the population of this doctoral study was limited to secondary data. Accordingly, the forms related with IRB such as; confidentiality, consent, and letter of cooperation documents do not apply. IRB approval number for this study is 02-18-16-0313855. Further, researchers need to secure the vital materials and information of their work right after successful completion (Ferrel et al., 2014). Hence, storing data secured location related to this doctoral study in password protected folder for 5 years after publication is my goal.

Data Collection Instruments

Instruments are vital in collecting primary data through observation, surveys, and interview (Barley & Moreland, 2014). The data for this doctoral study is secondary, which The Bank of Ghana and PricewaterhouseCoopers staff collected beforehand for a different purpose. For this data, I did not conduct observation, surveys, and interviews. Researchers that use secondary data do not have data collecting instruments (Barley & Moreland, 2014). The two primarily sources of collecting data are primary and secondary (Lamb, Hair, & McDaniel, 2015). Primary data is a data collected primarily for the specific research (Sekaran & Bougie, 2013). Whereas, researchers use secondary data when there is data readily available not specifically intended for their research (Lamb et al., 2015). The information from secondary data, as part of the research design, is vital and readily usable by any researcher (Lamb et al., 2015).

The four data types include nominal, ordinal, interval and ratio (Green & Salkind, 2014). Nominal data is a data that has no numerical or orderly value (Green & Salkind, 2014). In addition, the scale data refers to a data with a numerical value, but without orderly value. Further, the ordinal data refers to a data that has orderly value but without the numerical value (Green & Salkind, 2014). The following table shows the types of data for the variables.

Table 4

Variables and their Scale of Measurement

List of the Variables	Nominal	Scale
Ownership Structure	Foreign, Private, and State	
Risk/NPL		Ratio
Efficiency		Numerical
Size		Ratios
Performance		Ratios

Quantitative researchers identify secondary data as effective in conducting statistical analysis (Garcia & Zazueta, 2015). In this doctoral study, I used banks data from PricewaterhouseCoopers. PricewaterhouseCoopers data consists of comprehensive and accurate banks information provided by the banks and Bank of Ghana.

Data Collection Technique

The primary data collection technique comprises of observations, questionnaires, focus groups, online surveys, tests, and personal interviews (Lamb et al., 2015). Researchers that choose primary data gain from the originality of the data (Fleischhacker et al., 2013). Fleischhacker et al. (2013) recommend that researchers use primary data as much as possible. The use of the secondary data is appropriate and adequate when dealing with large data sets (Fleischhacker et al., 2013). According to Lamb et al. researchers that use secondary data do not need to implement any of the data collecting techniques. Further, researchers reduce time and cost of the data collection process by using secondary data (Lin & Lui, 2015). Because data from this doctoral study only

came from secondary data, I reject the use of primary data collection technique for this doctoral study.

The weakness of secondary data is that the original data might exclude important information that distorts the result (Bevan, Baumgartner, Johnson, & McCarthy).

Further, Bevan et al. (2013) identified that the initial researcher might missed important observations or inputs during the data collection processes. The source of the secondary data for this doctoral study is PricewaterhouseCoopers, Bank of Ghana and the banks, which the originators and the data repository used by banks respectively. As previously indicated, an assumption of this doctoral study is that data is collected using appropriate procedures. As a quality control measure, I cross some of the data with the information from the some of the banks websites to verify the reliability of the secondary data

Data Analysis

The main goal of this study is to answer the overarching question: What is the relationship between efficiency, size, risk, ownership structure, and Ghanaian banks' performance when minimum capital requirement changes from 2008 to 2013 This doctoral study included four independent variables: efficiency, size, risk, ownership structure. performance is the dependent variable. My research question is as follows: What is the relationship between efficiency, size, risk, ownership structure, and Ghanaian banks' performance when minimum capital requirement changes from 2008 to 2013?

My hypothesis based upon the research question is as follows:

H_0 : There is no significant statistical relationship between banks efficiency, size, risk, ownership structure, and Ghanaian banks performance when minimum capital requirement increases.

H_a : There is a significant statistical relationship between banks efficiency, size, risk, ownership structure, and Ghanaian banks performance when minimum capital requirement increases.

The intended tools for the analysis of the quantitative data are statistical tools consisting of DEA, multiple regressions, and t -test. Researchers use DEA to measure the efficiency of multiple DMUs when there are multiple inputs and outputs (Siddiqui, 2012). DEA is appropriate for this study because the study used two inputs and two outputs in measuring efficiency. Charnes et al. (1978) built on the ideas of Farrell (1957) in measuring efficiency using the efficiency of DMUs. Charnes et al. applied linear programming to estimate an empirical production technology frontier known as DEA. Charnes et al. further developed the DEA using constant returns to scale. Banker et al. (1984) extended the DEA system to include a variable return to scale.

$$\text{Minimize: } z_{0=\theta} - \varepsilon \left(\sum_{i=1}^m s_i^- + \sum_{r=1}^s s_r^+ \right) \quad (1)$$

$$\text{Subjectto: } 0_{=\theta} x_{io} - \sum_{j=1}^n x_{ij} \lambda_j - s_i^- \quad (2)$$

$$y_{ro} = \sum_{j=1}^n y_{rj} \lambda_j - s_r^+ \quad (3)$$

$$1 = \sum \lambda_j (4)$$

$$\lambda_j \geq 0 \text{ for } j = 1, 2, \dots, n \quad (5)$$

$$s_i^- \geq 0, \text{ for } i = 1, 2, \dots, m \quad (6)$$

$$s_r^+ \geq 0, \text{ for } r = 1, 2, \dots, s \quad (7)$$

Where y is the radial efficiency score, which takes on a value between 0 and 1.

The optimal weights of referenced units for unit j are as follows: x_{ij} is the value of the i th input to unit j ; y_{rj} is the value of the r th output from unit j ; s_r^+ is the output slack/shortfall for the r th output; s_i^- is the input slack/excess for the i th input; and ϵ is the non-Archimedean infinitesimal. The formula of the Charnes-Cooper-Rhodes model is similar to the Banker-Charnes-Cooper model; the only difference is that the Charnes-Cooper-Rhodes model deals with constant return to scale while Banker-Charnes-Cooper deals with variable returns to scale (Othman et al., 2016).

Charnes et al. (1978) acknowledged that the ratio of outputs to inputs is used to measure the relative efficiency of the $j = 0$ term relative to the ratios of all of the $j = 1, 2, \dots, n$, and then to interpret the DMU j DMU. The Charnes-Cooper-Rhodes construction is the reduction of the multiple-output /multiple-input situation (for each DMU) to that of a single *virtual output* and *virtual input*. For a DMU, the ratio of this single virtual output to single virtual input provides a measure of efficiency as a function of the multipliers. The aim is to maximize this ratio in mathematical programming parlance, to form the objective function for the DMU under evaluation, so that symbolically:

$$Maxh_b: \sum_{r=1}^s u_r y_{rj} / \sum_{i=1}^m v_i x_{ij}$$

(A)

Consequently, the efficiency of banks is computed with the Equation A, where: b = a specific bank intended for evaluation, y_{rj} = the amount of output r from the bank, x_{ij} = the amount of input i to bank j , u_r = the weight chosen for output r , v_i = the weight chosen for input i , n = the number of banks, s = the number of outputs and, m = the number of inputs. The objective function defined by h_b is to maximize the ratio of weighted outputs to weighted inputs of the bank under evaluation. Thus, the weight is subject to the constraint that any other bank in the sample cannot exceed unit efficiency by using the same weights.

The assumption is that the weights come from optimization. However, initially they are unknown. The problem setting in Equation A is a fractional program. Charnes et al. (1978) discovered that researchers can convert the fractional program into a linear program form. The conversion is possible by restricting the denominator of the objective function h_b to unity, and maximizing (minimizing) the numerator. Below is the input-oriented version (Equation B) and an output-oriented version (Equation C) which is the linear program version of the fractional setting:

$$Maxh_b: \sum_{r=1}^s u_r y_{rj} / \sum_{i=1}^m v_i x_{ij}$$

$$subjectto: \sum_{r=1}^s u_r y_{rj} / \sum_{i=1}^m v_i x_{ij} \leq 1; u_r, v_i \geq 0$$

$$r = 1, \dots, s; i = 1, \dots, m \text{ and } j = 1, \dots, n \quad (B)$$

The representation of the primal problem is as follows:

$$\begin{aligned} \text{Max } h_b(u, y) &= \sum_{r=1}^s u_r y_{rb} \\ \text{subject to: } &\sum_{i=1}^m v_i x_{ij} = 1; \sum_{r=1}^s u_r y_{rb} - \sum_{i=1}^m v_i x_{ib} \leq 0; u_r, v_i \geq 0 \\ &r = 1, \dots, s; i = 1, \dots, m \text{ and } j = 1, \dots, n \end{aligned} \quad (C)$$

The maximizing linear program setting in Equation B assumes constant returns to scale technologies. When the formulation constraints the weighted sum of the inputs as in Equation B and maximizes the outputs, it assumes an input-based efficiency measurement. In this case, given outputs, banks minimize the use of inputs.

Alternatively,

$$\begin{aligned} \text{Min } h_b &= \sum_{i=1}^m v_i x_{ib} \\ \text{subject to: } &\sum_{r=1}^s u_r y_{rb} = 1; \sum_{r=1}^s u_r y_{rb} - \sum_{i=1}^m v_i x_{ib} \leq 0; u_r, v_i \geq 0 \\ &r = 1, \dots, s; i = 1, \dots, m \text{ and } j = 1, \dots, n \end{aligned} \quad (D)$$

As stated, regarding linear programming theories, there is a dual companion to the primal. By denoting the input weights of bank b by θ_b and the input and output weights

of other banks in the sample by λ_j ; the dual form of the maximizing problem, the construction of (input-oriented) Equation, is as follows:

The dual problem is as follows:

$$\begin{aligned} \text{Min } h_b &= \theta_b \\ \text{subject to } \sum_{i=1}^n \lambda_i y_{ri} - y_{rb} &\geq 0; \theta_b x_{ib} - \sum_{i=1}^n \lambda_i x_{ri} \geq 0; \lambda_j \geq 0 \end{aligned}$$

(e)

θ_b is unconstrained in sign; $j = 1, \dots, n$ with θ_b and λ_j as dual values. If the corresponding θ_b is equal to one then, Bank C is efficient. In order to obtain estimates for n banks, the optimizing system (primal or dual) must be run n times with the bank under evaluation changes changing each time. Charnes et al. (1978) developed the preceding version known as the Charnes-Cooper-Rhodes model; this model worked well when combined with the constant returns to scale assumption. The Charnes-Cooper-Rhodes model with constant returns and the bank's intermediary role approach option is suitable for the analysis.

Researchers use a bank's intermediary role in studying how managerially efficient the bank is in collecting deposits and managing expenditure (inputs) and then using the funds for advances and investments (output). Researchers have found a positive relationship between the proportions of non-performing loans and bank failures (Álvarez-Franco & Restrepo-Tobón, 2016). Kutlar, Kabasakal, and Babacan (2015) studied Turkish banks by using DEA from 2003 to 2012 and concluded that public banks had higher efficiency levels than private banks. In addition, Chang, Yang, Wang, and Linh,

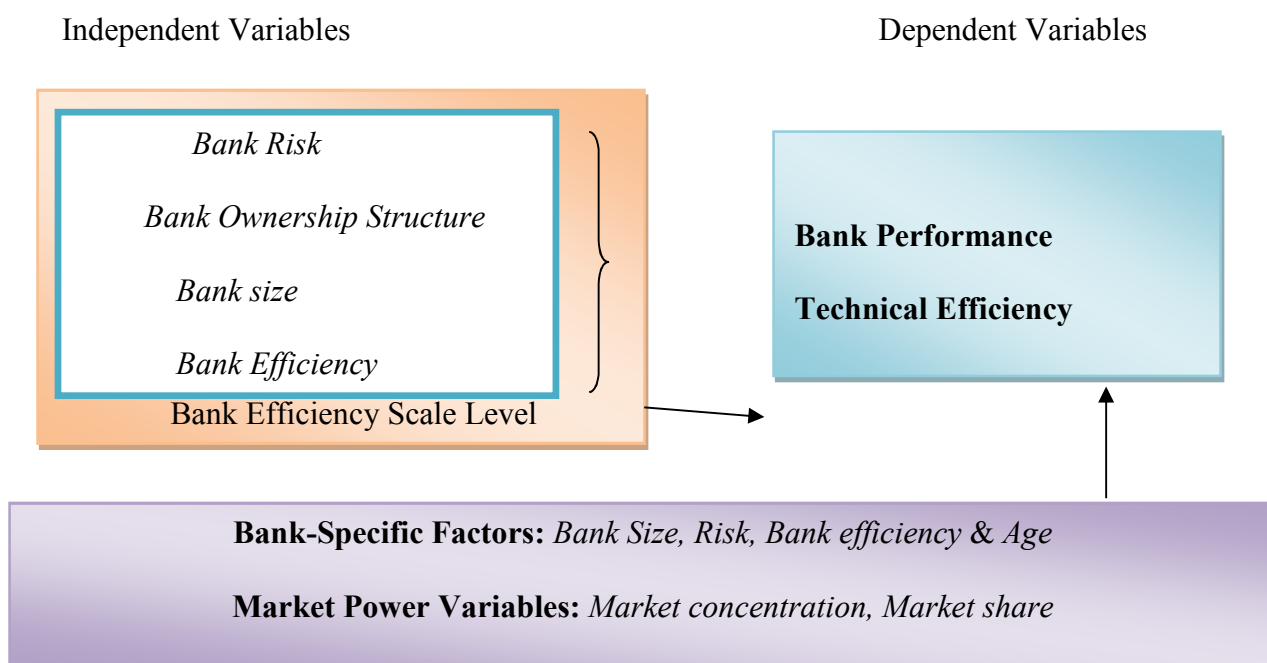
(2015) argued that joint stock commercial banks had higher efficiency than state owned commercial banks. Frimpong (2010) argued that the ownership structure of the banks influenced the banks efficiency levels using DEA, ROA, and ROE in studying the efficiency and ownership of Ghanaian banks. In estimating the DEA, I employed an intermediate constant return to scale approach option of the DEA for the efficiency data.

DEA is used as a preprocessor to measure relative performance of decision-making units (DMUs) and to produce test inputs for other modules (Kwon, Lee, & Roh, 2016). In choosing the data analyzing technique for this doctoral study, I considered multiple regression analysis, multiple analysis of variance (MANOVA), path analysis, and factor analysis. Researchers use multiple regression analysis to analyze the relationship between two or more independents and dependent variables (Bok-Hee & SoonGohn, 2014). The relationship between two or more dependents or correlated variables is analyzed using a statistical methodology identified as MANOVA (Tonidandel & LeBreton, 2013). Boslaugh (2013) identified multiple regression analysis as a research technique that is vital in analyzing multivariate variables. Researchers use multiple regression analysis to identify the degree of relationship between the independent variables in predicting the dependent variable (Sekaran & Bougie, 2013). Abbas, Azid, and Hj Besar, Hairul (2016) used DEA, in determining efficiency levels and then uses *t*-test, and regressions in analyzing the performance of Pakistani banks. The authors concluded that age, capitalization, size, non-markup expenditure, and minimum capital requirement had positive effect on Pakistani Islamic banks. Hence, I used

multiple regression analysis to examine the relationship between the independent variables; efficiency, ownership structure, risk, size, and the dependent variable; performance.

The data for analysis was retrieved from Price Water and Coopers. I transferred the information related to risk, efficiency, ownership, size and performance to Excel file before starting the analysis in SPSS and STATA. The multiple linear regression analysis is most appropriate when examining the relationship between multiple independent variables and a dependent variable (Bok-Hee & SoonGohn, 2014). Because the goal of this doctoral study was to examine the relationship between multiple independent and dependent variables, the appropriate decision was to use a multiple regression model.

Figure 1. Framework of Study



using the following generalized models:

The empirical specification of the Model is presented below:

$$Y_{it} = \alpha + \beta X_{1it} + \beta_3 X_{2it} + u_{it} \dots \dots \dots (4)$$

Where:

Y_{it} is a vector of bank performance, the endogenous variable ($BankPerf_{it}$)

measured with the proxies defined as :

Dependent variables. Bank efficiency and bank performance

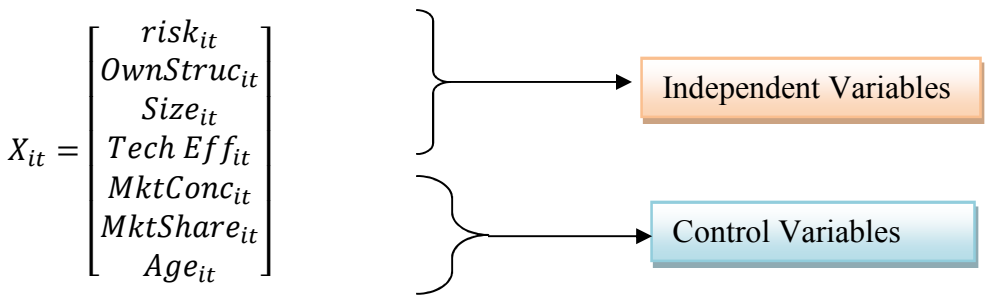
- a) Bank efficiency, the second dependent variable in this study was measured using the technical efficiency from the DEA result.
- b) Bank performance, the dependent variable in this study was measured as :

$$BankPerf_{it} = \begin{bmatrix} ROE_{it} \\ NIM_{it} \end{bmatrix},$$

ROE stands for return on equity and NIM is net interest margin

a ratio for the i^{th} bank at time , t_{it}

Independent and control variables. The vector of independent and control variables is represented as X_{it} defined as:



a) **Ownership Structure.** This independent variable was represented as:

$OwnStruc_{it}$ = ownership structure Variable that took the following values:

- (i) 1, if it is a foreign bank (*FOREIGN*) if foreigners are majority shareowners;
- (ii) 2, if it is a private bank (*PRIVATE*); majority shareowners are Ghanaians
- (iii) 3, if the bank's assets are largely owned by the government (*STATE*)

This approach to measuring ownership structure is quite analogous to that employed by some previous researchers ((Ehsan & Javid, 2015).

b) **Bank efficiency.** This exogenous variable denoted as:

Eff_{it} = refers to the i^{th} bank's efficiency. Values based on results of DEA analysis.

Efficiency dimensions used in the study was technical efficiency

c) **Bank technical efficiency.** This independent variable captured the efficiency level of banks denoted as:

Technical Eff_{it} = efficiency, a qualitative dummy variable represented as :

$$Technical\ Eff_{it} = \begin{cases} 1 : \text{Bank achieves maximum efficiency} \\ 0 : \text{Bank fails to achieve maximum efficiency} \end{cases}$$

d) **Bank size.** Bank size was measured and computed as:

$Size_{it}$ = the ratio of bank operating asset and market operating assets

$Size_{it}$ = Size Variable that took the following values:

- i) 1, if it is a large bank (*LARGE*) and has 10% of the market operating assets;
- ii) 2, if it is a medium bank (*MEDIUM*); has more than 3%, but less than 10% of the market operating assets

- iii) 3, if the bank's operating assets are less than 3% of the market operation assets (SMALL)
- e) **Bank risk.** The following variables will represent the risk level for each bank:
- i) $Risk_{it}$ = bank risk measured as total debt to equity ratio or non-performing loans/total loans portfolio
- 3) **Control variables.** Control variables are introduced into the model.
- i) *Market Concentration* –Market concentration will measure:

$MktConc_{it}$ = market concentration measured using the Herfindahl-Hirschman Index defined as:

$$HHI = \sum_{i=1}^N \left(\frac{Bank\ Deposits}{Market\ Deposits} \right)^2$$

- ii) *Market Share* –I captured bank's share in the market using the ratio:
 $MktShare_{it}$ = Bank Deposits/Market Deposits.
- iii) *Bank Age* - Bank age was measured as the natural logarithm of the difference between the years of incorporation till date.
 $Bank\ Age = \ln(Y_{inc} - Y_t)$, where Y_{inc} = year in which bank was incorporated, and Y_t = current year

The correlational research design is a nonexperimental research method without manipulation of any of the variables that investigate the relationship between the variables (Simon & Goes, 2013). Consequently, I checked for effects and the relationships between efficiency and performance measures from 2008 to 2013. In this

study, MAX DEA basic 6.4 and SPSS version 20 and STATA 12 were appropriate software for the analysis.

Study Validity

Validity is the degree to which an instrument accurately measures what it purports to measure (Venkatesh, Brown, & Bala, 2013). In this doctoral study, I examined the relationship between banks efficiency, size, ownership structure, risk, and performance. This study is nonexperimental design, therefore, threat to internal validity does not apply. However, because of the nature of the data and instrument for the analysis there is the possibility of threat to the validation of statistical conclusion.

Threats to statistical conclusion validity. The threats to validate the statistical conclusion discusses the Type I and Type II errors conditions that alters the findings from statistical analysis. Thus, exogenous probabilities of type I error known as false positive and type II error referred to as false negative (Christmann, 2014). Type I error refers to rejecting a factually true null hypothesis, and Type II error refers to accepting a factually false null hypothesis (Green & Salkind, 2014). Hence, to validate the conclusion of this doctoral study, I referred to instrumental reliability, assumptions related to data, and sample size.

Reliability of the instrument. In this doctoral study, secondary data is the only source of data. The use of secondary data for statistical analysis is appropriate for quantitative research (Garcia & Zarzuela, 2015). Using internal reliability checks enhanced in validating the reliability of the data.

Data assumptions. The key assumptions of data are outliers, linearity, normality, multicollinearity, homoscedasticity, and independence of error (Broberg, Salminen, & Kyttä, 2013). The violation of the key assumptions may result in Type I or Type II errors (Green & Salkind, 2014). Thus, to eliminate or minimize the violations of assumptions, I used robust estimates of standard errors and confidence intervals.

Transition and Summary

The preceding section describes the purpose of the research, the role of the researcher and participants, the method and design, the population and sample, ethical research, data collection, organization and analysis, and the reliability and validity of the research. The next section includes fieldwork, data analysis, and interpretation. It concluded with the implications for social change, and recommendations for action and future studies.

Section 3: Application to Professional Practice and Implications for Change

Introduction

The purpose of a quantitative doctoral study was to analyze the relationship between ownership structure, bank size, risk, efficiency, and performance of Ghanaian banks under the efficient structure theory. In achieving this purpose, the study sought to analyze, *t* test and econometric regression models under the efficient market theory and buffer capital theory. The findings of this study provided evidence that Ghanaian bank managers used different strategies in meeting the minimum capital requirement. The *t* test revealed significant increases in efficiency, net interest margin, return on equity and risk. In the t-test efficiency, $t(21) = 3.849, p \leq 0.05$, net interest margin by $t(21) = 5.201, p \leq 0.05$, return on equity $t(21) = 1.833, p \leq 0.1$, and risk $t(21) = 3.614, p \leq 0.05$. The results of the multiple regression analysis models could significantly predict banks performance for the 5-year period ending 2013. The return on equity (ROE) model, $F(8, 123) = 5.18, p = .00, R^2 = .133$ using return on. In the ROE model, ownership type and size were statistically significant with State banks ($t = -2.26, p < .025$) accounting for a higher contribution to the model than size ($t = 2.00, p < .047$). The net interest margin (NIM) model, $F(8, 123) = 6.94, p = .00, R^2 = .288$. In the NIM model, efficiency and ownership type were statistically significant with efficiency ($t = 6.09, p < .000$) representing a higher contribution to the model than foreign banks ($t = 2.96, p < .004$).

Presentation of the Findings

In this presentation of the findings, I discussed the results related to the descriptive statistics, presentation of result for the descriptive statistics, inferential statistics, and presentation of result for the t test. I then tested for the assumptions for the regression, the presentation result of inferential statistics, provision of a theoretical conversation pertaining to the findings, and conclude with a summary. As the sample was from all the banks in Ghana with available data from 2008 to 2013, there was no risk associated with duplicating when selecting sample from the population. In this doctoral study, to minimize the impact of the outliers that might influence the outcome of the study, I tested all the assumptions pertaining to regression with an appropriate model.

Descriptive Statistics

Efficiency for foreign banks decreased from an average of 0.86 to 0.74, and state banks from 0.8 to 0.79, which translated, into percentage changes as -13.79% and -1.72% respectively. While, private banks continued to be the most efficient banks with an increase in average efficiency levels from 0.9 to 0.91, 1.45% positive change. Overall, average change in efficiency for banks in Ghana increased from 0.85 to 0.93 on a scale of 0 to 1, which represent 9.1% increase.

Table 5

Percentage Changes in Technical Efficiency of Banks

	2008	2013	% change
Foreign	0.86	0.74	-13.79%
Private	0.90	0.91	1.45%
State	0.80	0.79	-1.72%
Total	0.85	0.93	9.08%

Table 6

Percentage Changes in Share of the Banks

Banks Size	2013	2008	% change
Average Large	0.129	0.141	-8.51%
Average Medium	0.053	0.048	9.50%
Average Small	0.015	0.014	10.44%
Total Assets	10.3b	34.296b	232.97%

Frimpong (2010) classified the banks into three categories: large, medium, and small. The proportion of the bank share of the industry assets was the basis for the categorization of the banks' sizes as described by Frimpong. Large banks had 10% or more and medium banks had less than 10%, but more than 3%, and small banks had less than 3%. In this study, I adopted the method used by Frimpong (2010) in evaluating banks size by using operating assets in Ghana for the analysis. The rationale is that the ratio involves all the banks in Ghana, not just the top four banks and the emphasis was on the banks' ability to meet the new capital requirement, which does not involve fixed assets. Market operating assets, which are the proxy for banks size, increased from 10.3 billion Ghana cedis to 34.296 Ghana cedis. Small banks recorded the highest increase in average size 2008 and 2013 from 0.014 to 0.015 representing 10.44%. Whereas, medium banks increased their size by 9.5% between 2008 and 2013. Large banks size, on the other hand, decreased in magnitude and numbers. As at the end of 2008 two banks (Barclays and GCB) had 10% or more of the share of the total industry, assets

while, only Ecobank had a large size in 2013. Large banks size share of the market size decreased by 8.51%.

Majority of the banks in both 2008 and 2013 were foreign banks. Private bank and state banks ownership structure did not change between 2008 and 2013. Nevertheless, foreign banks size increased from 13 to 15 representing 15.4% share of the total number of banks, while the overall bank structure changed by only 8% within the same period.

Table 7

<i>Percentage Change in Ownership Structure</i>			
	2008	2013	% change
Foreign	13.00	15.00	15.38%
Private	9.00	9.00	0.00%
State	3.00	3.00	0.00%
Total	25.00	27.00	8.00%

Average industry impairment allowance, to gross loans and advances (NPL) which was used as a proxy for risk increased between 2008 and 2013 from 0.52 to 0.063 representing 21.15% upward change. While return on equity (ROE) increased from 0.185 to 0.275 indicating an improvement of 48.7% by managers on their performance. Furthermore, managers enhanced their performance by increasing their average net interest margin from 0.66 to 0.167 signifying 153.03%.

Table 8

<i>Percentage Changes in Risk (NPL), ROE, and NIM</i>			
	2008	2013	% Change
NPL	0.052	0.063	21.15%
ROE	0.185	0.275	48.65%
NIM	0.066	0.167	153.03%

Inferential Statics for *t*-test Quantitative Study Variables

The result from the one tail paired sample t-test with $\alpha = .05$ revealed that Ghanaian bank managers earned more profit for shareholders (ROE) in 2013 ($m = .226682, s = .1491597$, compare to 2008 ($m = .3535811, s = .3535811$), $t(21) = 1.833, p = .041$. Equally, the analysis indicated that Ghanaian bank managers allowed more impairment allowance to gross loans (NPL) in 2013 ($m = .082500, s = .0668479$, compare to 2008 ($m = .024273, s = .0346825$), $t(21) = 3.614, p = .001$. However, the managers increased their efficiency levels in 2013 ($m = .782293, s = .1911240$, compare to 2008 ($m = .626361, s = .2544823$), $t(21) = 3.849, p = .001$. Furthermore, the managers could increase their net interest margin (NIM) in 2013 ($m = .12227, s = .039023$, compare to 2008 ($m = .08055, s = .038493$), $t(21) = 5.201, p \leq .05$. Concerning the overall average bank size managers did not make significant increase in 2013 ($m = .042955, s = .0312661$, compare to 2008 ($m = .041227, s = .0399404$), $t(21) = .292, p \geq .05$.

In total, I selected all the banks on the PricewaterhouseCoopers banking survey with available data. Table 9 shows the descriptive statistical value of the study variables for the descriptive analysis.

Table 9

Mean and Standard Deviations for Quantitative Study Variables

		Mean	Std. Deviation	Std. Error Mean
Pair 1	ROE2013	.226682	.1491597	.0318009
	ROE2008	.078091	.3535811	.0753837
Pair 2	SIZE2013	.042955	.0312661	.0066660
	SIZE2008	.041227	.0399404	.0085153
Pair 3	RISK2013	.082500	.0668479	.0142520
	RISK2008	.024273	.0346825	.0073943
Pair 4	EFF2013	.782293	.1911240	.0407478
	EFF2008	.626361	.2544823	.0542558
Pair 5	NIM2013	.12227	.039023	.008320
	NIM2008	.08055	.038493	.008207

Table 10

Inferential Statics for t-test Quantitative Study Variables

		Paired Differences		T	Sig. (2- tailed)
		95% Confidence Interval of the Difference			
		Lower	Upper		
Pair 1	ROE2013-2008	-.0199999	.3171818	1.833	.081
Pair 2	SIZE2013-2008	-.0105638	.0140184	.292	.773
Pair 3	RISK2013-2008	.0247219	.0917327	3.614	.002
Pair 4	EFF2013 - EFF2008	.0716792	.2401851	3.849	.001
Pair 5	NIM2013-2008	.025042	.058413	5.201	.000

Distribution of market share and market concentration. The average market concentration from 2008 to 2013 the banks was $HHI = 0.0645235$. Liston-Hayes and Pilkington (2004) suggests the following for interpretation of the HHI:

- An H below 0.01 (or 100) indicates a highly competitive index.
- An H below 0.15 (or 1,500) indicates low concentrated index.
- An H between 0.15 to 0.25 (or 1,500 to 2,500) indicates moderate concentration.
- An H above 0.25 (above 2,500) indicates high concentration.

The result indicates that the Ghanaian banking industry is low concentrated with a much greater propensity towards high competition ($0.01 \leq HHI = 0.0645235 \leq 0.15$) based on Liston-Hayes and Pilkington (2004).

Relationship between banks' size, efficiency, ownership structure and their ROE and NIM. Out of the 27 banks currently operating in Ghana, the study used 22 banks. I selected the banks based on the availability of data and the banks, which have operated throughout 2008 and 2013. As indicated in the table below average net interest margin (NIM) was 8.98%; technical efficiency (TECHEFFIC) was 0.73 on the scale of 0 to 1. Followed by market concentration (MKTCONC) 0.003, market share (MKTSHARE) 0.042, size 0.41; with large, medium and small as its components and their corresponding average percentage shares were 8.3, 45.5, and 46.2 respectively. While, return on equity (ROE) 9.6%, and ownership structure with its components as and percentage shares as foreign banks 55.5%, private 31.1% and state 13.6 %.

Test of Assumptions for Regression Analysis of Ghanaian Bank Efficiency

I first tested for the appropriate model using the Breusch-Pagan Lagrange multiplier (LM) to determine whether OLS or the random effect model is appropriate for the analysis because the chi statistics is less than 0.05 ($p \geq 0.05$). I then did the Hausman test to choose between fixed and random effect and the random model was appropriate since the Hausman chi-square statistic is greater than 0.05 ($p = 0.708$).

Therefore, based on the results of the random effect model on efficiency, the findings indicated that market share and bank size could be better predictors of Ghanaian banks' efficiency. *Ceteris paribus*, Ghanaian bank efficiency could be largely attributable to increases in bank size whereas any increase in their market share, could seriously undermine their efficiency.

It appeared, under the random effects model, that market concentration, bank risk, the age of bank, and ownership structure (foreign banks and state banks compared to private) did not have any significant statistical effects on the efficiency of Ghanaian banks. Under the random effect model, efficiency of banks was negatively affected by Market share ($B = -7.7489$; $p = 0.019 \leq 0.05$). Bank size had a strong positive significant effect on efficiency ($B = 7.354$; $p = 0.031 \leq 0.05$). Market concentration, bank age, ownership structure, and risk exerted statistically insignificant effects on the efficiency of Ghanaian banks. The final model for technical efficiency is as follows:

$$\text{Techeffic} = 0.739 - 0.091\text{Foreign} - 0.0684\text{State} + 7.978\text{Size} + 0.184\text{Risk} + 4.846\text{Mktconc} \\ - 0.7354\text{Mktshare} + \varepsilon$$

The model shows that a change in ownership structure from private to foreign could reduce efficiency by 0.091 and a change from private to state could reduce efficiency by 0.0684, but none of them would have a significant effect on the industry. A unit increase in bank size leads to a significant increase in efficiency of banks by 7.97. If banks should increase their risk-taking behavior by 1 unit, it could lead to an insignificant increase in efficiency by 0.184. If banks become concentrated through mergers and consolidation, the action could cause the industry efficiency to improve by 10.46 units, though the increase would be insignificant. However, a unit increase in bank market share could significantly reduce industry efficiency by 7.749.

Table 11

Regression Analysis Summary for Predictor Variables (TE)

Foreign	-0.0912	(0.200)
State	-0.0684	(0.550)
Size	7.978**	(0.011)
Risk	0.184	(0.623)
Market concentration	4.846	(0.724)
Market share	-7.354**	(0.031)
cons	0.739***	(0.000)
<i>N</i>	132	
<i>R</i> ²	0.164	

P-values in parentheses

* $P < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Test of Assumptions for the Analyses of Return on Equity with Net Interest Margin as Proxies for Bank Performance

The multivariate regressions of the variables both controlled and independent variables. The independent variables were efficiency, risk, size, and ownership structure

of the banks. Dependent variables were the two proxies of bank performance, namely, return on equity (ROE) and net interest margin (NIM).

Diagnostic tests to determine the appropriate model for the analysis of the ROE. I tested for the appropriate model using the Breusch-Pagan Lagrange multiplier (LM) to determine whether OLS or the random effect model is appropriate for the analysis. The results of the Breusch-Pagan Lagrange multiplier (LM) indicates that there is no evidence of significant differences across banks meaning that the random effects model is not appropriate when compared with the pooled multivariate OLS model. Hence, I fail to reject the results of the pooled OLS and reject the random and fixed effects models because the chi statistics is more than 0.05 (1.0000 Prob>chi-square \geq 0.05).

Residual Diagnostics test on ROE model: Diagnostic for heteroscedasticity.

For the parameter estimates of the multivariate regression model to represent the Best Linear Unbiased Estimator (BLUE), the normality assumption was tested. The p-value of Breusch-Pagan/Cook-Weisberg test value 0.000 (Prob \leq chi-square \leq 0.05) indicates that the regression residuals do not follow a normal probability distribution. The result indicates that the observed relationship between ROE, ownership structure, efficiency, size, and the control variables of the multivariate regression model is not generalizable to all contexts.

The null hypothesis is the presence of homoskedasticity (or constant variance) in regression residuals. The p-value of the chi-square statistic is 0.000 (Prob \leq chi-square \leq

0.05). Therefore, I fail to reject the null hypothesis, and then concluded that there was heteroskedasticity in the regression residuals. I followed the recommendation of Beck and Katz (1995) suggest OLS parameter estimates with panels corrected standard errors (PCSEs) to control for heteroskedasticity. Beck and Katz (1995) show that the OLS robust regressions under these assumptions are BLUE. I employed OLS robust errors regression based on panels corrected standard errors that controlled for panel-specific first order serial autocorrelation, cross-sectional dependence, and heteroskedasticity.

The OLS robust multivariate regression results, however, show that market concentration had negative effects on ROE of banks ($B=38.77; p = 0.018 \leq 0.05$). State banks had a negative and significant effect on ROE when compared with private banks ($B=-1.16335; p=0.028 \leq 0.05$). While the size of the banks had strong positive and statistically significant effect on ROE of Ghanaian ($B=11.193; p = 0.043 \leq 0.05$). Efficiency had positive, but insignificant effect on ROE ($p \geq 0.05$). However, foreign bank structure, risk, market share, and age of the banks had a negative and insignificant effect on the banks ROE ($p \geq 0.05$; see Table 12). The final model for return on equity (ROE):

$$\text{ROE} = 0.181 - 0.055\text{Foreign} - 0.164\text{State} + 11.69\text{Size} - 1.76\text{Risk} - 38.63\text{Mktconc} - 3.252\text{Mktshare} + 0.235\text{techeffice} - 0.00283\text{Age} + \varepsilon$$

The model indicates that a change in ownership structure from private to foreign could cause ROE to insignificantly reduce by 0.055, while a change from private to the state could reduce ROE by 0.164, representing a significant reduction in ROE. A unit increase in bank size could result in 11.69 units significant improvement in ROE. Again,

a unit increase in bank risk (non-performing loans) could result in 1.76 units but insignificant decrease in bank ROE. If the Ghanaian banking industry increases its concentration by 1 unit, ROE could significantly reduce by nearly 38.63 units. As banks' market share of the industry increases, ROE (industry profitability) is reduced by approximately 3.252 units, but this would not represent a significant reduction in the industry average ROE. Although a unit increase in bank technical efficiency by one unit, could lead to 0.235 units in ROE but would not have a significant effect on ROE. A one-year increase in bank age could stimulate nearly 0.00283 insignificant reductions in ROE.

Table 12

Regression Analysis Summary for Predictor Variables (ROE)

Foreign	-0.055	(0.286)
State	-0.164**	(0.025)
Size	11.69**	(0.048)
Risk	-1.760	(0.162)
Market concentration	-38.63**	(0.018)
Market share	-3.252	(0.627)
Technical efficiency	0.235	(0.118)
Age	-0.00283	(0.927)
_cons	-0.181	(0.179)
<i>N</i>	132	
<i>R</i> ²	0.133	
	F (8, 123) = 5.18	
	<i>p</i> = 0.000	

P-values in parentheses

* $P < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Diagnostic tests for net interest margin (NIM) model. Finally, I tested for the appropriate model using the Breusch-Pagan Lagrange multiplier (LM) to determine

whether OLS or the random effect model is appropriate for the analysis. The results of the Breusch-Pagan Lagrange multiplier (LM) indicates that there was no evidence of significant differences across banks meaning that the random effects model was not appropriate when compared with the pooled multivariate OLS model. Hence, I fail to reject the results of the pooled OLS and reject the random and fixed effects models because the chi statistics was more than 0.05 (0.0501).

Residual diagnostics test on NIM model: Diagnostic for heteroskedasticity.

Furthermore, in estimating the parameter of the multivariate regression model to represent the Best Linear Unbiased Estimator (BLUE), the normality assumption was tested. The p-value of Breusch-Pagan/Cook-Weisberg test value of 0.0011 (Prob \leq chi-square \leq 0.05) indicates that the regression residuals do not follow a normal probability distribution. The output shows that the observed relationship between NIM, ownership structure, minimum capital requirements, efficiency, size, and the control variables of the multivariate regression model is not generalizable to all contexts.

The null hypothesis is the presence of homoskedasticity (or constant variance) in regression residuals. The p -value of the chi-square statistic is 0.000 (Prob \leq chi-square \leq 0.05). Hence, we fail to reject the null and conclude that there was heteroskedasticity in the regression residuals. Heteroskedasticity and robust standard errors specifying the robust option is equivalent to requesting White-corrected standard errors in the presence of heteroskedasticity (Over, Jolliffe, & Foster, 1996). Over et al. (1996) further explained that the advantage of the robust estimate is that it used in fixing

all the error in the assumptions. I used the Ghanaian bank industry data, in the process of looking at the profitability of the banks, to analyze variables with considerable heteroskedasticity. Hence, the robust OLS model was applied to correct the effect of heteroscedasticity in the data set. Therefore, OLS with robust option was applied to correct the effect of none normal distribution of the variables.

The pooled OLS multivariate robust regression results indicates that foreign banks had positive significant effects on NIM ($B = 0.185$; $p = 0.005 \leq 0.05$). Additionally, efficiency had positive and statistical significant effect on NIM ($B = 0.0766$; $p = 0.000 \leq 0.05$). Similarly, Market concentration had positive but weak significant effect on NIM 10 % significant level ($B = 3.34$; $p = 0,077 \leq 0.1$). Risk and state banks compared with private banks had a positive insignificant effect on NIM ($p \geq 0.05$). Conversely, size, age, and market share had a negative but insignificant effect on NIM ($p \geq 0.05$; See Table 13). The final model for net interest margin (NIM):

$$\text{ROE} = 0.0323 + 0.185\text{Foreign} + 0.159\text{State} - 0.112\text{Size} + 0.751\text{Risk} - 0.383\text{Mktshare} + 3.34\text{Mktconc} + 0.0766\text{techeffice} - 0.00086\text{Age} + \varepsilon$$

The model indicates that a change in ownership structure from private to foreign could cause NIM to significantly increase by 0.185, while a change from private to the state could increase NIM by 0.159, but not significant. A unit increase in bank size could result in 0.112 unit albeit insignificant reduction in NIM. Again, a unit increase in bank risk (non-performing loans) could result in 0.751 units but insignificant increase in bank NIM. As banks' market share of the industry increase, approximately 0.383 units drive

down NIM, but this would not represent a significant reduction in the industry average NIM. If the Ghanaian banking industry increases its concentration by 1 unit, NIM could increase by nearly 3.34 units but not significant. Furthermore, a unit increase in bank technical efficiency could significantly increase NIM by 0.0766 units. A one-year increase in bank age could cause nearly 0.00086 insignificant reductions in NIM.

Table 13

Regression Analysis Summary for Predictor Variables (NIM)

Foreign	0.0185***	(0.004)
State	0.0159	(0.164)
Size	-0.112	(0.812)
Risk	0.0751	(0.320)
Market share	-0.383	(0.433)
Market concentration	3.340*	(0.077)
Technical efficiency	0.0766***	(0.000)
Age	-0.000863	(0.834)
cons	0.0323**	(0.014)
<i>N</i>	132	
<i>R</i> ²	0.288	
	F (8, 123) = 6.94	
	<i>p</i> = 0.000	

P-values in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Discussion

The overarching purpose of the study was to analyze the relationship between ownership structure, risk, size, and efficiency and the performance of Ghanaian banks under the efficient structure theory. To achieve this purpose, the I sought to analyze, within OLS and random effects panel econometric regression models, under the Efficient Market Structure Theory. First, I analyzed the changes in bank size, risk, efficiency, and ownership structure of Ghanaian banks between 2008 and 2013. Then analyzed the effect of ownership structure, size, risk and other bank specific variables on bank efficiency. Likewise, I analyzed the effects of ownership structure, size, risk and other bank-specific variables, and the control variables on the performance of Ghanaian banks when Bank of Ghana changed the minimum capital requirement in 2008. A summary of my analysis is as follows:

Change in bank efficiency, size, risk, and ownership structure between 2008 and 2013. Private bank management continued to increase their average efficiency by 1.45%, while foreign and state banks efficiency decreased by 13.79% and 1.72% respectively. Hence, the finding supports the study by Frimpong (2010) who found private banks in Ghana to perform better than foreign and state banks regarding their efficiency levels. There was an overall positive significant change ($t= 3.849, p=0.001 \leq 0.05$) in industry average efficiency between 2008 and 2013.

However, ownership structure for both private and state banks remained the same while foreign bank size increased by 15.38%. With regards to bank size medium and small banks, management increased their size by 9.5% and 10.4% respectively, while

large bank size reduced by 8.5. Bank managers increased the total operation asset, which was the proxy for bank size increased by over 200 percent. The increase in size could be because of the increase in the minimum capital requirement with the mandate for all banks to satisfy the requirement to continue to operate in Ghana. There was no significant change in the mean size of the banks because the small banks and medium bank managers increased their sizes to meet the new requirement. As a result, their markets share of the size increased at the expense of the large bank. The findings indicated that Ghanaian bank managers allowed significantly more impairment allowance to gross loans NPL) in 2013 compared to 2008 ($p \leq 0.05$). However, managers in the industry significantly increased their return on shareholders' equity and net interest margin ($p \leq 0.05$). The findings support the argument by Barth, Lin, Ma, Seade, and Song (2013) who contended that financial reforms had a positive impact on profitability and efficiency. The findings further suggest that though the average industry risk-taking behavior increased between 2008 and 2013, the bank managers passed their losses to customers by charging high interest margin. The results confirm the study by Nkegbe and Ustarz (2015) argued that Ghanaian banks pass on their inefficiencies to customers. As a result, both NIM and ROE increased while allowances for loan losses were increasing.

Impact of size, and risk on bank efficiency. In this study, the inputs of Ghanaian banks size and bank market share were found to be very high in determining the bank efficiency. Bokpin, (2013) found a significant effect of bank size on efficiency. Shehzad et al. (2013) established a positive relationship between bank size and

efficiency. Bank market share was found to be a significant explanatory of bank efficiency in Ghana. Indicating that larger banks in Ghana might outperform their smaller counterpart, because, of their size. While, the size of the smaller banks market share put them at a disadvantage because the finding indicates a low market concentration in the industry. Large banks operating asset, which is the proxy for bank size may have the ability to meet the minimum capital requirement, because, the bank has a high level of liquid asset. Medium and smaller bank managers increased their size to meet the new minimum capital requirement and in doing that, they increased their efficiency levels. The findings confirm a study by Barros and Williams (2013) who argued that the consolidation of local banks enhance their long-term efficiency.

Variables affecting the performance of Ghanaian banks. Based on the evidence gathered from the analysis of the OLS model, the following conclusion was drawn: Significant Predictor Variables of Ghanaian banks' performance (ROE and NIM) Under X-efficiency. Return on equity (ROE) is one proxy for bank performance. By the results of the Breusch and Pagan Lagrangian multiplier test for random effects using OLS model for the analysis, it was concluded that ownership structure, market concentration, and bank size could better predict ROE of Ghanaian banks. In other words, increases in ROE of Ghanaian banks, *all other factors being held constant*, could be largely attributable to changes in ownership structure, increases banks size and reduction in their market concentration levels.

The pooled OLS multivariate regression results, show that market concentration had negative effects on ROE of banks ($B=-38.77$; $p = 0.017 \leq 0.05$). State banks had a negative significant effect on ROE when compared with private banks ($B=-.16335$; $p=0.028 \leq 0.05$). Thus, private banks performed significantly better than state banks and better but insignificant than foreign banks confirming the argument by (Rahman & Reja, 2015; Waleed, Shah, & Mughal, 2015) who argued that private banks perform better than state-owned banks. The size of the banks had strong positive and statistically significant effect on ROE of Ghanaian ($B=11.193$; $p=0.043 \leq 0.05$). Adusei, (2016) studies in Ghana found similar results by showing that if Ghanaian bank managers can increase their size, then they can increase their performance. Efficiency had positive, but insignificant effect on ROE ($p \geq 0.05$). Thus, the finding supports the study by Nkegbe and Ustarz (2015) who argued that banks managers in Ghana pass their inefficiency to the customers through higher margin spread. Thus, Ghanaian banks efficiency and risk did not have any significant effect on profitability. Therefore, using ROE as a proxy for bank performance, *Under X- efficiency: risk, ownership structure, efficiency and bank size*, was rejected. Because technical efficiency and risk did not exert any statistically significant effects on ROE, rather, size and ownership structure had a significant effect on ROE.

The second part of the efficient structure theory related to the EST is the scale efficiency hypothesis (ESS). Berger (1995), argues that profits are realized through efficiencies of scale, and any observed relationship with market share is a proxy for bank

size. Hence, ROE supports scale-efficiency hypothesis (ESS) which argues that bank size has an influence on its performance.

The second proxy of bank performance is net interest margin (NIM). The ordinal least square model (OLS), from the analysis, was found to be more appropriate in predicting NIM of Ghanaian banks based on the set of independent and control variables than the fixed effects model. Under the OLS model, NIM of banks was observed, to be positively influenced by foreign banks ownership structure compared with private banks ($B = 0.0185$; $p = 0.004 \leq 0.05$). Hence, the findings support the study by Andries et al. (2013) who argued that foreign banks perform better than local banks. Other scholars that supported this view include Jiang, Yao, and Feng (2013) and Tzeremes (2015). The second variable that had a positive significant effect on NIM was efficiency ($B = 0.0766$; $p = 0.000 \leq 0.05$). Gökğöz (2014) found a positive relationship between bank efficiency and performance. Thus, if bank managers increase their efficiency levels through efficient management of their inputs and outputs, it could lead to high performances. Nonetheless, the age of bank, bank size, risk, and market share, and market concentration exerted statistically insignificant effects on NIM of Ghanaian banks. ($R\text{-squared} = 0.2883$; $F = 6.94$; $p = 0.000 \leq 0.05$).

Therefore, using NIM as a proxy for bank performance, *Under X- efficiency: risk, ownership structure, efficiency and bank size*, was partly rejected. Because risk and bank size did not exert any statistically significant effects on NIM, but efficiency and foreign bank ownership had a positive significant effect on NIM. These conclusions support the

findings that foreign bank ownership structure and bank efficiency have significant effects on bank performance.

Significant predictor variables of Ghanaian banks' performance (NIM) under scale-efficiency. Under Scale-efficiency, risk, size, ownership structure, and efficiency of Ghanaian banks are the most significant variables that affect their performance, was rejected. Because, under Scale-efficiency, the size of Ghanaian banks and market share were not found to be significant variables that affected bank performance (NIM). Rather, efficiency and foreign banks were the most significant predictors of Ghanaian banks' performance (NIM). According to X-efficiency, banks that are relatively more revenue, efficient may charge different prices than competitors and potentially earn economic rents. Banks that are more revenue efficient are expected to earn higher profits. Moreover, larger and more efficient banks are in a better position to entrench their products and services in the market, thereby leading to market concentration, which has an effect on their NIM. The evidence supports the findings by Gormley (2010) who argued that although foreign banks perform better, they only finance a small set of highly profitable firms in the economy. Since private banks had higher efficiency levels than foreign banks, yet foreign banks have higher interest margin than local banks. The findings from this study provided evidence that efficiency significantly influences NIM of banks. Therefore, efficient structure hypothesis (X-efficiency) might better explain NIM performance of Ghanaian banks whereas Scale-efficiency (ESX hypothesis) might account for ROE performance of Ghanaian banks

Applications to Professional Practice

The finding in this study revealed that increases in efficiency, bank size, and market share increased bank profitability, which may enhance the banks' sustainability during a financial crisis. Thus, the finding may help bank managers and the Bank of Ghana to better understand how bank managers deal effectively with changes in the minimum capital requirement during a financial crisis. The ability of banks to increase their size, market shares, and efficiency could help small banks to chances their survival rate irrespective of economic conditions (Berger & Bouwman, 3013). Hence, bank's ability to increase its market share could enhance bank profitability (Mirzaei, Moore, & Lui, 2013). Again, banks could increase their efficiency levels through the optimal deployment of input–output mix to boost their performance (Jayaraman & Srinivasan, 2014), which support the x-efficiency hypothesis.

Implications for Social Change

Efficient and profitable banks have managerial strategies that if they share with less efficient and less profitable banks may improve the profitability and sustainability of all Ghanaian banks. The findings indicated high efficiency is an indicator of profitability, which cushion against losses not covered by current earnings. Therefore, bank capitalization had a positive effect on bank stability (Olalekan, & Adeyinka, 2013). Because operating asset which was a proxy for size has a positive effect on banks efficiency and profitability. Hence, results of the study show that high efficiency and

profitability of the bank can prevent bank failure during financial crisis because they will have a cushion against losses not covered by current earnings.

Bank failure has a negative impact on depositors' incomes in Ghana because no guaranteed insurance for depositors exists in Ghana. As a result, in the case of bank failure depositors can only get back 11% of their deposits, which the Bank of Ghana maintains in the form of the regulatory reserve requirement (Bank of Ghana, 2014). Thus, bank failure erodes public confidence in the financial system. Hence, the possible social benefits of bank financial sufficiency and efficiency include a stable economy for communities in which the banks operate and public confidence in the financial system to promote viable business growth, reduce unemployment and social crisis. One of the functions of banks is to serve as a financial intermediary between borrowers and savers, which is the prerequisite for the survival and growth of all other sectors (Odunga, Nyangweso, Carter, & Mwarumba, 2013). Hence, stable banks facilitate employment creation by making loanable funds available to employers.

Recommendations for Action

Bank managers can take proactive measure to increase their profitability levels. Profitable banks turn to be stable bank during economic crisis. Therefore, Ghanaian banks need to monitor their sizes, efficiency, and market concentration for effective management of their profit levels. Secondly, banks need to observe their efficiency levels. Thirdly, the state banks should emulate some of the strategies of the foreign and private banks to increase their abilities to enhance their efficiency and profit levels.

The results of the study will be available to the public and stakeholders of the banks through online and University of Professional Studies, Accra library. Bank managers and the BOG can inculcate it as part of their strategic decision making. Investors and financial analysts can use it as part of their analysis for recommendations and financial decision making.

Recommendations for Further Research

Additional research using data from other African countries for the analysis could expand the knowledge regarding what bank managers should monitor during the financial crisis and increases in minimum capital requirement. Again, this study is based on secondary data other studies can be done using primary data in addition to economic variables to extend the knowledge on bank efficiency and profitability.

Furthermore, the study covers only universal banks. However, further research could expand the knowledge to include rural banks in Ghana. Conducting additional quantitative studies could assist in establishing bank strategies that enhance efficiency and profitability during the financial crisis and changes in minimum capital requirement.

Reflections

As an active supporter for better bank strategies with the notion that sound management could prevent bank failure, I gained knowledge on variables that enhance banks sustainability. I gained detailed knowledge on the variables that enhance bank profit, which could serve as a buffer during the crisis. The knowledge gained through this study has taught me to know that risk taking does not directly affect Ghanaian bank

profitability, rather ownership structure, size, efficiency, and market share. This study has motivated me to observe the effect on changes in minimum capital requirement and bank risk taking behavior of Ghanaian banks.

Conclusion

The purpose of this quantitative study was to examine the changes in efficiency, size, risk, and ownership structure between 2008 and 2013. Then examine the relationship between efficiency, size, ownership structure, risk and Ghanaian banks efficiency, and performance. The finding indicated that foreign bank managers increased their percentage share of the ownership structure of total banks. Again, the strategies used by the Ghanaian bank managers to meet the new capital requirement were significant changes in their profitability, efficiency, and risk levels. Furthermore, the study revealed that though average Ghanaian bank managers increased their risk level, however, that action did not significantly change their profitability. Rather, the changes in the bank's ownership structure, size, efficiency, and bank-specific variables affected Ghanaian bank efficiency and profitability levels. Knowledge on bank efficiency and profitability could help bank managers know which variables to monitor to survive during the financial crisis and changes in minimum capital requirement. Further studies on banks performance and efficiency using data that include rural banks and other African countries may assist investors and bank managers to know their options and competitors, and variables to focus on if they want to invest or survive.

References

- Abbas, M., Azid, T., & Hj Besar, M., Hairul Azrin. (2016). Efficiency, effectiveness and performance profile of Islamic and conventional banks in Pakistan. *Humanomics*, 32(1), 2-18. Retrieved from <http://www.emeraldinsight.com/loi/h>
- Abdallah, Z. M., Amin, M. A. M., Sanusi, N. A., & Kusairi, S. (2014). Impact of size and ownership structure on efficiency of commercial banks in Tanzania: Stochastic frontier analysis. *International Journal of Economic Perspectives*, 8(4), 66-76. Retrieved from http://www.econ-society.org/ijep_home.php
- Acharya, V.V., & Richardson, M. (2009). Causes of the financial crisis. *Journal of Politics and Society*, 21(2), 195-210. doi:10.1080/08913810902952903
- Adjei-Frimpong, K., Gan, C., & Hu, B. (2014). Cost efficiency of Ghana's banking industry: A panel data analysis. *The International Journal of Business and Finance Research*, 8(2), 69-86. Retrieved from Retrieved from <http://www.theibfr.com/ijbfr.htm>
- Adjei-Frimpong, K., Gan, C., & Hu, B. (2016). Competition in the banking industry: Empirical evidence from Ghana. *Journal of Banking Regulation*, 17(3), 159-175. doi:10.1057/jbr.2014.24
- Adusei, M. (2016) Modeling the efficiency of universal banks in Ghana. *Quantitative Finance Letters*, 4(1), 60-70. doi:10.1080/21649502.2016.1262938
- Aiyar, S., Calomiris, C. W., & Wieladek, T. (2014). Identifying channels of credit substitution when bank capital requirements are varied. *Economic Policy*, 29(77),

45-77. doi:10.1111/1468-0327.12026

Aiyar, S., Calomiris, C. W., & Wieladek, T. (2015). Bank capital regulation: Theory, empirics, and policy. *IMF Economic Review*, 63, 955-983.

doi:10.1057/imfer.2015.18

Alam, N. (2013). Impact of banking regulation on risk and efficiency in Islamic banking. *Journal of Financial Reporting and Accounting*, 11(1), 29-50. doi:10.1108/JFRA-03-2013-0010

Alhassan, A. L., Tetteh, M. L., & Brobbey, F. O. (2016). Market power, efficiency and bank profitability: Evidence from Ghana. *Economic Change and Restructuring*, 49(1), 71-93. doi:10.1007/s10644-015-9174-6

Allen, F., Goldstein, I., Jagtiani, J., & Lang, W. W. (2016). Enhancing prudential standards in financial regulations. *Journal of Financial Services Research*, 49(2-3), 133-149. doi:10.1007/s10693-016-0253-2

Alnaa, S. E., Adongo, J., & Juabin, M. (2016). Comparative analysis of profitability of local and foreign banks in Ghana. *Asian Economic and Financial Review*, 6(5), 238-246. doi:10.18488/journal.aefr/2016.6.5/102.5.238.246

Álvarez-Franco, P. B., & Restrepo-Tobón, D. A. (2016). Managerial efficiency and failure of U.S. commercial banks during the 2007-2009 financial crisis: Was this time different? *Ecos De Economía*, 20(43), 1-23. doi:10.17230/ecos.2016.43.1

Ameti, C. T. (2014). *Impact of bank recapitalization on the profitability of banks in Ghana*. (Master's thesis). Retrieved from <http://ugspace.ug.edu.gh> (No.10396338)

- Andries, A.M., Mehdian, S., & Stoica, O. (2013). Impact of European integration on efficiency and productivity growth of Romanian banks. *Inzinerine Ekonomika*, 24(3), 187-197. doi:10.5755/j01.ee.24.3.2922
- Angeloni, I., & Faia, E. (2013). Capital regulation and monetary policy with fragile banks. *Journal of Monetary Economics*, 60(3), 311-324. doi:10.1016/j.jmoneco.2013.01.003
- Apostolopoulos, N., & Liargovas, P. (2016). Regional parameters and solar energy enterprises. *International Journal of Energy Sector Management*, 10(1), 19-37. Retrieved from <http://www.emeraldinsight.com/journal/ijesm>
- Ary, D., Jacobs, L.C., & Sorensen, C., & Walker, D. (2014). *Introduction to Research in Education*. (9th ed.). Belmont, CA: Wadsworth/Cengage Learning
- Baker, M., & Wurgler, J. (2015). Do strict capital requirements raise the cost of capital? Bank regulation, capital structure, and the low-risk anomaly. *The American Economic Review*, 105(5), 315-320. doi:10.1257/aer.p20151092
- Baláz, P., & Bayer, J. (2015). The world economy in the times of financial crisis and its impact on European energy policy. *Central European Business Review*, 4(1), 14-22. Retrieved from <https://cebr.vse.cz/index.php/cebr>
- Balmaceda, F., Fisher, R., & Ramirez, F. (2013). Liberalization, market structure and credit penetration. *Journal of Financial Intermediation*, 23, 47-75. doi:10.1016/j.jfi.2013.08.003
- Bank of Ghana (2002). *Banking acts Act 612 (BSD FORM LGBI.1)*. Retrieved from

<http://www.bog.gov.gh>

Bank of Ghana (2007). *Banking acts Act 738 (BSD FORM LGBI.1)*. Retrieved from

<http://www.bog.gov.gh>

Bank of Ghana (2008). *Guidelines for Class 1 banking licenses (BSD FORM LGBI.1)*.

Retrieved from <http://www.bog.gov.gh>

Bank of Ghana (2009). Monetary policy reports. *Financial Stability Report, 5(1)*. 1-12.

Retrieved from <http://www.bog.gov.gh>

Bank of Ghana (2013). *Minimum capital requirements for banks and non-bank financial institutions (NOTICE NO. BG/GOV/SEC/2013/08)*. Retrieved from

<http://www.bog.gov.gh>

Bank of Ghana (2014). *Legal framework (BSD FORM LGBI.1)*. Retrieved from

<http://www.bog.gov.gh>

Banker, R. D., Charnes, A., & Cooper, W. W. (1984). Some models for estimating technical and scale inefficiencies in data envelopment analysis. *Management Science, 30(9)*, 1078-1092. doi:10.1287/mnsc.30.9.1078

Baten, A., Kasim, M. M., & Rahman, M. (2015). Efficiency and productivity change of selected online banks in Bangladesh: A non-parametric malmquist approach.

Journal of Internet Banking and Commerce, 20(3), 1-16. Retrieved from

<http://www.icommerceland.com/>

Barth, J. R., Lin, C., Ma, Y., Seade, J., & Song, F.M. (2013). Do bank regulation,

supervision and monitoring enhance or impede bank efficiency? *Journal of*

Banking & Finance, 37, 2879-2892. doi:10.1016/j.jbankfin.2013.04.030

Barros, C. P., & Williams, J. (2013). The random parameters stochastic frontier cost function and the effectiveness of public policy: Evidence from bank restructuring in Mexico. *International Review of Financial Analysis*, 30, 98-108.

doi:10.1016/j.irfa.2013.06.006

Barley, G., & Moreland, N. (2014). *A practical guide to academic research*. New York, NY: Routledge.

Barua, S., Khan, T., & Barua, B. (2017). Internationalization and performance: Evidence from Bangladeshi banks. *Journal of Developing Areas*, 51(2), 105-118. Retrieved from <https://muse.jhu.edu/journal/258>

Beck, N., & Katz, J. (1995). What to do (and not to do) with time-series cross-section data. *American Political Science Review*, 89, 634-647. doi:10.2307/2082979

Beck, T., Demirgüç-Kunt, A., & Merrouche, O. (2013). Islamic vs. conventional banking: Business model, efficiency, and stability. *Journal of Banking & Finance*, 37(2), 433-447. doi:10.1016/j.jbankfin.2012.09.016

Bevan, S., Baumgartner, F. R., Johnson, E. W., & McCarthy, J. D. (2013). Understanding selection bias, time lags and measurement bias in secondary data sources: Putting the encyclopedia of associations database in broader context. *Social Science Research*, 42, 1750-1764. doi:10.1016/j.ssresearch.2013.08.003

Berger, A. (1995). The profit-structure relationship in banking: Tests of market power and efficient-structure hypotheses. *Journal of Money, Credit and Banking*, 27(2),

404-431. doi:10.2307/2077876

Berger, A., & Black, L.K. (2011). Bank sizes, lending technologies, and small business finance. *Journal of Banking & Finance*, 35, 724-735.

doi:10.1016/j.jbankfin.2010.09.004

Berger, A., & Bouwman, C. H. S. (2013). How does capital affect bank performance during financial crises? *Journal of Financial Economics*, 109(1), 146-176.

doi:10.1016/j.jfineco.2013.02.008

Bhattacharyya, A., & Pal, S. (2013). Financial reforms and technical efficiency in Indian commercial banking: A generalized stochastic frontier analysis. *Review of Financial Economics*, 22(3), 109-117. doi:10.1016/j.rfe.2013.04.002

doi:10.1016/j.rfe.2013.04.002

Bok-Hee, J., & SoonGohn, K. (2014). A festival satisfaction evaluation method using multiple regression analysis. *International Journal of Software Engineering & Its Applications*, 8(4), 187-196. doi:10.14257/ijseia.2014.8.4.20

doi:10.14257/ijseia.2014.8.4.20

Bokpin, G. A. (2013) Ownership structure, corporate governance and bank efficiency: An empirical analysis of panel data from the banking industry in Ghana. *Corporate Governance: The International Journal of Business in Society*, 13(3), 274-287.

doi:10.1108/CG-05-2010-0041

Boslaugh, S. (2013). *Statistics in a nutshell* (2nd ed.). Sebastopol, CA: O'Reilly Media, Inc.

- Broberg, A., Salminen, S., & Kyttä, M. (2013). Physical environmental characteristics promoting independent and active transport to children's meaningful places. *Applied Geography*, 38, 43-52. doi:10.1016/j.apgeog.2012.11.014
- Busun, S. K., & Kasman, A. (2015). A note on bank capital buffer, portfolio risk and business Cycle. *Ege Akademik Bakis*, 15(1), 1-7. Retrieved from <http://www.onlinedergi.com/eab/giris.aspx>
- Calem, P.S., & Rob, R. (1996). The impact of capital-base regulation on bank risk-taking: A dynamic model, board of governors of the Federal Reserve System. *Economics Discussions series* 96/12, 36. Retrieved from <https://paper.ssrn.com>
- Caruth, G.D (2013). Demystifying mixed method research design: A review of the literature. *Mevlana International Journal of Education*, 3(2), 112-122. doi:10.13054/mije.13.35.3.2
- Carvalho, O., & Kasman, A. (2013). Efficiency and risk in Latin American banking: explaining resilience. *Emerging Markets Finance and Trade*, 49(2), 105-130. doi:10.2753/REE1540-496X490207
- Casu, B., Ferrari, A., & Zhao, T. (2013). Regulatory reform and productivity change in Indian banking. *The Review of Economics and Statistics*, 95(3), 1066-1077. doi:10.1162/REST_a_00298
- Cava, P. B., Salgado, A. P., Junior, & Branco, A. M. D. F. (2016). Evaluation of bank efficiency in Brazil: A DEA approach. *Revista De Administração Mackenzie*, 17(4), 62-84. doi:10.1590/1678-69712016/administracao.v17n4p61-83

- Chang, H., Yang, F., Wang, Y., & Linh, D. T. (2015). Evaluating the efficiency of Vietnamese commercial banks by using Data Envelopment Analysis approach. *Journal of Accounting, Finance & Management Strategy*, 10(1), 147-169. Retrieved from http://performancesforum.org/JAFMS_home.html
- Charnes, A., Cooper, W. W., & Rhodes, E. (1978). Measuring efficiency of decision making units. *European Journal of Operations Research*, 2(6), 429-444. doi:10.1016/0377-2217(78)90138-8
- Christmann, R. (2014). No judge, no job! Court errors and the contingent labor contract. *European Journal of Law and Economics*, 38(3), 409-429. doi:10.1007/s10657-012-9365-9
- Chaudhary, G. M., & Abbas, Z. (2017). Global financial crisis and its impact on efficiency and performance of commercial banks in Pakistan. *Journal of Business Studies Quarterly*, 8(4), 15-29. doi:10.1080/00036840802112315
- Chortareas, G. E., Girardone, C., & Ventouri, A. (2013). Financial freedom and bank efficiency: Evidence from the European Union. *Journal of Banking & Finance*, 37, 1223-1231. doi:10.1016/j.jbankfin.2012.11.015
- Claessens, S., & Horen, N. V. (2014). Foreign banks: Trends and impact. *Journal of Money, Credit and Banking*, 46(1), 295-326. doi:10.1111/jmcb.12092
- Cokley, K., & Awad, G. H. (2013). In defense of quantitative methods: Using the “Master’s Tools” to promote social justice. *Journal for Social Action in Counseling and Psychology*, 5(2), 26-41. Retrieved from <http://jsacp.tumblr.com>

- Cooper, W. W., Seiford, L. M., & Zhu, J. (2011). *Handbook on data envelopment analysis, International Series in Operations Research & Management Science*. (2nd ed.). New York, NY: Springer Science.
- Demirguc-Kunt, A. (2013). Bank capital: Lessons from the financial crisis. *Journal of Money, Credit and Banking*, 45, 1147-1164. doi:10.1111/jmcb.12047
- Demsetz, H. (1973). Industry structure, market rivalry and public policy. *Journal of Law and Economics*, 16(1), 1-9. Retrieved from <http://www.jstor.org/stable/724822>
- DeNisi, A. S. (2013). *An I/O psychologist's perspective on diversity and inclusion in the workplace*. San Francisco, CA: Wiley.
- Distinguin, I., Roulet, C., & Tarazi, M. (2013). Bank regulatory capital and liquidity: Evidence from US and European publicly traded banks. *Journal of Banking & Finance*, 37, 3295–3317. doi:10.1016/j.jbankfin.2013.04.027
- Dombret, A., & Ebner, A. (2013). Default of systemically important financial intermediaries: Short-term stability versus incentive compatibility? *German Economic Review*, 14(1), 15-30. doi:10.1111/geer.12002
- Ehsan, S., & Javid, A. Y. (2015). Ownership structure and bank performance: A case of banking industry in Pakistan. *Journal of Business & Economics*, 7(1), 1-27. Retrieved from <https://www.journals.elsevier.com/journal-of-economics-and-business>
- Fanning, S. F. (2014). Data sources: Uses and evaluation. *Appraisal Journal*, 82, 295-307. Retrieved from www.highbeam.com

- Farrag, N., & Lang, G. (2015). Is bigger better for Egyptian banks? An efficiency analysis of the Egyptian banks during a period of reform 2000-2006. *Review of Middle East Economics & Finance, 11*(3), 225-248. doi:10.1515/rmeef-2014-0037
- Ferrel, O. C., Fraedrich, J., & Ferrel, L. (2014). *Business ethics: Ethical decision making & class* (10th ed.). Stanford, CT: Cengage Learning.
- Farrell, M. J. (1957). The measurement of productive efficiency. *Journal of Royal Statistical Society Association, Series 120*(3), 235-290. Retrieved from <http://links.jstor.org>
- Fassinger, R., & Morrow, S. L. (2013). Toward best practices in quantitative, qualitative, and mixed- method research: A social justice perspective. *Journal for Social Action in Counseling and Psychology, 5*(2), 69-83. Retrieved from <http://jsacp.tumblr.com/>
- Fethi, M. D., Shaban, M., & Weyman-Jones, T. (2013). Turkish banking recapitalization and the financial crisis: An efficiency and productivity analysis. *Emerging Markets Finance & Trade, 48*(5), 76-90. doi:10.2753/REE1540-496X4806S506
- Figueria, C., Nellis, J., & Parker, D. (2009). The effect of ownership on bank efficiency in Latin America. *Applied Economics, 41*(18), 2353-2368. doi:10.1080/00036840701222546
- Fleischhacker, S. E., Evenson, K. R., Sharkey, J., Pitts, S. B. J., & Rodriguez, D. A. (2013). Validity of secondary retail food outlet data: A systematic review.

American Journal of Preventive Medicine, 45, 462-473.

doi:10.1016/j.amepre.2013.06.009

Frimpong, J. M. (2010). Investigating efficiency of Ghana Banks: A non-parametric approach. *American Journal of Scientific Research*, (7), 64-76. Retrieved from <http://www.eurojournals.com/ajsr.htm>

Fungáčová, Z., Herrala, R., & Weill, L. (2013). The influence of bank ownership on credit supply: Evidence from the recent financial crisis. *Emerging Markets Review*, 15, 136-147. doi:10.1016/j.ememar.2013.02.002

Galán, J. E., Veiga, H., & Wiper, M. P. (2015). Dynamic effects in inefficiency: Evidence from the Colombian banking sector. *European Journal of Operational Research*, 240, 562-571. doi:10.1016/j.ejor.2014.07.005

Garcia, J. R., & Zazueta, A. (2015). Going beyond mixed methods to mixed approaches: A systems perspective for making the right questions. *IDS Bulletin*, 46(1), 30-43. doi:10.1111/1759-5436.12119

Gilsinan, J. F., Islam, M., Seitz, N., & Fisher, J. (2015). Discretionary justice. *Journal of Financial Crime*, 22(1), 5-15. doi:10.1108/JFC-02-2014-0009

Green, S., & Salkind, N. (2014). *Using SPSS for Windows and Macintosh*, Upper Saddle River, NJ: Pearson education, Inc.

Gökgöz, F. (2014). Measuring technical financial efficiencies and performances in the emerging markets: Evidence from Turkish banking sector. *Investment Management and Financial Innovations*, 11(2), 111 -122. Retrieved from

<https://businessperspectives.org/journals/investment-management-and-financial-innovations>

Gormley, T. A. (2010). The impact of foreign bank entry in emerging markets: Evidence from India. *Journal of Financial Intermediation*, 19(1), 26-51.

doi:10.1016/j.jfi.2009.01.003

Griffin, M. (2015). *A case study of blue-collar worker retirement investment decisions* (Doctoral dissertation). Retrieved from ProQuest Dissertation and Theses database (UMI No.1664610870)

Guidara, A., Lai, A. S., Soumare, I., & Tchana, F. T. (2013). Banks capital buffer, risk and performance in the Canadian banking system: Impact of business cycles and regulatory changes. *Journal of Banking & Finance*, 37(9), 3373-3387.

doi:10.1016/j.jbankfin.2013.05.012

Hadad, M. D., Hall, M. J. B., Santoso, W., & Simper, R. (2013). Economies of scale and a process for identifying hypothetical merger potential in Indonesian commercial banks. *Journal of Asian Economics*, 26, 42-51. doi:10.1016/j.asieco.2013.04.006

Hallerberg, M., & Scartascini, C. (2015). When do governments improve fiscal institutions? Lessons from financial crisis and fiscal reform in Latin America. *Economia*, 16(1), 41-76. Retrieved from

<https://www.journals.elsevier.com/economia>

- Hanson, S. G., Kashyap, A. K., Stein, J.C. (2011). A macroprudential approach to financial regulation. *Journal of Economic Perspectives*, 25(1), 3-28.
doi:10.1257/jep.25.1.3
- Hemmati, M., Dalghandi, S., & Nazari, H. (2013). Measuring relative performance of banking industry using a DEA and TOPSIS. *Management Science Letters*, 3, 499-504. doi:10.5267/j.msl.2012.12.025
- Hennebel, T., Boon, N., Maes, S., & Lenz, M. (2015). Biotechnologies for critical raw material recovery from primary and secondary sources: R&D priorities and future perspectives. *New Biotechnology*, 32(1), 121-127. doi:10.1016/j.nbt.2013.08.004
- Hermes, N., & Lensink, R. (2013). *Financial development and business growth: Theory and experiences from developing countries*. London, United Kingdom: Routledge
- Hermes, N., & Meesters, A. (2015). Financial liberalization, financial regulation, and bank efficiency: A multi-country analysis. *Applied Economics*, 47, 2154-2172.
doi:10.1080/00036846.2015.1005815
- Hossain, M., Jain, P. K., & Mitra, S. (2013). State ownership and bank equity in the Asia-Pacific region. *Pacific-Basin Finance Journal*, 21(1), 914-931.
doi:10.1016/j.pacfin.2012.06.004
- Hsiao, H-C., & Lin, M. (2013). Taiwan second financial restructuring and commercial bank productivity growth. *Review of Accounting & Finance*, 12(4), 327-350.
doi:10.1108/RAF-05-2012-0043
- Huljak, I. (2015). Market power and stability of CEE banks. *Business Systems Research*,

6(2), 74-90. doi:10.1515/bsrj-2015-0013

- Ibrahim, M. (2015). Measuring the financial performance of Islamic banks. *Journal of Applied Finance and Banking*, 5(3), 93-104. Retrieved from https://www.scienpress.com/journal_focus.asp?Main_Id=56
- Iftikhar, S. F. (2015). Financial reforms and financial fragility: A panel data analysis. *International Journal of Financial Studies*, 3(2), 84-101. doi:10.3390/ijfs3020084
- Ionescu, I. G. (2013). Agreement Basel II and major changes regarding banking risk management. *Knowledge Horizons Economics*, 5(2), 140-144. Retrieved from <http://orizonturi.ucdc.ro/online.html>
- Jaffry, S., Ghulam, Y., & Cox, J. (2013). Trends in efficiency in response to regulatory reforms: The case of Indian and Pakistani commercial banks. *European Journal of Operational Research*, 226(1), 122-131. doi:10.1016/j.ejor.2012.11.002
- Jayaraman, A. R., & Srinivasan, M. R., (2014). Analyzing profit efficiency of banks in India with undesirable output - Nerlovian profit indicator approach. *IIMB Management Review*, 26(4), 222-233. doi:10.1016/j.iimb.2014.09.003
- Jiang, C., Yao, S., & Feng, G. (2013). Bank ownership, privatization, and performance: Evidence from a transition country. *Journal of Banking & Finance*, 37(9), 3364-3372. doi:10.1016/j.jbankfin.2013.05.009
- Jianhua, H., Qu, B., & Wang, P. (2013). Market concentration, risk-taking, and bank performance: Evidence from emerging economies. *International Review of Financial Analysis*, 30(1), 149-157. doi:10.1016/j.irfa.2013.07.016

- Kaplanski, G., & Levy, H. (2013): Value-at-risk capital requirement regulation, risk taking and asset allocation: A mean–variance analysis. *European Journal of Finance*, 21(3), 215-241. doi:10.1080/1351847X.2013.802249
- Karakurt, B., & Akdemir, T. (2016). The effects of the global crisis on public debt: An assessment on advanced and developing countries. *Sosyoekonomi*, 24(29), 225-255. doi:10.17233/se.2016.07.003
- Karim, R. A., & Alam, T. (2013). An evaluation of financial performance of private commercial banks in Bangladesh: Ratio analysis. *Journal of Business Studies Quarterly*, 5(2), 65-77. Retrieved from <http://jbsq.org/>
- Kirkwood, A., & Price, L. (2013). Examining some assumptions and limitations of research on the effects of emerging technologies for teaching and learning in higher education. *British Journal of Educational Technology*, 44, 536-543. doi:10.1111/bjet.12049
- Koçyigit, M., & Karadag, E. (2016). Developing an ethical tendencies scale based on the theories of ethics. *Turkish Journal of Business Ethics*, 9(2), 283-307. doi:10.12711/tjbe.2016.9.0016
- Kumar, S. (2013). Banking reforms and the evolution of cost efficiency in Indian public sector banks. *Economic Change Restructuring*, 64(2), 143-182. doi:10.1007/s10644-012-9121-8

- Kutlar, A., Kabasakal, A., & Babacan, A. (2015). Dynamic efficiency of Turkish banks: A DEA window and Malmquist index analysis for the period of 2003-2012/. *Sosyoekonomi*, (2), 71-97. doi:10.17233/se.09289
- Kwon, H., Lee, J., & Roh, J. J. (2016). Best performance modeling using complementary DEA-ANN approach. *Benchmarking*, 23(3), 704-721. Retrieved from <http://www.emeraldinsight.com/journal/bij>
- Lach, D. (2014) Challenges of interdisciplinary research: Reconciling qualitative and quantitative methods for understanding human-landscape systems. *Environmental Management*, 53(1). 88-93. doi:10.1007/s00267-013-0115-8
- Lamb, C., Hair, J., & McDaniel, C., (2015). *Principles of marketing*. Boston, MA: Cengage Learning.
- Landers, R. N., & Behrend, T. S. (2015). An inconvenient truth: Arbitrary distinctions between organizational, mechanical Turk, and other convenience samples. *Industrial and Organizational Psychology*, 8(2), 142-164. doi:10.1017/iop.2015.13
- Latif, A. A. (2015). Income diversification and bank efficiency in an emerging market. *Managerial Finance*, 41(12), 1318-1335. Retrieved from <http://www.emeraldinsight.com/loi/mf>
- Lee, T., Liang, L., & Huang, B. (2013). Do mergers improve the efficiency of banks in Taiwan? Evidence from stochastic frontier approach. *The Journal of Developing Areas*, 47(1), 395-416. doi:10.1353/jda.2013.0017

- Lin, Y., & Lui, J. C. S. (2015). Analyzing competitive influence maximization problems with partial information: An approximation algorithmic framework. *Performance Evaluation, 91*, 187-204. doi:10.1016/j.peva.2015.06.012
- Luft, J., & Shields, M. D. (2014). Subjectivity in developing and validating causal explanations in positivist accounting research. *Accounting, Organizations and Society, 39*, 550-558. doi:10.1016/j.aos.2013.09.001
- Maghyereh, A. I., & Awartani, B. (2014). The effect of market structure, regulation, and risk on banks efficiency: Evidence from the Gulf cooperation council countries. *Journal of Economic Studies, 14*, 405-430. doi:10.1108/JES-05-2012-0067
- Majeed, M. T., & Zanib, A. (2016). Efficiency analysis of Islamic banks in Pakistan. *Humanomics, 32*(1), 19-32. Retrieved from <http://www.emeraldinsight.com/loi/h>
- Maji, S. G., & De, U. K. (2015). Regulatory capital and risk of Indian banks: A simultaneous equation approach. *Journal of Financial Economic Policy, 7*(2), 140-156. Retrieved from <http://www.emeraldinsight.com/journal/jfep>
- McCusker, K., & Gunavdin, S. (2015). Research using qualitative, quantitative or mixed methods and choice based on the research. *Perfusion, 30*, 537-542. doi:10.1177/0267659114559116
- Mirzaei, A., Moore, T., & Lui, G. (2013). Does market structure matter on banks' profitability and stability? Emerging vs. advanced economies. *Journal of Banking & Finance, 37*, 2920-2937. doi:10.1016/j.jbankfin.2013.04.031
- Mohapatra, L. M., & Gopaldaswamy, A. K. (2016). FDI, Domestic investment and 2008

- financial crisis: Evidence from emerging nations. *The Journal of Developing Areas*, 50(6), 277-289. doi:10.1353/jda.2016.0137
- Morar, A., Oros, O., & Pece, A. (2014). How we determine systemically important banks? The role of data disclosed in the financial statements. *Valahian Journal of Economic Studies*, 5(4), 7-16. Retrieved from <http://www.vjes.eu/>
- Munoz, F., Vargas, M., & Marco, I. (2014). Environmental mutual funds: Financial performance and managerial abilities. *Journal of Business Ethics*, 124, 551-569. doi:10.1007/s10551-013-1893-x
- Nguyen, T. P. T., Roca, E., & Sharma, P. (2014). How efficient is the banking system of Asia's next economic dragon? Evidence from rolling DEA windows. *Applied Economics*, 46, 2665-2684. doi:10.1080/00036846.2014.909578
- Nkegbe, P. K., & Ustarz, Y. (2015). Banks performance in Ghana: Trends and determinants. *Ghana Journal of Development Studies*, 12(1), 33-52. doi:10.4314/gjds.v13i1&2.3
- Noreen, U., Alamdar, F., & Tariq, T. (2016). Capital buffers and bank risk: Empirical study of adjustment of Pakistani banks. *International Journal of Economics and Financial Issues*, 6(4) 1-13. Retrieved from <https://www.econjournals.com/index.php/ijefi>
- Obinne, G., & Okpara, M. (2015). Regulation of bank capital requirements and bank risk-taking behaviour: Evidence from the Nigerian banking industry. *International Journal of Economics and Finance*, 7(8), 31-37. doi:10.5539/ijef.v7n8p31

- Olalekan, A., & Adeyinka, S. (2013). Capital adequacy and banks' profitability: An empirical evidence from Nigeria. *American International Journal of Contemporary Research*, 3(10), 87-93. Retrieved from www.aijcnrnet.com
- Oliver, A. M. (2013). Why high productivity growth of banks preceded the financial crisis. *Journal of Financial Intermediation*, 22, 688-712.
doi:0.1016/j.jfi.2013.04.004
- Ongore, V. O. (2013). Determinants of financial performance of commercial banks in Kenya. *International Journal of Economics and Financial Issues* 3(1), 237-252.
Retrieved from <https://www.econjournals.com/index.php/ijefi>
- Osei-Assibey, E., & Asenso, J. K. (2015). Regulatory capital and its effect on credit growth, non-performing loans and bank efficiency. *Journal of Financial Economic Policy*, 7(4), 401-420. Retrieved from
<http://www.emeraldinsight.com/journal/jfep>
- Othman, F. M., Mohd-Zamil, N., Abdul Rasid, S. Z., Vakilbashi, A., & Mokhber, M. (2016). Data envelopment analysis: A tool of measuring efficiency in banking sector. *International Journal of Economics and Financial Issues*, 6(3) Retrieved from <https://www.econjournals.com/index.php/ijefi>
- Owusu, E. L., & Odhiambo, N. M. (2015). Financial sector reforms and economic growth in Ghana: A dynamic ARDL model. *Contemporary Economics*, 9(2), 181-192.
doi:10.5709/ce.1897-9254.166

- Palinkas, L.A., Horwitz, S.M., Green, C.A., Wisdom, J. P., Duan, N., & Hoagwood, K (2013). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Administration and Policy in Mental Health and Mental Health Research*, 42(5), 1-12. doi:10.1007/s10488-013-0528-y
- Pereirs, J.A.M., & Saito, R. (2015). Coordination of capital and risk profile under supervision of central banks. *Revista Brasileira De finanças*, 13(1), 73-101.
Retrieved from
- Pham, T. N., & Hong Nghiem, S. (2015). The interrelationships among default risk, capital ratio and efficiency. *Managerial Finance*, 41(5), 507-525. Retrieved from <http://www.emeraldinsight.com/loi/mf>
- Polit, D. F., & Hungler, B. P. (2013). *Essentials of nursing research: Methods, appraisal, and utilization* (8th ed.). Philadelphia, PA: Wolters Kluwer/.
- Polovina, N., & Peasnell, K. (2015). The effect of foreign management and board membership on the performance of foreign acquired Turkish banks. *International Journal of Managerial Finance*, 11(3), 359-387. Retrieved from <http://www.emeraldinsight.com/journal/ijmf>
- Posner, E. A. (2015). How do bank regulators determine capital-adequacy requirements? *University of Chicago Law Review*, 82, 1853-1895. doi:10.2139/ssrn.2493968
- Postel-Vinay, N. (2016). What caused Chicago bank failures in the great depression? A look at the 1920s. *The Journal of Economic History*, 76(2), 478-519.
doi:10.1017/S002205071600053X

- PricewaterhouseCoopers (2009). *Ghana banking survey*. Retrieved from <http://www.slashdocs.com/mupqkn/ghana-banking-survey-2009.html>
- PricewaterhouseCoopers (2013). *Ghana banking survey*. Retrieved from <http://www.slashdocs.com/mupqkn/ghana-banking-survey-2013.html>
- Rafay, A., Sadiq, R., & Khan, T. M. (2016). X-efficiency in banking industry - evidence from South Asian economy. *Global Management Journal for Academic & Corporate Studies*, 6(1), 25-36. Retrieved from <http://gmjacs.bahria.edu.pk/>
- Rahman, M. M., Hamid, K., & Mannan Khan, A. M. (2015). Determinants of bank profitability: Empirical evidence from Bangladesh. *International Journal of Business and Management*, 10(8). 35-150. doi:10.5539/ijbm.v10n8p135
- Rahman, A. N. A., & Reja, M. A. F. (2015). Ownership structure and bank performance. *Journal of Economics, Business and Management*, 3(5), 483-488. doi:10.7763/JOEBM.2015.V3.232
- Redo, M. (2015). The importance of prudential regulations in the process of transmitting monetary policy to economy. *Copernican Journal of Finance and Accounting*, 4(2), 145-158. Retrieved <http://apcz.umk.pl/czasopisma/index.php/CJFA/index>
- Repullo, R., & Suarez, J. (2013). The procyclical effect of bank capital regulation. *Review of Financial Studies*, 26, 452-490. doi:10.1093/rfs/hhs118
- Ritchie, J., Lewis, J., & Nicholls, C. M. (2014.). *Qualitative research practice: A guide for social sciences students and researchers*. (2nd ed.). London, U.K: Sage.
- Saez-Fernandez, F. J., Picazo-Tadeo, A. J., & Beltran-Esteve, M. (2015). Assessing the

performance of the Latin American and Caribbean banking industry: Are domestic and foreign banks so different? *Cogent Economics & Finance*, 3(1), 1-16. doi:10.1080/23322039.2015.1006976

Said, S. M., & Masoud, R. M. (2014). Cost and profit efficiency and management behaviour of commercial banks (evidence from Tanzania). *Asian Economic and Financial Review*, 4(10), 1447-1460. Retrieved from <https://journals.indexcopernicus.com/search/details?id=32522>

Sathye, M. (2003). Efficiency of banks in developing economy: The case of India. *European Journal of Operational Research*, 168(3), 662-671. Retrieved from <http://sciencedirect.com>

Schliephake, E., & Kirstein, R. (2013). Strategic effects of regulatory capital requirements in imperfect banking competition. *Journal of Money, Credit and Banking*, 45(4), 675-700. doi:10.1111/jmcb.12020

Sedgwick, P. (2013). Convenience sampling. *BMJ*, (347), 1-2. doi:10.1136/bmj.f6304

Sekaran, U., & Bougie, R. (2013). *Research methods for business* (6th ed.). Sussex, UK: John Wiley & Sons Ltd.

Shabbir, M. S., & Rehman, A. K. (2016). The impact of financial crises and economic growth of East Asian countries. *Journal of Internet Banking and Commerce*, 21(1), 1-13. doi:10.4172/2167-0269.1000210

Sharma, S. K., & Dalip, R. (2014). Efficiency and productivity analysis of Indian banking industry using Hicks-Moorsteen approach. *International Journal of Productivity*

and Performance Management, 63(1), 57-84. doi:10.1108/IJPPM-09-2012-0096

- Shehzad, C. T., de Haan, J., & Scholtens, B. (2013). The relationship between size, growth and profitability of commercial banks. *Applied Economics*, 45, 1751-1765, doi:10.1080/00036846.2011.637896
- Siddiqui, S. A. (2012). A study of various technique's for measuring banking efficiency: A significant look at data envelopment analysis. *International Journal of Management*, 3(2), 381-386. Retrieved from <http://theijm.com/>
- Simon, M., & Goes, J. (2013). *Correlational research. Dissertation and scholarly research: Recipes for success*. Seattle, WA: Dissertation Success.
- Singh, P. K., & Thaker, K. (2016). Dynamics of scale efficiency of Indian banks: A deterministic frontier approach. *The Journal of Developing Areas*, 50, 437-457. Retrieved from <https://muse.jhu.edu/journal/258>
- Stephan, U., Patterson, M. G., Kelly, C., & Mair, J (2016). Organizational driving positive social change: A review and an integrative framework of change processes. *Journal of Management*, 42, 1250-1281. doi:101177/0149206316633268
- Suzuki, Y., & Sohrab, S. M. (2014). The impact of competition on bank performance in Bangladesh. *International Journal of Financial Services Management*, 7(1), 73-94. doi:10.1504/IJFSM.2014.062293
- Tanda, A. (2015). The effects of bank regulation on the relationship between capital and risk. *Comparative Economic Studies*, 57(1), 31-54. doi:10.1057/ces.2014.35

- Ting, H. (2017). Financial development, role of government, and bank profitability: Evidence from the 2008 financial crisis. *Journal of Economics and Finance*, 41(2), 370-391. doi:10.1007/s12197-016-9356-8
- Tetteh, M. L. (2014). Local versus foreign bank performance: The case of Ghana. *Banks and Bank Systems*, 9(3) 43-49. Retrieved from <http://businessperspectives.org>
- Tina Zhang, X., & Wang, Y. (2014). Production efficiency of Chinese banks: A revisit. *Managerial Finance*, 40, 969-986. Retrieved from <http://www.emeraldinsight.com/loi/mf>
- Toader, O. (2015). Estimating the impact of higher capital requirements on the cost of equity: An empirical study of European banks. *International Economics and Economic Policy*, 12(3), 411-436. doi:10.1007/s10368-014-0303-x
- Tonidandel, S., & LeBreton, J. M. (2013). Beyond step-down analysis: A new test for decomposing the importance of dependent variables in MANOVA. *Journal of Applied Psychology*, 98, 469-477. doi:10.1037/a003200
- Tzeremes, N. G. (2015). Efficiency dynamics in Indian banking: A conditional directional distance approach. *European Journal of Operational Research*, 240, 807-818. doi:10.1016/j.ejor.2014.07.029
- U.S. Department of Health and Human Services. (2014). *Human subjects research* (45 CFR 46). Retrieved from <http://www.hhs.gov/ohrp/humansubjects/guidance/belmont.html>
- Venkatesh, V., Brown, S. A., & Bala, H. (2013). Bridging the quantitative-qualitative

divide: Guidelines for conducting mixed methods research in information system.

MIS Quarterly, 37(1), 21-54. Retrieved from <https://misq.org/>

Vigneswara, S. (2014) Testing the interrelatedness of banking stability measures.

Journal of Financial Economic Policy, 6(1), 25-45. doi:10.1108/JFEP-01-2013-0002

Waleed, A., Shah, M. B., & Mughal, K (2015). Comparison of private and public banks performance. *Journal of Business and Management*, 17(7), 32-38. Retrieved from iosr.com

Wang, K., Huang, W., Wu, J., & Lui, Y-N. (2014). Efficiency measures of the Chinese commercial banking system using an additive two-stage DEA. *Omega*, 44, 5-20. doi:10.1016/j.omega.2013.09.005

Appendix A: Training Certificate

