Prudential Regulations and Financial Performance of Commercial Banks in Kenya

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Abstract
Banks are the primary intermediaries for the reason that in various countries of the world, they carry out financial intermediation. Through the years, different countries have gone through an unprecedented number of failures in the commercial banks internationally. These failures have prompted the need for a more serious focus on suitable methods of improving the performance of national financial systems. Further than the intermediation task, the banks' performance of banks carries a huge implication to expansion of an economy. The fall down in banks' performance has been worrying. The study examined the consequence of prudential system on performance of Kenyan banks. The explicit goal was to examine the effect of capital adequacy, liquidity and credit risk regulation on performance of Kenyan banks. Finally, the study examined the moderating effect bank size on the interlink between prudential regulations and financial performance of banks. Stakeholder Theory, Liquidity Preference and Market Power concepts was of guidance. Causal design of research was utilized in the study. The population target was 42 banks operational from 2013 up to 2018. Census was the approach of gathering data. The data to be collected was secondary in nature. The analysis involved the application of both descriptive and panel regression analysis. In analyzing, STATA software was used. Ethical concerns on the subject of this research was duly complied with. The findings revealed regulation of capital adequacy had a statistically significant influence on the financial performance of banks at p value (p=0.000<0.05). The analysis further revealed that regulation of liquidity had a statistically significant influence on financial performance of the commercial banks (p=0.035<0.05). On average non-performing loans stood at Ksh. 2496.78 million over the five-year period. Results further show that credit risk was a significant determiner of financial performance of commercials banks in Kenya (p=0.014<0.05). When it comes to bank size, the findings showed that the Kenyan banks averaged at 4.29 Billion. As a moderator, it was found that bank size did not significantly influence the relationship between prudential regulations and financial performance (p=0.289>0.05) and its interaction with capital adequacy, liquidity and credit risk did not have any significant effect on ROE. The study recommends that Central Bank of Kenya should tighten regulation on capital adequacy, to create more balance in the core capital and total assets of banks. This would bridge the huge gap identified between banks with high capital and total assets and those with minimum core capital and total assets. The Central Bank of Kenya should also put more effort to regulate the liquidity of the industry to ensure that the huge gap in liquidity is minimized to promote equal growth in the industry. Tight regulations on credit risks more so on non-performing loans should be put into effect to ensure that banks bear less risks from the NPLs
Key Words: Capital Adequacy, Liquidity, Credit Risk, Bank Size, ROE

I. Introduction

Abera (2012) suggests that profit-making banks are the principal intermediaries for the reason that in various countries of the world, they carry out financial intermediation. Through the years, different countries have gone through an unprecedented number of failures in the commercial banks internationally. These failures have prompted the need for a more serious focus on suitable methods of improving the outcomes of national system of finance (Dang, 2011). Without a doubt, an extensive literature is by now up-and-coming on the grounds and end result of banking crises alongside diverse improvements that can aid in curbing potential crises. While the wished-for reforms vary in significant respects, practically almost all these reforms embrace improvements in the already in place regulations and managerial principles. This foundation of conformity is without doubt explicable in the fiscal crises in nations, which have been traced to poor guidelines and administration (Ongore & Kusa, 2013).

Prudential regulations are a type of government commands that place banking sectors into some requirements, precincts and guidelines as formulated by their Regulators such as Central Bank in order to ensure market transparency between banking industry and individuals or among banking institution or other

corporation that they do business with (Abera, 2012). These regulations include adequacy of capital, liquidity, credit risk and investment regulations. The at hand study shall be anchored on adequacy of capital, liquidity and credit risk as they are the most key components of prudential regulations.

Capital adequacy explains the amount that a commercial bank need as capital for it to be in a position tom grapple with risks which mainly include; operational, marketing and credit risks. The essence of this is for them to be able to deal with the possible losses and shield the company's debtors. Capital the most vital variables within a bank that have a direct influence on the profitability levels. It entails amount of finances owned by a bank for the business to be effectively sustained. The capital of a bank cushions it whenever unfavorable situations happen. Moreover, capital ensures liquidity of a bank for the reason that deposits are most brittle and susceptible to bank runs (Abera, 2012). Excellent capital amount lessen the room for failures in a banking body. World Bank (2017) indicated the capital adequacy of banks in Kenya to 21%, 20% and 19% in the years 2013, 2014 and 2015 respectively. Furthermore, the years 2016 and 2017 had capital adequacy levels of 19.8% and 18.8% respectively. The study will make use of the ratio of customer deposits to entire assets ratio as a gauge of adequacy of capital.

Liquidity explains capability of a bank to settle its commitments, above all that of depositors. The substantial liquidity levels are straightforwardly proportional to the profitability of a bank. To gauge liquidity, the executives should make use of the fraction of assets that are liquid which include; cash and outstanding cash from banks, securities accessible for-trade, and securities of government to the entire assets (Ongore & Kusa, 2013). Profit-making banks having a diminished amount of -assets that are liquid have the prospect of not being able to finance their daily business activities. The measure of liquidity is determined by the use of the universal financial ratios that depicts the situation of liquidity in a bank. These ratios comprise ratio of client deposit to entire asset alongside entire loan-to-client deposits and cash-to-deposit ratio (Nyanga, 2012). IMF (2017) reported that liquidity for Kenya banks to be 17.88% in the year 2013, 16.97% in 2014 which indicates a decrease in the liquidity levels of banks. However, the subsequent years 2015 and 2016, the liquidity of Kenyan banks was reported at 18.32% and 18.15% respectively. In the case of this study, liquid assets to entire assets was a stand-in for liquidity.

Credit risk explains an assessment of the possibility of loan default coupled with an assessment of its marketability (Molefe & Muzindutsi, 2015). Therefore, the quality of asset evaluates the prices through which bank can trade a loan to a different party as the borrower determines. Assets of a bank comprise long term and short-term assets, credit assortment alongside additional investments. The biggest component of bank assets is loans and makes up the utmost degree of threat to their capital (Nyanga, 2012). Real estates, off-balance sheet components, outstanding cash from accounts and premises represent other components having a likely influence on the worth of asset. Quality of asset is determined by CBK using the ratio of net loans that aren't performing and gross loans and this was used in this study. World Bank (2017) reported an increasing level of NPLs among Kenya commercial banks. The NPL level for Kenyan banks was 4.43 of 2011 which increased to 4.59% in 2012. The trend in non-performing loans continued to increase from 2012 to 2015, where it was reported at 11.66% in 2016.

The ultimate aim of profit-making banks is profit. The modalities designed alongside the activities carried out by banks are aimed at making sure that this noble goal is attained. Nonetheless, the pursuit of this goal doesn't imply that banks do not have other objectives. Profit making banks happens to have extra social and economic goals (Ongore & Kusa, 2013). Nevertheless, the meaning of the present research has connection to the former objective. ROA and ROE are broadly employed in assessing bank`s performance

ROA and ROE have been used by regulators of banks to evaluate performance in an industry and predict trends in the structure of market. They are also used to predict failures of banks in case of mergers. Commercial banks' profitability is determined from the interest spreads between loans and deposits, as majority of its income is from interest income. Since profitability is known from revenue and costs, it is essential that banks strongly evaluate the variables that affect ROA and ROE (Bennaceur & Goaied, 2008). ROA; this is considered by the net profits prior to tax divided by the entire assets of bank. It measures overall effectiveness in generating profits with available assets.

Kenya banking is under the Central Bank Prudential Guidelines CBK Act, Companies Act, and Banking Act. 1995 ion and removal of exchange controls in banking (Otuori, 2013). Central Bank is accountable for coming with and implementation of monetary policies among other functions of fostering the liquidity of the financial system (Chepkoech, 2015). The reporting and publishing of information regarding Kenya's banking sector are one of the sole responsibilities of CBK (Otuori, 2013). Also, the umbrella body for banking institutions in Kenya is known as Kenya Bankers Association which seeks to protect the interest of member institutions by addressing issues affecting banks. Based on ROE, Kenyan commercial banks have had a negative trend over years as shown in table 1

Table 1 Banking sector profitability 2013-2017

		BANKING SECTOR PROFITABILITY- DECEMBER (2013 -2017) %				
		2013	2014	2015	2016	2017
No	BANK NAME	ROE	ROE	ROE	ROE	ROE
1	Equity Bank Ltd	36.00%	49.40%	47.20%	43.50%	37.30%
2	Barclays Bank of Kenya Ltd	36.80%	32.30%	30.40%	24.80%	23.00%
3	CFC Stanbic Bank (K) Ltd	31.30%	27.70%	25.10%	22.90%	16.90%
4	Diamond Trust Bank (K) Ltd	30.00%	24.50%	23.50%	24.40%	19.10%
5	NIC Bank Ltd	29.60%	26.90%	23.70%	19.60%	19.60%

Source: CBK reports (2013-2017)

The declining performance of Kenyan commercial in banks is worrying. This reduction has been consistent from the year 2013 through to 2017. For instance the ROE for Equity bank declined from 7.7% to 5.7%, Similarly ROE for Barclays bank declined from 5.8% to 3.7% while that of CFC Stanbic Bank from 4.1% to 2.3%. It is undeniable that performance of banks has enormous influence on economic expansion of a country (Ongore & Kusa, 2013). Prudential regulations and financial performance has therefore sparked the interest various researchers around the world, as evident from the studies in Sri Lanka, Jordan, Japan, Malawi and Nigeria such as Abera (2012), Olalekan (2013), Faris (2014). Even locally, a number of studies based on the banks performance have been undertaken. It is, however, necessary to note that each study is independent from the other and that their results will differ according to the context of the country among other factors. Banks in different countries differ in terms of the market conditions, regulatory and the financial systems in which they operate (Olweny & Shipho, 2011). This means that what determines bank performance found in a particular nation may not be relevant in another country or may not apply in a similar way. In line with the above, the study was purposed to establish the effect of prudential regulations onKenyan commercial banks' financial performance,with bank size as a moderator.To address this issue, the current study was pegged on the following aims:

i. To assess the influence of adequate capital regulation on financial performance of banks' in Kenya.
ii. To determine the influence of regulation of liquidity on financial performance of banks' in Kenya.
iii. To investigate the impact of the risks of credit regulation on financial performance of banks' in Kenya.
iv. To establish the moderating effect of bank size on the interaction between prudential regulations and financial performance of banks' in Kenya

Theoretical framework

The study was pegged on stakeholder theory, Liquidity Preference Theory and The theory of Market Power

Stakeholder concept was advanced by Ian Mitroff in 1983. In operation of any business, shareholders and management are not only the important ones in the running of business. Miles (2012), Stakeholders theory considers wider group which affects the organizational objectives and policies as compared to agency theory which consider only two groups, shareholders and management. This theory recognizes both the internal and external stakeholders. Internal stakeholders is composed of employees, executives and owners while outside stakeholders are composed of suppliers, government, creditors, customers, society and environment from which the business is operating in. Other stakeholder involvement in organizational decision making can help to reduce conflict hence smooth business operation (Turnbull, 1994). There are three important approaches in stakeholders' theory, descriptive, instrumental and normative approach. Descriptive approach is used to show characteristics and behavior on how firm is managed. Instrumental approach shows connection that exists between stakeholder's management group and the organizational goals. Normative approach identifies morals for good organizational operation and management (Donaldson & Preston, 1995).

Banks regulation recognizes all the above stakeholders as they play a central role in banks' performance. McDonald and Puxty (1979) states, company's no longer concentrates with shareholders only, this is because every business operates within a society which it has to be recognized. The issue of social and environment accounting has been for the last few years gaining an important in the modern business world. Starik and Rands (1995) suggested environment as key important stakeholder in the running of a business. Information about business operating environment is becoming important to both the business and information

users as it provides information which helps to discharge accountability to the society. It also helps in demonstrating responsiveness of the firm to certain ethical issues in that community. some business which supports the issue of community environment are becoming 'greener' in their business operation (Gray, Collison &Bebbington, 1997). The postulates of Stakeholders Theory support the variable performance of banks which is a function of various stakeholders.

On the other hand, the idea of Liquidity Preferencewas advocated by Keynes (1936). It rests on the idea that institutions just like individuals desire to for different reasons hold money. Liquidity is any form of an asset which is easily converted in to cash, money is considered as the most liquid in all assets. Commercial banks deal with mostly liquid assets which can be demanded anytime by the investors. Interest rate is a reward for not holding liquid asset for specified period which it is calculated by the demand and supply of money. According to Keynes, demand for money is categorized in three motives; firstly, transaction motive which is desire to have cash for basic transaction such as for transport, wages or raw material payment. Secondly, precautionary motive which is holding cash to cater for any unexpected expenses if happens such as; accident or illness. Thirdly, speculative motive which is to hold cash and anticipate future changes in order to exercise your rights in stock buying. If stock price is expected to rise then interest rate is expected to fall so, investors will buy and waituntil price rises. Supply of money of money is the entire amount of money in a country (Keynes 1936).

Different investors have different taste in liquidity where some may prefer illiquid assets. The more illiquid an asset is the more the interest rate. Liquidity in banks can be affected by several factors such as political instability in a country, like in the case of what happened in Kenya in 2007 and 2008 post-election violence, every investor from the affected area rushed to the bank with the desire to have his cash in the pocket. Argument by Keynes was criticized by other authors such as Rothbard (1962), argued that, interest rate is influenced by other factors not liquidity preference only as Keynes suggested. Keynesian theory of interest considers short-run interest with no explanation on long run interest. The postulates of Liquidity Preference Theory provide theoretical support for the linkage between liquidity regulation and banks' performance.

Finally, the presumption of Market Power originated in 1965 by Bhagwati. It suggests that the arrangement of the market in an industry has a momentous consequence on the banks' performance. According to Olweny and Shipho (2011) SCP (Structure Conduct Performance) and the RMP (Relative Market Power) hypotheses are two suggestions under this theory.

The SCP hypothesis explains the association between the arrangement of market, behavior of firm and performance. Baye (2010) put forward that the industry's structure comprises concentration, conditions of the market and technology whereas the conduct comprises decisions on pricing, advertising and R&D. Athanasoglou (2008) proposes a boost in power in the market leads to monopoly in profits.In addition, Olweny and Shipho (2011) suggest that market concentration in banking sector can result in power in market that ensures high profits.

The hurdles towards an entry to a particular industry can change the profitability of a firm for the reason that increased entry costs aid existing firms in sustaining profit monopoly since new entrants can reduce the profit share (Berger, 1995). Concentration in the Market therefore leads to a reduction in the cost of consent between available banks resulting in profits. Olweny and Shipho (2011) opines that banks operating in markets that are concentrated can join together and charge superiorrates in loan concurrent with the payment of rates of deposit that are low. The end result is abnormal profits superior to those that operate in markets that are concentrated less, not considering their effectiveness.

The RMP, submits that bank's profitability is impacted by market share and suggests that merely large banks having differentiated products have the capacity to manage prices and make their profits rise. They have the ability to exercise power in the market thus gaining profit monopoly unlike smaller firms in terms of market share which operate like they are under ideal competition (Berger, 1995). The prepositions of Market Power Theory reinforce the variable bank size. Market Power reinforces the moderating variable as it links size of banks which translates into their market share/market power.

II. Literature review
a) Capital Adequacy Regulation and Banks' Financial Performance

Sangmi & Nazir (2010) concentrated on performance of banks in India and reported that, adequacy of capital (CAR) has direct effect on the bank's profitability in India because they have managed their capital adequacy ratio well by keeping it higher than the least standard of 10% as it is fixed by RBI (Reserve Bank of India). However, this study only focused on Indian banks, whereas the current study explored the Kenyan situation.

Nzioki (2011) investigated on impact of adequacy of capital on performance of banks in NSE. He found that, capital adequacy influences performance Kenyan bank positively. In his conclusion he proposes that, the larger the bank capital adequacy the smaller the probability of financial distress and liquidity creation. The

study however did not mull over the bank size as a moderator on the link between adequacy of capital and performance.

Olalekan (2013) conducted a study on adequacy of capital and banks' profitability: empirical proof from Nigeria. The purpose was to appraise the consequence of adequacy of capital of both domestic and foreign banks in Nigeria and their profitability. The findings revealed that, adequacy of capital relates positively to profitability of Nigerian banks because it is an assurance boost to public, depositors and regulatory body in Nigeria. He concluded by suggesting capital adequacy as the most important factor in determining profit ability for Nigerian banks. Unlike the study by Olalekan which focused on Nigeria, the present study was focusing on banks in Kenya.

A positive noteworthy connection between capitalization and profitability in Nigeria was also established by Obamuyi (2013). He submits that banks having much capital have an easy access to funds at a cheaper rate and boost their capacity to deal with risk while investing in improved quality assets. The positive relationship reflects the statements found in the anticipated bankruptcy costs hypothesis and the signaling hypothesis according to Obamuyi (2013). Similarly, the study was done in the perspective of Nigerian banks, but the current study was in the context of Kenya.

b) Liquidity and Financial Performance

Lamberg and Valming (2009) explored the implications of managing liquidity on profitability. The study was done in Sweden and revolved around the use of liquidity strategies. The reason of the study was to recognize if any variation in liquidity strategies is connected to profitability which can be examined by ROA. They found that, firms which had tightened there liquidity management strategies had good financial benefits of their commitment. This shows that, there is an evidence of strong link between liquidity management and firm's performance. They concluded there study by encouraging companies to ensure good focus on liquidity management in order to achieve good financial performance. The study was done for Sweden banks, therefore due to different economic conditions of countries, the findings aren't applicable to Kenyan banks.

Dang (2011) did a study on CAMEL system of rating in banking control and concluded that, there is strong bond between adequate liquidity level with banks' performance in terms of profitability. Similarly, Demirgunes (2016) did on consequence of liquidity on performance for retail industry in Turkey and found existence of strong association between liquidity and performance for Turkish retail industry. The study was done for banks in Turkey and the moderating impact of the size of the bank on the link between liquidity and banks` performance was not considered.

In another study by Abera (2012) the variables that determine profitability in Ethiopian banks were analysed. The analysis revolved around bank and industry-specific and macro-economic dynamics that had an influence on the profitability. The period of study was 2000-2011and used mixed methods research approach. The method brought together analysis of documents and interviews to gather important data for the study. The population target was commercial banks registered by NBE. A sample of 8 banks was considered. The regression analysis showed the negligible effect that liquidity had on the profitability. On the contrary, the in-depth interviews depicted that banks' liquidity was the most important variable and had momentous impact on the profitability of banks in Ethiopia. Nonetheless, the regression investigation and the interviews indicated that an inverse relationship exist between liquidity and profitability. The study concentrated on commercial banks in Ethiopia. In the current study, secondary data was used as against primary data and will center on Kenyan banks.

Faris (2014) researched on the efficiency of liquidity management in two Islamic banks; Islamic International Arab Bank and Islamic Bank and found that, the issue of liquidity management efficiency is not as it is supposed to be in those two Islamic banks thus the reason for not well financially performing. Also, the results indicated liquidity problem in long term. He concluded that, there is risky of equity capital and reserves because Return on Asset (ROA) was not efficient during the study period. The study however centered on Jordan Islamic banks unlike the present study which concentrated on banks in Kenya.

Ibe (2013) examined the consequence of liquidity, management on profitability of banks in Nigeria. It concentrated on three banks in Nigeria and found crucial problem with Nigerian banks where the selected variables performed poorly in terms of profitability. This revealed that, banks in Nigeria have poor liquidity management. He concluded by stating that, each bank in Nigeria should determine optimal liquidity position which will enable achievement of good financial performance. The present study was on Kenyan banks, thereby dealing with research gaps.

Molefe and Muzindutsi (2015) did a study on effect of capital and liquidity management on profitability of main South African Banks. The study covered five leading banks in South Africa for a time between 2004 to 2014. The study showed capital adequacy is the mainly effective tool for soundness of financial institutions in South Africa. There was weak connection between liquidity and profitability for those five leading banks South African banks. The study concluded that, banks should revise the liquidity

management guideline to determine optimal liquidity level in order to improve performance. The present study however, focused on Kenyan banks.

c) Credit Risk and Financial Performance

Olweny and Shipho (2011), did a study on Kenya's banking sector on the effects of bank-specific factors on the performance. An explanatory approach through the use of panel design research was used. Yearly financials of 38 banks through the period 2002 to 2008 were accessed from the CBK and banking assessment 2009 for scrutiny purpose. The analysis of data was done using multiple linear regression. The outcome showed that banks can realize profitability through improvement of quality of asset by cutting on the rate of non-performing loans.

Demirgunes (2016) did a study on credit risk and performance for Turkish retail industry. Using regression analysis, the results indicate that credit risk negatively impact on financial performance for Turkish retail industry. The study was done for banks in Turkey and the moderating effect of bank size on association between credit risk and performance of banks was not considered. The present study will focus on Kenyan banks where the moderating influence of the size of on the connection between credit risk and bank`s performance was examined.

In another study by Abera (2012) the variables that determine profitability in Ethiopian banks were analysed. The analysis revolved around bank and industry-specific and macro-economic dynamics that had an influence on the profitability. The period of study was 2000-2011 and used mixed methods research approach. The method brought together analysis of documents and interviews to gather important data for the study. According to the findings, credit risk has a negative effect on the profitability of the banks. The present study was based on secondary data as against primary data and focused on Kenyan banks.

d) Bank Size and Financial performance

In a study relating to the sizer of a bank and its financial performance, Ezra (2013) focused on the variables influencing the profitability Sub-Sahara Africa banks. The time scale was 1999 - 2006 where it was based on an unbalanced panel of 216 for 42 countries in SSA. The variables used in the research were size of the bank, adequate capital, inflation and operational efficiency. Based on the findings, bank size was revealed to significantly impact on Sub-Sahara Africa banks profitability. The study notably was based on a countryside level scrutiny unlike the current which was focusing on banks in the Kenyan perspective.

Kwakwa (2014) explored factors that determine bank`s performance, singling out the Ghanaian situation for his study. Bank size was one of the independent variables of the study whereas performance which was assessed using ROA and ROE was the dependent variable. In the case of ROA, a positive and noteworthy effect of bank size on ROA was established. In the case of ROE, a positive and non-significant impact on Return on equity was found. However, the researcher focused on banks in the context of Ghana which though a developing country, it is characterized by varying regulatory framework when compared to Kenya. In sealing this background gap, the study centered on profit-making Kenyan banks.

III. Methodology

Causal research design was chosen since the study meant to establish the cause-effect relationship between banks' prudential regulations and financial performance. The study population comprised of the 42 banks that were in operation from 2013 to 2018 which is the time scale. The period was appropriate because a number of changes occurred within this period, the significant one being the interest rate capping bill of 2016.

Empirical Model

The study employed a panel regression model as expressed below:

B= f (Capital adequacy, Liquidity, credit risk) ………………………………………… (Eq 1)

$B_{it} = \beta_0 + \beta_1 A_{1it} + \beta_2 A_{2it} + \beta_3 A_{3it} + \epsilon_{it}$……………………………………….…… (Eq 2)

Where:

B_{it} – Financial performance

β_0 - Constant

A_{1it} – CAR (capital adequacy regulation)

A_{2it} – Liquidity Regulation

A_{3it} –Regulation of risk

$\beta_1 – \beta_3$= Regression

ϵ_{it}= term of error

Moderation Test

Moderation effect was tested using an approach developed by Whisman and McClelland (2005). The test is based on two steps where in the initial step, the moderating variable is expressed as an independent variable and

the subsequent step the moderating variable is also expressed as an independent variable but further interacted with the independent variables as depicted in equations 1 and 2.

$B_{it} = \beta 0 + \beta_1 X_{it} + \beta_2 MV_{it} + \varepsilon$………..(Eq 3)

$B_{it} = \beta 0 + \beta_1 X_{it} + \beta_2 MV_{it} + \beta 3\ X_{it} * MV_{it} + \varepsilon$...(Eq 4)

Where:

X_{it} = composite of the independent variables

M_{it}= Moderating Variable

$X_{it}*M_{it}$= Interaction of the independent and intervening variable

Model diagnostics such as normal distribution, Heteroscedasticity, autocorrelation and multicollinearity were performed in order to ensure all the assumptions of panel regression were met. The variables were measured as shown in table 2

Table 2 Variable measurements and operationalization

Variables	Role	Operationalization	Measurement
Capital adequacy	Independent	Adequate capital	Core capital to total assets
Liquidity	Independent	Ratio of Liquidity	deposit to assets
Risk of credit	Independent	NPL ratio	NPL/Total Loans
Size of the bank	Intervening	Total assets	Logarithm of assets value (Ksh)
Performance	Dependent factor	ROE	-Net income -Equity

Source: Researcher (2019)

Secondary data was used for the period 2013 to 2018 and was extracted from the commercial banks' annual financials. The data collected for each variable include; in the case of the dependent variable (financial performance), the data was return of equity; for capital adequacy, the data was core capital to entire assets, for liquidity regulation the data collected was liquid assets to total assets, for credit risk, the data to be retrieved was total loans and non-performing loans. However, for the moderating variable which is bank size, the data collected was bank size (total assets).

This study used panel data which ensured sufficient data was available to the researcher because it contains both time series and cross-sectional dimensions thus, minimal biasness in parameter estimators (Baltagi, 2005).STATA software was used where the regression results was presented through the use of graphs and tables. The following hypothesis were tested during the analysis:

H_{01}: Capital Adequacy regulation has no significant effect on financial performance of commercial banks in Kenya.

H_{02}: Liquidity regulation has no significant effect on financial performance commercial banks in Kenya.

H_{03}: there is no significant effect of Credit risk regulation on financial performance of banks in Kenya

H_{04}: there is no significant effect of Bank size on the relationship of financial bank performance and prudential regulations.

IV. Results

Descriptive Statistics

The study had 5 variables, each of them with 240 observations representing 6 observations for each bank. The summary of descriptive statistics is displayed in table 3

Table 3 Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
CapitalAde~y	240	2.270042	12.38476	0	84.36
Liquidity	240	3.035083	6.702491	.01	47.74
Creditrisk	240	2496.779	5212.795	60	45654
Banksize	240	4.296667	.8476819	1.93	5.85
ROE	240	31.1465	184.6178	.04	1234.86

Source: Commercial banks data (2013-2018)

The findings show that the mean capital adequacy among the banks was 2.27 with a minimum of 0 and a maximum of 84.36. A standard deviation of 12.38 was high, and indication that there was a large dispersion among the bank themselves, where some had high capital adequacy while others had very low. The mean liquidity was found to be 3.04 with a minimum of 0.01 and a maximum of 47.74. A standard deviation of 6.7 was quite high, which also indicates large disparity where some commercial banks had disproportionately higher liquidity than others. The credit risk, which was assessed through non-performing loans, was high in almost all the banks with a mean of 2496.78, a minimum of 60 and a maximum of 45654. A standard deviation of 5212 was very high, an indication that some banks had very high credit risk compared to others. When it comes to bank size, which was measured through natural logarithm of total assets, a mean of 4.30 was establish with a minimum of 1.93 and a maximum of 5.85. A standard deviation of 0.85 was low, an indication that the spread in bank size was low. Financial performance, measured through return on equity had a mean of 31.15 with a minimum of 0.04 and a maximum of 1234.86. A standard deviation of 184.62 meant that the spread among the banks was high, which also means some banks had very high ROE while others had very low. In his study covering 2007 to 2014, Kagecha (2018) reported a capital adequacy ratio of 0.1753, a liquidity ratio of 0.5692, a bank size of 3.6615 and a ROE of 0.0641. Considering the fact that the current study covered the period of 2014 to 2019, the implication is that these ratios have increased over time. Another study by Ongare (2015) involving only large commercial banks found a capital adequacy ratio of 17.23, liquidity of 77.5 and ROE of 14.8. This finding proves the existence of large disparities between small and large commercial banks as depicted in the current study.

Diagnostic tests
Before the panel regression was conducted, critical diagnostic tests were carried in order to ensure the basic assumptions of a panel regression were upheld. In this study, the researcher performed: normality, multicollinearity, homoscedasticity, autocorrelation, stationarity and model specification tests.

Normality test
Normality test was done using Jacque-Bera test where test hypothesis was 'normal distribution was present'. The test was performed at 95% confidence interval. Table 4 displays the results

Table 4 Normality test results

Skewness/Kurtosis tests for Normality

Variable	obs	Pr (skewness)	Pr (kurtosis)	joint Adj chi2 (2)	Prob>chi2
CapitalAdequacy	240	0.0144	0.0285	2.19	0.21
Liquidity	240	0.0145	0.0430	2.98	0.21
Creditrisk	240	0.0171	0.0394	2.31	0.33
Banksize	240	0.3395	0.5092	3.62	0.15
ROE	240	0.0031	0.0011	2.92	0.18

Source: Commercial banks data (2013-2018)

Multicollinearity test
Multicollinearity test was performed by establishing the Variance Inflation Factors (VIF), where VIFs of between 1 and 10 were considered 'no multicollinearity'. Any other result meant multicollinearity existed. Table 5 shows the results

Table 5 Multicollinearity test results

Variable	VIF	Judgement
Capital adequacy	1.20	No collinearity
Liquidity	1.08	No collinearity
Credit risk	1.17	No collinearity
Bank size	1.30	No collinearity
Average VIF	1.19	No collinearity

Source: Commercial banks data (2013-2018)
From the findings, all the VIFs were between 1 and 10, hence the problem of multicollinearity did not exist from the data used for panel regression in this study.

Heteroscedasticity test

Breusch Pagan Godfrey test was used to determine presence or absence of Heteroscedasticity, where the hypothesis of 'presence of heteroscedasticity' was tested. The results were as displayed in table 6

Table 6 Heteroscedasticity test results

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Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
       Ho: Constant variance
       Variables: fitted values of ROE


       chi2(1)      =     461.01
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Source: Commercial banks data (2013-2018)

The hypothesis for heteroscedasticity was rejected (p=0.0000<0.05), and indication that the data was homoscedastic, hence suitable for panel regression.

Autocorrelation test

In this study, the researcher conducted a Durbin Watson test where a value that is not significantly different from 2, indicates lack of serial correlation. A hypothesis of zero autocorrelation was tested, where calculated value must be greater than lower critical value (DL). Fig 1 shows the behavior of residuals for each year while Table 7 displays the statistics.

Figure 1 Residuals
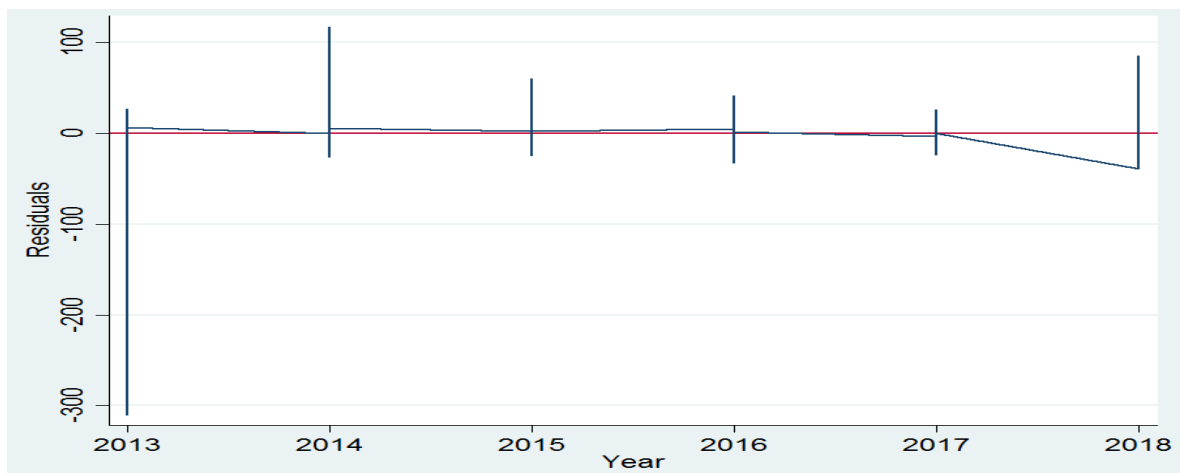
Source: Commercial banks data (2013-2018)

Table 7 Durbin Watson test

Durbin Watson indicators	Finding
N	40
k (regressors)	5
Hypothesis (H0)	Zero autocorrelation
Durbin Watson value	2.704526
Critical value (95%)	1.718 (DL)
	1.809 (DU)
Judgement	Hypothesis not rejected

Source: Commercial banks data (2013-2018)

Since Durbin Watson value (D) is greater than lower critical value (DL) (D=2.704526>1.718,   the lags of the data used in this study did not pose the problem of serial correlation.

Stationarity test

To test for stationarity, this study carried out a unit root test using Augmented Dickey–Fuller (ADF) test, under the null hypothesis of 'there was unit root/data was not stationary'. Since ADF is based on lags (t-1), the first observation is never included in the test. Fig 2 displays the unit root curve while table 8 displays the ADF test findings.

Figure 2 Unit root curve
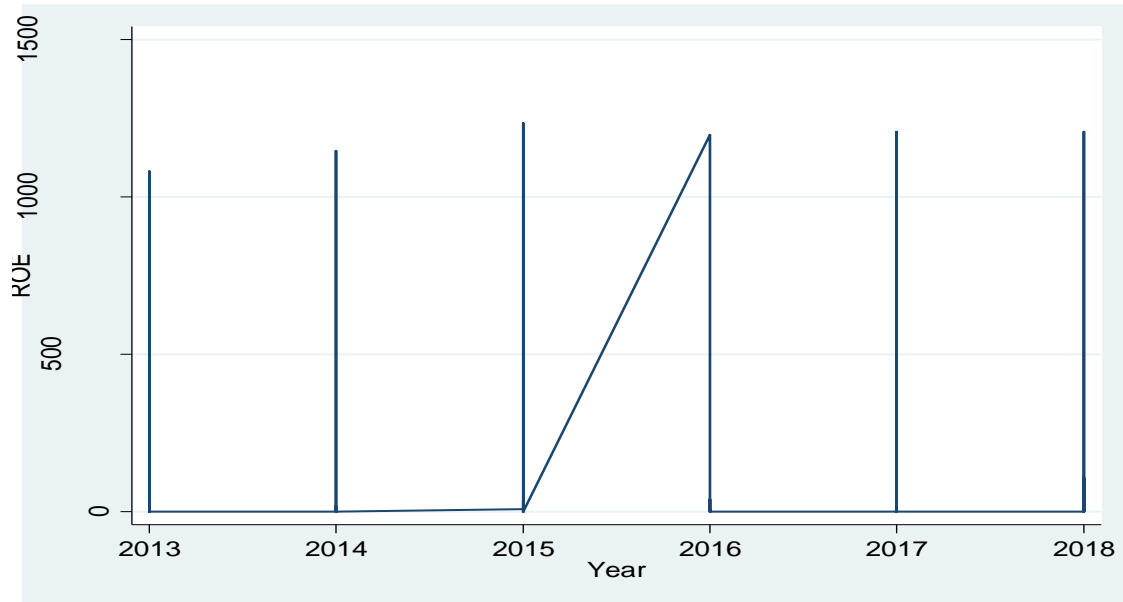
Source: Commercial banks data (2013-2018)

From the curve, it can be observed that superficially, there were observable trends in the data collected in all the 5 years, an early indication of lack of unit root.

Table 8 Augmented Dickey-Fuller test

```
Dickey-Fuller test for unit root                    Number of obs   =        239

                           ───────── Interpolated Dickey-Fuller ─────────
                 Test         1% Critical       5% Critical      10% Critical
              Statistic          Value             Value             Value

Z(t)           -4.703           -3.994            -3.431            -3.131

MacKinnon approximate p-value for Z(t) = 0.0007
```

D.ROE	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
ROE						
L1.	-.1707719	.0363107	-4.70	0.000	-.2423064	-.0992374
_trend	-.1149518	.0971581	-1.18	0.238	-.3063598	.0764561
_cons	19.13457	13.63482	1.40	0.162	-7.726945	45.99608

Source: Commercial banks data (2013-2018)

From the findings, the calculated test statistic is less than critical value (-4.703<-3.431) and the difference was statistically significant (p=0.0007<0.05) at 95% confidence interval, hence the hypothesis that 'there is unit root' is rejected and a conclusion that the data used in this study was stationary, hence statistically valid for regression models. Furthermore, the fact that the coefficient of lag 1 (L1) was negative (-0.1707719) makes the model valid.

Model specification

The study employed Hausman Specification Test to determine whether the suitable model was Random Effect or Fixed Effect. The null hypothesis tested was 'the preferred model was random effect'. A p-value of less than 0.05 leads to rejection of null hypothesis. The results were as displayed in table 9

Table 9 Hausman Test

| | ──── Coefficients ──── | | | |
| | (b) | (B) | (b-B) | sqrt(diag(V_b-V_B)) |
	fe	re	Difference	S.E.
CapitalAde~y	2.599285	13.14679	-10.54751	.2027711
Liquidity	.2270135	.1088151	.1181984	.
Creditrisk	.0003731	.0002715	.0001016	.
Banksize	1.893249	2.89093	-.997681	.

```
                 b = consistent under Ho and Ha; obtained from xtreg
      B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test:  Ho:  difference in coefficients not systematic

        chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                =        2420.38
      Prob>chi2 =        0.0000
      (V_b-V_B is not positive definite)
```

Source: Commercial banks data (2013-2018)
From the findings, it was clear that the null hypothesis that random effect was the preferred model was hereby rejected (p= 0.000<0.05), hence the fixed effect model was the suitable panel regression for this study.

Regression analysis
The had two sets of models, one without a moderator and the other with a moderator
Panel regression without a moderator
The first regression model involved independent variables without a moderator as shown in table 10

Table 10 Panel regression without a moderator

```
Fixed-effects (within) regression          Number of obs    =       240
Group variable: Bank                       Number of groups =        40

R-sq:                                      Obs per group:
    within  = 0.2373                                      min =         6
    between = 0.9949                                      avg =       6.0
    overall = 0.9783                                      max =         6

                                           F(3,197)         =     20.43
corr(u_i, Xb)  = 0.9856                    Prob > F         =    0.0000
```

ROE	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
CapitalAdequacy	2.532783	.3920799	6.46	0.000	1.75957	3.305995
Liquidity	.229067	.1079551	2.12	0.035	.0161709	.441963
Creditrisk	.0003814	.0001545	2.47	0.014	.0000767	.0006862
_cons	23.74936	1.122798	21.15	0.000	21.53512	25.96361
sigma_u	155.0013					
sigma_e	9.0800855					
rho	.99658004	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(39, 197) = 37.60          Prob > F = 0.0000
```

Source: Commercial banks data (2013-2018)

$$ROE_{it} = 23.75 + 2.53 CapitalAdequacy_{it} + 0.23 Liquidity_{it} + 0.00038 Creditrisk_{it} + \varepsilon$$

The findings show that the combined influence of independent variables was determined using the R Square (0.9783) which implies that the independent variables in the model had 97.83 determination of commercial banks' financial performance, which was statistically significant evidence by the p value 0.000<0.05. There was only 2.07% of the outcome of Return on Equity, which could not be explained by the variables in the model, hence could only result from other variables beyond the scope of the study. The findings show that the panel regression model was well defined and the influence of the independent variables on the financial performance of banks was not by chance alone. The findings show that a unit increase in capital adequacy would lead to 2.53 increase in ROE. A p-value of 0.000<0.05 meant that capital adequacy was significant predictor of banks financial performance. Therefore, based on the statistically significant effect of regulation of capital adequacy on the financial performance of banks, the first H_{01} ' Capital Adequacy regulation has no significant effect on financial performance of commercial banks in Kenya' is therefore rejected. The findings show that in the Kenyan Banking industry, adequate capital regulation is an important determinant of the financial performance of banks. These findings corroborate those by Sangmi and Nzir (2010) who found adequacy of capital (CAR) has direct effect on the bank's profitability in India because they had managed their capital adequacy ratio well by keeping it higher than the least standard of 10% as it is fixed by RBI (Reserve Bank of India). Similar findings were reported in a local study conducted by Nzioki (2011) who investigated on impact of adequacy of capital on performance of banks in NSE. He found that, capital adequacy influences performance Kenyan bank positively. In his conclusion he proposes that, the larger the bank capital adequacy the smaller the probability of financial distress and liquidity creation. These findings show that adequate regulation of capital adequacy as in the case of India and Kenya have a significant influence on the performance of banks.

A unit increase in liquidity would lead to 0.23 increase in ROE, with a p-value 0.035<0.05, an indication that liquidity had a statistically significant influence on banks financial performance. Therefore, the second H_0 'Liquidity regulation has no significant effect on financial performance of commercial banks in Kenya' is hereby rejected. These findings show that among Kenyan banks, regulation of the liquidity has a significant influence on their financial performance. These findings are similar to the findings by Lamberg and Valming (2009) who found that among Swedish banks, that had tightened their liquidity management strategies had good financial benefits from their commitment. This shows that, there is an evidence of strong link between liquidity management and firm's performance. Similar findings are reached by Demirgunes (2016) in Turkish Banks where a strong association between liquidity and performance for Turkish retail industry was identified.

Furthermore, a unit increase in credit risk 0.00038 change in ROE with a p-value of 0.014<0.05, hence being a significant predictor of commercial banks' financial performance. The third H_{03}: 'there is no significant effect of Credit risk regulation on financial performance of banks in Kenya' was therefore, rejected. These findings are similar to the findings by Abera (2012) who found that in Ethiopian banks, credit risk had a negative effect on the profitability of the banks. Similar findings were reported by Demirgunes (2016) who found that credit risk negatively impacted on financial performance for Turkish retail industry. Furthermore, in a local study done by Olweny and Shipho (2011), the outcome showed that banks can realize profitability through improvement of quality of asset by cutting on the rate of non-performing loan.

Panel regression with a moderator
The second panel regression model involved the independent variable together with a moderator (table 11)

Panel regression with a moderator

```
Fixed-effects (within) regression          Number of obs     =        240
Group variable: Bank                       Number of groups  =         40

R-sq:                                      Obs per group:
    within  = 0.2416                                     min =          6
    between = 0.9914                                     avg =        6.0
    overall = 0.9749                                     max =          6

                                           F(4,196)          =      15.61
corr(u_i, Xb)  = 0.9830                     Prob > F          =     0.0000
```

ROE	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
CapitalAdequacy	2.599285	.3969074	6.55	0.000	1.816527	3.382042
Liquidity	.2270135	.1079366	2.10	0.037	.0141473	.4398796
Creditrisk	.0003731	.0001547	2.41	0.017	.000068	.0006781
Banksize	1.893249	1.780376	1.06	0.289	-1.617904	5.404402
_cons	15.49084	7.846851	1.97	0.050	.0157467	30.96594

sigma_u	154.79922		
sigma_e	9.0770723		
rho	.9965734	(fraction of variance due to u_i)	

```
F test that all u_i=0: F(39, 196) = 37.64          Prob > F = 0.0000
```

Source: Commercial banks data (2013-2018)

$ROE_{it} = 15.49 + 2.599 CapitalAdequacy_{it} + 0.227 Liquidity_{it} + 0.00037 Creditrisk_{it} + 1.893 Banksize_{it} + \varepsilon$

The model incorporating a moderator shows that a unit increase in capital adequacy increased ROE by 2.6, and this change was statistically significant (p=0.000<0.05). A unit increase in liquidity increased ROE by 0.23, a change that was statistically significant (p=0.037<0.05). Moreover, a unit increase in credit risk led to 0.00037 increase in ROE, which was also statistically significant (p=0.017<0.005). A unit increase in bank size increased ROE by 1.8932 but its influence was not statistically significant (p=0.289>0.05). The findings show that when bank size is used as part of independent variables, the general behavior of other variables (capital adequacy, liquidity, credit risk) did not change since their influence on ROE remained positive and statistically significant.

Panel regression under interactions

The third panel regression model involved the interactions between the moderator and the independent variable (table 12)

Table 12 Panel regression under interactions with moderator

```
Random-effects GLS regression              Number of obs    =        240
Group variable: Bank                       Number of groups =         40

R-sq:                                      Obs per group:
    within  = 0.1746                                  min =          6
    between = 0.9892                                  avg =        6.0
    overall = 0.9655                                  max =          6

                                           Wald chi2(3)     =     385.89
corr(u_i, X)   = 0 (assumed)               Prob > chi2      =     0.0000
```

ROE	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
CapitaladequacyBanksize	3.994482	.2039231	19.59	0.000	3.5948	4.394164
LiquidityBanksize	.0344907	.0596489	0.58	0.563	-.0824189	.1514003
CreditriskBanksize	.0000593	.0000779	0.76	0.446	-.0000933	.000212
_cons	7.111945	7.785441	0.91	0.361	-8.147239	22.37113
sigma_u	19.193433					
sigma_e	9.1603215					
rho	.81447797	(fraction of variance due to u_i)				

Source: Commercial banks data (2013-2018)

$ROE_{it} = 7.11 + 3.994 CapitalAdequacyBanksize_{it} + 0.0344 LiquidityBanksize_{it} + 0.00006 CreditriskBanksize_{it} + \varepsilon$

The interaction between capital adequacy and bank size led to 3.99 increase in ROE, and the effect was statistically significant (0.00<0.05). A unit increase in interaction between liquidity and banks size led to 0.034 increase in ROE. A p-value of 0.563>0.05 meant that the interaction did not have a significant effect on commercial banks' financial performance. Finally, A unit increase in the interaction between credit risk and bank size led to 0.000059 increase in ROE, a change that was statistically insignificant (p=0.361>0.05). The null hypothesis H04: 'there is no significant moderating effect of Bank size on the relationship between banks' financial performance and prudential regulations' is not therefore, rejected. The implication is that Bank size was not a significant moderator in this study, since it did not significantly change the decision rule in the model. While analyzing time series data from EU 27 banking systems, Petriaa, Caprarub and Ihnatov (2015) found that the size of the bank did not matter when relating prudential regulations such as capital adequacy and liquidity with ROE. A study by Kagecha (2018) also collected a timeseries data of 2007 to 2013 from Kenyan commercial banks and found banks size not be an important factor when establishing relationship between macroeconomic aspects and bank performance. These studies corroborate well with the findings in this study, underscoring the triviality of banks size in influencing the relationship between prudential regulations and bank performance. The summary of the hypothesis testing is as displayed in table 13

Table 13 Summary of hypothesis testing

Hypothesis	Verdict
H01: Capital Adequacy regulation has no significant effect on financial performance of commercial banks in Kenya.	Rejected
H02: Liquidity regulation has no significant effect on financial performance commercial banks in Kenya.	Rejected
H03: there is no significant effect of Credit risk regulation on financial performance of banks in Kenya	Rejected
H04: there is no significant moderating effect of Bank size on the relationship between banks' financial performance and prudential regulations.	Not rejected

Source: Commercial banks data (2013-2018)

V. CONCLUSION

The researcher concludes that a few banks hold the bulk of the capital in the banking industry and that the adequate regulation of capital has a significant influence on the financial performance of banks in the country.In regards to liquidity, the study concludes that liquidity is not well distributed across the banks, with a few banks having high liquidity and the majority not being so. Further, the research concludes that regulation of liquidity has a significant influence on the financial performance of banks in Kenya.Credit risk was a significant predictor of commercial banks' financial performance, hence the hypothesis that 'there is no significant effect of credit risk on financial performance' was rejected. It can therefore be concluded that regulation of non-performing loans among commercial banks was an important determiner of their financial performance. In regards to the bank size, the researcher found that the bank size, as a moderating factor did not have a statistically significant moderating effect on the relationship between prudential regulations and commercial banks' financial performance. Therefore, the study concludes that generally, bank size is not an important factor when establishing the relationship between prudential regulations and ROE. The study recommends that CBK should tighten regulation on capital adequacy, to create more balance in the core capital and total assets of banks. This would bridge the huge gap identified between banks with high capital and total assets and those with minimum core capital and total assets.The CBK should also put more effort to regulate the liquidity of the industry to ensure that the huge gap in liquidity is minimized to promote equal growth in the industry.Tight regulations on credit risks more so on non-performing loans should be put into effect to ensure that banks bear less risks from the NPLs.

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